The 4th FANUS Kigali Conference
LEMIGO Hotel
"Nutrition in Action for Sustainable Development in Africa"
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AKNOWLEDGEMENTS

The Organizers of the 4th Federation of African Nutrition Societies Conference are very grateful for the support received from the following organizations, agencies and companies: the Federation of African Nutrition Societies (FANUS), International Union of Nutrition Sciences (IUNS), World Food Programme, Catholic Relief Services, Sight and Life, Food and Agriculture Organisation, HarvestPlus, Nestlé Nutrition Institute Africa (NNIA), Rwanda Nutritionist Association, Global Alliance for Improved Nutrition (GAIN), Choices International Foundation, Research for Development (RDI), Ajinomoto Co., Inc and the Government of Rwanda. Our appreciation also goes to all members of the organizing committee who have worked tirelessly in planning for the congress. In particular the dedication put in by Dr Robert Fungo, Prof Nnam Ngoz, Prof Ali Dhansay, Prof, Francis Zotor, Prof Andrew Prentice and Dr Christine Mukantwali, are gratefully acknowledged. Lastly, we would like to extend our thanks to all the delegates and other guests attending.
MEMBERS ORGANISING COMMITTEE

Dr Christine Mukatawli (Chair LOC),
Professor Ngozi Nnam, University of Nigeria, Nsukka, Nigeria
Dr Robert Fungo, Makerere University and Center for International Tropical Research (CIAT), Uganda
Dr Ella Compaore, Université de Ouagadougou, Burkina Faso
Professor Ali Dansay, South African Medical Research Council, South Africa,
Professor Andrew Prentice, The Gambia and United Kingdom
Professor Francis Zotor, University of Ho, Ghana
Professor Richmond Aryeetey, University of Ghana, Legon, Accra
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Kamanzi U.Odette
Ms. Muhoza Liane/Event Manager
Hategekimana Theogene
KEYNOTE SPEAKERS
Professor Andrew Prentice, MRC, The Gambia, London School of Hygiene and Tropical Medicine
Professor Paul Amuna, University of Ho, Ghana
Professor Alfredo Martinez, IUNS President & University of Navarra, Spain.
Dr Jacqueline Landman, University of Southampton, UK
Professor Edelweiss Wentzel-Viljoen, North West University, South Africa
Dr Mphumuzi Sukati, Senior Nutrition and Food Systems Office, FAO, Accra Ghana
Professor Henrietta Nkechi Ene-Obong - FAO AFROFOODS Coordinator, Nigeria
Ms Joelle Abega-Oyouomi, Managing Director Nestlé R&D Centre Abidjan, Ivory Coast

PLENARY PRESENTERS
Dr Carla Cerami, MRC Unit, The Gambia, London School of Hygiene and Tropical Medicine, United Kingdom.
Professor Judith Kimiywe, Kenyatta University-Nairobi
Dr Alemayehu Gebremariam: CRS Rwanda
Dr Victor O. Owino, Nutritionist, IAEA Austria
Professor Alfredo Martinez, IUNS President University of Navarra, Spain.
Dr Jack Clift- Results for Development Institute- Washington, USA
Professor Richmond Aryeetey, University of Ghana, School of Public Health
Mark Hollingsworth- CEO Nutrition Society of UK and Northern Ireland
Dr Mphumuzi Sukati, FAO Senior Nutrition and Food Systems Officer
Dr Christine Taljaard-Krugell. President, Association for Dietetics South Africa (ADSA)
Dr Erick Boy Head, Nutrition, Harvest Plus
Professor Jan W. Low. 2016 World Food Prize Co-Laureate, International Potato Center-SSA
Professor Klaus KRAEMER- Managing Director, Sight and Life
Mr Janosch Klemm- World Food Programme (WFP)
Mr Modou Phall- Executive Director of National Nutrition Agency (NaNA) The Gambia
Mr Raphael Siwiti, World Food Programme (WFP)
Dr Rutger Schilpzand Choices International Foundation, Netherlands
Dr Kingsley Akinroye National Heart Foundations Nigeria

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LIST OF CHAIRPERSONS AND CO-CHAIRS

Dr Amos Laar- President, African Nutrition Society, University of Ghana, Legon.
Dr Habiba Hassan-Wassef. National Research Center, Cairo Egypt
Professor Ngozi Nnam - President Federation of African Nutrition Societies (FANUS)
Professor Johann Jerling, Director, African Nutrition Leadership Programme (ANLP), South Africa
Professor Tola Atnimo, Founder President of FANUS and University of Ibadan, Nigeria
Professor Ignatius Onimawo, Vice-Chancellor of Ambrose Alli University, Ekpoma, Nigeria
Professor Judith Kimiywe, Kenyatta University-Nairobi
Professor Richmond Aryeetey, University of Ghana, School of Public Health
Mark Hollingsworth- CEO Nutrition Society of UK and Northern Ireland
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Dr Kaleb Baye, University of Addis Ababa, Ethiopia
Dr Ismael Ngnie-Teta, Cameroon
Mr Raphael Siwiti, World Food Programme (WFP)
Dr Ferew Lemma, Addis Ababa, Ethiopia
Dr Rev Tom Ndaniu, University of Ghana, Legon
Dr Tonderayi Matsungo, University of Zimbabwe, Harere
Dr Folake Samuel, University of Ibadan, Nigeria
Dr Mercy Lung’aho, CIAT, Kenya
Dr Reggie Anaan, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
Dr Martani Lombard, North West University, South Africa
Professor Henrietta Ene-Obong, University of Calabar, Nigeria
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Dr Victor Owino, Nutritionist, IAEA Austria
Professor Ali Dansay, South African Medical Research Council, South Africa,
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Dr Jacqueline Landman, University of Southampton, UK
Dr Generose Mulokoz, IMA, Tanzania
Dr Adepoju oladejo, University of Ibadan, Nigeria
Dr Ella Compaore, Université de Ouagadougou, Burkina Faso
Dr Frederick VUVOR, CSIR, Accra, Ghana
Dr Oluwaseun Ariyo, University of Ibadan, Nigeria
Dr Hayford M. Avedzi, Univeristy of Alberta Canada,
Dr Frederick K.E. Grant, Center for International Potato Center (CIP), Dareselem, Tanzania
Dr Peiman Milani, World Food Programme, Rwanda
Dr Lydia Waswa, Egerton University, Kenya
Dr Silvenus O Konyole, Masinde Muliro University of Science and Technology, Kenya
CONFERENCE SUB-THEMES

The Conference has parallel and sponsored symposia focused on 21 sub-themes:

- Malnutrition; forms, trends, causalities, innovations and cost.
- Commitments, policies and strategies to eliminate malnutrition
- Multi-sectoral coordination of nutrition initiatives
- Sustainable financing of Nutrition
- Human Capital Development and Education
- Nutrition and NCDs
- Stable Isotope Techniques in Nutrition Assessments in Africa
- Advocacy, communication and mobilization
- Data generation and Knowledge systems
- Nutrition policies, politics, and nutrition governance in Africa
- Nutrition and health implication of the current food system in Africa
- Scaling up Biofortification in Africa: Join the movement for a more Nutritious Agriculture
- Improving food systems and diets to improve nutrition: how can we grow demand and supply of healthy, safe, nutritious foods to fill the nutrient gap?
- FANUS Leadership & Capacity Development Round Table Symposium
- Leveraging Small Businesses to Improve Nutrition in Africa
- Research, Knowledge Gaps and Needs for Food & Nutrition Security and Sustainability in Africa
- Maternal Nutrition and Infant and Young Child Feeding
- Nutrition Through the Life Cycle: Nutrition Specific, Nutrition-Sensitive Policies, Research, Interventions and Programs
- Micronutrient Deficiencies in Africa
- African Initiatives to Fight the Double Burden of Malnutrition: Choices International Foundation Sponsored Symposium
PRE-CONFERENCE WORKSHOPS AND POST CONFERENCE WORKSHOPS

Sunday, 25th August 2019

1. Improving the Quality and Reliability of Food Composition in Africa by FAO and AFROFOODS. Organised by Professor Heneritta Ene-Obong, Dr Ella Compaore, Burkina Faso and Ms Angela Kimani FAO Nairobi
2. How to Publish in an International Nutrition Journal, Organised by Prof Salome Kruger, North West University South Africa, Prof Baye Kaleb, Addis Ababa University, Ethiopia, and Professor Joyce Kinabo

Friday 30th August 2019

Statistics for Nutrition Research and Data Analysis, Sponsored Training Workshop by DR Rev Tom Ndanu, Ghana and Professor Elahi Basma, UK
PROFILES OF KEY NOTE AND PLENARY SPEAKERS

Prof. Dr Klaus Kraemer,
Managing Director, Sight and Life Foundation
Adjunct Associate Professor, Johns Hopkins Bloomberg School of Public Health
Email: klaus.kraemer@sighandlife.org

Dr Klaus Kraemer is Managing Director of Sight and Life Foundation, a Swiss-based nutrition think tank. Sight and Life informs, supports, designs, and incubates evidence-based malnutrition solutions, grounded in solid scientific evidence, to improve the lives of those most in need. Dr Kraemer provides its leadership, vision, and direction, guides its global team, interacts with funders and partners, is its key spokesperson, and is the editor of Sight and Life Magazine. Since 2013, Dr Kraemer has served as Adjunct Associate Professor in the Department of International Health of Johns Hopkins Bloomberg School of Public Health, USA. Dr Kraemer’s expertise focuses on a wide range of issues relating to the nutritional and safety aspects of vitamins, minerals, and other micronutrients. He serves several professional societies dedicated to nutrition, food systems, micronutrients, implementation science, reviews scientific journals, has published about 140 scientific articles, monographs, reviews, and book chapters, co-edited 12 books, and coordinated four special supplements. He presents on nutrition, food systems and micronutrient topics at forums worldwide, and is a frequent panel member in discussions addressing nutrition and food security issues. He serves on the Board of the Micronutrient Forum, assumes several advisory functions, and is the recipient of distinguished international honors.
Dr Rutger Schilpzand

As Managing Director of Choices International, Rutger supports national healthy food choice initiatives, based on the Choices program, worldwide. He studied Human Nutrition at Wageningen University and worked as a strategic consultant in nutrition and a campaigner for several NGOs. He is co-founder of the Ghana Schoolfeeding Programme that now serves 1.5 million meals daily to Ghanaian school kids. In 2005, he initiated the Future of Food seminars initiative – international high level seminars about future developments in the global food system.

Dr Alemayehu Gebremariam (PhD).

Alemayehu Gebremariam (PhD) works for Catholic Relief Services (CRS) as a Chief of Party for a USAID funded integrated Nutrition and WASH program (Gikuriro) in Rwanda. He has over 25 years of hands-on experience in public health, nutrition, HIV/AIDS and general development programming. Dr. Alemayehu has held various senior leadership and technical advisory positions previously including Chief of Party, Program Manager, Deputy Chief of Party (DCOP), and Regional Technical Advisor (RTA) with numerous international NGOs like ActionAid, Concern Worldwide, Save the Children US, Clinton Health Access Initiative (CHAI), Catholic Relief Services (CRS), and John Snow Inc. working in different countries across Africa including Ethiopia, Burundi, Rwanda, Nigeria, DRC, Cameroon, CAR and Chad. Alemayehu attained a PhD degree in Health Studies from University of South Africa, Master of Public Health (MPH) from University of Gondar and bachelor’s degree in Sociology and Anthropology from Addis Ababa University (AAU).
Dr Christine Taljaard-Krugell

Christine Taljaard-Krugell is an independent researcher working in the fields of nutrition and public health. This means wearing a number of hats, including; consultant, contracted post-graduate supervisor at the Centre of Excellence Nutrition (NWU), part-time lecturer, President of the Association of Dietetics South Africa (ADSA), chair of the local organizing committee for the International Congress of Dietetics (2020). Various initiatives within her role as President of ADSA, focus on capacity building of nutrition professionals in South Africa.

Christine has served as the General Manager of the African Nutrition Leadership Programme (ANLP) for the past six years. The aim of the ANLP is to develop individual and institutional leadership capacity at various levels in nutrition across the African continent.

Professor EDELWEISS WENTZEL-VILJOEN

Edelweiss Wentzel-Viljoen, PhD Dietetics, is a national of South Africa, with experience in both rural and urban areas in South Africa and registered as a Dietitian and Nutritionist with the Health Professional Council of South Africa. She has extensive expertise in nutrition research, dietary methodology, food composition data, curriculum
development, continuing professional development for health professionals, leadership development, project management (including the organization of international congresses), policy development and monitoring and evaluation. She was part of the multi-sectoral team responsible for the legislation regarding salt reduction content of certain food stuffs and the use of a nutrient profiling model to assess if food stuffs are eligible to carry a nutrient and/or health claim in South Africa. Edelweiss is passionate about leadership development, development of young people and is part of the African Nutrition Leadership Programme (ANLP) team and joined the ‘Partners for Possibility’ as a partner – with a focus on leadership development in schools. She has published and presented research nationally and internationally. She has served as the Chairperson for the Professional Board for Dietetics and Nutrition (1996 – 1999; 2010-2015), President of the Association for Dietetics in South Africa (1996 – 1998) and Chairperson of local nutrition congresses. She served as program leader/HOD of dietetic programs at Western Cape University and North-West University in South Africa.

Research focus includes dietary intake, nutrient and dietary patterns, nutrition transition, nutrient profiling, infant and young child nutrition, development of food-based dietary guidelines, nutrition-related policy development, evaluation of nutrition-related programmes/interventions and salt reduction strategy and hypertension.

Edelweiss is currently a member of the WHO NUGAG Subgroup on Policy Actions. As a consultant to the Professional Board for Dietetics and Nutrition in South Africa she is responsible for the accreditation and implementation of the new program to train dietitian-nutritionists in South Africa as well as the accreditation of a new dietetics program in Botswana.

She is currently a free-lance nutrition consultant and appointed as extra-ordinary professor of nutrition at the Centre of Excellence for Nutrition (CEN), Faculty of Health Sciences, North-West University, South Africa.

**Professor HENRIETTA ENE-OBONG**

Henrietta Ene-Obong is a Professor of Human Nutrition and coordinator, Human Nutrition and Dietetics programme, Department of Biochemistry, Faculty of Basic Medical Sciences, University of Calabar, Calabar, Cross River State, Nigeria. She is the current coordinator of the African Network of Food Data Systems (AFROFOODS), which is the Regional Data Centre of FAO/International Network of Food Data Systems (INFOODS). She is the immediate past co-chair of the International Union of Nutritional Sciences’ (IUNS) INFOODS Task Force and one-time Editor-in-Chief of the Nigerian Journal of Nutritional Sciences and also one time member of the Technical Advisory Group (TAC) of the Tertiary Education Trust Fund (Tetfund), Nigeria on Book Development Programme. She is presently serving as a member of Technical Advisory Committee for the proposed National Food Consumption and Micronutrient Survey and for Setting Menu Standards for the National Home Grown School Feeding (HGSF)
programme all in Nigeria. Her research interest is in the areas of Food Consumption, Composition and Dietary Assessment as well as Traditional/indigenous People’s food Systems. She has published extensively in reputable journals and has about a 100 research publications to her credit. She is a Fellow of the Nutrition Society of Nigeria (NSN) and a Fellow of the Nigerian Academy of Science (NAS). She is happily married with four children.

Dr Jack Clift

Dr Jack Clift is the Program Director for Nutrition at Results for Development Institute (R4D), a global non-profit dedicated to building self-sustaining systems that support healthy, educated people. At R4D, Dr Clift currently oversees a portfolio of nutrition finance and strategy projects, with a primary focus on sustainable financing for nutrition at the global, national and sub-national level. Dr Clift previously managed the R4D team supporting development of African Development Bank’s multi-sectoral nutrition action plan, and currently serves as Chair of the Technical Advisory Panel for the Power of Nutrition.

Dr Jacqueline Landman

Dr Jacqueline Landman was born in South Africa. She undertook a PhD at the University of the West Indies where she introduced nutrition into the medical and nursing undergraduate curricula. She was a lecturer and researcher in
Jamaica, Scotland and England, undertaking consultancies in nutrition planning for UNICEF, FAO and UNDP and in public health in the UK. For 11 years until 2009, she was the British Nutrition Society’s Registrar and Head of Professional Development, piloting course accreditation and extended voluntary professional registration in nutrition. Until 2015 she was a Senior Teaching Fellow at the University of Southampton. She is still involved in professional regulation as a Trustee and Member of the Council of the Association for Nutrition which holds the voluntary UK Register of Nutritionists. She is an assessor and chairs the committee that certifies non-degree qualifications and course designed to raise the standards of education and training for the wider workforce who practice nutrition as part of their duties and form the frontline in the practice of nutrition in the UK.

Ms Jöelle Abega-Oyouomi
MD of Nestlé R&D for SubSaharan Africa - Abidjan, Côte d’Ivoire

Mrs Joëlle Abega-Oyouomi is a food processing engineer and the managing director of the Nestlé R&D Center in Abidjan since 2016. Prior this role Ms. Abega-Oyouomi worked as research associate at Nestlé R & D Abidjan Center (2001), as product development and nutrition specialist Nestlé R & D Shanghai (2003) and as global project manager for functional ingredients at Nestlé Research Center (2008) in Lausanne before returning to Nestlé R & D Abidjan Center (2009) as Head of Product Development. Following these international R&D positions, Joëlle moved to Operations in Ghana as regional manufacturing services for Central and West Africa (2015) where she reinforced the alignment between the technical teams, the business and the research ensuring successful implementation of the Innovation & Renovation projects.
Professor Johann Jerling

Johann Jerling holds a B.Sc with Physiology and Psychology as majors from Stellenbosch University and a PhD in Nutrition from the North-West University in South Africa. He is the Director of the African Nutrition Leadership Programme and a former Director of the Centre of Excellence for Nutrition at North-West University in Potchefstroom, South Africa. His research track record includes more than 70 papers on diet and haemostasis, micronutrient bioavailability and nutrition and cognitive development. More recently his focus has shifted to the practice and study of transformational leadership development in multi-sectoral settings. He is committed to the development of transformational leadership within the field of nutrition.

Professor Judith Kimiywe, PhD CNS
Nutritionist, Researcher and Consultant
Kenyatta University, School of Applied Human Sciences,
Department of Food, Nutrition and dietetics, Nairobi Kenya
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“Saving lives One person One community at a time”

Judith is an Associate Professor and a Certified Nutrition Specialist in the Department of Food, Nutrition and Dietetics at Kenyatta University. Her main goal is to bring about transformational change in livelihoods through translating nutritional science into sustainable action. Her research has centered on use of locally available resources and support systems to enhance food and nutrition security of individuals and communities to mitigate hunger, malnutrition and
poverty. Worked as a consultant for various international and UN agencies on development programs for informing policy for Kenya, Regional and Internationally, and has made a significant contribution to formulation of country policies, strategic plans and guidelines.

Dr. Kingsley K. Akinroye is a Cardiovascular Health Physician and Executive Director, Nigerian Heart Foundation. He is a graduate of College of Medicine, University of Lagos and had further training in Cardiovascular Epidemiology at the University of Kuopio and National Public Health Institute, Finland. He is Past Vice – President, World Heart Federation, Past President, African Heart Network, Past President, African Epidemiological Association. He served as Member of the Non-communicable Disease Committee at the Nigerian Federal Ministry of Health; and Past Temporary Advisor, World Health Organization on Non-Communicable Disease; and National Coordinator, Nigerian Report Cards on Physical Activity for Children and Youths.

Mr Mark Hollingsworth

Mark Hollingsworth is the CEO of the Nutrition Society, a scientific learned society, based in London, United Kingdom, a position he has held since July 2014. Hollingsworth began his career by serving for 16 years in a variety of roles as a military officer in the Royal Air Force. Hollingsworth then developed extensive leadership experience in the non-profit sector, serving as a Director, Vice-President, Executive Director and Board Chair in Canada. This was followed by a two-year period as a visiting lecturer on Leadership at the University of Winnipeg in Canada, during
which time he published two books on the basic skills of leadership. He returned to the United Kingdom in 2014 to take up his role as CEO of the Nutrition Society. Hollingsworth, in his capacity of CEO, also serves on the UK Parliamentary Scientific Advisory Committee, The Royal Society of Biology Strategic Partners Group and the UK Medical CEOs Group. He is a member of his Church’s Council and serves on the Royal British Legion Committee. He was awarded CEO of The Year for life sciences in 2018 by the internationally renowned CEO Today Magazine.

Prof J. Alfredo Martínez

Prof J. Alfredo Martínez holds a PhD in Nutrition being also PharmD and MD. He is co-author or has been involved in several landmark intervention trials such as SEAFOODplus, DIOGENES, NUGENOB, FOOD4ME, PREDIMED, PREVIEW, SWEET, and STOP, whose results and comments have been published in the most relevant medical and scientific journals including NEJM, Lancet; Nature Reviews, BMJ, AJCN, Circulation, etc with more than 26,000 citations (HFactor > 64), being IP in more than 50 national and international projects. Furthermore, Prof J. Alfredo Martínez has supervised more than seventy PhD students and published more than 800 peer-reviewed manuscripts and book chapters in the areas of Obesity and Personalized Nutrition, including precision nutritional omics. He is currently President of the International Union of Nutritional Sciences (IUNS) and has been recipient of several important awards including Hipocrates and Dupont prizes. In addition to be staff at the University of Navarra and IMDEA as well as some Spanish institutions such as University of Basque Country and University of Santiago de Compostela. During his scientific career, Prof J. Alfredo Martínez has enjoyed training or invited stays at Nottingham, Berkeley, MIT, Harvard, Oxford and King College London. Prof Martinez has been advisor for EU Projects or guest, speaker/ Main keynote lecturer in Important FORUM concerning Precision Nutrition in obesity and cardiometabolic diseases, such as IUNS and ISNN, OMS, FAO, IAEA, NIH. SLAN, FEN
Mr Raphael Siwiti

Raphael Siwiti is Partnership Manager within the Nutrition Division at the World Food Programme (WFP) Headquarters in Rome, serving as the focal point on private sector partnerships including the development of the new initiative to expand nutrition in mainstream retail. He has extensive experience in both development and private sectors, specializing in expanding private sector investment in nutrition. Raphael is credited with leading the “Good Food Logo” programme – a front-of-pack labeling initiative in Zambia that aims to help consumers identify nutritious foods in store. He most recently was a key member in the Global Team of the Scaling-Up Nutrition Business Network (SBN) which supports the growing number of National networks working to increase private sector investment in nutrition at SUN Country level. Before this, he worked for WFP in the Zambia Country Office where he led the SUN Business Network for over three years. Raphael provided strategic guidance to the broader Network as well as day-to-day operations leading to successful engagement of over 40 local SMEs to make commitments towards increasing investment in nutrition. Prior to joining WFP, he spent 4 years with Unilever in Zambia, becoming one of the youngest, and most successful brand managers via his innovative marketing and sales techniques. Raphael is a graduate of Marketing from the University of Greenwich.

Dr Richmond Aryeetey

Dr Richmond Aryeetey is an Associate Professor at the University of Ghana School of Public Health. He has worked in Ghana as a researcher in maternal and child health/nutrition for the past 20 years. His Research interests are multidisciplinary and cuts across maternal, infant and child nutrition, community health, Food systems, and health
policy analysis. He has expertise in monitoring and Evaluation, Training, and Facilitation. In the past five years, Dr Aryeetey has evaluated programs for FAO, UNICEF, and GAIN. He has strong competencies in evidence synthesis, implementation research, and evidence-informed decision making in health and nutrition. His previous research has been supported with funding from European Commission, Global Affairs Canada, New York Population Council, Bill and Melinda Gates Foundation, Family, Larsson-Rosenquist Foundation, and the international Food Policy Research Institute. Dr Aryeetey has successfully worked with multidisciplinary teams on various projects focused on maternal and child nutrition including Nutrition Links (https://www.mcgill.ca/cine/research/building-capacity-sustainable-livelihoods-and-health-ghana), Becoming Breastfeeding Friendly (https://publichealth.yale.edu/bfci/bbf/index.aspx), breastfeed4Ghana (http://breastfeed4ghana.com.gh/), and Transform Nutrition West Africa (https://westafrica.transformnutrition.org/country/ghana/). Currently, Dr Aryeetey serves on various National Committees including the National Salt Iodization Committee, and the National Scaling Up Nutrition Movement Capacity Building working group. He has several research collaborations across multiple institutions in Sub-Saharan Africa, North America, and Europe. He has authored more than 70 peer reviewed journal articles and books/book chapters on various subjects spanning diverse research areas.

Research Interests
• Infant and young child feeding policies and interventions
• Community-based interventions for food and nutrition security
• Ecological determinants of overweight and nutrition-related NCDs

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Professor Ngozi Nnam
Professor Ngozi Nnam is a Professor of Community and Public Health Nutrition affiliated to the Department of Nutrition and Dietetics, University of Nigeria, Nsukka, Nigeria. She is a graduate of the University of Nigeria, Nsukka with a Bachelor’s of Science Degree in Food and Home Science, Postgraduate Diploma in Education, and a Masters Degree in Education (Guidance and Counseling). She also has a second Masters Degree and a Ph.D. Degree in Human Nutrition. Professor Nnam was the winner of 1994 Vice-Chancellor’s Faculty Postgraduate Prize for the best graduating student in the Faculty of Agriculture.
Professor Nnam is the President Federation of African Nutrition Societies (FANUS). She was the Immediate Past President of the Nutrition Society of Nigeria (NSN) and a Fellow of the Society (FNSN). She has served on Council of NSN for more than 18 years. She belongs to so many other professional organizations. Professor Nnam was the first female Dean, Faculty of Agriculture, University of Nigeria, Nsukka. She served as the Head, Department of Home Science, Nutrition and Dietetics for many years and also a Development Officer in the Vice Chancellor’s Office, University of Nigeria Nsukka. Professor Nnam is the Immediate Past Chairman of Civil Society - Scaling Up Nutrition in Nigeria (CS-SUNN). She was the Co-Chairman Steering Committee for Building Nutritious Food Basket of the International Potato Center (CIP), Lima, Peru. She serves as Trustee for African Nutrition Society, E – Nutrition Academy, Nutrition Society of Nigeria and Civil Society- Scaling Up Nutrition in Nigeria. Professor Nnam is a member of the Scientific Committee of Choices International Foundation, The Netherlands. She also serves in the Nutrition Advisory Board for the Bill and Melinda Gates Foundation Nutrition Private Sector Partnership Program, Wageningen, The Netherlands.

Professor Nnam’s research interest is on Nutrition of women and children, addressing malnutrition through the use of locally available food crops, improving nutritional qualities of plant foods to increase utilization and production and food product development especially infant complementary foods. She has worked extensively on improving infant, young child and maternal nutrition particularly nutrition in the first 1000 days. Professor Nnam has over 100 publications to her credit in reputable peer reviewed national and international journals. She reviews and serves in the editorial boards of many national and international journals.

Professor Nnam has a wealth of Professional experiences. She works with International Organizations like UNICEF, USAID, GAIN, Save the Children and other Nutrition partners and Civil Society Organizations to improve Nutrition. She serves as external assessor for staff and external examiner for students within Nigeria and the African continent. She has served as a visiting Professor to Universities in Nigeria and within Africa. Professor Nnam has travelled across continents to present papers in many International Science Conferences and Workshops. She serves in many local, national and international committees for the promotion of Nutritional Sciences. She served on the committee that developed Profiles for Nutrition Policy Analysis and Advocacy in Nigeria in collaboration with BASICS II/USAID, the committee that developed the National Policy on Food and Nutrition and the National Plan of Action on Food and Nutrition in Nigeria

Professor Nnam is happily married and blessed with children and grandchildren. She could be reached through her e-mail: ngnnam@yahoo.com, ngozi.nnam@unn.edu.ng or mobile phone +234 803 757 307
Dr Victor Owino

Dr Victor Owino is a Nutrition Specialist in the International Atomic Energy Agency’s Nutritional and Health-Related Environmental Studies Section. His work focuses on supporting Member States to apply stable isotope techniques to design and evaluate nutrition interventions that target all forms of malnutrition. Dr Owino has previously led work at Valid Nutrition on development and testing of the efficacy of novel ready to use foods for management of acute malnutrition. He also championed the nutrition component of the pilot phase of the WASH Benefits Project that compared the efficacy of a lipid-based supplement compared to water and sanitation on child growth and health in Western Kenya. Until 2015 Dr Owino led the Department of Human Nutrition at the Technical University of Kenya. He is a member of the Kenya Nutritionists and Dieticians Institute and a Fellow of the Nevin Scrimshaw International Nutrition Foundation and an alumnus of Africa Nutrition Leadership Programme. Dr Owino has recently taken a new challenge as a student of Master of Business Administration in Leadership and Management at York St John’s University (UK) and Robert Kennedy College, Switzerland. Dr Owino has over 30 publications in the area of food and nutrition in peer reviewed journals.

Dr Jan Low

Jan Low is currently a principal scientist with the International Potato Center (CIP), based in their regional office for Africa in Nairobi, Kenya. She manages the Sweetpotato Action for Security and Health in Africa (SASHA) project and co-leads the Sweetpotato for Profit and Health Initiative (SPHI). The SPHI seeks to improve the lives of 10 million African households in 17 target countries by 2020, through access to improved varieties of sweetpotato and...
their diversified use. Dr. Low obtained her doctorate in agricultural economics at Cornell University, minoring in nutrition. She has focused with her team on developing and promoting biofortified orange-fleshed sweetpotato to combat vitamin A deficiency. She has worked over 25 years in sub-Saharan Africa and served as President of the African Potato Association (APA) from 2011-2013. In 2016, along with two CIP sweetpotato breeders and Dr. Howarth Bouis of HarvestPlus, Dr. Low was awarded the World Food Prize for her work on biofortification.

Dr Mphumzi Sukati
Dr Mphumzi Sukati is an Economist and a Veterinary Doctor. He is the Senior Nutrition and Food Systems Officer at FAORAF. Before joining FAORAF he was the Senior Policy Officer: Economics, Trade and Marketing at the African Union Inter-African Bureau for Animal Resources (AU-IBAR), based in Nairobi, Kenya. Before joining AU-IBAR he was an Agricultural Economist at the Common Market for Eastern and Southern Africa (COMESA), based in Zambia, Lusaka. He has practiced as a veterinary doctor in Swaziland for several years and has done a lot of consultancy work for FAO and UNDP Swaziland as an Economist National Consultant with focus on agriculture and food systems. He was key in drafting the Swaziland National Agricultural Investment Plan. He has drafted various agricultural development strategies including that for Lesotho and Zimbabwe. He has publications in various peer reviewed journals. He has a PhD in Economics from the University of Nottingham, UK.
Prof Andrew M Prentice, PhD, FMedSci
Professor Andrew Prentice was born and bred in Uganda. He studied a BSc in biochemistry followed by a PhD in Nutrition at Darwin College, Cambridge. Andrew has been associated with the nutrition fieldsite at MRCG Keneba in rural Gambia since his first post-doc positions there in the late 1970’s. He is currently the Theme Leader for Nutrition at MRC Unit The Gambia @ LSHTM and directs a broad portfolio of discovery research aimed at developing more effective nutritional interventions for poor populations in sub-Saharan Africa. He has played senior roles on many expert advisor groups and is a Council Member of IUNS with a delegated responsibility for FANUS.

Dr Carla Cerami, MD, PhD
Dr Carla Cerami trained as a physician in New York, and then obtained her PhD on malaria at Columbia. She has worked in drug development establishing biotech start-ups before returning to full-time research on malaria and iron at the University of North Carolina. In 2016 Carla moved to the MRC Unit The Gambia @ LSHTM to lead the Iron, Infection & Anemia Group. Carla and her team have described the mechanism by which iron administration to young children and pregnant women increases their susceptibility to Plasmodium falciparum infection and now focuses on the design of safer and more effective interventions against iron deficiency in poor populations.
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PLENARY SESSION
Welcome: President, Rwanda Nutrition Association and LOC Chair:
Dr Christine Mukantwali

The federation of African Nutrition Societies (FANUS) holds a nutrition conference every four years in one of member
African countries. This 4th FANUS conference held in Kigali, Rwanda in 2019. Rwanda to host the conference was
selected based on its strong leadership and political commitment to eliminate malnutrition. Being active member of
FANUS and IUNS, the Rwanda Nutritionists’ Society was mandated to organize the conference in collaboration with
FANUS executive committee.

Although child under nutrition has been declining in Sub-Saharan Africa, Africa is still facing a challenge with regards
to malnutrition, in particular stunting. Some countries have achieved good progress towards reduction of stunting.
Based on this encouraging level of decline, African continent would share the success stories on the positive current
momentum and drivers of child stunting reduction.

Rwanda, a hosting country of the conference, is in addition using this important conference to highlight the
mechanistic approaches of essential nutrition specific and sensitive actions that drives the tangible improvement in
maternal and child nutrition.

This conference is gathering together heterogeneous groups of people with nutritional caliber from government
institutions, NGOs, research institutes, academia, developmental professionals’ organizations and private sector from
all mainly over Africa and the rest of the world and serves as a platform to bring all the knowledge, skills, good
practices and all the effort to assess the success, bottlenecks and challenges we face as East African countries and to
brainstorm blueprint to speed up the trend for achieving desirable maternal and child nutrition for SDGs targets.

Around a theme of “From Nutrition to sustainable development”, this conference is a great opportunity to get updates
on nutrition situation at global and country scale. It is a framework to showcase of countries’ achievement in
addressing malnutrition in Africa. The conference is furthermore an exchange forum of best practices and approaches
among African countries.

All African countries and nutrition societies are going to benefit from this FANUS Conference:
• The anticipated main accrued benefits from this conference are namely knowledge and expertise sharing, and
achievements/lessons learnt on productive nutritional interventions, initiatives and policies among countries.
• The capacity of the young African scientists, professionals and practitioners in nutrition is expected to be
strengthened due to the exposure to a wide and diverse expertise.
• The conference is a good platform for the African countries to showcase the achievements in fighting
malnutrition to donors and to the international audience.

The Federation of African Nutrition Societies (FANUS) keeps strengthening its visibility among international nutrition societies by showing its role and ability in promoting nutrition at the continent.

Finally, during this conference, a new FANUS committee is going to be elected.

I thank everybody here present for your efforts in fighting against malnutrition on the African continent for it to have
a well-nourished and healthy population.

Welcome to Rwanda, a country of thousand hills.
I warmly welcome all of you to the 4th Conference of the Federation of African Nutrition Societies (FANUS) here in Lemigo Hotel Kigali, Rwanda.

In a very special way, I welcome the President, International Union of Nutritional Sciences (IUNS), Professor Alfredo Martinez, who travelled all the way from Spain to join us in this conference. Thank you very much, Prof, for making time out of your very busy schedule to be part of this conference from the beginning to almost the last day. We are very grateful, Sir. Professor Martinez has graciously organised a special IUNS session on Monday after lunch (today) from 14.00hr – 15.00hr. The session will feature presentation by the IUNS President, Professor Martinez, and the African Representatives on Council of IUNS. The presentations are linked to the activities of IUNS task forces and will help to build capacity of Nutritionists and Nutrition stakeholders in addressing malnutrition. Please endeavour to join the session and tap directly from the IUNS leaders.

I say a big welcome to all the speakers and chairpersons of sessions, our sponsors, and collaborators who have travelled far and wide to join the conference. Thank you for coming. The participants are great men and women. I welcome all of you to the conference.

FANUS is an umbrella body for all National Nutrition Associations in Africa affiliated to the International Union of Nutritional Sciences (IUNS). The major objective of FANUS is to promote the advancement of nutrition science in Africa and build capacity of African countries to take nutrition issues in their hands and improve the nutrition landscape of their countries. Against this backdrop, the theme of the conference is “Nutrition in action for sustainable development in Africa”. The conference will address some topical issues around capacity development for Nutritionists and National Nutrition Societies. These include maternal nutrition and young child feeding, use of isotopes in assessing nutritional status, nutrition policies, politics and governance in Africa, nutrition through the life cycle, double burden of malnutrition, nutrition sensitive agriculture, food systems and diets, food and nutrition security, biofortification and scaling up Nutrition through the business network. It is hoped that this conference will build on the gains already made last year at the Africa Nutrition Society Conference in Addis Ababa to further improve the nutrition outlook of Africa.

The 3 African Representatives on the Council of IUNS – Professor Francis Zotor, Professor Andrew Prentice and Professor Ali Dhansay – were very strong work force in planning the conference. I am very grateful to them for their wonderful support. They have demonstrated that we made the right choice in electing them as IUNS Council members during the IUNS election in Argentina in 2017. Dr Robert Fungo, the Vice-President of FANUS, has been very active in all aspects of planning the conference. Thank you, Robert, for your commitment to the success of the conference. I appreciate the efforts of all the Council members and the LOC under the Chairmanship of Dr Christine Mukantwali. Finally, I sincerely thank all our sponsors and collaborators for supporting this conference.

I am fully convinced that the conference will provide a good platform for sharing research findings, knowledge and skills, good practices, success stories and networking with a view to repositioning the nutrition outlook of the continent. Please, relax and enjoy the FANUS conference. There is a free afternoon on Thursday. Keep it really free so as to visit important holiday resorts and markets in Kigali and take interesting memories home. Enjoy your stay in the beautiful city of Kigali.

Thank you

Professor Ngozi Nnam
President, Federation of African Nutrition Societies

Goodwill Messages: President, International Union of Nutritional Sciences:

Professor Alfredo Martinez
KEYNOTE 1: Africa’s Rapid Development: Nutritional Opportunities and Challenges

Professor Andrew Prentice, MRC Unit The Gambia @ LSHTM

History tells us that many of the nutritional conditions associated with poverty gradually (sometimes rapidly) resolve as countries pass through the demographic transition and as per person GDP rises. Stunting, underweight and anemia are prime examples of conditions that once were rife in South and Central America and in many South-East Asian countries but have now largely resolved. Such resolution occurs spontaneously and usually unaided by directed interventions run by governments or aid organisations. They are driven by peoples’ natural desire to purchase and consume higher value foods, often animal products. These are the opportunities. The challenges relate to the virtually inevitable loss of traditional diets and the overconsumption of highly-processed nutrient-poor foods that contribute to obesity. He challenges are frequently portrayed as being greater than the opportunities. Africa, however, has the opportunity to learn from the mistakes of nations that have passed through the demographic transition sooner and faster. It ought to be possible to travel a safer road to nutritional prosperity and better health; a responsibility that we in FANUS should embrace.

KEYNOTE 2: Addressing the Capacity Gaps for Nutrition Research and Multisectoral Actions for Health: What Happened to Mentoring?

Professor Paul Amuna - School of Public Health, University of Health and Allied Sciences, Hohoe, Ghana

The centrality of adequately trained and competent nutrition professionals within the health and agriculture workforce is increasingly being recognised as necessary to meet the addressing global nutrition problems.

The nutrition human capital needs to be well informed at all levels of training. Furthermore, the economic case for investments in nutrition and evidence of their impact require well designed means of data gathering, analysis and reporting to leverage policy and continued investments in interventions. However, capacity gaps exist in good quality nutrition research especially among young scientists in Africa. Understanding and implementation of multisectoral actions for health as part of ‘Action Research’ are also currently lacking for a number of reasons including the lack of adequate supervision, guidance and mentoring support. In this presentation, the importance of nutrition research capacity is made, the current state of the art in Africa is highlighted and ways of addressing the training and mentoring gaps are proposed.

KEYNOTE 3: Capacity Development for Nutrition Teachers, Children and Young People

Dr Jackie Landman

Professor Alan Jackson1,3, CBE, Professor Basma Ellahi2,4, Dr Jacqueline Landman1,4, Dr Stephen Wootton1,3, OBE

1University of Southampton, 2University of Chester, England, 3International Malnutrition Task Force of the IUNS, and the International Cancer and Nutrition Collaboration of the IUNS, 4Nutrition Society, UK.

Background

The Sustainable Development Goals identify ambitious targets for balanced development harmonious for the planet and for all individuals. A critical determinant is each individual’s ability to achieve and maintain health, including an adequate, balanced sustainable intake of food. Societal responsibility requires all individuals to be informed enough to take personal responsibility for and make their own decisions around food, nutrition and physical exercise. The emerging problems of the double burden of malnutrition indicates the scale of failure to meet this challenge, to date.
The Report by the Director General of WHO for the seventy-second World Health Assembly in May 2019 on the Outcome of the Second International Conference on Nutrition identified five areas that will require intensive action for the way forward. “Schools are excellent environments in which to address the double burden of malnutrition and install good dietary habits”\(^2\) taken from the United Nations Standing Committee on Nutrition’s report, “Schools as a System to Improve Nutrition”\(^2\). SCN identifies the need to build capacity and capability of teachers and pupils, noting “Countries should consider increased investment in school and nutrition programmes”\(^2\).

**Project initiation**

At the eighth meeting of Africa Nutrition Epidemiology Conference, 2018, the community of African nutritionists undertook to explore how they might best contribute to widening and improving nutrition education in schools. The authors formed an ad-hoc group that undertook an initial scoping and mapping exercise, to discover what is needed and to facilitate a discussion at the 6th meeting of FANUS in Kigali.

**Progress and report**

A desktop review was undertaken of contemporary food and nutrition programmes in the schools, highlighting Africa in an international context. Conceptually 8,000 days are required to reach adulthood that presents opportunities to improve the health, physical growth and development of children\(^2,3\). Well-designed school feeding benefits schoolchildren’s health and nutrition; may be integrated into the curriculum, can extend benefits to families in a safety net, provide scope for community development, including benefits to local employment and agriculture in school’s localities\(^3\). There are opportunities for more nutritionists to make contributions to nutrition in schools as a system, for example by undertaking evaluations of nutrition education in schools, of teachers and pupils nutrition knowledge, or of school feeding among other technical contributions, such as advocacy around integration of nutrition education, school feeding with nutrition health and agriculture policies and programmes and to share best practice across Africa.

MATERNAL NUTRITION AND INFANT AND YOUNG CHILD FEEDING

**Topic: Combating Iron Deficiency in Mothers and Young Children**

*Dr Carla Cerami, MRC Unit The Gambia @LSHTM*

The most recent Global Burden of Disease (GBD2017) analysis shows that approximately 1.25 billion people worldwide suffer from iron deficiency anemia (IDA) and it causes more life years lost to disability than all other micronutrient deficiencies combined. The burden is particularly concentrated in sub-Saharan Africa. Iron supplements are potentially very cheap and easy to administer so resolution of IDA should not – in theory – represent an insurmountable public health challenge. Yet the problem persists. Africa has been blighted by a policy impasse since publication of the notorious Pemba Trial results showing that iron increased hospitalisations and deaths. The reasons for this malign interaction, and the lessons learned, will be discussed. Policy stasis and programmatic inefficiencies are not the only cause of the poor resolution of IDA. The discovery of the master regulator of iron metabolism – hepcidin - has provided vital new insights into why iron is so poorly absorbed in the presence of inflammation. Recent research by our group has shown that even very-low-grade inflammation (especially related to respiratory infections) causes hepcidin-mediated blockade of iron absorption. This emphasises the need for holistic approaches to the control of iron deficiency and anemia in which environmental improvements and infection control must go hand in hand with nutritional interventions.

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Kenya faces numerous challenges in the area of maternal and child nutrition. Despite of improvements on malnutrition among children under five years and women, the rates still fall short of the global recommendations. Paradoxically the prevalence of obesity and overweight is also increasing in Kenya. Micronutrient deficiencies are highly prevalent especially among children under five years and women (KSMS 2011). The National Maternal, Infant and Young child Nutrition (MIYCN) operational guidelines (2013) are anchored on the Kenya Food and Nutrition Security Policy (2011), the Breastmilk Substitute (Regulation and Control) Act (2012), the National Maternal, Infant and Young Child Policy (2018), Kenya national Nutrition Action Plan (2012-2017) and the Maternal, Infant and Young Child Strategy (2012-2017). The Baby Friendly Community Initiative has been widely accepted as a platform for anchoring all MIYCN related interventions. These documents among others provide a framework for national and county response to priority areas of MIYCN as well as goals and targets for MIYCN. The Kenya constitution guarantees every citizen the right to nutrition as a fundamental right. Kenya’s Vision 2030, the Blue print for country’s development, provides for “equitable and affordable health care at the highest affordable standards” to her citizens. Good health and nutrition is expected to play an important role in boosting economic growth, poverty reduction and the realization of social goals. This presentation will explore some of the initiatives in place, the challenges and opportunities that exist, and also identify some of the gaps that need to be urgently addressed for Kenya to realize its goals on MIYCN.

Keywords: MIYCN Policy, Vision 2030, Operational Guidelines, Community-based Interventions

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**Topic:4. Effectiveness of mHealth in delivering behavior change messages to reduce under-two malnutrition in rural Rwanda: a quasi-experimental study**

**Alemayehu Gebremariam: CRS Rwanda**

- Alemayehu Gebremariam (PhD), Chief of Party, Gikuroro Program
- Janvier Karuhije (MPH), SBC Specialty, Gikuroro Program
- Collins Lotuk, MEAL Advisor, Gikuroro Program

Collaborators:
- Dr. Yvonne Umurungi, Deputy Chief of Party, Gikuroro Program
- Claire Uwamahoro, Sr. SBC Officer, Gikuroro Program

**Background**

Mobile phone technology is viewed as a promising communication channel that offers the potential to improve healthcare delivery and promote behavior change among vulnerable populations. Furthermore, evidence shows that poor compliance to conventional health talks and professional advice often occurs wherever some form of discretionary action or self-administration by audience is involved (Riekert et al., 2014). A study confirmed positive contribution in improving uptake of MCH services through SMS based intervention (Atnafu, Otto, & Herbst, 2017). The focus of this study was to assess the feasibility and comparative advantages of using IVR based voice messaging to increase knowledge and practices related to meal frequency and dietary diversity for children 6-23mon.

**Study Objective**

To test the comparative strength of using combined interpersonal and mHealth-based messaging in increasing knowledge and practices on meal frequency and dietary diversity for households with under-two children.

**Study Method and Materials**

- A quasi-experimental design.
- 110 HHs in Ngoma district based on their cellphone ownership.
- 110 HHs with similar background characteristics in Kayonza district.
12 separate messages on dietary diversity and meal frequency were sent to all HHs in intervention zone in 12 weeks.

Results
Over 60% of the study participants successfully received the weekly voice message on first push during the 12-week period. Listenership has increase to more than 74% considering second attempts each week. Approximately 50% of study participants have received weekly SMS to recall on the contents of voice messages that were delivered preceding weeks.

Knowledge on dietary diversity for 6-23mon has increased by 8% in the intervention district compared to 5% in the comparison district. These changes were statistically significant where mHealth application was associated with greater practical significance with relatively higher outcome.

The proportion of mothers practicing minimum meal frequency for children 6-23 months increased from 23 % at baseline to 36 % at end line in Ngoma (p = 0.038) whereas in Kayonza, it increased from 30% to 40.9 % (p = 0.059) where the intervention contributed superior results. There was no statistically significant difference in relation to practicing dietary diversity in both intervention and control population. Furthermore, result showed that Minimum Acceptable Diet increased in both districts with a difference of 3.7 % points in Ngoma and 2.9% points in Kayonza with no statistical difference.

Conclusion
Considering the country’s over 92% penetration of mobile network and 60% ownership of cellphone[15], mHealth can complement significantly to the ongoing health promotion and disease prevention efforts in Rwanda.

TOPIC 5: THE ROLE OF BODY COMPOSITION IN DECODING THE DYNAMICS OF THE DOUBLE BURDEN OF MALNUTRITION IN AFRICA.

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Background: Body composition (BC), in its simplest definition consisting of fat-free mass (FFM) and fat mass (FM), enables better interpretation of the relationship between malnutrition, its metabolic consequences and response to corrective interventions.
Objective: To highlight how body composition data contribute to understanding the multiple dimensions of the double burden of malnutrition in Africa.
Methods: A critical analysis of studies measuring BC to assess obesity prevalence or in the context of treatment of moderate or severe acute malnutrition using various BC measurement techniques including isotope dilution.
Results: Studies from several African countries (Ghana, Kenya, Mauritius, Morocco, Namibia, Senegal, Tunisia, Seychelles and United Republic of Tanzania) among school age children showed that BMI-for-age underestimates the prevalence of obesity. Two studies from Burkina Faso and Kenya testing the effectiveness of different food formulations in treating moderate acute malnutrition in children found that the weight gain related to intervention was mainly due to FFM accretion. A study from, DR Congo found that children with severe acute malnutrition had lower fat-free mass compared to community control despite treatment with ready to use therapeutic foods.
Conclusion: Body composition data allow for more accurate assessment of obesity prevalence and allow nuanced interpretation of weight gain during treatment of acute malnutrition and its potential metabolic implications.

INTERNATIONAL UNION OF NUTRITION SCIENCE (IUNS) SPECIAL PLENARY SESSION

Chair of Plenary session: Professor Alfredo Martinez, IUNS President

TOPIC ONE: Possibilities for Precision nutrition in a changing World: Professor Alfredo Martinez, IUNS President and Chair of session
ABSTRACT NOT RECEIVED
**TOPIC TWO:** Changing patterns in diet-related disease globally: Professor Andrew Prentice, IUNS Africa Representative

ABSTRACT NOT RECEIVED

**TOPIC THREE:** Risk-Benefit and Cost Effectiveness of Micronutrient Interventions: An IUNS Task Force. Prof Andrew Prentice on behalf of Dr Sant-Rayn Pasricha and TaskForce Members

ABSTRACT NOT RECEIVED
SY I THEME: MALNUTRITION; FORMS, TRENDS, CAUSALITIES, INNOVATIONS AND COST.

SY I. 01: KNOWLEDGE AND USE OF FOLIC ACID AMONG FEMALE STUDENTS OF REPRODUCTIVE AGE IN LEAD CITY UNIVERSITY, IBADAN, OYO STATE, NIGERIA:

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Introduction: Preparation for future reproductive health, especially among women starts from the period of adolescence. However, anecdotal evidence supports the fact that many Women of Reproductive Age (WRA) have insufficient information on basic nutrients requirements at this crucial stage of life. Previous studies have focused mainly on calorie and iron intake to control weight and compensate for menstrual loss, respectively with little consideration for Folic Acid (FA). FA is one of the micronutrients required by WRA and its deficiency is associated with poor foetal development.

Purpose of the study: The study was conducted to probe the knowledge and use of FA among female of reproductive age attending a private University in Ibadan, Nigeria; with the intention to recommend appropriate interventions.

Method and Approach Used: The study design was a descriptive cross-sectional, using a purposive random sampling technique. Four hundred and eighteen female students participated in the study. Data were collected with the aid of a validated questionnaire to assess knowledge, perception, use of FA and factors influencing the use. Knowledge and perception scales were developed having 19 and 16 points, respectively. Descriptive and bivariate statistical analyses were used to analyse data at p≤0.05

Summary of Results: Respondents’ age was 22.0±3.6 years and 93.6% were single. Majority (66.3%) had poor knowledge of FA and 20.0% used it daily. Perception score showed that 78.0% had right perception of FA. Many (56.2%) indicated that they had never received any prior information on the use of FA. Logistic regression revealed that respondents who were single were less likely to use FA than those who were married (OR: 0.011; C.I= 0.01-0.04)

Major Conclusion and Recommendations: Knowledge and use of FA were below average. School-based health promotion strategies including peer education and inclusion of basic nutrition information in the educational curriculum are recommended.

SY I. 02: COMPLEMENTARY FEEDING PRACTICES AMONG MOTHERS IN FISHING COMMUNITIES IN BADAGRY LOCAL GOVERNMENT AREA, LAGOS STATE

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Introduction/Purpose of Study: Studies abound on complementary feeding (CF) practices of mothers in urban and rural communities in Nigeria. There is however, little information on such practices among mothers of young children living in fishing communities, which are often characterized by poverty and malnutrition. This study, therefore, investigated CF practices among mothers in fishing communities in Badagry Local Government Area, Lagos State in southwest Nigeria.

Methodology: This descriptive study involved 197 mother-child pairs in three fishing communities. Questionnaires were used to elicit data from mothers on socio-demographic characteristics, 24 hour recall and mothers’ knowledge of Infant and Young Child Feeding was assessed using FAO guidelines and categorized as poor (1-6), fair (7-12) and good (13-18). The CF practices were assessed using WHO indicators- minimum meal frequency (MMF), minimum dietary diversity (MDD), and minimum acceptable diet (MAD). Children’s anthropometry was measured and analysed using standard procedures. Data were analysed using descriptive and inferential statistics at p≤0.05.

Results: About sixty percent of the mothers were of Ogu ethnicity, with 23.9% having no formal education. Age of mothers and children was 29.6±5.6 years and 13.8±5.4 months respectively. Knowledge score of majority (72.6%) of the mothers was fair. Introduction of complementary foods at age 6 months was 53.3% with 59.4% still currently breastfeeding. For practices, MMF, MDD and MAD were met at 58.4%, 75.1% and 54.8% respectively and only 29.4% received appropriate complementary feeding (ACF). On the day preceding the survey, 71.1% of children
consumed fish and sea foods. Prevalence of wasting, stunting and underweight were 19.8%, 41.1% and 12.7% respectively. Income, place of work, and family type were associated with MDD, while occupation, place of work and number of children were associated with ACF.

Conclusions/Recommendations: The findings indicate the need for nutrition interventions to improve the complementary feeding practices of the mothers in these fishing communities.

Key words: Fishing communities, complementary feeding, malnutrition

SY I.03: NOVEL SMARTPHONE INTERVENTION FOR BREASTFEEDING: ACCEPTABILITY AND USABILITY TESTING AMONG PREGNANT WOMEN

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Background/Rationale: The cornerstone of child survival and early childhood development is optimum breastfeeding practice. Several interventions have been implemented to ensure improvement in the level of optimum breastfeeding however the use of technology is yet to be fully explored

Objective(s): The study was aimed at the utilizing the developing field of mobile health (m-Health) to test the level of acceptability and usability of a newly developed smartphone breastfeeding application (BF101) among pregnant women

Methodology: The cross-sectional study was conducted among 52 pregnant women attending ante-natal clinic of the University College Hospital. An android compliant breastfeeding application (BF101) was installed on the smartphones of the pregnant women after due informed consent. A phone interview was conducted after one week of installation of the application to evaluate the acceptability and usability of the application using a 7-item checklist

Results: Most of the respondents (82%) indicated that the application excellently provided basic information on breastfeeding. On the ease of usage, about two-thirds were of the view that the application was good to use while about 60% felt that the application was good enough on its clarity and content. More than half also believed that the application was interactive (58%) and attractive (56%). Ninety five percent indicated that the application was educative while 80% indicated that the application was an excellent means of disseminating information on breastfeeding. Averaging rating given by the respondents on the acceptability and usability of the application was 80%.

Conclusion: The novel BF101 application was found to be generally acceptable and its usability was supported by the pregnant women

Implication for policy: This application is suitable to educate all breastfeeding stakeholders on the basics of breastfeeding therefore its usage should be promoted

SY I.04: UNDERSTANDING THE DETERMINANTS OF STUNTING IN RWANDA: A CASE-CONTROL STUDY

Lung’aho M, Birachi E, Butare L, Musoni A, Muhinda M. JJ, and Buruchara R

International Center for Tropical Agriculture (CIAT) and Rwanda Agricultural Board (RAB)

Introduction: Despite the clear potential for agriculture to improve maternal and child nutrition outcomes, the evidence base for this relationship is weak. In fact, a DFID commissioned analysis of 23 studies of agriculture interventions found no evidence of impact on the prevalence of stunting among children under five.

Methodology: Agriculture as a source of food is the most direct pathway through which own production translates to food access, affects diets, and ultimately impacts nutrition outcomes. In order to understand the mechanisms in this conceptual production pathway linking agriculture to nutrition outcomes, a pathway analysis was conducted on data collected in Rwanda.
The data was part of a larger case-control study investigating pathways linking agriculture to nutrition, and the determinants of stunting in children under 24 months. The survey was conducted in 2014 in Rubavu, Ngororero, Gakenke, Musanze, Kirehe, Nyagatare, Nyaruguru, Nyamagabe and Gasabo districts in Rwanda. Cases and respective controls were selected based on evidence of childhood stunting in the households. Controls were matched 1:1 to cases on the basis of sex, age, and location. Information on variables of interest for both groups was collected using questionnaires. The selected indicators for this analysis included: Household wealth, agricultural livelihoods, food production, food prices, processing and storage, food access, diets, stunting in children, and anemia in mothers.

Findings and Interpretation: Regression analysis was used to understand the pathway mechanism for the production pathway linking agriculture to nutrition outcomes in Rwanda. The link between food access and diets was significant (p=0.05). Diet was significantly affected by two sources of food; own production and food purchases. The data indicated that diet diversity improved when an increasing share of food consumed by the household was procured from the market rather than from the households’ own production, indicating increased market reliance to achieve diet diversity.

On the other hand, households with proximity to markets (less than 1 km to market) had a better diet diversity score than those living further from the market (more than 5 km but less than 15 km). Markets are becoming even more important for food availability and access year-round. Therefore, a better understanding of price trends, seasonality, and stability can guide agricultural interventions aimed at improving the efficiency of value chains to ensure affordable food prices for vulnerable consumers.

**SY I.05: LINKAGE BETWEEN ENVIRONMENTAL ENTERIC DYSFUNCTION AND LINEAR GROWTH FROM 12-15 MONTHS OF AGE AMONG RURAL KENYAN CHILDREN WITH POOR ACCESS TO SANITATION FACILITIES**

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**Introduction:** Stunting develops in the first 1000 days of life, affects 161 million <5 years and is irreversible without appropriate interventions. Environmental enteric dysfunction (EED) affects nearly all children <5 years in poor settings linked to compromised sanitation, retarded growth, altered gut microbiota and decreased vaccine responsiveness. In Kenya, 64% have unimproved toilet facility and 26% <5 years stunted. This study aims to investigate link between EED and how it affects linear growth among rural Kenyan children using a novel, non-invasive stable isotope technique.

**Specific objectives**
- To establish the occurrence of EED using 13C SBT among 12-15 months old rural Kenyan children
- To assess the level of stunting in EED+ vs EED- children 12-15 months among rural Kenyan children
- To assess the relationship between EED and body composition among children 12-15 months from rural Kenya
- To establish the correlation between EED and the surrounding water sanitation and hygiene situation among children 12-15 months in rural Kenya

**Methods:** A prospective cohort study exploring how EED affects linear growth trajectory in infants 12-15 months in MCH clinics in western Kenya. A convenient sample of 100 infants. Due the absence of data on EED and stunting, a difference of at least +0.2 in LAZ between EED+ve and EED-ve groups to be considered biologically relevant.

**Inclusion criteria:** non-stunted Infants (HAZ ≥ -1 to +2 SD) or at risk of stunting (HAZ < -1 to ≥ -2 SD) will be included. Only infants who are EED+ or EED- will be followed up.

**Data management and analysis plan:** The data entry format will allow for immediate data checks for compliance. There will be two primary analyses which will compare stunting in individuals previously identified as EED+ or EED- and investigate predictors of change in stunting since baseline in children previously initially EED+ or EED-

**Key words:** Environmental enteric dysfunction (EED), stunting, water hygiene and sanitation, 13 Carbon sucrose breath test (13C SBT)
SY II: MULTI-SECTORAL COORDINATION OF NUTRITION INITIATIVES

SY II.01: FACILITATING FACTORS AND CHALLENGES IN IMPLEMENTING MULTISECTORAL NUTRITION PROGRAMS AT THE COMMUNITY LEVEL: EXPERIENCES FROM THE NORTHERN REGION IN BURKINA FASO

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Introduction: Multisectoral nutrition programs’ effectiveness is widely demonstrated. However, the quality of implementation is a prerequisite to reach it. In Burkina Faso, there are many challenges in the implementation, and the concern remains: "how to successfully implement programs focused on multisectorality in nutrition at the community level?"

Objective: To identify facilitating factors and challenges in implementing multisectoral nutrition programs at the community level based on experience from the northern region of Burkina Faso.

Description of the program: Coverage of 3 health districts: Yako, Gourcy and Titao from 2013-2018
Package of multisectoral nutrition interventions to fight stunting: nutrition education for IYCF, micronutrient powder distribution, agriculture sensible nutrition, small livestock, nutrition education in primary schools and multisectoral governance. 4 sectors involved: health, agriculture, livestock and education

Methods: A qualitative study has been realized. Data were collected through document review, in-depth individual interviews with 47 implementing actors composed of 04 sectors, NGO’s staff and communities’ leaders. Transcribed, coded, synthesized data by theme using the deductive approach.

Results: Most of the factors influencing implementation were common to all three districts. Community participation, sectors commitment and participation, capacity building, geographic convergence, nature of interventions, integration of multisectoral interventions, existence and proper functioning of the multisectoral coordination platform and diversification of funding sources were the facilitating factors in implementation multisectoral nutrition program.

The main barriers identified included: different targeting strategies between sectors, the habit of working by sector, weak ownership of activities by sectors, lack of technical capacity of community agents, turnover implementing actors, lack of champions in nutrition at the local level, low geographical convergence, lack of a multisectoral monitoring and accountability mechanism, lack of financial resources and context of insecurity.

Conclusion: The search for a common intersectoral targeting strategy, the integration of activities and the mobilization of resources will help to remove the challenges to successful implementation.

SY II.02: ELABORATION, VALIDATION AND IMPLEMENTATION OF CAMEROON FOOD-BASED GUIDELINES

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**Context:** In Cameroon, malnutrition remains a serious public health challenge. From 2012 to 2016, the number of children moderately malnourished in Cameroon have moved from 135,000 to 142,000. A slight decrease was observed for severe malnutrition, 83,000 children to 65,000 children, in the same period. Likewise, the rising trends in Non-communicable diseases (NCDs) in Cameroon have been documented between 1994 and 2003. To address these issues, the government has put in place diseases-oriented interventions. However, the double-burden of malnutrition can be prevented by proper eating habits. Food guides have been designed to promote good eating habits, reduce the risk of chronic nutrition-related diseases, and improve public health. In Africa, only four countries possess a food-based guide, namely: South Africa, Nigeria, Namibia and Benin. The aim of this project is to develop, implement and sustain Cameroon-based guidelines.

**Methodology:** Building food-based guidelines involves (WHO/FAO, 1998; Pena et al., 1999): proposal drafting; creation of a multi-sectorial committee; fundraising; Definition of Health and nutrition objectives; classification of food items and determination of serving ranges per food group; graphical conception and validation of the food-based guidelines; implementation and empowerment of the food-based guidelines; food-based guidelines revision.

**Results:** The first draft of the project is available but needs to be validated by the multi-sectorial committee. The project team is still in the process of recruiting some key stakeholders in multi-sectorial committee such as the Ministry of agriculture and Livestock; the Ministry of rural development; WHO and FAO experts.

**Conclusion:** There is a need for advocacy strategies as some partners are not fully committed to the project vision. Sources of funding are also a huge challenge. There is a necessity for additional experienced experts in food-based guidelines development from other African countries.

**Keywords:** Advocacy, elaboration, food-based guidelines, fundraising, validation.

**SY II.03: SUPPORTING CAMEROON’S CIVIL SOCIETY NETWORK AND LOCAL GOVERNMENTS TO ADVANCE SCALING UP NUTRITION (SUN)**

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**Introduction:** Cameroon joined the SUN movement in 2013 but has only recently initiated a multisector national plan of action for nutrition. Though SUN governance and nutrition multisectoral advocacy and coordination is vibrant at national level, there is limited local capacity for budgeting and implementing the plan at district and municipality levels. Also, Cameroun SUN movement has successfully engaged parliamentarians in Nutrition advocacy, yet mayors and other locally elected officials are not reached.

**Purpose:** The United Nations Office for Project Services (UNOPS) is providing support through Cameroon’s SUN Civil Society Network (CSN) to strengthen capacity of local civil society organizations (CSO) and municipalities to advocate for inclusion in Nutrition activities in local budget and implement the multisector nutrition strategies prioritized in the national plan. Helen Keller International (HKI) is facilitating the effort.

**Approach:** The central government allocates bloc grants in the amount of about USD 200,000 to each municipality to fund local development plans. To ensure multisector nutrition activities are prioritized in these local budgets’ plans, the SUN CSN has challenged municipalities to allocate 1% of this fund to Nutrition activities.

**Results:** The project is piloted in 11 municipalities and has trained 34 CSO members and 21 mayors and local council members to identify most relevant nutrition-specific and sensitive activities for their locality (e.g., micronutrient supplementation; support groups for improved infant and young child feeding, hygiene practices and management of acute malnutrition; and food security). Each municipality has signed a commitment to support the operationalization of the multisector national plan of action for nutrition in his catchment area. A Network of Nutrition Champions mayors was formed through which to share best practices.

**Conclusions:** The initiative is heightened local understanding, capacity and partnerships for multisectoral nutrition development and is an approach that can be scaled across the country.
SY II.04: UNLEASHING PARLIAMENTARY POWER TO HEIGHTEN THE FIGHT AGAINST FOOD INSECURITY AND MALNUTRITION IN AFRICA- DIA SANOU

Abstract Not Received

SY II.05: TRANSITIONING PRUDENTLY AND EFFICIENTLY FROM VA SUPPLEMENTATION TO LONGER-TERM STRATEGIES TO ACHIEVE ADEQUATE VA INTAKE FOR CHILDREN: MODEL-BASED OPTIONS FOR CAMEROON


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Objective: Meeting vitamin A (VA) needs of children 6-59 mo is a policy priority. Benchmarks for VA dietary intake exist; meeting them efficiently is a fiscal imperative. We sought to identify cost-effective combinations of VA intervention programs over a 10-year planning time horizon in three macro-regions (North, South, Cities) in Cameroon, while confirming adequate VA status by one or two post-intervention VA status surveys, as recommended by the Global Association for VA (GAVA).

Methods: We used national dietary intake data to predict the nutritional benefits of alternative combinations of VA intervention programs in terms of effective coverage (achieving dietary VA adequacy) and deaths averted. Costs of programs were estimated. An economic optimization model identified the least-cost VA strategy for each macro-region, and a sequence of policy choices leading from the business-as-usual (BAU) to a more efficient strategy, confirming through VA status surveys that children at risk of VAD continue to be protected during policy transition periods.

Results: The BAU programs effectively cover ~12.8m child-years and cost ~$30.1m over ten years; ~$2.34 per child-year effectively covered. Improving the national VA-fortified oil program, implementing a VA-fortified bouillon cube program, and retaining VA supplements (VAS) in the North macro-region for three years effectively covers ~13.1m child-years at a cost of ~$9.5m over ten years, or ~$0.71 per child-year effectively covered. However, new programs require investments and children could be at risk of VAD-related mortality during transitions. One transition pathway involves three-year investments in VA-fortified oil and bouillon cube programs. By year four, fortification programs are predicted to eliminate inadequate VA intake in the South and Cities macro-regions, but not the North, where VAS should continue until additional delivery platforms can be identified and implemented.

Conclusions: Current VA intervention programs in Cameroon are effective but inefficient. Modeling identifies more cost-effective programs; cost savings can be large. The chosen approach to confirm adequate VA status (i.e., one versus two surveys in non-consecutive years) will greatly affect cost savings. During programmatic transitions, at-risk children need continual twice-annual VAS.

Keywords: VA supplementation, VA fortification, economic optimization model, children, Cameroon

SY III: SUSTAINABLE FINANCING FOR NUTRITION IN AFRICA: SYSTEMS STRENGTHENING APPROACHES
SY III.01: HOW STRONGER SYSTEMS FOR SUSTAINABLE FINANCING CAN HELP US END MALNUTRITION.

ABSTRACT NOT RECEIVED

SY III.02: RESOURCE TRACKING FOR IMPROVED NUTRITION – GLOBAL AND COUNTRY EXPERIENCES FROM ETHIOPIA AND MALAWI

Ferew Lemma, Felix Phiri, Feven Girma, Jack Clift, Kavya Ghai, Mary D’Alimonte, Teresa Guthrie, Yosef Alemu, Martha Berhanu, Spy Munthali, Julita Manda, Emily Thacher, Kyle Borces, and Augustin Flory

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Introduction and Purpose: Substantial increases of funding are needed to reach global and national targets for nutrition, with more needed both from domestic sources and development assistance. Resource tracking at global and national level is critical for mutual accountability, planning and resource mobilization.

Methods: This session brings together findings and practical lessons learned from three related activities: (1) Global efforts to track donor aid to high impact nutrition-specific interventions, (2) Reviewing nutrition expenditures and integrating multisectoral resource tracking for nutrition into Ethiopia’s annual resource mapping and (3) Operationalizing the multisectoral Nutrition Resource Tracking System (NURTS) in Malawi

Results: Globally, resource tracking shows that the donor community is not meeting financial benchmarks for nutrition, even seeing a decline between 2015 and 2016; and many recipient countries are not receiving support in line with their burden. Urgent action is needed by global donors and advocates to raise new resources for high-impact interventions.

In Ethiopia, nutrition-sensitive program categories have been partially integrated into the annual health mapping exercise and will be fully integrated during the next budget cycle. Ethiopia is a pioneer in creating a single unified resource tracking system for nutrition, which will be a critical enabler for planning and accountability in the new Food & Nutrition Strategy.

In Malawi, the NURTS tool has been deployed at national level and piloted at district level, with a vision of a dynamic flow of information between the two levels, supporting both national- and district-level resource mobilization efforts, and fully integrated with an online platform for nutrition M&E to provide leaders with easy access to important data for decision-making.

Conclusions: Bringing together varied global and country-level resource tracking experiences is useful for countries looking to implement a similar process. Implications of the analysis and practical lessons learned from all three experiences will be presented and discussed.

SY III.03: PRESENTATIONS BY GOVERNMENT REPRESENTATIVES AND TECHNICAL PARTNERS ON HOW SYSTEMS STRENGTHENING FOR SUSTAINABLE FINANCING HAS BEEN APPROACHED WITHIN THEIR NATIONAL CONTEXTS. ETHIOPIA, MALAWI ETC

ABSTRACT NOT RECEIVED
SY IV: NUTRITION POLICIES, POLITICS AND NUTRITION GOVERNANCE IN AFRICA

SY IV.01: THE NUTRITION STAKEHOLDER AND ACTION MAPPING – GENERATING EVIDENCE TO STRENGTHEN NUTRITION GOVERNANCE IN CHAD

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Background: Malnutrition remains a significant public health and development concern in Chad. Despite all governmental, UN agencies’, and humanitarian and development actors’ efforts the complexity of the organizations involved in the response to malnutrition and the lack of sufficient governmental resources to respond adequately are aggravating the situation. This necessitates prioritizing in-country’s multisectoral collaboration for stronger nutrition governance. To respond to this need, the Chadian government has invested in multisectoral and multi-stakeholder nutrition efforts using different facilities, multisectoral platforms, and tools. As part of these efforts, the Chadian government, with the support of the UN Network-REACH Secretariat, has launched the Nutrition Stakeholder and Action Mapping.

Methods: The mapping exercise uses the DHIS2 web-based software capitalizing on its widespread adoption, ability to integrate with other software, and cross-sector implementation, making it a cost-effective and sustainable option. This tool accounts for population coverage and compares it with prevalence of malnutrition at subnational levels. It also ensures interactive visualization of results through shared customizable dashboards providing needed information to different line ministries aligned with their respective sectoral interests.

Results: The mapping exercise informs stakeholders on who does what, how and where to scale up nutrition. Preliminary results have shown that nutrition actions are mostly implemented in 5 provinces. Concerning the number of implementing partners, Lac and N’Djamena have the highest concentration. The analysis of delivery mechanisms showed that health centres are employed in almost all provinces and used for the implementation of half of the mapped nutrition actions. Findings will be used to strategize for an effective and efficient nutrition responses through guiding evidence-based decision-making, efficient resource allocation towards nutrition, and advocacy efforts for government, development partners and donors. This exercise also generates data that serves as a baseline to assess success of nutrition plans and policies and ultimately, contribute to improving nutrition outcomes.

Conclusions: During the presentation, the Government and REACH team will present how the Nutrition Stakeholder and Action Mapping will strengthen nutrition governance in Chad and how it will be used to improve the nutrition situation.

SY IV.02: APPROACH TO ASSESS THE LEVEL OF INTEGRATION OF NUTRITION INTO AGRICULTURAL DEVELOPMENT PLANS IN SUB-SAHARAN AFRICA: THE CASE OF NATIONAL AGRICULTURAL INVESTMENT PLANS (NAIPS)

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Context: Malnutrition is prevalent in Sub-Saharan Africa and has negative impact on the socioeconomic development. Fighting against malnutrition requires full involvement of other sectors than health, such as agriculture. Agriculture can significantly contribute to improved nutrition. Being in charge of food production, this sector can ensure that safe, diverse and nutritious foods are available for healthy diets. It is also the main economic activity for the majority of the
population and can have beneficial impact on diet quality. This could only happen if agriculture investment plans adequately integrate nutrition. It is therefore important to assess the NAIPs to identify gaps and propose recommendations.

**Objectives:** To assess the level of integration of nutrition into the National Agricultural Investment Plans (NAIPs) of selected Sub-Saharan countries: Chad, Democratic Republic of Congo and Republic of Congo

- Propose policy options to improve the mainstreaming of nutrition into these documents

**Methodology:** The assessment of NAIPs was based on FAO’s Toolkit on nutrition-sensitive agriculture and food systems that includes key recommendations for improving the mainstreaming of nutrition into agricultural policies, plans and investments.

**Results:** The results show insufficient integration of nutrition. Few NAIPs have specific nutrition objectives and indicators, and do not include enough priority nutrition interventions. Crosscutting topics such as gender, social protection and climate deserve also better consideration.

**Recommendations:** The lack of awareness and technical capacity on nutrition-sensitive agriculture are some key factors that explain the low integration of nutrition into the NAIPs. It is therefore important to advocate for nutrition-sensitive agriculture in countries. Countries should also develop capacity strengthening programmes on nutrition-sensitive agriculture.

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**SY IV.03: COSTING OF MULTI SECTORAL ACTION PLAN FOR NUTRITION: CHALLENGES AND LESSONS LEARNED FROM NIGER EXPERIENCE**

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**Introduction:** The Niger Multi-sectoral Action Plan for Nutrition (MSAPN) was developed to reduce and prevent malnutrition in all its forms. Costing this plan was a major challenge due to lack of standard methods.

**Objectives:** To find and agree on a simple method for the costing of MSAPN, particularly for estimating cost of nutrition-sensitive interventions out of health sector.

**Methods:** Nutrition interventions through health sector were costing using standard “One Heath Tool”. Due to lack of standard methods, the “ingredient approach” was used in other sectors (agriculture, livestock, fisheries, education and social protection). This method is based on estimation of the cost of activities and tasks contributing to each intervention. The total cost of the intervention equal to the sum of costs of activities, sub-activities and tasks contributing to the intervention. Unit costs were collected through key informants and validated by nutrition multi-stakeholder. To avoid double internal resources allocations in ministries, only activities making interventions and programmes nutrition sensitive were costed. New interventions were also costed.

**Summary of Results:** The costing process was participatory and iterative. It contributed to strengthen planning and budgeting capacities of more than 120 participants from various sectoral ministries. The process helped to improve policy dialogue among the actors within and across sectors. Costing exercise facilitated refinement, better planning and prioritization of the cost-effective interventions; alignment with programme-budgets of ministries, as well as a better integration of the costed nutrition interventions in sectoral and multisectoral policies at the national level.
Conclusion: Costing is a useful tool to improve planning, refinement and prioritization of nutrition interventions and their integration into sectoral policies and programmes. Costing process seems to be long and challenging, but participative approach helps to better explain step by step the methods while fostering technical abilities of actors. Costing is a useful exercise for advocacy and resource mobilization to scale-up nutrition.

**Key-words:** Costing, Multisectoral action plan, Nutrition, Niger

**SY IV.04: AVAILABLE IN ZAMBA’S MARKETS: FOOD REFLECTIONS OF CONTACT, COLONIALISM, AND MIGRATION**

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**Background:** An assessment of the food available in open-air markets, supermarkets, and grocery stores, allows one to consider food security issues, document nutritional content, and track historical factors such as colonial rule.

**Objective:** Despite the value of food inventories for determining specific items that could improve the ingestion of macro/micronutrients and trace minerals, few assessments have been undertaken and published; consequently, we examined market availability, food preparation methods, consumption patterns, nutritional content, and site of domestication to illuminate factors affecting food security.

**Design:** We inventoried available foods in Zambia’s capital, Lusaka, and in sites within Copperbelt Province, Luanshya and Ndola, during May-June of 2017 and 2018.

**Results:** A variety of raw and processed food types was available in each of the three open-air urban markets inventoried; however, many of the available foods are not indigenous to Zambia or the African continent. Zambia’s most important staples, corn (Zea mays) and cassava (Manihot esculenta), are from the Americas, as are many common fruits, including pumpkins (Cucurbita pepo spp.), butternut squash (Cucurbita moschata), tomatoes (Solanum lycopersicum), and avocados (Persea americana). Although tea (Camellia sinensis) remains a beverage of choice, it is indigenous to China and India, and was introduced during England’s colonial rule. Foods indigenous to Zambia or Africa, such as Mopane caterpillars (Gonimbrasia belina, Anthoера zambezina), kapente fish (Limnothrissa miodon, Stolothrissa tanganicae), Chisense fish (Potamothrissa acutirostris, Microthrissa stappersii, Poecilothrissa moeruensis), Nile tilapia (Oreochromis niloticus), the common carp (Cyprinus carpio), okra (Abelmoschus esculentus), and alligator peppers (Afromomum melegueta), are often seasonal, holiday-specific, and/or associated with a particular socioeconomic status and location.

**Conclusions:** Food use patterns and preparation styles for many of the available foods, regardless of origin, seldom maximize nutritional content. We discuss availability in some of Zambia’s largest markets in light of food security issues and the ongoing dietary transition now underway.

**Keywords:** food security, market availability, indigenous foods, food systems, food preparation patterns, nutritional content, Zambia

**SY IV.05: PROCESS OF INTEGRATING COMMUNITY NUTRITION ACTIVITIES INTO THE FARMER FIELD SCHOOL APPROACH OF AN ON-GOING PROJECT IN WEST NILE, UGANDA**

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**Introduction:** Welthungerhilfe is implementing the Strengthening Resilience through Infrastructure, Agriculture and Skills Development (RIAS) project with refugees and the Ugandan host population in Arua, Yumbe and Adjumani
Districts. In 2017, the project started to strengthen its nutrition focus, complementing on-going agriculture, livelihoods and hygiene activities delivered through farmer field schools (FFS).

**Purpose:** To develop and design a community nutrition component that could be integrated in on-going, predominantly agricultural project activities. The component was intended to use the existing FFS as a delivery platform.

**Approach used:** A brief situation/ needs assessment among 90 FFS was conducted in mid-2017, followed by a nutrition planning workshop with selected project staff. A barrier analysis survey was conducted in September 2017 that investigated determinants of adequate maternal dietary diversity. A consultant supported project nutritionists in developing a training package for 13 sessions, covering maternal, infant and young child feeding (based on Ministry of Health messages), men’s engagement in nutrition, post-harvest management. The participatory training/session method was modelled on the ‘care group’ approach and adjusted to the context of FFS and the West Nile Region. A nutrition baseline survey was conducted on the session topics. Cascading trainings commenced about eight months after the barrier analysis. Lessons learned are being collected and addressed on an on-going basis.

**Results:** It is possible to integrate community nutrition activities in the FFS approach and in an on-going project. The approach appears to be well-received by communities. FFS are a suitable platform to deliver community nutrition activities.

**Conclusions/ recommendations:** It takes time to develop well-tailored materials and integrate a systematic approach to promoting nutrition behaviour change at community level. The development should draw on adequate formative research with an in-depth understanding of current practices at community level. Project designers and donors should allow for these important processes during an inception phase.

**SY V: FANUS LEADERSHIP & CAPACITY DEVELOPMENT ROUND TABLE SYMPOSIUM**

(IUNS/NS/FANUS Sponsored Symposium)

**SY V.01:** INTRODUCTION AND BACK GROUND TO INTIATIVE OF CAPACITY BUILDING OF AFRICAN NUTRITION SOCIETIES. Reggie Annan and Mark Hollingsworth

**SY V.02:** EXPERIENCES AND CHALLENGES TO START NUTRITION SOCIETY (DR CONGO, SIERA LEONE, ZIMBABWE, SECYECLLES AND LIBERIA)

**SY V.03:** HOW AFRICAN NUTRITION SOCIETIES CAN AFFILIATE WITH FANUS. FUNGO ROBERT VICE PRESIDENT OF FANUS

**SY VI: HUMAN CAPITAL DEVELOPMENT AND EDUCATION**

**SY VI.01:** SCHOOL FEEDING PROGRAMME IN SAGAMU, SOUTHWEST NIGERIA: A STUDY OF CLASS TEACHERS’ PERCEPTION

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**INTRODUCTION:** Malnutrition in forms of stunting and underweight among school-aged children is a risk factor for many illnesses and long-term disability. The school meal programme is a nutrition-sensitive intervention adopted to alleviate hunger and eradicate malnutrition among school age children and enhance the achievement of universal basic education, providing both educational and health benefits to the most vulnerable children.

**PURPOSE OF THE STUDY:** This study assessed the knowledge and perception of class teachers concerning the school feeding programme.
METHODS: A cross-sectional descriptive study was carried out among class teachers in public primary schools in Sagamu Township, Ogun State, using a multi-stage sampling technique. All eligible teachers participated. Data were collected using semi-structured, self-administered questionnaires and analyzed with SPSS 20.0. Relevant descriptive and inferential statistics were calculated. Participation was fully voluntary.

SUMMARY OF RESULTS: Mean age of the respondents was 37 ± 9.69 years. Majority of the respondents were female (74%). Majority of the respondents were married i.e 72%. The respondents were predominantly university degree holders i.e 56.7%. 83.3% of the teachers were aware of the School Feeding Programme while 16.7% were not. 73.3% of the respondents had a good knowledge while 26.7% had poor knowledge. 78% of respondents perceived the benefit was to alleviate hunger/malnutrition while majority 66% perceived lack of supporting infrastructure was a major challenge.

CONCLUSION/RECOMMENDATIONS: Knowledge of School Feeding Programme was good among class teachers. Alleviation of hunger and eradication of malnutrition were perceived benefits. Lack of supporting infrastructure and poor funding were major challenges.

RECOMMENDATION: Adequate funding of the programme and training of workers on the benefits and tenets of school feeding will be of great value in optimizing the advantages of the programme.

SY VI.02: NUTRITIONAL STATUS, INTELLIGENT QUOTIENT AND ACADEMIC PERFORMANCE OF PRIMARY SCHOOL CHILDREN IN A SUBURB OF ENUGU STATE, NIGERIA

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Background: Nutritional inadequacy could result to irreversible negative impact on normal brain function especially among growing children.

Objective: This study assessed the nutritional status, intelligent quotient and academic performance of primary school children (6 – 14 years) in Nsukka local government area (LGA) of Enugu State.

Method: A multi-stage random sampling technique was adopted. Nsukka LGA was stratified into urban and rural communities. Six communities (3 from urban and 3 from rural) were randomly selected from 15 communities in Nsukka LGA. A list of primary schools in the selected communities was obtained from which a total of 317 school children within 6 – 14 years were randomly selected. Validated structured questionnaire elucidated information on socioeconomic status of the parents, personal data and dietary pattern of the children. Anthropometric indices derived from measurements of weight, height, mid and upper arm circumference were compared with the reference standard for the age group. The academic performance of the children was assessed using the average grade points of two school terms in all the subjects. Raven Standard Progressive Matrices test was used to assess their intelligence quotient (IQ). The data obtained were analyzed using Statistical Product for Service Solution (SPSS), version 22 and expressed as frequencies, means and percentages.

Results: Stunting (44.48%) and underweight (11.04%) were prevalent among the school children. Energy (62.85%), protein (50.54%), carbohydrate (66.53%) and fat (63.18%) intake were below recommended daily intake. About 4% had low intelligent quotient and 12.93% had below average IQ. The children who had poor academic performance were 6.62% while 12.30% were below average. Significant (p < 0.05) relationship existed between anthropometric indices, IQ and academic performance.

Recommendation: Improving the nutritional status of school children should be paramount in order to improve their educational and intellectual capacity.

Keywords: Malnutrition, intelligent quotient, school children, nutritional status, growth, underweight, stunting.

SY VI.03: UNDERSTANDING PATHWAYS BETWEEN AGRICULTURE INVESTMENT AND HOUSEHOLD FOOD SECURITY AND DIET DIVERSITY IN RWANDA

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Background: Village Savings and Loan Associations (VSLA), a form of non-traditional finance for the rural poor, and Farmer Field Schools (FFS), which promote agricultural experimentation and productivity, are prominent throughout sub-Saharan Africa. Both VSLAs and FFSs promote resiliency and investment, and can improve household food security and diet diversity. Yet, little is known about the joint and independent mechanisms through which these programs influence these outcomes. This study aims to: 1) Determine the association between agricultural investment (i.e. spending on land, tools, seeds, etc.) and household food insecurity (HFI) and Minimum Diet Diversity (MDD); 2) Determine the role of crop productivity and diversity in mediating this association.

Methods: Cross-sectional data were collected from 375 households in Musanze district, Rwanda. Multivariate regression methods were used to investigate independent associations of agricultural investment with crop productivity and diversity; crop productivity and HFI; and crop diversity with diet diversity.

Results: A $10 USD increase in a households’ agricultural investment over 12 months is associated with a 10.1 kg higher yield in crop production (p < 0.0001). Furthermore, a 10 kg increase in crop production is associated with a 0.69% higher odds of the household’s youngest child meeting MDD requirements (p < 0.051). Meanwhile, those in the highest quintile of agricultural investment will cultivate 1.28 times the number of crops of those with an average agricultural investment (p < 0.05). Crop diversity was not associated with odds of a child meeting MDD requirements.

Conclusion: Though agricultural investment enhances crop productivity and diversity, these do not substantially improve childhood diet diversity. This suggests that additional nutrition behavior change efforts must be provided to agricultural families. FFSs and VSLAs, both providing opportunities for increased agricultural investment, may serve as key programs for integration of nutrition behavior change interventions.

Key Words: Household food security; diet diversity; agriculture

SY VI.04: DEVELOPMENT OF AN INNOVATIVE, NOVEL, GOLD STANDARD FRAMEWORK FOR INCORPORATING NUTRITION EDUCATION INTO MEDICAL SCHOOL CURRICULUM

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Objectives: To develop a generalizable gold standard framework for nutrition content for use in the enhancement of undergraduate medical curriculum in Malawi.

Methods: A review of available literature was conducted to determine what nutrition content was deemed important in medical schools worldwide. Common themes were found across medical school curricula in the United States, United Kingdom, Australia, New Zealand, and Bahrain. The information from the literature was collated and organized into four overarching categories. The nutrition content areas were further sub-classified to offer more detailed recommendations. The gold standard framework was then customized to better meet unique public health needs in Malawi.

Results: The literature search identified ten publications detailing nutrition topics present in medical school education. Recurring topics were incorporated into a gold standard tool, produced to guide universities in Malawi on the minimum nutrition content requirement in their curricula.

Conclusions: Guidelines recommend that medical students are provided with a minimum of twenty-five hours of nutrition content teaching over the course of their medical education. However, there is scarcity of published data to guide universities on specific components of nutrition science and education training needed to produce skilled physicians. Lessons learned from the literature search highlighted that key elements of medical education should give focus to basic nutrition principles and practice skills, and nutrition as it relates to organ systems and changes along the lifecycle. The developed gold standard framework, succinctly, delineates important aspects of nutrition to include in the curricula of medical schools in Malawi and can be further individualized to meet the needs of any country.

Keywords: Nutrition Education, Medical Education, Medical Nutrition Education, Global Nutrition
SY VI.05: IDENTIFICATION AND VERIFICATION OF OUTCOMES FOR A DIABETES NUTRITION EDUCATION INTERVENTION FOR TYPE 2 DIABETES ADULTS: A MIXED METHOD APPROACH

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**Background:** Targeted interventions are considered the most effective in improving health outcomes.

**Aim:** To explore the challenges with diabetes dietary and related problems in order to identify the targets (outcomes) for diabetes nutrition education intervention for adults with type 2 diabetes mellitus (T2DM).

**Methods:** Mixed methods research was employed in a sequential manner. The qualitative domain was used in the needs assessment with T2DM patients (n= 31) and ten health professionals serving them at two community health centres in Moretele sub-district, North West Province, (SA). Five focus group discussions guided by semi-structured questions obtained data from patients. Open ended questionnaires obtained data from health professionals. Thematic framework analysis was conducted. Identified problems were incorporated as target behaviours/outcomes for the planned intervention. Quantitative data were collected at baseline with T2DM patients (n=82) using closed ended or structured questionnaires to measure the target behaviours/outcomes for the intervention. Study had ethical approval from Faculty of Health Sciences, Research Ethics Committee, UP (numbers 164/2008, 215/2009).

**Results:** Qualitative results revealed diabetes related knowledge deficits and inappropriate dietary practices (food portion control problems, inadequate intake of vegetables and fruits and unbalanced diets). Diabetes knowledge, starchy food portion control, intake of vegetables and fruits and meal balance were identified as intervention targets. Quantitative baseline data revealed high intake of starchy food portions (> 11.8 median servings/day vs. recommended 6-11), low vegetables and fruit intake (1.3-1.5 portions/day vs. 5), unbalanced energy from carbohydrates (median > 66% vs. 45-65%) and low diabetes knowledge scores (mean scores ~6/15; 40%).

**Conclusion:** Quantitative methods corroborated the results of the qualitative data, thereby confirming the credibility thereof and appropriateness of the selected outcomes. Qualitative methods provided comprehensive insight in a relatively easy way on problems faced by patients which could have been difficult to capture using quantitative methods. This enabled the planning of an intervention that was relevant and customised to the patients’ needs.

**Key words** Type 2 diabetes mellitus; diabetes nutrition education; mixed methods research; outcomes; intervention

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**SY VII: ISOTOPE ASSESSMENTS IN NUTRITION (IAEA Stable Isotopes Sponsored Symposium)**

**SY VII.01: RELIABILITY OF FTIR SPECTROSCOPY MEASUREMENTS AND VALIDITY OF BIOELECTRICAL IMPEDANCE ANALYSIS AS A SURROGATE MEASURE OF BODY COMPOSITION AMONG CHILDREN AND ADOLESCENTS AGED 8-19 YEARS ATTENDING SCHOOLS IN KAMPALA, UGANDA**

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*The 4th FANUS Kigali Conference*  
*LEMIGO Hotel*  
*“Nutrition in Action for Sustainable Development in Africa”*
Background: Accurate measurement of body composition in children and adolescents is important as the quantities of fat and fat-free mass have implications for health risk. The objectives of the present study were: to determine the reliability of Fourier Transform Infrared spectroscopy (FTIR) measurements and; compare the Fat Mass (FM), Fat Free Mass (FFM) and body fat percentage (%BF) values determined by bioelectrical impedance analysis (BIA) to those determined by deuterium dilution method (DDM) to identify correlations and agreement between the two methods.

Methods: A cross-sectional study was conducted among 203 children and adolescents aged 8-19 years attending schools in Kampala city, Uganda. Pearson product-moment correlation at 5% significance level was considered for assessing correlations. Bland Altman analysis was used to examine the agreement between of FTIR measurements and between estimates by DDM and BIA. Reliability of measurements was determined by Cronbach’s alpha.

Results: There was good agreement between the in vivo D$_2$O saliva enrichment measurements at 3 and 4 hours among the studied age groups based on Bland-Altman plots. Cronbach's alpha revealed that measurements of D$_2$O saliva enrichment had very good reliability. For children and young adolescents, DDM and BIA gave similar estimates of FFM, FM, and %BF. Among older adolescents, BIA significantly over-estimated FFM and significantly underestimated FM and %BF compared to estimates by DDM. The correlation between FFM, FM and %BF estimates by DDM and BIA was high and significant among young and older adolescents and for FFM among children.

Conclusions: Reliability of the FTIR spectroscopy measurements was very good among the studied population. BIA is suitable for assessing body composition among children (8-9 years) and young adolescents (10-14 years) but not among older adolescents (15-19 years) in Uganda. The body composition measurements of older adolescents determined by DDM can be predicted using those provided by BIA using population-specific regression equations.

Keywords: Body composition; bioelectric impedance analysis; deuterium dilution method; children; adolescents, agreement, reliability

SY VII.02: THE MEDIUM-TERM NUTRITIONAL STATUS, PHYSICAL FUNCTION, METABOLIC PROFILE AND BODY COMPOSITION USING NUCLEAR TECHNIQUES OF CHILDREN PREVIOUSLY TREATED FOR MODERATE OR SEVERE ACUTE MALNUTRITION.

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Introduction: Community management of acute malnutrition uses anthropometry as a proxy indicator for nutritional recovery. However, there is paucity of data on medium and long-term impact of nutritional rehabilitation on body composition.

Objective: The aim of the study was to evaluate long term effects of treatment of severe acute malnutrition on nutritional status and body composition.

Methodology: This was a prospective cohort study carried out in Blantyre, Southern Malawi. 152 surviving members of a cohort of 1024 children treated for acute malnutrition between 2006 and 2007 and their age and sex matched community controls and siblings who were never treated for acute malnutrition were enrolled. Weight, height and mid upper arm circumference (MUAC) were measured. Body mass index (BMI) and Waist to Hip Ratio (WHR) Z scores were calculated using the World Health Organisation growth standards. Fat mass and fat free mass was measured using the deuterium dilution technique (DDT).

Results: The study enrolled 152 previously malnourished, 120 siblings and 130 community control adolescents and young adults. The number (%) of males and females was 200 (49.8%) and 202 (50.2%) respectively. The mean (range) age of the participants was 13.9 (7.0 to 28.5) years. Mean (SD) MUAC and BMI were 216.7 (26.69), 17.7, (223.9 (39.90) 18.7 and 221 (29.51), 18.2 in previously malnourished, siblings and community controls respectively. Previously malnourished children had lower BMI compared to siblings, mean difference (95% confidence interval) 1.03 (0.17 to 1.90) p =0.014. No differences were observed in BMI between previously malnourished and community
controls. Overall, there were no statistically significant differences in MUAC and WHR among participants. Body composition data is being analysed and will be available before the conference.

Conclusions: Preliminary data suggest that there may be differences in anthropometric indices in the medium and long term.

SY VII.03: Body composition 4 to 5 years after acute malnutrition in Ethiopian children: case-control study

Tsinuel Girma Alemseged Abdissa, Paluku Bahwere, ACAM study group

Background: Children recovering from acute malnutrition (AM) have good short-term nutrition and health outcomes. But, long-term outcomes of survivors including restoring body composition are not well documented.

Objective: assess long-term impact of episodes of AM on body composition among children.

Methods: This study was done in 5 districts of Jimma zone, Ethiopia. In 2017, we traced all children who had moderate acute malnutrition (MAM) or severe acute malnutrition (SAM) and their controls that we studied in 2013 and 2015. They were aged between 6 and 59 months then and without disabilities or any chronic diseases. For deuterium dilution technique (DDT) of measuring body composition, children received deuterium (10g for children <30kg and 20g for children 30 to 50 kg) after an overnight fasting and deuterium enrichment was measured by Fourier Transform Infrared spectrometry in the 3-hour post-dose saliva sample.

Results: DDT were obtained from 509 (54.6% girls) children. Both Past-SAM and Past-MAM had lower height standardised fat-free mass than their controls. The magnitude of the difference was around -1 kg.m\(^{-1}\) for both the Past-SAM \([\Delta(95\%CI) = -0.9(1.3; -0.5)\] \(\text{kg.m}\(^{-1}\); p<0.001 for the comparison Past-SAM against SAM-Controls and -1.2(-1.7; -0.8) \(\text{kg.m}\(^{-1}\); p<0.001 for the comparison Past-SAM against MAM-controls] and the Past-MAM \([\Delta(95\%CI) = -0.8(-1.1; -0.5)\] \(\text{kg.m}\(^{-1}\); p<0.001 for the comparison Past-MAM against SAM-Controls and -1.1(-1.4; -0.8) \(\text{kg.m}\(^{-1}\); p<0.001 for the comparison Past-MAM against MAM-controls].

Only 0.98% (5/509) had obesity as measured by percentage of body fat mass (BFM%). BFM% did not differ between past-SAM and SAM-control (p=0.771) or past-SAM to MAM-Controls (p=0.990). Similarly, body fat per meter of height did not when comparing Past-SAM to SAM-controls (p=0.119). But, this index was lower in Past-SAM than MAM-controls (p=0.027). Past-MAM children had lower body fat than their controls using BFM% (p=0.04) and BFMI (p<0.001).

Conclusion: Children who had been exposed to acute malnutrition have catch-up in body fat mass about five years after the episode while they remain with lean mass deficit.

SY VII.04: SEVERE ACUTE MALNUTRITION IN CHILDHOOD AND CHRONIC DISEASES IN ADULTHOOD IN THE EASTERN REGION OF THE DEMOCRATIC REPUBLIC OF CONGO: A LONGITUDINAL STUDY

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Introduction: The double burden of malnutrition is a public health problem, so knowledge about the future of children treated for Severe Acute Malnutrition (SAM) needs to be improved.

Aim: to explore the long-term effects of SAM.
Methods: A total of 1981 medical files were extracted from the data of Lwiro Hospital (LH), South-Kivu, DRC between 1988-2002 and set up as the baseline sample size. The median age at admission was 41 months. From December 2017 to June 2018, we proceed to the tracing of adult who were still alive in Miti-Murhesa and Katana following SAM inpatient treatment at LH (cases) and compared them with community controls age-and-sex matched. Our outcomes of interest were anthropometry, blood markers of Non-Communicable Diseases (NCD) and body composition. For comparisons of all outcomes, we used simple linear and logistic regression but multivariate analyzes are in progress. Body composition was measured by the deuterium dilution technique and analyzes with Agilent FTIR are in progress.

Results: 520 former malnourished and 398 controls were identified. The median (Min-Max) age was 22 years (16-40) in two groups. Proportion of men in case group and control group was respectively 47.3% and 50.2%. Compared with controls, cases had lower weight (-1.7kg, \( p=0.001 \)), height [sitting (-1.7cm, \( p=0.006 \)) and standing (-1.3cm, \( p=0.003 \)], MUAC (-3.9mm, \( p=0.054 \)), leg length (-3.9cm, \( p=0.055 \)), handgrip strength (-2.8kg, \( p<0.001 \)) and hip circumference (-1.5cm, \( p=0.005 \)). Despite a mean BMI of 22 in cases, proportion of low BMI tended to be higher in cases compared to control. Hb A1c (0.4%, \( p<0.001 \)) and waist circumference (1,1cm, \( p=0.023 \)) were significantly higher in cases. However, no difference was observed for glycemia, blood pressure, lipid profile, creatinine, thoracic length, head and thoracic circumferences. Cases had significantly high risk of metabolic syndrome (OR=2.8, \( p=0.008 \)) and visceral adiposity (OR=1.8, \( p=0.003 \)) compared to controls, but not of hypertension, dyslipidemia or diabetes.

Conclusion: Our preliminary results suggest that SAM has long-term adverse effects. Survivors have so-called economic growth structures associated with future NCD.

Key words: childhood malnutrition, long-term effects SAM, Non-communicable diseases, body composition

SY VII.05: ASSOCIATION BETWEEN PHYSICAL ACTIVITY LEVELS AND BODY FAT PERCENTAGE IN 6-8 YEAR OLD CHILDREN FROM A BLACK SOUTH AFRICAN POPULATION: BC-IT STUDY.

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Background: Obesity and physical inactivity are global health problems in children and adults alike, with developing countries experiencing a shift from mortality predominately driven by infectious diseases to mortality driven largely by non-communicable diseases (NCDs). Studies assessing the association between physical activity (PA) and obesity have been extensively performed but they however mostly rely on the self-reported or parental report measures of PA which are subjected to report bias. The purpose of this study was to determine the association between objective physical activity levels and body fat percentage determined by stable isotope and BIA in 6–8 year-old children from a black South African population

Methods: A total of 96 (53 girls and 43 boys) children with a mean age of 7.7±1.23 who are part of a larger study on body composition using isotope technique (BC-IT) are participant in this cross-sectional study. Height and weight were measured according to the standard procedures. Body mass index (BMI) was calculated as weight in kilogram divided by height in meter squared. Body fat percentage was assessed using stable dilution techniques (D2O) and bioelectrical impedance analysis (BIA) using Bodystat 1500 MDD. ActiGraph accelerometer (Model GT3X-BT) was used to determine PA for a minimum of 10 hours/day for seven consecutive days. PA data was then categories into sedentary PA (<99 counts per minutes), light PA (≥ 100 counts per minutes), moderate PA (≥2296 counts per minute), vigorous PA (≥ 4012 counts per minutes) and moderate to vigorous PA (MVPA). Descriptive statistics and independent sample t-test for gender difference were performed by SPSS program. Correlation coefficients were used to determine the relationship between physical activity and body composition. The level of significance was set at \( p<0.05 \).

Results: Prevalence of overweight/obesity for the total group using D2O was 22% and 13% by BMI and respectively; with 12% and 11% being underweight and with girls (33%) being more overweight/obesity than the boy (7%). Girls where significantly (\( p=0.03 \)) more sedentary (356.14±48.66 min/week, girls’ vs 325.4±49.38 min/week, boys) and
fatter (7.26±3.29kg) than boys (5.44±2.43kg). Boys spent significantly (p<0.05) more time in moderate and vigorous PA (48.80±13.44 min/week) than girls (65.84±15.16±15.16). Objective PA levels (Moderate, Vigorous and MVPA) were inversely associated with fat mass as determined by stable isotope (r= -0.27, p=0.01, r=-0.27, p=0.01 and r= -0.27, p<0.05) and BIA (r= -0.27, p=0.01; r=-0.29, p<0.05 and r = -0.30, p<0.05).

**Conclusion:** Girls were more overweight and sedentary compared to their boys’ counterparts. Additionally, it was evident that excessive fatness negatively affected the children participation in physical activity. The health implications of these results to the studied children warrant urgent strategic interventions.

**SY VIII: NUTRITION AND NCDS**

**SY VIII.01: INTERGENERATIONAL EFFECTS OF MALNUTRITION: A COHORT STUDY OF CHILDREN BORN FROM MOTHERS TREATED FROM SEVERE MALNUTRITION IN DEMOCRATIC REPUBLIC OF CONGO BETWEEN 1995-2002.**

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**INTRODUCTION:** The intergenerational effects of malnutrition have been described but most publications refer to the context of endemic malnutrition in general without giving details about children born from mothers who have been treated from severe malnutrition.

**OBJECTIVE:** To describe the nutritional and biological status of children born from mothers who have been treated from severe malnutrition in their childhood.

**METHODOLOGY:** It is a cohort study conducted in Miti-Murhesa health District (Eastern DRC) from February to May 2019 bearing children born from mothers who were treated from severe malnutrition in Lwiro pediatric hospital between 1988-2002. This cohort was matched with control cases selected according to age, sex and villages, but whose mothers have not any known case of malnutrition. Case recruitments was done by a team of investigators consisting of three physicians, two nutritionists, four nutrition assistants and community health workers, most of whom worked in the community nutritional program between 1995-2002. An electronic database, records and patient records have been used to identify cases with certainty.

We collected anthropometric parameters (weight, height, MUAC, skin folds) and biological parameters (hemogram, blood glucose, urea, creatinine, CRP, HIV test and stool). For breastfeeding mothers with children aged between 3-12 months, we administered a deuterium solution and we collected saliva samples to analyze the breastmilk intake by deuterium method validated by the WHO. We also took 20ml of breastmilk (10ml per breast) for the composition analysis.

**RESULTS:** We recorded 117 mothers with a history of severe malnutrition and their 271 children, including 197 children aged under 5 years. In the control group we identified 159 mothers and their 201 children, of whom 145 children aged under 5 years. 124 mothers participated to the breastmilk intake tests and breastmilk composition, including 61 cases and 63 controls.

**CONCLUSION:** The analysis are in progress and results will be presented at the 4th FANUS congress in August 2019.

**KEY WORDS:** Malnutrition, Intergenerational effects, Breastmilk intake, Breastmilk composition
SY VIII.02: UNCONTROLLED HYPERTENSION AND ASSOCIATED FACTORS AMONG ADULT HYPERTENSIVE PATIENTS ON FOLLOW-UP AT JIMMA UNIVERSITY TEACHING AND SPECIALIZED HOSPITAL: CROSS-SECTIONAL STUDY, 2016

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Introduction: Hypertension, including poorly controlled blood pressure, is the major global health problem which affects one billion people worldwide. Very few studies in Ethiopia and not at all at study area, have been conducted on prevalence of uncontrolled hypertension and associated factors among adult hypertensive patients.

Objective: The aim was to determine the prevalence of uncontrolled hypertension and associated factors among adult hypertensive patients at Jimma University Teaching and Specialized Hospital.

Method: Institution based cross-sectional study was conducted at the chronic illness clinic of Jimma University Specialized and Teaching hospital from March 09 to April 13, 2016. Samples of 345 hypertensive patients were selected using systematic sampling technique. Data were collected using structured questionnaire through face to face exit interview and chart review. Data were analyzed using SPSS version 20.0 software. The bivariate and multivariable analysis were done to identify factors of uncontrolled hypertension.

Result: More than half 52.7% of the patients had uncontrolled hypertension. Poor knowledge status on hypertension related complication (AOR=2.140, 95%CI=1.272-3.600), non-adherent to smoke abstinence (AOR=3.935, 95%CI=1.065-14.535), non-adherent to alcohol abstinence (AOR=2.477, 95%CI=1.074-5.711), Khat (Catha edulis) chewing (AOR=2.518, 95%CI=1.250-5.073), overweight (AOR=2.241, CI=1.239-4.053), middle age (AOR=7.893, 95%CI=1.860-33.493) and old age (AOR=9.944, 95%CI=2.523-39.188) were significant predictors of uncontrolled hypertension.

Conclusion: The prevalence of uncontrolled hypertension is high at Jimma University Teaching and Specialized hospital. Unhealthy lifestyles were major factors. Continuous health education on lifestyle practices and hypertension related complications in each follow-up visit through nurses, physicians and pharmacists are very essential to avert the problem.

Keywords: Uncontrolled hypertension; Hypertensive Patients; Jimma; Ethiopia

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SY VIII.03: ANTI-INFLAMMATORY ACTIVITY OF RUMEX ABYSSINICUS (RA), LIPIDIUM SATIVUM (LS), GUIZOTIA ABYSSINICA (GA) ON LPS-INDUCED INFLAMMATION IN BV-2 MICROGLIA CELLS.

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Background: The activated microglia cells are likely to contribute to the mechanism of neural damage and neurodegenerative diseases including Parkinson’s disease, Alzheimer, Amyotrophic lateralsclerosis, Pain, Infection, stroke and other real potential dangers to the CNS. Considering the preliminary research on the biological properties of Medicinal plants, it’s been recognized in the development of human culture and diseases management. The inhibition of the release of Pro-inflammatory molecules may prevent the progression of these diseases.

Objective: The purpose of this study is to examine the anti-inflammatory effects on LPS caused inflammation of BV-2 microglia cells by RA, LS, and GA.

Method: All the three plants were selected among other commonly used Ethiopian medicinal plant species and taken to South Korea for examination and kept at Duksung women’s university, department of Food and Nutrition Laboratory. Their aqueous extracts were experimentally examined with chemical reagents to verify their efficiency in inhibiting the production of pro-cytokines (IL-1β, IL-6, TNF-α).
**Results**: The decreased expression of GAPDH in LPS-activated microglia BV-2 cells was observed in the presence of curcumin (used as control) and significantly inhibited the release of pro-inflammatory cytokines and attenuated expression of IL-1β, IL-6 and iNOS in a dose dependent manner.

**Conclusions**: In the Investigations to find whether these particular plants are effective, RA effect was much higher than LS and GA potency in attenuating multiple pro-inflammatory agents hence indicating their potentiality against neurodegenerative diseases. In general, theses plants have manifested protective effects on microglial cells’ remarkably.

**Keywords**: RA, LS, GA, pro-inflammatory cytokines, Microglia cells, ROS, Nitric oxide, and Anti-inflammatory.

**SY VIII.04: GENETIC POLYMORPHISM OF FAT AND BITTER TASTE RECEPTOR GENES, CD36 AND TAS2R38, IN OBESE PARTICIPANTS**

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**Background and objectives**: Sensory perception of food strongly affects the ingestive behavior and intake of nutrients. The genetic variation in the genes encoding taste receptors also modulates the sensory properties in human beings. The aim of this study was to evaluate the polymorphism in genes encoding bitter and lipid taste receptor in lean and obese subjects.

**Methods**: We conducted our study on lean (n=53) and obese (n=53) participants that were recruited in National Institute of Nutrition (Tunis). We employed linoleic acid and PROP to assess, respectively, fat and bitter taste in the participants by employing the 3-armed forced choice test. We isolated the genomic DNA from blood samples by employing restriction-fragment polymorphism (RFLP).

**Results/Discussion**: Our study shows that fat taste and bitter taste perception altered in obesity may play a key role: Direct association between the perception of fat (CD36) and bitter (TAS2R38) in obesity.

We also determined hormone levels before and after the taste perception rounds. There was a positive relationship between and increased thresholds for fat and bitter taste. We looked for the single nucleotide polymorphism (SNP) of two genes, CD36 (fat taste) and TAS2R38 (bitter taste). The CD36 gene variant was rs1761667 and TAS2R38 gene variant were rs1726866 and rs10246939. We noticed that A-genotype of rs1761667 was positively associated with obesity. Similarly, A-genotype and C-genotype, respectively of two rs1726866 and rs10246939 were associated with obesity.

**Keywords**: Obesity, fat taste, bitter taste, genetic polymorphism.

**SY VIII.05: RISK FACTOR PROFILE FOR NON-COMMUNICABLE DISEASES: FINDINGS OF A STEPS SURVEY AMONG THE SUPPORT STAFF AT UNIVERSITY OF PRETORIA, SOUTH AFRICA**

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**Introduction**: Non-communicable diseases (NCDs) account for 71% mortalities globally and over 85% premature deaths in middle- and low-income countries. In South Africa, 60% of all deaths are attributable to NCDs. Common behavioural health risk factors linked to these diseases include: smoking, alcohol consumption, physical inactivity and unhealthy diet. Early screening could help lower NCDs incidences, treatment costs and prevent long term consequences. The aim of the study was to profile the NCDs risk factors among the insourced support staff at an institution of higher learning in Pretoria, South Africa.
Methodology: A cross-sectional, descriptive study approach was used. The WHO STEPS questionnaire was administered to collect: behavioural risk factor profile and NCDs history (STEP I), anthropometric (STEP II) and biochemical measurements (STEP III). Participants were insourced support staff (18 - 64 years) at University of Pretoria. Data was analysed using Epi-Info version 3.5.1.

Summary of results: A quarter of the study population reported that they consumed alcohol daily and 18.5% were current smokers. Majority of participants (97.8%) had low daily fruits and vegetables intake. Eighty percent of the study population “always” or “often” added salt to their food when cooking and 17.8% reported to consume “too much” or “far too much” salt. Based on body mass index (BMI), more than two thirds of the subjects were found to be either overweight or obese (70.6%), and 61.1% had abdominal obesity, both males and females. More than a third of the participants had raised systolic and diastolic blood pressure, blood sugar and cholesterol levels.

Conclusion: The study showed high prevalence of NCD risk factors among insourced support staff. Appropriate tailored measures are needed to lower the elevated risk.
NUTRITION POLICIES, POLITICS, AND NUTRITION GOVERNANCE IN AFRICA

TOPIC: LEADERSHIP AND NUTRITION GOVERNANCE OF SOCIETIES

Mark Hollingsworth, CEO Nutrition Society of UK and Northern Ireland

Title: What defines good governance in a Nutrition Society?
Presenter: Mark Hollingsworth, CEO The Nutrition Society, United Kingdom

Abstract Text:

The presentation examines the structure of good governance within nutrition societies. Good governance is fundamental to success. A Society is best placed to achieve its ambitions and aims if it has effective governance and the right leadership structures. Good governance enables and supports a Society’s compliance with relevant legislation and regulation. It also promotes attitudes and a culture where everyone and everything works towards fulfilling the Society’s vision.

Societies owe it to their beneficiaries, stakeholders and supporters to demonstrate exemplary leadership and governance.

In practice this means following 6 principles:
1. Organisational purpose. The Board is clear about the Society’s aims and ensures that these are being delivered effectively and sustainably;
2. Strategic leadership. The Society is led by an effective Board that provides strategic leadership in line with its aims and values;
3. Ethical behaviour. Ethical leaders act in accord with their conscience, when called upon, risking their careers by pursuing a more expansive vision of the organisational, institution, national or local interest in opposition to internal and/or external popular opinion or pressure;
4. Decision-making and control. The Board ensures that its decision-making processes are informed, rigorous and timely and that effective delegation, control and risk management systems are set up and monitored;
5. Transparency. The Board leads by example in being transparent and accountable to those it serves;
6. Discipline. The Board works as an effective team, controlling and motivating itself (and its individual members), staying on track and doing what is right.

Achieving these standards is not necessarily a legal or regulatory requirement. Instead, these principles and good practice are deliberately aspirational. They demand continuous improvement by leaders in Societies to strive to achieve the highest standards in personal and professional behaviour. If all Societies aspired to achieve such standards the collective global impact upon nutritional science could be truly profound.
This paper pursues a simple analysis of a static relationship between national income and income distribution, and obesity/overweight and undernutrition in African countries. From intuition, a relation between national income (GDP/Capita) and malnutrition is expected. Countries that have higher income are expected to have higher prevalence of obesity/overweight. Likewise, countries with higher income should have lower levels of undernutrition. This paper tests this hypothesis using macroeconomic data. The paper also analyses the role of income inequality, as measured by the GINI coefficient, as a potential driver of malnutrition. In this case, countries that have high levels of income inequality are expected to have coexistent high levels of both obesity and undernourishment. Results of this analysis show that there is a correlation between income and malnutrition. However, this relationship is weak, with a correlation coefficient of less than 50% for both undernourishment and overweight/obesity. However, the signs are as expected, even when running a simple regression of the variables. Higher national income has a positive relationship with obesity and negative relationship with undernourishment. From the regression, only the coefficient on undernourishment is significant at 5% confidence level. No significant relationship was found between income distribution and malnourishment, even on the extended logistic model. These finding are not realistically surprising. Higher income does not guarantee good nutrition, although poorer countries are expected to have high level of undernourishment. Also, there is a friction in the response of undernourishment to growth in GDP. Given the low-income elasticity of demand for food, higher income is not expected to be strongly linked to obesity. This could also be an explanation for the low response of malnutrition to income inequalities, although this latter relationship needs to be tested further with data sets of longer duration, in a time series approach. As such, it is important to lobby governments to mainstream food and nutrition security in other initiatives that increase national income, and to promote direct interventions that reduce the prevalence of undernourishment as part of meeting the Sustainable Development Goals (SDGs). This will ensure that high national income translates to reduction in malnutrition prevalence across countries.

Key words: Malnutrition; Obesity; Undernourishment; GDP/Capita; GINI Coefficient

TOPIC: HARNESSING THE POTENTIAL OF CAPACITY BUILDING IN AFRICA

Dr Christine Taljaard-Krugell
President, Association for Dietetics South Africa (ADSA)

ABSTRACT NOT RECEIVED

TOPIC: FINANCING TO MEET THE WORLD HEALTH ASSEMBLY TARGETS FOR NUTRITION: PROGRESS AND CHALLENGES

Dr Jack Clift, Results for Development Institute- Washington

According to the Investment Framework for Nutrition, developed by the World Bank, Results for Development Institute and 1000 Days, $70B in additional funding is needed from 2015 to 2025 to scale up nutrition specific programs to help reach the World Health Assembly targets for nutrition. The bulk of this funding is expected to come from domestic and donor resources. This presentation will outline global progress to date against the financial benchmarks. The presentation will also highlight which countries in Africa appear to be ‘donor orphans’ when it comes to nutrition funding, receiving little external aid relative to their need, and discuss what could be done to better support these countries in the fight against malnutrition.

TOPIC: NUTRITION THROUGH THE LIFE CYCLE: NUTRITION SPECIFIC, NUTRITION-SENSITIVE POLICIES, RESEARCH, INTERVENTIONS AND PROGRAMS

30
TOPIC: BREASTFEEDING IN AFRICA: ANCIENT ART AND MODERN MIRACLE'

Modou Phall
Executive Director of National Nutrition Agency (NaNA) The Gambia

ABSTRACT NOT RECEIVED

TOPIC: ASSESSING BREASTFEEDING FRIENDLINESS IN GHANA: LESSONS FOR THE REST OF AFRICA

Associate Professor Richmond Aryeetey
University of Ghana School of Public Health

Background: Breastfeeding is recognized as a key public health intervention. Although interventions that promote breastfeeding are effective, feasible, and cost-effective, they are often not implemented with adequate quality at scale. Better and context-appropriate evidence is needed to inform policy and programming for scaling up breastfeeding friendly environment. Aim: Between 2016 and 2018, the Becoming Breastfeeding Friendly (BBF) initiative was implemented to understand the current breastfeeding environment and to make recommendations for scale-up of effective breastfeeding actions in a more resource- and time-effective manner in Ghana.

Methodology: A BBF implementation committee of in-country experts applied the multi-dimensional BBF index, to assess how friendly the breastfeeding environment is in Ghana. The dimensions assessed were Advocacy; Political Will; Legislation & Policy; Funding and Resources; Training and Program Delivery; Promotion; Research and Evaluation; and Coordination, Goals & Monitoring. Following this, a mapping exercise was carried out to determine which stakeholders are active in the breastfeeding landscape, how they are linked, and how they influence each other. There is also ongoing work to understand how the evidence generated can influence key policy makers and implementing institutions. The BBF index was implemented twice (2016 and 2018) in Ghana.

Findings: The overall BBF index score declined from 2.0/3.0 in 2016 to 1.6/3.0 in 2018. The findings indicate that although there is high expressed political will to scale-up breastfeeding promotion, protection and support in Ghana, this has not been translated into addressing gaps in sub-optimal funding, weak enforcement of legislation & policy, insufficient advocacy & communication, and poor coordination across stakeholders. Although a wide range of actors are involved in the breastfeeding landscape only a few actively influence the landscape.

Conclusions: This evidence-based approach is well accepted and should be applied to strengthen policies and program implementation elsewhere in Africa to improve breastfeeding outcomes

TOPIC: BIOFORTIFICATION - SCALING UP BASED ON EVIDENCE

Dr Erick Boy
ABSTRACT NOT RECEIVED

TOPIC: FILL THE NUTRIENT GAP SITUATION ANALYSES AND RECOMMENDATIONS TO IMPROVE NUTRITION ACROSS SYSTEMS – EXAMPLES FROM AFRICA

Speaker: Janosch Klemm- WFP

ABSTRACT NOT RECEIVED

SY I: ADVOCACY, COMMUNICATION AND MOBILIZATION
SY I.01: HEALTH FACILITY-BASED COUNSELLING AND COMMUNITY OUTREACH ARE MODESTLY ASSOCIATED WITH MATERNAL DIET IN TANZANIA

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IMA World Health, Washington DC, USA

Background: Maternal diets contribute to the short, medium, and long-term well-being of mothers and children; however, in many settings, practices related to maternal diet are sub-optimal. Additionally, the reach of government programs including health facility and community-based nutrition counselling, especially related to maternal diets is limited.

Methods: We examined baseline data from our stunting reduction project (ASTUTE) that included 5,000 pregnant women in North-western Tanzania to better understand the role of counselling and community outreach on women’s dietary practices. We used chi-squares, t-tests, and ordered logistic regression to test these associations.

Results: Dietary practices among pregnant Tanzanian women are largely inadequate. Women rarely received government facility-based nutrition counselling and community outreach. Pregnant women who received antenatal care were advised about nutrition during pregnancy, and those who heard information about child health from a community health worker (CHW) were often significantly more likely than women who had not received such services to eat more during pregnancy and to have greater dietary diversity. 11.2% of women who received counselling about maternal nutrition before pregnancy and 6.3% of women who did not ate more types of foods (p<.001) during pregnancy. 9.7% of mothers who were counselled by CHWs about child health and 7.2% who were not ate more food during pregnancy. However, from a public health perspective, these differences are modest. After adjusting for a range of sociodemographic variables, these associations did not persist except for advice on maternal nutrition during pregnancy.

Conclusions: Facility-based counselling and community outreach are promising strategies to improve dietary practices; however, more widespread counselling will likely be needed to see a larger impact.

Recommendation: The Government of Tanzania and other implementing partners should strengthen policies and programs to increase mothers’ access to such services and reduce maternal malnutrition.

Keywords: Maternal diets, Tanzania, counselling, community outreach, pregnancy

SY I.02: AN EXPLORATION OF THE KNOWLEDGE AND INVOLVEMENT OF FATHERS IN THE PRACTICE OF COMPLEMENTARY FEEDING OF INFANTS AND YOUNG CHILDREN IN SOUTHERN ZIMBABWE

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Background: The role of fathers in infant and young child feeding has not been explored in Zimbabwe and its contribution to stunting reduction. To date, local research studies that have explored the role of parents in infant and young child feeding have tended to focus firstly, more on the mothers than the fathers and secondly, more on breastfeeding than complementary feeding practices which begin from 6 months of age.

Purpose of study: To explore the knowledge and extent of involvement of fathers in the complementary feeding of children 6 to 23 months in Zimbabwe.

Method: Through a qualitative approach, 10 fathers with children aged 6 to 23 months participated in the study. Local key informants were used to validate information given by fathers. Thematic analysis was used to identify emergent themes.

Results: There has been a notable change in behaviour among the fathers in comparison to what they did 10 years ago. The study also found that the fathers did support their wives with household activities such as playing with the
child, fetching water and firewood in bulk and cooking simple meals for their children, though the latter was generally reported as being done during the mothers’ absence. Some of the fathers are still however, mindful of what the predominant culture defines as a father’s role in child feeding and thus only do selective activities.

**Major conclusion:** New insight into the literature describing the knowledge and involvement of fathers in complementary feeding for fathers in Zimbabwe has been obtained.

**Key words:** knowledge, involvement, fathers, complementary feeding, children 6-23 months, Zimbabwe.

**SY I.03: NUTRITION EDUCATION INCREASES WOMEN'S DIETARY DIVERSITY IN KARAMOJA, NORTH-EAST UGANDA**

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**Background:** Inadequate dietary intake by women can cause malnutrition and is associated with poor nutritional status of under-five children. Adequate intake of (pro-)vitamin A and iron are a main challenge.

**Objective:** The study assessed the potential of Nutrition Education (NE) to improve dietary diversity of women within a Welthungerhilfe intervention, also including agricultural and entrepreneurial skills training amongst others.

**Design:** A quantitative study was carried out with women in the two project villages of Nadunget sub-county. At baseline (February 2018), 62 women were interviewed, using standardized questions on socio-economic status and dietary diversity. Afterwards, five 3-hours long nutrition sessions were held. At endline, three weeks after NE (April 2018), dietary diversity was assessed, calculating Minimum Dietary Diversity for Women (MDD-W, ≥5 of 10 groups), using a 7-day recall. Additionally, participant’s feedback on NE was investigated in.

**Results:** Percentage of women achieving MDD-W in the last 7d increased by 35.5% (baseline 43.5%; endline 79.0%). Mean number of food groups consumed increased by 1.1 (baseline 5.0 (±2.2); endline 6.1 (±1.9)). 'Other (pro-)vitamin A-rich fruits and vegetables’ showed the largest increase in consumption (+35.5%), followed by 'Nuts and seeds' (+32.2%); intake of 'Meat, poultry, fish' enhanced by 9.7%; consumption of 'Other vegetables' decreased by 16.1%.

**Conclusion:** Measurement of short-term effect showed that the proportion of women achieving MDD-W increased, especially due to higher consumption of (pro-)vitamin A-rich foods. NE embedded in multisectoral approach led to enhanced confidence and knowledge in diversified diets, that led, together with the other project interventions, to an increased MDD-W. However, refresher sessions and household follow-ups, as requested by participants are needed, to sustainably enhance dietary diversity.

**Keywords:** Nutrition Education, Dietary diversity, Women, rural Uganda, Karamoja.

**SY I.04: A PEER-LED PULSE-BASED NUTRITION EDUCATION INTERVENTION IMPROVED SCHOOL-AGED CHILDREN’S KNOWLEDGE, ATTITUDE, PRACTICE (KAP) AND NUTRITIONAL STATUS IN SOUTHERN ETHIOPIA**

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**Background:** Peer-led nutrition education intervention on promoting locally available pulses among school-aged children could be one strategy to overcome child malnutrition in poor communities.

**Objectives:** This study was aimed at assessing the effect of a peer-led pulse nutrition education intervention on knowledge, attitude, practice of pulse consumption and nutritional status among 202 school children.
Methods: School based randomized controlled trial was conducted among 202 (101 control and 101 cases). School age children were selected from the two groups using simple random sampling technique. Baseline data were collected from 1st May to 15th May, 2016. Six month peer led nutrition intervention was provided for the study subjects. Pre-test, post-test and anthropometric measurements (weight and height) were conducted at baseline and end of the intervention. Statistical tests such as independent two samples t-test were employed. World Health Organization (WHO) Anthrop Plus software version 1.0.4 was used to calculate anthropometric indices.

Results: The mean diet diversity score was significantly (P<0.001) improved from 2.78 (0.96) to 3.60 (1.10) after a six month intervention in the intervention group. The independent two samples t-test showed significant differences (p<0.001) in knowledge, attitude and practice mean scores of school age children about pulse preparation and consumption. There was no significant difference in nutritional status: BAZ (p=0.774) and HAZ (p=0.516) of school age children between the intervention and control groups at baseline. Post-intervention showed significant (p=0.01) differences between intervention and control schools in BAZ mean score of the children which was reflected in significantly (P<0.001) decreased prevalence of thinness

Conclusion: The study concluded that peer led education strategy provides an opportunity to reduce malnutrition and its impacts if properly designed, including the use of behavioral change mode.

Keywords: diet diversity, KAP, Peer-led education, pulses, nutritional status, school age children

SY I.05: HOUSEHOLD FOOD INSECURITY, COPING STRATEGIES AND NUTRITIONAL STATUS OF CHILDREN (24-59 MONTHS) IN IBADAN, NIGERIA

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Background: During periods of recession, households employ some coping strategies in order to augment for nutritional deficiency; a consequence of food insecurity. There is usually a decline in certain macroeconomic indicators such as gross domestic product (GDP), capacity utilization, household income, and inflation, with the attendant increase in the rate of unemployment.

AIM: The objective was to assess the household food insecurity, coping strategies and nutritional status of children (24-59 months) in Ibadan.

Methodology: A community-based descriptive cross-sectional study was conducted among 360 households with children (24–59 months). For each representative household, household food insecurity access scale, coping strategy, 24-hr dietary recall and anthropometry were used to assess household food insecurity and nutritional status of the respondents.

Results: Of the 360 households, food insecurity access scale indicated 54.7% of households were moderately food insecure while 11.4% were severely food insecure. This was found to be associated with mother and fathers’ educational level and household monthly income (p<0.05). Consequently, the prevalence of wasting, stunting and under-weight among children aged 24–59 months were 15.5%, 26.1%, and 18.3%, respectively. However, age groups 36-47, 24-35 and 24-35 had highest prevalence in wasting, stunting and underweight respectively. A negative correlation was identified between food security status and height-for-age as well as weight-for-age. A statistically significant relationship was found between food security status and coping strategy with a high percentage of respondents who relied on less preferred and less expensive foods, ration money to the household, reduce the number of meals consumed by the household and had mothers who limit their intake as coping strategies.

Conclusion: This study revealed that household food security affects a child’s nutritional status coupled with the coping strategy employed to ameliorate the effect of the food insecurity experienced.

Key words: Household Food Insecurity, Coping Strategy, Nutritional Status, Under-5

SY II: NUTRITION AND HEALTH IMPLICATION OF THE CURRENT FOOD SYSTEM IN AFRICA

The 4th FANUS Kigali Conference
LEMIGO Hotel
“Nutrition in Action for Sustainable Development in Africa”
SY II.01: FS4NEEDS: A NEW PLATFORM FOR ALIGNING THE FOOD SYSTEM WITH NUTRITION AND OTHER SOCIETAL NEEDS IN RWANDA

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Introduction: Despite laudable progress made by Rwanda on SDG 2 in the recent past, the burden of malnutrition remains persistently high. Stunting and anemia are still at 38 percent among children under 5. Overweight and obesity are increasing among children under 5 and women of reproductive age, as the nutrition transition unfolds in Rwanda. Diets remain inadequate, with only 18 percent of children 6-23 months receiving a minimum acceptable diet. Most of the investment towards addressing malnutrition has been channeled through the health system and safety nets.

Purpose: To test the hypothesis that a holistic, food system approach to improving nutrition through healthier diets can achieve superior, faster and more sustainable results than several parallel, uncoordinated initiatives.

Methods/Approach: A multi-sectoral platform was established in Rwanda to align the food system with nutrition and other societal needs (Food System for Nutrition, Equity, Economic Development and Sustainability – FS4NEEDS). The platform has launched a set of mutually reinforcing initiatives to increase supply and quality of nutrient-dense processed and unprocessed foods while generating demand for them, disincentivizing consumption of unhealthy foods, and creating the necessary enabling environment. Initiatives include fortification, complementary food safety and quality, improved product labeling, and nutrition-informed public sector procurement.

Summary of results: All initiatives show good progress, with fortification set to become mandatory by the second half of 2019 and strong engagement from key players from the public, private, social and academic sectors, as well as civil society. Capacity-building in local food processors targets both fortification and improvements in their processes for food safety and quality. Schools, health centers, armed forces and the prison system are being engaged to ensure all government food purchases are nutrition-informed.

Conclusion: Early results are encouraging and suggest accelerating synergies across initiatives and increased collaboration among food system stakeholders towards improving nutrition in Rwanda.

SY II.02: DEVELOPMENT OF FOOD-BASED RECOMMENDATIONS FOR 19-30YO WOMEN LIVING IN URBAN EGYPT USING OPTIFOOD

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Background: Growing urbanization and rapid changes in dietary patterns and lifestyle led to a nutrition transition in Egypt[1, 2]. While Egyptian women have the second highest mean body mass index in Africa [3], they also suffer from several micronutrient deficiencies such as iron[4] and vitamin D[5].

Objective: identify changes needed in dietary practices and product offer, which could help to rebalance energy and nutrient intakes for women living in urban Egypt.

Methods: Food intakes were obtained from a 4-days dietary record in 127 women from urban Egypt (19-30 yo). Food prices were collected in modern and traditional trades typical from middle socio-economic classes in Cairo to calculate diet cost. Modeling analyses (Optifood software[6]) were used to identify problem nutrients and design affordable food-based recommendations (FBRs): we assessed whether the most consumed foods (i.e. consumed by >5% of women) could theoretically ensure nutrient adequacy under the mean diet cost, without exceeding recommendations.
in energy, SFAs, sugars and sodium. The potential of fortified foods to improve intakes of the most problematic micronutrient to cover was tested in additional modeling analyses.

**Results:** Iron is the most problematic recommendation to cover with local and consumed foods. Daily consumption of fruits, vegetables, milk or yoghurt, and tahini (sesame paste) associated with specific food choices in the meat-fish-eggs category would result in a low percentage of women at risk of inadequate intakes for 11 out of 12 micronutrients modeled. Among the fortified foods tested, iron fortified bread, rice, milk or yoghurt are promising vectors to improve iron intakes.

**Conclusion:** Local and consumed foods can ensure nutrient adequacy of most nutrients except iron, for which fortified products would be required to ensure adequacy. Tailored strategies are needed to promote acceptable FBRs (and fortified products) and secure that nutrient requirements are met by most Egyptian women.

**SY II.03: EFFECT OF LYSINE SUPPLEMENTATION ON HYPERTENSIVE MEN AND WOMEN IN SELECTED PERI-URBAN COMMUNITY IN GHANA**

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**Introduction:** Lysine is one of the essential amino acids and in cereal based diets it is known to be the most limiting and therefore determines the quality of dietary protein in such diets. This study investigated the effect of lysine supplementation on blood pressure of hypertensive adults in selected peri-urban community in Accra, Ghana.

**Purpose of the study:** Current research indicates that addition of lysine to the diets has a favorable effect on protein status, morbidity (as described by diarrhea), chronic and acute anxiety. Based on this study was done in Ghana that examined the impact of lysine on protein status and hypertension of adult men and women. It also examined the potential of incorporating lysine in diets globally through the development of a food products.

**Methods:** The study was a randomized double-blind controlled study made up of adults men and women assigned to a lysine supplemented group and a placebo-supplemented (control) group. The subjects aged between 18 – 45 years and totaling 180.

**Results:** Total of 50 (28%) of the participating were hypertensive defined as Systolic Blood Pressure (SBP) ≥140 mmHg. The mean SBP of lysine-supplemented group significantly dropped from 146.11 ± 11.92 to 128.95 ± 10.44 mmHg (p = 0.02). That of women also dropped from 144.12 ± 10.41 to 132.28 ± 10.69 mmHg, (p = 0.06) while the control group had there SBP remained fairly constant after 112 days of intervention with changes in men from 145.79 ± 12.56 to 142.79 ± 11.07 mmHg (p = 0.32) and women in the control had very little drop from 145.15 ± 14.79 to 145.00 ± 17.93 mmHg (p = 0.96).

**Conclusion:** Lysine supplementation resulted in normalization/reduction of blood pressure of hypertensive subjects who have suboptimal lysine intake.

**Keyword:** Lysine, Hypertension, Placebo, Supplementation

**SY II.04: IDENTIFICATION AND DOCUMENTATION OF NEGLECTED UNDERUTILIZED GREEN LEAFY VEGETABLES AND FRUITS IN SOUTH EAST GEO-POLITICAL ZONE OF NIGERIA**

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Background/Objective: Micronutrient malnutrition is a public health problem. Fruits and vegetables are good sources of micronutrients to fight hidden hunger and several chronic diseases like obesity, diabetes mellitus, hypertension, cancer and cardiovascular diseases. The study was designed to identify, characterize and document neglected underutilized fruits and vegetables in Southeast geopolitical zone of Nigeria.

Methodology: A multiple sampling technique was used. Focus group discussion (FGD) was used to elicit information on the underutilized fruits and vegetables, their availability and utilization in the study communities. Samples of 306 elderly women were used for the study. Volunteers from the FGD helped the researcher to uproot the food crops from the forest for further study. The plants uprooted were identified at Herbarium of the Department of Botany University of Nigeria Nsukka.

Results: The result showed that quite a number of fruits and vegetables abound in the study area. A total of forty-five (45) underutilized vegetables, fourteen (14) common vegetables, twenty-three (23) underutilized fruits and twenty-two (22) common fruits were identified and documented. Underutilized fruits and vegetables are used in different ways to cure so many diseases.

Conclusion: Adequate consumption of these fruits and vegetables will help to fight micronutrient deficiency-related problems, chronic diseases and diversify diet thereby leading to food security.

Keywords: Identification; characterization; documentation; underutilized; vegetables and fruits.

SY IL05: NUTRITIONAL STATUS AND ASSOCIATED DRIVERS OF FOOD CHOICE AMONG LACTATING WOMEN IN DEBREBIRHAN TOWN, NORTH SHOA ZONE, AMHARA REGION, ETHIOPIA

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BACKGROUND: People’s perception of food products during food choice is a very complex phenomenon that is influenced by a wide range of characteristics that an individuals, groups and local communities make.

OBJECTIVE: This study investigated nutritional status and associated motives of food choice among lactating women.

METHODS: Anthropometric measurements and questionnaires were used to collect the required data among 423 randomly selected lactating women using cross-sectional study. Data was analyzed via SPSS version 20, and associated motives of food choice to nutritional status of women were identified by logistic regression analysis; p-value < 0.05 was taken as statistically significant.

RESULTS: Prevalence of chronic energy deficiency, underweight and stunting was identified as 21.7%, 26.5% and 5% respectively. In a multivariate regression model, all food choice questionnaire motivations, the strongest motivations specifically affecting were healthy meal, price and mood. Accordingly, healthy meal eating motivation, price and mood concern were the most significant determinant with AOR (95% CI) of 2.1 (1.21-3.62), 3.01(1.32-6.9) and 0.5(0.30-0.95) respectively.

CONCLUSION: Nutritional status of lactating mothers was assessed using anthropometric measurement. In this particular group of women the most important motivating factors of food choice for nutritional status were health meal, price and mood. Focus on supporting people’s motivations to attain their good health by addressing issues of dietary self-control and self-regulation through nutrition education about healthy food choice is recommended. Since awareness creation is an important to inspire women, their families and communities to increase food intake, proper dietary practices and dietary diversification during lactation in order to successful in improving the livelihood of lactating women.

Key words: Nutritional status, Motives, Food choice, Lactating women
SY III: DATA GENERATION AND KNOWLEDGE SYSTEMS

SY III.01: MID-TERM NUTRITION AND WASH OUTCOMES: PROMISING ACHIEVEMENTS OF GIKURIRO PROGRAM TOWARDS REDUCTION OF STUNTING AMONG CHILDREN UNDER 5 YEARS OF AGE IN RURAL RWANDA

Alemayehu Gebremariam: CRS Rwanda

Background: Despite the tremendous progress made, malnutrition in all its forms continues to be a public health concern in Rwanda. Currently, stunting (chronic malnutrition) is rated to 38% in Rwanda. Since End of 2015, Gikuriro program was started to support the Government of Rwanda to improving nutritional status of women in reproductive age, and children under 5 years of age since. This report summarizes the nutrition outcomes from mid-term evaluation of Gikuriro program interventions in 5 operational districts.

Methods: This study used a cross-sectional household (HH) survey design. The study used quantitative methods which consisted a structured questionnaire in sampled HHs within the program area of interventions. The study used a representative multi-stage sampling technique to select a total of 2562 HHs. Data were recorded to a highly secure central server https://www.commcarehq.org, processed using Excel. Cleaning and analysis were done using STATA v15 and SPSS v25.

Findings: By 2.5 years of Gikuriro program, the average number of HH with kitchen garden significantly increased from 31% to 43.5% \( (p=0.000) \). Green vegetables were commonly grown (75.0%). The HH acceptable food consumption increased from 22% to 45.5% \( (p=0.000) \). Proportion of women diverse diet increased from 24.5% to 66.1%. Also, the study showed a significant increase of mothers’ knowledge of “age to start complementary feeding”, from 80.3% to 85.4% \( (p=0001) \); and mothers’ knowledge of “breastfeeding should be continued up to 24 months” increased from 55.6% to 63.9% \( (p=003) \). The proportion of HH with water, soap and handwashing station increased from 16% to 21% \( (p=0.0001) \), and with access to basic sanitation services significantly increased from 69.5% to 80.7% \( (p=0.0001) \). Also, the proportion of HH who stored drinking water shot up from 59.0% to 67.7% \( \text{Diff: 8.7%, 95% CI: 5.36, 10.64, p=0.0001} \). Among children under 5 years of age, the prevalence of diarrhea decreased from 22% to 17% \( (p=0.0001) \).

Conclusions: The findings show a significant improvement in HH’s access to food, and basic sanitation services over last 2.5 years of Gikuriro program at community level. Also, it tells about a promising contribution of Gikuriro program to reduce stunting among under 5 years of age as well as to the fight other forms of malnutrition in rural Rwanda. These achievements might be attributed to Gikuriro program’s five main strategies. Strengthening and or reviewing the existing implementation strategies, and ensuring effective monitoring system would maintain and or accelerate this momentum of positive trends, and leading sustainable program outcomes. There is a need to thoroughly explore specific factors interfering with greater positive trends the program.

SY III.02: ANTHROPOMETRIC STATUS AND PREVALENCE OF FUNCTIONAL IMPAIRMENTS AMONG ELDERLY IN IJEBO ODE LOCAL GOVERNMENT AREA OF Ogun STATE NIGERIA.

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Background: As people gets older, bodily function decreases. This increases the vulnerability to poor nutritional status causing many to seek assistance in carrying out specific activities of daily living.

Objective: This study assessed the anthropometric status and prevalence of functional impairments among elderly subjects in Ijebu-Ode Local Government Area of Ogun State, Nigeria.

Methods: A descriptive cross sectional study involving 500 elderly subjects (206 - 41.2% male) and (294 – 58.2% female).
female) selected from 100 households in 5 of the 11 wards in the study area. Body Mass Index (BMI) was derived from weight and height measurements, waist and hip circumferences taken to assess abdominal obesity. Functional Impairments evaluated with Katz Index of Independence Activities of Daily Living (KADL). SPSS 20.0 was used for data analysis.

**Results:** Most (47%) of the elderly studied were aged 60-69yrs while 16.8% were ≥ 80years. The mean age was 71.10±8.40years. Based on Body Mass Index (BMI), more than half of both sexes (55.3%) male and (51%) female had normal value of 18.5-24.9kg/m² while < 2% male and 3.4% female respectively were underweight. Waist to Hip Ratio indicated more women (72.1%) at high risk than men (20.9%). Prevalence of functional impairment was 26.6% related mostly to transference (25.6%) and the least with feeding (3.6%). Impairment was more (58.6%) in women than men (41.4%). However, (49.6%) were mildly impaired while (15%) were severely impaired. Overweight and obesity was more in non-impaired than the impaired (33.8% and 12.8%; 30.1% and 8.3%) respectively. The eldest category of ≥80years had significant association with severe functional impairment (p=0.001˂0.05). BMI was not dependent on functional impairment (p=0.09˃0.05).

**Conclusion:** The study established that elderly are prone to functional impairments which advances with age. It was more in women in addition to overweight and obesity. Thus the need for appropriate nutrition education to address issues of overweight and obesity among women.

**Keywords:** Anthropometric status, prevalence, functional impairment, elderly

**SY III.03: AFLATOXIN AND MALNUTRITION OF CHILDREN UNDER 5 AT OUÉLÈSSEBOUBOU IN MALI**

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**Background:** Malnutrition is not just insufficient nutrient intake. The consumption of aflatoxin B1 can lead to malnutrition through poor intestinal absorption and the immune dysfunction it causes. Aflatoxin is a toxin secreted by *Aspergillus flavus* that preferentially proliferates on cereals, peanuts and other aliments. The present study aimed to highlight the presence of aflatoxin B1 in the blood of children under 5 in Ouélessebougou.

**Materials and methods:** We conducted a cross-sectional study in September 2016 in Ouélessebougou on 36 children aged 6-59 months selected at random from a cohort of nutritional monitoring. In addition to anthropometric measurements, blood was taken for the determination of aflatoxin B1. Multiple logistic regression was performed.

**Results:** Wasting was 5.6% without a severe form, stunting was 33.3%, of which 13.9% was severe and underweight 11.1% with 2.8% severe. Aflatoxin was present in 86.1% of children. The average aflatoxin level was 29.7 μg / mg (20-48). The blood of all stunted children contained aflatoxin, in contrast to emaciated children. Aflatoxin levels were higher in cases of severe growth retardation. No association has been found associations between malnutrition and aflatoxin.

**Conclusions:** Aflatoxin B1 exists in the blood of Malian children in Ouélessebougou with high levels. There is reason to believe that stunting may be associated with aflatoxin levels.

**Recommendations:** A second study with a larger sample size could highlight this association.
Key words: Aflatoxin, wasting, stunting, underweight, children 6-59 months, Ouélessebougou.

SY III.04: HOW DOES NUTRITIONAL STATUS RELATES TO HANDGRIP STRENGTH OF SMALLHOLDERS IN TESO SOUTH, KENYA?

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Background: Smallholder farmers’ agricultural practices in sub-Saharan Africa demand a high amount of physical activity. Ironically, they often belong to the most malnourished people in Kenya. As muscle function reacts early to nutritional deprivation, handgrip strength has become a popular marker of nutritional status and is increasingly being employed in nutritional intervention studies. The objective of this study is to investigate the association between nutritional status and handgrip strength (HGS) in farmers in Teso South, Kenya.

Methods: A total of 455 farm families participated in a cross-sectional study conducted in July 2017. Handgrip strength was measured from adult farmers. Measurements were taken in a standing position using a Jamar hydraulic handgrip dynamometer from Lafayette Instrument®. Additionally, weight and height were assessed to calculate Body Mass Index (BMI).

Results: 72% of the study participants were female while 28% were male. Mean age was 33 ± 9.2 years. Mostly, participants had a moderate to heavy daily activity (men: 94%; women 88 %). Mean BMI was normal (women: 23 kg/m² ± 4 and men: 21 kg/m² ± 4). Mean maximal HGS in dominant hand was 35 kg (min: 12 – max: 70). HGS was higher in men than in women (44 kg ± 6 vs 31 ± 6). Not normal BMI was associated with lower physical strength (quadratic relationship). Female farmers had a lower HGS compared to male farmers.

Conclusion: Poor nutritional status was associated with poor HGS. This may indicate that underweight and overweight farmers are likely to have more difficulties in food production. Although, the labor allocation of men and women farmers is almost equally distributed, male farmers have a higher HGS than women. There is need to investigate further the associations smallholders’ nutritional status, and HGS in relationship to their physical activity among male and female.

SY III.05: EFFECT OF MATERNAL AFLATOXIN EXPOSURE THROUGH DIET ON GROWTH OF INFANTS 0 - 3 MONTHS IN KISUMU COUNTY, KENYA

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Background: Aflatoxins are naturally occurring carcinogenic toxins associated with poor growth outcomes in young children. Although evidence supports mother to infant exposure during pregnancy and breastfeeding, evidence of its effect on growth is limited to the period after introduction of complementary foods. It is therefore unclear whether early maternal exposure to aflatoxin affects infant growth right from birth.

Objective: The main objective of this study was to determine the effect of maternal aflatoxin exposure on growth of
infants 0-3 months old in Kisumu County, Kenya.

**Design:** In a prospective cohort study design, 553 pregnant women were screened for aflatoxin exposure, out of which 137 exposed and 137 non-exposed women, matched for age and household income, participated in an 8-month cohort study. The women were followed up to delivery and their infants up to 3 months after delivery. Infant length and weight data was collected monthly. Length-for-age (LAZ), weight-for-length (WLZ)) and weight-for-age (WAZ) z-scores were generated. Aflatoxin levels were analyzed using Enzyme Linked Immunosorbent Assay (ELISA) in parts per billion (ppb). Effects of aflatoxin on infant growth outcomes were assessed using multivariate linear and logistic regression. Effect of maternal aflatoxin exposure on infant length, weight, LAZ, WLZ, WAZ was determined using Cox regression with constant time at risk.

**Results:** Infants of exposed women had lower weight (95% CI: -0.85, -0.53), length (95% CI: -4.08, -3.36), LAZ (95% CI: -1.93, -1.16) and WAZ (95% CI: -1.03, -0.54) at 3 months of age, but there was no difference in WLZ (95% CI: -0.03, 0.74). Risk of stunting and underweight in infants of women who were exposed to aflatoxin levels above 10 ppb was 4.07 times higher (95% CI: 1.35, 12.29; p=0.013) and 6.61 times higher (95% CI: 0.80, 54.33; p=0.079), respectively, than in infants who were not exposed. The risk of wasting was 38% lower in infants of exposed compared to infants of non-exposed women (RR 0.38, 95% CI: 0.040, 3.39; p=0.38)

**Conclusion:** The findings of this study suggest that maternal exposure to aflatoxin could affect growth of their infants during the period of exclusive breastfeeding.

**Key words:** Aflatoxin, maternal, infant, growth, z-scores, ELISA, stunting, underweight.

### SY IV: DATA GENERATION AND KNOWLEDGE SYSTEMS

**SY IV.01: SPATIAL DISTRIBUTION AND PREDICTORS OF VITAMIN A DEFICIENCY AMONG INFANTS 6-23 MONTHS IN BUNGOMA AND BUSIA COUNTIES, KENYA**

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**Background:** Geospatial unevenness in disease conditions which is often unnoticed can influence the success of interventions where the physical location of a children can affect their health through several ways.

**Purpose:** To determine prevalence, geospatial distribution and predictors of vitamin A deficiency (VAD) among children aged 6-23 months in Western Kenya.

**Method:** Retinol-binding protein (RBP) and C-reactive protein (CRP) was undertaken to estimate VA and sub-clinical inflammation. ArcGIS and GeoDa 1.6 were used for spatial analysis. A null hypothesis of spatial randomness was tested at a level of significance α=0.005 against the thought of Spatial Autocorrelation (SA). It was rejected giving a strong evidence of significant spatial patterns of VAD distribution in Bungoma and Busia. Local Indicators of Spatial Association were used to assess levels of local clustering. Regression analysis was conducted to model most significant prediction equation for a set of 12 covariates. Exploratory Spatial Data Analysis was conducted followed by Ordinary Least Squares Regression (OLSR) on the predictor variables. Dependent variable was VAD while spatial and demographic variables were the independent variables. The results of OLSR were scrutinized by a set test diagnostic for existence of spatial dependence (Lagrange Multiplier diagnostics).

**Summary of results:** Analysis of Moran's Index in Bungoma and Busia revealed heavy clustering of High-High (M≥0.9). Lower parts of Bungoma and Busia showed heavy clustering of Low-Low values of VAD (M≤0.9). Spatial error model yielded varying levels of coefficients with diverse spatial and non-spatial independent variables at α≤0.005 with a sensitivity of 999 permutations and λ=0.381. OLSR identified length of crop growing period, distance to health facilities and towns as the most significant spatial predictors of VAD.

**Conclusions & recommendations:** Distribution of VAD prevalence in the study population is not uniformly distributed which requires varying intervention approaches currently in the call for nutrition-specific and nutrition-sensitive interventions.

**Key Words:** VAD, Spatial distribution, Predictor
SY IV.02: RELATIONSHIP BETWEEN NUTRITIONAL STATUS, MALARIA, ANAEMIA AND SOCIO-ECONOMIC IMPACT AMONGST UNDER-TEN CHILDREN IN THE NORTH REGION OF CAMEROON

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Introduction: Malaria, anaemia, and malnutrition are key public-health challenges in Cameroon. However, little has been reported on the interaction between these interconnected health determinants. The study was designed to investigate the relationship between nutritional status, malaria occurrence and anaemia, amongst under – ten children living in an area of intense seasonal malaria transmission in Northern Cameroon.

Methods: A Cross-sectional survey was conducted in November 2013, in Pitoa and Mayo-Oulo Health Districts. Total, 368 children aged 6months-10 years were enrolled. Anthropometric measurements were taken using standard methods. Nutritional status was assessed by calculating Height for Age (HA), Weight for Age (WA) and Weight for Height (WH) z-scores to determine stunting, underweight and wasting respectively. Structured questionnaires were used to assess Socio-economic status. Finger-prick blood samples collected were used for haematocrit, malaria parasite prevalence, specie and density as well as Plasmodium DNA extraction from filter paper for PCR. Data analysis was by SPSS 20 and Epi-info-6.

Results: Overall prevalences of malnutrition, malaria, and anaemia were 54.1%, 32.9%, and 20.6% respectively. Stunting, underweight and wasting were prevalent in 56.9%, 63.5% and 34.8% of the children respectively. A statistically significant association was found between malaria and malnutrition [OR=1.89,(95%CI:1.12-3.19);(p=0.017)]. Malnutrition was also strongly associated with malaria status [OR=2.07,(95%CI:1.22-3.53);(p=0.007)]. No significant associations were found between malnutrition and development index (p=0.348), malaria and anaemia (p=0.422) as well as anaemia and malnutrition (p=0.599). However, both malaria status and anaemia correlated with development index [OR=0.75,(95%CI:0.58-0.99);(p=0.042)] and [OR=1.45,(95%CI:1.05-2.00);(p=0.023)] respectively.

Conclusion: Malaria and malnutrition may not have been the causes of anaemia. Therefore, other factors may have accounted for anaemia in the children. Socio-economic status did not influence malnutrition. Malaria programmes should also scale-up on improving the health of malnourished and anaemic in poor communities, thereby reducing the socio-economic burden and improving nutrition for longevity and sustainable development in Africa and why not, the world at large. Further studies are recommended to ascertain the possible causes of anaemia.

Keywords: Nutritional status, malaria, anaemia, prevalence.

SY IV.03: GEOMEDICINE AND TRANSGENERATIONAL HEALTH : ASSESSING DEFIENCIES OF LOW SELENIUM INTAKE IN CAMEROONIAN POPULATION, AND HEALTH RISKS FOR THEIR OFFSPRINGS

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**Background:** Selenium is an essential trace mineral of fundamental importance to human health. It is a key constituent of selenoproteins and play a structural and enzymatic roles. Diets are the main source of selenium intake in humans and animals. The current (ongoing) project aims at estimating the level of selenium dietary intake by individuals from the five agroecological zones of Cameroon, and evaluate risks of deficiencies.

**Methods:** In the phase 1 of this project, a systematic review was conducted to review the actual levels of selenium detected in most consumed foods and diets in Cameroon. 126 published papers dealing with mineral analysis in foods and diets were collected and reviewed. 235 entries of data, (dishes and food items) were grouped for main ethnic groups in the five agroecological zones.

**Results:** Less than 10% of papers reviewed were found to have included selenium in their analysis. All the agroecological zones and food categories were found to be present. Methodological approaches used in these studies include total diet studies, analysis of raw and cooked foods. 82% of the foods and dishes were found not to contain selenium. Spices had the highest concentration of selenium. Fresh and smoked Fish, soup (chicken and tomato), vegetables had detectable levels of selenium. Other foods categories seems to be very poor.

**Conclusions:** Till now, very few studies on mineral analysis in foods have included selenium analysis. Existing data showed that most consumed foods items from all foods categories in the five agroecological zones of Cameroon have very low levels of selenium. This suggest a low intake and possible deficiencies in an important portion of the population. Adding spices in diet appears to greatly increase selenium levels.

**Keywords**: Selenium – dietary intake – Deficiency – Offspring – Agroecological zones

**SY IV.04: HOUSEHOLD FOOD INSECURITY, COPING STRATEGIES AND DIETARY DIVERSITY AFTER THE MAJOR 2010 LANDSLIDE DISASTER IN EASTERN UGANDA: A CROSS-SECTIONAL SURVEY**

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**Background:** In 2010 a major landslide in Bududa district in Eastern Uganda killed about 350 people and nearly 1000 affected households were resettled in Kiryandongo district of Western Uganda.

**Methodology:** A cross-sectional survey assessed household food insecurity, related coping strategies and the diversity and varieties of food eaten in the diet of 1078 affected and control households in the two districts. The Household Food Insecurity Access Scale, Child Hunger Index and Coping Strategies Index were adapted to assess food insecurity and coping experiences, while diet diversity and food variety scores applied to estimate food groups and food varieties eaten.

**Results:** In Bududa, those affected had a lower adjusted mean (SE) score of food insecurity than controls: 92 (04) vs. 123 (04) (P < 001), but higher diet diversity score (DDS): 71 (01) vs. 59 (01) (P < 001). Household size increased the likelihood of food insecurity (OR 115; 95% CI 100, 132; P < 005), but reduced DDS (OR 093; 95% CI 087, <100; P = 004). Low DDS was more likely in disaster affected households (OR 422; 95% CI 265, 672; P < 001) and mainly farmers (OR 252; 95% CI 137, 464; P < 001). In Kiryandongo, affected households had higher food insecurity: 123 (08) vs. 26 (08) (P < 001) with severe coping higher among affected households. Affected households also had a higher likelihood to skip a day without eating a household meal together (OR = 177; 95% CI 123, 257; P < 001).
Conclusion: The resettlement of victims into Kiryandongo was linked to severe coping experiences. Administrative remedies and social protection could mitigate food insecurity, coping strategies and poor diet in post-disaster situations.

Key words: Household food insecurity, diet diversity, coping strategies, landslides, Eastern Uganda

SY IV.05: A SYSTEMATIC REVIEW AND META-ANALYSIS ON PREVALENCE OF DIETARY DIVERSITY FEEDING PRACTICE AND ITS ASSOCIATED FACTORS AMONG CHILDREN AGE 6-23 MONTHS IN ETHIOPIA FROM 2011 UP TO 2018.

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Background: Globally, less than one fourth of children age 6-23 months get the recommended minimum dietary diversity feeding practice. In Ethiopia, fragmented and inconsistent findings were found. Therefore, the main objective of this meta-analysis was to estimate the pooled prevalence of dietary diversity feeding practice and to identify its associated factors among children age 6-23 months in Ethiopia.

Methods: The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guideline was followed. Articles were systematically searched through PubMed, Google scholar, Google, Hinari and Cochrane library. A total of 14 studies were extracted and analyzed using STATA 14. Random effect model was used to estimate the pooled prevalence; whereas subgroup analysis and meta-regression was performed to identify the probable source of heterogeneity. Both Egger’s and Begg’s test were used to check publication bias. The effect between associated factor variables, and dietary diversity feeding practices were examined.

Results: The 14 studies were included in meta-analysis. The pooled prevalence of dietary feeding practice among children age 6-23 months in Ethiopia was 23.25 % (CI 17.73, 28.78) with severe heterogeneity ($I^2 = 98.8$, $p= 0.00$). The lowest prevalence was observed in Amhara region [12.58 % (CI: 8.61, 16.55)]. Home delivery OR: 0.63 (95% CI 0.36, 1.00), antenatal care follow up OR: 1.80 (95% CI 1.06, 3.05), postnatal care visit OR: 2.61(95% CI 2.15, 3.18), mothers decision making status OR: 1.65(95% CI 1.30, 2.09), mothers media exposure status OR: 2.79 (95%CI 1.88, 4.15) and being urban residence OR: 2.18 (1.26, 3.77) were factors of recommended dietary diversity feeding practice.

Conclusions: The pooled prevalence of dietary diversity feeding practice among children age 6-23 months in Ethiopia was low. Place of delivery, post natal care, antenatal care service, mothers decision making status, mothers media exposure status and being urban residence were found to be the significant factors.

Key words: Dietary diversity, Pooled prevalence, Age 6–23 months, Ethiopia

SY V: IMPROVING FOOD SYSTEMS AND DIETS TO IMPROVE NUTRITION: HOW CAN WE GROW DEMAND AND SUPPLY OF HEALTHY, SAFE, NUTRITIOUS FOODS TO FILL THE NUTRIENT GAP? (World Food Programme and Sight and Life Symposium)

SY V.01: INTRODUCTION TO FNG & ITS USE IN AFRICA: WHY, METHODOLOGY, EXAMPLES OF FINDINGS AND HOW THEY’RE USED

FNG team
ABSTRACT NOT RECEIVED
SY V.02: FNG RWANDA & UGANDA, HIGHLIGHTS OF RESULTS & RECOMMENDATIONS

Robert Ackatia-Armah / Government representatives

ABSTRACT NOT RECEIVED

SY V.03: FS4NEEDS, RWANDA: WHY, VISION, FRAMEWORK, INITIATIVES AND PROGRESS SO FAR

Peiman Milani / Government representative

Introduction: Despite laudable progress made by Rwanda on SDG 2 in the recent past, the burden of malnutrition remains persistently high. Stunting and anemia are still at 38 percent among children under 5. Overweight and obesity are increasing among children under 5 and women of reproductive age, as the nutrition transition unfolds in Rwanda. Diets remain inadequate, with only 18 percent of children 6–23 months receiving a minimum acceptable diet. Most of the investment towards addressing malnutrition has been channeled through the health system and safety nets.

Purpose: To test the hypothesis that a holistic, food system approach to improving nutrition through healthier diets can achieve superior, faster and more sustainable results than several parallel, uncoordinated initiatives.

Methods/Approach: A multi-sectoral platform was established in Rwanda to align the food system with nutrition and other societal needs (Food System for Nutrition, Equity, Economic Development and Sustainability – FS4NEEDS). The platform has launched a set of mutually reinforcing initiatives to increase supply and quality of nutrient-dense processed and unprocessed foods while generating demand for them, disincentivizing consumption of unhealthy foods, and creating the necessary enabling environment. Initiatives include fortification, complementary food safety and quality, improved product labeling, and nutrition-informed public sector procurement.

Summary of results: All initiatives show good progress, with fortification set to become mandatory by the second half of 2019 and strong engagement from key players from the public, private, social and academic sectors, as well as civil society. Capacity-building in local food processors targets both fortification and improvements in their processes for food safety and quality. Schools, health centers, armed forces and the prison system are being engaged to ensure all government food purchases are nutrition-informed.

Conclusion: Early results are encouraging and suggest accelerating synergies across initiatives and increased collaboration among food system stakeholders towards improving nutrition in Rwanda.

SY V.04: CROSS-FERTILIZATION ON NUTRITIOUS FOOD INITIATIVES IN GHANA: OBAA SIMA, FNG, WFP PROGRAMMING

Vera Kwara

ABSTRACT NOT RECEIVED

SY VI: NUTRITION POLICIES, POLITICS, AND NUTRITION GOVERNANCE IN AFRICA

SY VI.01: PERCEPTIONS OF MOTHERS, CAREGIVERS AND HEALTH WORKERS TOWARDS DONOR HUMAN MILK BANKING IN ZIMBABWE

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**Background:** The WHO recommends that donor breastmilk is superior to artificial infant formula in situations where the baby cannot feed on the mother’s breastmilk.

**Purpose:** To assess the perceptions of mothers, caregivers and health workers towards the use of breastmilk banks in Zimbabwe.

**Methods:** A cross-sectional study design was done with a sample size of 535 health workers, 10 key informants and 2 FGDs. Purposive sampling was done for selecting the 3 referral hospitals and key informants. Five health professions working in maternity ward were also purposively selected and lastly random sampling was used to select health workers from each professional group.

**Results:** Knowledge on breastmilk banks and processing of donor human milk was significantly associated to health workers' professions (p<0.05), high among KII and low among mothers. Most mothers would not receive donated breastmilk due to fear of disease transmission unless it is made safe and majority would rather donate their breastmilk to help other babies in need. Commitment to implement breastmilk banks in Zimbabwe was moderate among hospital management and policy makers if equipped with knowledge, skills and resources.

**Conclusions:** The results show that health workers and policy informers will consider the use of breastmilk banks, while acceptability by mothers and caregivers was low due to their lack of awareness. Overall, considering the positive attitudes by policy makers, the adoption of breastmilk banks in Zimbabwe is a possibility, with the entry point via health workers.

**Keywords:** Breastmilk banks, knowledge, mothers, breastfeeding

**SY VI.02: USING MACHINE LEARNING TOOLS TO DESIGNS TRANSFORMATIVE INTERVENTIONS AND POLICIES TO COMBAT CHILD MALNUTRITION AND FOOD INSECURITY**

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**Background:** In most developing countries, malnutrition is directly or indirectly responsible for half of all deaths among children under the age of five. Moreover, malnourished children are more prone to other risks factors that affect child’s physical and mental growth. The cycle of food insecurity a predisposition of chronic diseases, tends to drain the household budget, leaving little limited resources essential for nutrition and other care.

**Objective:** This paper contributes in exploring the possibilities of using machine learning in identifying the cause of child malnutrition and food insecurity in developing countries.

**Design:** Machined learning tools for clustering, classification, and prediction such as t-SNE, XGboost and neural networks are used to identify important risk factors influencing child malnutrition and food security. Rwanda, Malawi, Tanzania, and Uganda are used as case studies using data from the Living Standard Measurement Studies and the Demographic Health Surveys. The dependent variables are child nutrition status and the degree of food insecurity. Predictor variables include demographic, access, health, household, biophysical, and socioeconomic factors that contribute to both child malnutrition and food insecurity. Combining these variables is critical when indemnifying causality.

**Results:** The main findings suggest that machine learning is an efficiency approach in terms of identifying key variables related to child malnutrition and household level food insecurity. Farming systems, remoteness, literacy, and vulnerability to poverty accentuated both child malnutrition and food insecurity.

**Conclusion:** Targeting households with low literacy rates through tailored educational interventions and formulating public policies that aim to increase productivity of specific farming systems will generate impactful results.

**Keywords:** machine learning, multilabel classification, neural networks, Tanzania
SY VI.03: EVALUATION OF THE NUTRITIONAL POTENTIAL OF ORANGE-FLESHED SWEET POTATOES TO PREVENT VITAMIN A DEFICIENCY IN RURAL AREAS OF KAFFRINE REGION OF SENEGAL

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Introduction: In Senegal, the prevalence of vitamin A deficiency (VAD) remains high and affects 24% of children. Biofortification using orange-fleshed sweet potato (OFSP), an excellent source of \( \beta \)-carotene, is well-established strategy to address VAD in vulnerable populations. This study aims to assess the nutrition potential of OFSP, grown for the first time in the agro-ecological area of groundnut basin of Senegal, to prevent VAD in lactating women and their children < 2 years.

Methods: The OFSP was from healthy cuttings of the Kandee variety provided by the Senegalese Institute of Agricultural Research. Mature OFSP roots were harvested 5 months after planting. 5 samples of usual consumption forms of OFSP (raw, boiled, fried) were used for total carotenoid and \( \beta \)-carotene contents measurements by a photometric method, and retinol activity equivalent (RAE) was estimated. The retention of \( \beta \)-carotene in boiled et fried was also calculated. Mean and frequency of OFSP consumption were assessed in mothers and children by food questionnaire and their contribution to VA intake was calculated.

Results: Mean \( \beta \)-carotene of the raw OFSP was 10000 ± 248.1 \( \mu \)g/100 g Fresh Weight (FW). After cooking according to the traditional preparation methods, the retention of \( \beta \)-carotene was 50% for the boiled and 49.8% for the fried form. The VA contents in 100 g of raw, fried, and boiled OFSP were 275, 137, and 124 \( \mu \)g RAE/100 g FW, respectively. In mothers, consumption of 100 g of raw, fried, and boiled OFSP cover 32.3, 16.1, and 14.6% of daily VA recommended safe intake (RSI). Among children aged 7-23 months, consumption of 100 g of boiled OFSP accounts for 31% of their daily VA RSI.

Conclusions: Success of the OFSP cultivar, which is newly introduced in Kaffrine, is promising for the prevention of maternal and child VAD in the rural areas of Senegal.

Key words: Vitamin A deficiency, Orange-fleshed sweet potato, lactating women, children <2 years, rural area Senegal

SY VI.04: VITAMIN A DEFICIENCY IS PREVALENT IN SENEGALESE RURAL PRESCHOOL CHILDREN 5 MONTHS AFTER VITAMIN A SUPPLEMENTATION

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Introduction: Marginal vitamin A deficiency (VAD) is a public health problem in Senegalese preschool children. Main implemented control strategies are mandatory vitamin A (VA) fortification of oil and semi-annual high-dose VA supplementation but there is a lack of data on the implication of these interventions on the VA status of children.

Purpose of the study: This study aimed to measure the status of VA in children 3 to 5 years old who have received VA supplements in a background context of national mandatory oil fortification.

Methods: A cross-sectional study was conducted in Kathiotte, a rural setting of Kaffrine region, on 55 children who received a single oral high-dose (200000 UI) of VA supplements 5 months prior to the study. Serum retinol (SR), C-reactive protein and Alpha-1 acid glycoprotein were analyzed. Weight and height were measured and weight-for-height (WHZ) and height-for-age (HAZ) calculated according to WHO growth standard reference. Food frequency data and consumption of fortified oil were collected.
**Summary of results:** Overall, 53.7% (n=29) of the children had VAD (SR $\leq 0.7 \mu$mol/L). Stunting (HAZ $<-2$) affects 23.6% and 12.7% of children, respectively. There was no difference in SR concentration regarding sex and age group. Despite high presence of acute (35.3%) and chronic (43.4%) inflammation, no relationship was found between SR concentration and inflammation. Consumption of VA fortified oil was low among these children (22.6%) and those consuming milk and dairy products had lower risk of VAD (OR: 0.31; 95% CI: 0.10-0.98) (p<0.05).

**Major conclusions/ Recommendations:** Vitamin A Supplementation does not seem to sustainably improve VA status until 5 months in rural preschool children, resulting in high prevalence of VAD. In addition, low consumption of fortified oil raises the question of VA mandatory fortification program coverage. Therefore promoting consumption of preformed retinol rich foods could improve VA status in this setting.

**Key words:** vitamin A deficiency, preschool children, vitamin A supplementation, vitamin A mandatory oil fortification, Senegal.

**SY VI.05: GENDER DIFFERENCES IN DETERMINANTS OF FOOD INSECURITY IN UGANDA**

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**Introduction:** Women are more likely to be food insecure than men in every region of the world. The 2017 report by the FAO revealed the gender gap in food insecurity (FI) was greatest (1.5%) in Africa. In Uganda, FI as one of the leading health and nutrition issues affects 30% of the population.

**Purpose of the study:** This study aimed to assess whether or not the linear additive combination of socio-economic and demographic factors explained the variance of FI.

**Methods:** We used Gallup World Poll data for Uganda, 2017 (n=1000, >15 y.o.). FI was assessed by eight items from the food insecurity experience scale. Multivariate redundancy analysis (RDA) was used to interpret the associations between response and explanatory variables.

**Results:** Permutation tests (999 permutations) indicated the statistical significance of the RDA models (p=0.001 for men and p=0.003 for women). Higher levels of moderate to severe FI were found among male participants who were younger, more educated, being employed, living in a large city or suburb of a large city compared to single female participants with more education, being employed, and living in suburb of a large city. Mild to moderate levels of FI were correlated with being single and part time employed among men and being divorced, younger, and full time employed among women in addition to living in a small town or village for both. Although higher levels of health status were correlated with more income, education, and being employed, it was negatively associated with higher levels of FI in men and women.

**Conclusions:** The results indicated that the additive linear combination of explanatory variables, including gender, explained a statistically significant portion of the variance in FI experiences in Uganda in 2017. Further structural equation modeling (path modeling) and qualitative studies will be necessary to explain the RDA findings.

**SY VIII: SCALING UP BIOFORTIFICATION IN AFRICA: JOIN THE MOVEMENT FOR A MORE NUTRITIOUS AGRICULTURE** (HarvestPlus Sponsored Symposium)
SY VIII.01: INTRODUCTION (BACKGROUND, OBJECTIVE, FORMAT, SPEAKERS)
Andrew Prentice

SY VIII.02: THE EVIDENCE, FRAMEWORK (PATHWAY TO IMPACT) AND AFRICAN CROPS FINDINGS
Erick Boy
ABSTRACT NOT RECEIVED

SY VIII.03: MAINSTREAMING AND SCALING UP WITH FOOD SYSTEMS CONSIDERATIONS: RATIONALE, STRATEGY, AND RESULTS TO DATE
Paul Ilona
ABSTRACT NOT RECEIVED

SY VIII.04: BPI AND MODELING OF IMPACT (DALYS)
Michael Tedla Diressie
ABSTRACT NOT RECEIVED

SY VIII.05: SUMMARY AND Q&A’S (PANEL)
Donald Mavindidze

SY IX: EXPLORING THE POTENTIAL OF AFRICAN FOODS IN NUTRITION AND DISEASE

SY IX.01: NUTRITIONAL COMPOSITION AND ACCEPTABILITY OF BISCUITS FORTIFIED WITH PALM WEEVIL LARVAE AND ORANGE FLESHED SWEET POTATO

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Introduction: Edible insects are currently being promoted as an inexpensive alternative source of protein in underdeveloped countries due to the rising cost of conventional animal protein and the foreseen future deficit in its supply. Recommendations from the World Health Organisation supports its use in malnutrition prevention and management among vulnerable populations. We developed a supplemental palm weevil larvae and orange fleshed sweet potato biscuit for examining the health benefits of edible insect consumption among pregnant women in Ghana.

Methods: The larvae were cleaned, parboiled and oven dried at 60°C till constant weight before milling into flour. The palm weevil larva flour and the orange fleshed sweet potato flour were mixed with wheat flour in three formulations that had 0, 35 and 70% of palm weevil, before being made into biscuits. The biscuits were subjected to proximate and mineral content determination and sensory evaluation.
Results: Proximate and mineral composition of the biscuits increased with increasing levels of palm weevil substitution. Amongst the blends, biscuits containing 70% palm weevil larvae had the highest energy and fat content, while protein also increased by 45% compared with biscuits made from 100% wheat flour. Calcium, iron and zinc levels also increased with increasing levels of palm weevil substitution. However, carbohydrate and crude fibre concentrations of the biscuits decreased. There was a high acceptability of the biscuits by pregnant women.

Conclusion: Biscuits fortified with palm weevil larvae can be a nutritious snack for pregnant women

Keywords: Palm weevil larvae, fortified biscuits, Health, Biscuits

SY IX.02: SPECIES DIVERSITY AND THEIR UTILISATION FOR FOOD AND NUTRITION SECURITY AMONG COMMUNITIES EXPERIENCING LAND OWNERSHIP CHALLENGES IN TESO AND ACHOLI SUB-REGIONS OF UGANDA

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Introduction: Land remains a fundamental component of the world’s ability to feed itself. When land users feel secure about their land, they invest in long-term practices that will enhance FNS. In Uganda, Teso and Acholi sub-regions have undergone civil unrest (1986-1992) and subsequent insecurity and displacement affected many communities well into 2000s. Even after stabilisation returnees still face numerous land-related problems. This study sought to establish diversity in species accessible and their utilisation for FNS among communities from areas perceived to be experiencing land ownership challenges in Teso and Acholi.

Methods: Through FGDs, 4-cell analysis approach was used to characterise agrobiodiversity and establish its utilisation for FNS in 32 villages from Acholi and Teso. 202 and 215 women and men involved respectively. Food categories accessed included staples (roots/tubers/cereals/grains), legumes/nuts, meats, fruits, vegetables, fats/oils, eggs, milk/milk products, and wild species. Data was captured using the FGD checklist, recorders and photos and later, transcribed.

Results: In Teso, a total of 221 unique food species were reported (9-starchy staples, 11- domesticated animals, 15-fruit species, 37- vegetable species, 11-leguminous species, 4- milk and milk product, 5-eggs, 8-fats and oil and 121- wild species). Acholi had 246 food species (11-starchy staples, 12-domesticated animal, 19-fruits, 31-vegetables, 18-legumes, 5- milk and milk products, 12- eggs, 15- fats and oils and 121- wild species). Populations from regions perceived to be experiencing insecurity regarding land had access to more diverse species.

Conclusions: The wide species diversity, there is opportunity for safety nets during lean seasons. Higher species diversity among communities in unstable landholdings characterised by sparsely distributed households, higher forestry coverage indicates a great opportunity of intervening through awareness creation on agrobiodiversity conservation and sustainable utilisation to ensure despite upcoming high land demand (agriculture and settlement), population will still access a wide variety of nutritious food items and maintain functional ecosystem services.

Key words: agrobiodiversity; Species diversity, utilisation, conservation, food and nutrition security

SY IX.03: BEETROT JUICE INHIBITS ARGINASE AND LIPASE ENZYMES INVITRO LINKED TO CARDIOVASCULAR DISEASES

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**Introduction**: Plants foods that are effective in the prevention and management of diseases are referred to as functional or Bioactive foods. This is because they are good source of bioactive compounds like polyphenols, flavonoids and anthocyanins with high antioxidant properties. Modulation of enzyme activity is important in the management of hypertension, atherosclerosis and other cardiovascular diseases.

**Purpose of the study**: To determine the invitro ability of Beetroot juice (*Beta vulgaris*) to inhibit key enzymes (lipase and arginase) linked to cardiovascular diseases using spectrophotometric methods.

**Methods/approach**: 0.5gm of the freeze-dried crude extract of the beetroot (*Beta vulgaris*) was dissolved in 25ml of distilled water, homogenised and centrifuged. The filtrate was used for analyses of the percentage inhibition and its half maximal inhibitory concentration (IC$_{50}$) of lipase and arginase using appropriate buffer and substrate solutions.

**Results**: Beetroot extracts were confirmed to have a dose dependent invitro enzyme inhibitory activity. The IC$_{50}$ = 473µg/ml for arginase and IC$_{50}$=158.8ug/ml for lipase.

**Conclusions and recommendations**: Nigerian beetroot juice extracts possess invitro inhibitory lipase and arginase activity and can be used as an adjuvant in the management of cardiovascular diseases. There is a need to study the assessment of the in vivo inhibitory activity of these enzymes. This will be further emphasise its beneficial use to ameliorate the progression of cardiovascular diseases.

**SY IX.04: EVALUATION OF NUTRITIONAL, ANTIOXIDANT AND ANTIHYPERGLYCAEMIC POTENTIAL OF PLANT-BASED FUNCTIONAL DOUGH MEALS AS ALTERNATIVE TO SYNTHETIC ANTIDIABETIC AGENTS**

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**Background**: Epidemiological studies have reported that diabetes mellitus is one of the commonest causes of admission and death in tertiary health institutions in many parts of developing countries. Recently, synthetic antidiabetic agents has been implicated with several side effects, hence, efforts have been focused on the development of non-toxic plant-based antidiabetic agents. In view of this, this study aimed at developing functional food from plantain, tigernut and soycake and evaluated for the nutritional qualities and antidiabetes potentials.

**Methods**: Functional dough meals were formulated from the flour of plantain, tigernut and soycake to obtain PSB (plantain, 64.46; soycake, 35.54%); TNS (tigernut, 59.83; soycake, 40.17%); PTS (plantain, 51.07; tigernut, 11.50; soycake, 37.43%); TNT (100% tigernuts); PLT (100% plantain), and CNT (a commercial flour) samples. The blended samples were evaluated for nutritional, functional, antioxidant, protein digestibility, biochemical, and antihyperglycaemia properties in rats.

**Results**: Protein content (g/100g) of experimental dough meals ranged from 16.22 to 29.72, and was significantly (p<0.05) higher than PLT (9.45) and CNT (14.29); while energy values (Kcal/100g) ranged from 399.63 to 488.86. Phosphorus, iron, zinc and manganese concentration in experimental samples were significantly higher (p<0.05) than in PLT, but comparable to CNT. Total amino acids (mg/100 g protein) of experimental samples ranged from 399.63 to 488.86. For saturated, monounsaturated and polyunsaturated fatty acid, the range values were14.86-21.29, 55.14-56.56 and 23.14-27.84%, respectively. Polyunsaturated/saturated ratios, the values ranged from 1.09 to 1.92, and were higher than CNT (1.40). Antioxidant activities of the formulated dough meals were significantly (p<0.05) higher than CNT and PLT (100% plantain flour). Biological values blended flour samples ranged from 89.14% to 93.03%, and were comparable to that of CNT (86.3%), but higher than PLT (41.5%). The glycaemic load and glycaemic index of experimental food samples ranges were 6.51 - 15.10% and 36.05 - 42.95% respectively, while that of CNT was 45.67%. For antihyperglycaemia properties, the formulated dough meals had highest percentage of blood glucose reduction in streptozotocin diabetic-induced rats.
(60.5 – 71.9%), when compared to PLT (a 100% plantain flour) (41.6%) and CNT (a commercial dough meal flour) (46.1%), but similar in action to that of acarbose (a synthetic anti-diabetic agent) (69%).

**Conclusion:** In conclusion, the study established that formulated dough meals were rich in essential nutrients with very low antinutritional factors. The experimental dough meals exhibited antioxidant properties, and with blood glucose reducing potentials. Hence, the dough meals, particularly TNS, may be suitable as functional food for the treatment or management of diabetes.

**SY IX.05: EFFECT OF LOCALLY PRODUCED COMPLEMENTARY FOOD PRODUCTS ON FAT-FREE MASS, LINEAR GROWTH AND IRON STATUS AMONG KENYAN INFANTS: A RANDOMIZED CONTROLLED TRIAL**

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**Background:** The impact of qualities of complementary food products on infant growth and body composition has not been adequately investigated.

**Objective:** To evaluate the effect on fat-free mass (FFM) accrual, linear growth and iron status of daily supplements of complementary food products prepared using locally available animal-source foods (ASFs) and germinated grain amaranth or multi-micronutrient premix compared to a standard product.

**Design:** In a randomized, double-blind trial, 499 infants aged 6 months received monthly ration for 9 months of: 1) WinFood Classic (WFC) comprising germinated amaranth (71%), maize (10.4%), small fish (3%) and edible termites (10%); 2) WinFood Lite (WFL) comprising germinated amaranth (82.5%), maize (10.2%) and multi-micronutrient premix; or 3) Corn-soy blend plus (CSB+). Primary outcomes were changes in FFM, length, plasma ferritin and plasma transferrin receptors (TfR). FFM was determined using deuterium dilution. Analysis was by intention-to-treat.

**Results:** Compared to CSB+, there were no differences in change from 6 to 15 months in FFM for WFC -0.00 kg (95% CI: -0.30, 0.29) and WFL -0.03 kg (95% CI: -0.25, 0.32) and length change for WFC -0.3 cm (95% CI: -0.9, 0.4) and WFL -0.3 cm (95% CI: -0.9, 0.3). Increase in TfR in the WFC group 3.3 mg/L (95% CI: 1.7, 4.9) and the WFL group 1.7 mg/L (95% CI: 0.1, 3.4). Despite the increase in hemoglobin (Hb) over time in the CSB+ group, Hb reduced in the WFC group -0.9 g/dl (95% CI: -1.3, -0.5) with a lower increase in the WFL group -0.4 g/dl (95% CI: -0.8, 0.0).

**Conclusions:** WinFoods had no effect on FFM nor length but decreased Hb and iron status compared to CSB+. Germinated amaranth with ASFs or fortificant did not improve nutritional and optimising the two to improve nutritional status compared to CSB+ is recommended.

**Keywords:** body composition, deuterium oxide, animal-source foods, complementary feeding, iron status, fortification, stunting, anemia, edible termites, Kenya.
ABSTRACTS FOR WEDNESDAY 27th AUG SESSIONS

SUBTHEME: MICRONUTRIENT DEFICIENCIES IN AFRICA

Topic: GAIN Plenary Presentation:
Speaker: ABSTRACT NOT RECEIVED

Topic: Lessons learned from Integrating Nutrition Education with Biofortified Sweetpotato Promotion in Sub-Saharan Africa.
Dr Jan W. Low. 2016 World Food Prize Co-Laureate, International Potato Center-SSA
ABSTRACT NOT RECEIVED

TOPIC: Power for Mothers: Why Multiple Micronutrient Supplements in Pregnancy are an Ethical Issue
Professor Klaus KRAEMER- Managing Director, Sight and Life

Poor nutrition during pregnancy is a major global health problem due to increased requirements for vitamins and minerals to support maternal and fetal growth and development. Ensuring adequate nutrition in pregnancy can significantly improve maternal health and survival, the likelihood of a successful pregnancy, and the lifelong health and well-being of the child.

On 9 July 1999, a technical workshop was held at the UNICEF headquarters in New York to address widespread micronutrient deficiencies and high rates of anemia among pregnant women. The workshop designed a comprehensive prenatal supplement – or multiple micronutrient supplement (MMS) – that would be tested in effectiveness trials among pregnant women in low- and middle-income countries (LMICs). The group at the workshop was, in many ways, before its time. They identified access to MMS as an inequity issue: “The high [micronutrient] needs of pregnancy are almost impossible to cover through dietary intake [alone] – in most industrialized countries, it is common for women to take multiple micronutrient supplements during pregnancy and lactation.”

To help meet women’s increased nutritional needs during pregnancy, the WHO recommends iron and folic acid (IFA) as the current standard of care for pregnant women – but the policy has not changed in 50 years. The most recent 2016 WHO Antenatal Care (ANC) guidelines counsel against the use of MMS due to “some evidence of risk, and some important gaps in evidence,” but stipulate that “policymakers in populations with a high prevalence of nutritional deficiencies might consider the benefits to outweigh the disadvantages [such as cost], and may choose to give multiple micronutrient supplements that include iron and folic acid.”

Since 2016, the scientific community has met all the WHO’s concerns regarding risk and evidence and cost effectiveness. Compelling scientific evidence shows that taking MMS compared to IFA during pregnancy reduces the likelihood of a child being born with low birth weight (LBW) or small for gestational age (SGA). Anemic and underweight women benefit even more from MMS and have reduced risk of infant mortality and preterm births compared with mothers taking only IFA. Furthermore, recent research shows that MMS can reduce the gender imbalance in terms of the survival of female neonates compared with IFA supplementation alone, and that it represents an opportunity to invigorate maternal nutrition by putting women at the center of antenatal care.

At the Women Deliver Conference (Vancouver, 3–6 June 2019), Sight and Life co-hosted a side event named Power for Mothers to make the case for MMS and build support for the update of the global recommendations on MMS. After 20 years of research and some 20 studies and meta-analyses comparing IFA and MMS on birth outcomes, it is unethical to further withhold MMS from pregnant women in low-resource settings.
Malnutrition is a recurring decimal in Africa. Undernutrition and overnutrition, which manifests as non-communicable diseases are increasing simultaneously in different parts of Africa. The presentation x-rayed the picture of malnutrition in African continent. Reliable publications on the nutrition profile of African countries including the global nutrition report were accessed and the published results aggregated to document the data presented. The malnutrition picture for African regions showed that there is a slow decrease in undernutrition while overnutrition and non-communicable diseases are increasing rapidly in the continent. There has been some progress in the reduction of stunting among children globally, however the prevalence of overweight is increasing. Non-communicable diseases are fast taking the leading positions in the cause of early death as against communicable, maternal, neonatal and nutritional diseases. 

A lot of organizations in the continent are focusing on the fight and prevention of undernutrition, yet overnutrition with its consequences, which are causing more deaths than undernutrition is neglected. Only few organizations present in selected countries in Africa are working to fight and/or prevent overnutrition and non-communicable diseases. Cardiovascular diseases, diabetes and hypertensions tops the causes of mortality and morbidity globally which Africa is not left out in the trend. Policies and interventions that will be holistic in preventing and reducing the prevalence of malnutrition in Africa are necessary for a healthier continent.

**Topic:** FRONT-OF-PACK FOOD LABELLING: THE NIGERIAN HEART FOUNDATION EXPERIENCE

**Dr. Kingsley K. Akinroye, Executive Director, Nigerian Heart Foundation**

Non-Communicable diseases (cardiovascular disease, diabetes mellitus, cancer and chronic lung disease) are assuming significant causes of disability and premature deaths in Nigeria. Nigerian Heart Foundation (NHF) Heart Mark Food Labelling Programme was established in 1988; as a National Strategy to reduce the burden of NCDs and to help consumers easily identify healthier options of food products. The NHF Heart Check Food Labelling Programme is a tripartite partnership between National Agency for Food, Drug Administration and Control (NAFDAC); Nigerian Heart Foundation (NHF) and the Food Industry to promote front-of-pack food labelling for on the spot identification of heart-healthy food. Food products approved to use the Nigerian Heart Mark Logo must fulfil the criteria of which consider total transfat, saturated fat, cholesterol, fibre, sodium, sugar and total energy content. NHF criteria for acceptability of Food Products into the Programme is similar to the Choices International Foundation Criteria for Food Labelling. This paper will present the NHF Heart Food Labelling Programme, experience, challenges and lessons to learn in fulfilling the objective of reducing the burden of Non-Communicable Diseases in Nigeria.

**TOPIC: AN AFRICAN PROPOSITION FOR HEALTHIER FOOD CHOICES**

**Speaker: Dr Rutger Schilpzand, Choices International**

Summary presentation of Rutger Schilpzand

The nutrition transition takes place nowadays in Africa in high speed. Due to a rise in income and urbanization, the intake of pre-packaged or home cooked food high in fat, sugar and salt is increasing, while the intake of micronutrients is often insufficient. This causes the double burden of malnutrition. To alleviate this double burden, new nutrition strategies are needed. International organizations have issued well-thought recommendations to counteract this double burden, that need to be translated into national policies and actions.
This should start with consumer choice. The healthy choice should be made the easy choice by developing and promoting healthy products and by guiding and educating consumers to find them.

These actions should rest on criteria that define what are healthy products. The Choices International program has developed all necessary tools and formats to realize the necessary steps.

In addition to national actions, an African platform should be developed to support these national actions, for international advocacy and fund raising, and to act as an African Academy for Healthier Choices: and expertise centre for capacity development and international collaboration in scientific research.

The success of these actions on national and regional level will largely depend on a balanced collaboration in public private partnerships, including governments, front runner food companies, science, civil society and international organizations.

**Topic:** The way forward: WFP and SUN Business Network: National Partnerships for Nutrition Solutions

**Speaker:** Mr Raphael Siwiti

**ABSTRACT NOT RECEIVED**

**SY I: MALNUTRITION; FORMS, TRENDS, CAUSALITIES, INNOVATIONS AND COST**

**(AJINOMOTO CO., INC Sponsored Symposium)**

**SY I.01: EFFECT OF A NOVEL SUPPLEMENTARY PORRIDGE ON THE NUTRITIONAL STATUS OF INFANTS AND YOUNG CHILDREN DIAGNOSED WITH MODERATE ACUTE MALNUTRITION IN UGANDA: A CLUSTER RANDOMISED CONTROL TRIAL**

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**Introduction:** Moderate acute malnutrition (MAM) and anaemia is prevalent among infants and young children (IYC) in Uganda. A lack of consensus regarding the most effective strategy for managing MAM among IYC, resulted in comparing the effect of MSBP (an active malt, extruded maize and soy sorghum supplementary porridge developed for the purpose of the study) as intervention, to an extruded maize and soy micronutrient fortified blend (CSB+) as control and current standard care. Outcome measures were anthropometric status and haemoglobin levels.

**Methods:** A double blind cluster randomized control trial with eight to ten conveniently sampled consenting mother-IYC pairs per cluster, were randomly assigned to intervention (n=110) or control (n=110) for three months. Weekly anthropometric measurements were taken. Haemoglobin levels were measured at baseline and end line. Mean length-for-age, weight-for-age, length-for-weight, and mean haemoglobin levels of the treatment and control groups were compared using the independent t-test. The z-test was used to compare proportions of the outcome indicators between the treatment and control groups.

**Results:** Difference in mean weight-for-age z-scores in the treatment group improved when compared to control (p = 0.01). The change in mean haemoglobin levels was lower in the treatment versus control group (p = 0.01). The proportion of IYC recovering from MAM between treatment and control did not differ significantly (p = 0.055).

**Conclusion:** Recovery rates after supplementation with MSBP versus CSB+ resulted in similar weight-for-length and haemoglobin levels. Therefore, MSBP has the potential for being up scaled in the management of IYC with MAM in Uganda.

Key words: supplementary porridge, moderate acute malnutrition, haemoglobin, length-for-weight
SY I.02: IMPACT OF REDUCED DOSE READY-TO-USE THERAPEUTIC FOODS IN CHILDREN WITH UNCOMPLICATED SEVERE ACUTE MALNUTRITION: A RANDOMISED NON-INFERIORITY TRIAL IN BURKINA FASO

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**Background:** Children with uncomplicated severe acute malnutrition (SAM) are treated at home with ready-to-use therapeutic foods (RUTF). We investigated the efficacy of reducing the RUTF dosage in community-based treatment of uncomplicated SAM.

**Methods:** Our individually-randomised trial tested the non-inferiority of weight gain velocity of SAM children receiving a) standard RUTF dose for two weeks followed by a reduced dose thereafter, compared to b) standard RUTF dose throughout treatment.

**Results:** In total, 801 uncomplicated SAM children aged 6-59 months were enrolled from 10 community health centres in Burkina Faso. At admission the mean age was 13.4 months, 49% were male and the mean weight was 6.2 kg. The mean weight gain velocity from admission to discharge was 3.4g/kg/d and did not differ between study arms confirming non-inferiority (Δ 0.0g/kg/d; 95% CI -0.5, 0.4). The length of stay was not different between groups with a median of 56 days. No differences were found in recovery (53% and 55%), referral (19% and 20%), defaulter (12% and 9%), non-response (13% and 13%) and relapse (2% and 2%) rates between groups. However, the reduced RUTF dose had a small negative effect of -0.2 mm/week (95%CI -0.3, -0.0) on length/height gain velocity with a mean of 2.6 mm/w with reduced RUTF and 2.8 mm/w with standard RUTF. The impact of the reduced dose on linear growth was more pronounced in children under 12 months of age (p for interaction=0.003) who gained 2.8 mm/w with reduced and 3.2 mm/w with standard dose (Δ -0.4mm/w; 95%CI -0.6, -0.2).

**Conclusions:** Reducing the RUTF dose given to SAM children after the first 2 weeks of treatment did not reduce overall weight gain velocity nor recovery or lengthen the treatment time. However, the reduced dose had a small but significant negative effect on linear growth, especially among the youngest age group.

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SY I.03: MULTIFUNCTIONAL DIETARY PROPERTIES OF MICRO-ALGAE SPIRULINA AND ITS USE FOR HUMAN CONSUMPTION

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**Background:** The utilization of micro-algae, particularly Spirulina, as a functional food was suggested decades ago due to the fact that it is a high biological protein-dense food source. Micro-algae Spirulina represent a biomass of cyanobacteria (blue-green algae) that can be consumed by humans and other animals. There are two species, Arthrosporic platensis and Arthrospira maxima. Arthospira is cultivated in some parts of the world: used as a dietary supplement as well as a whole food; and is also available in capsule, tablet, flakes and powder form.

**Study objective:** To establish the Multifunctional Dietary Properties of Micro-Algae Spirulina and its Use for Human Consumption.

**Design:** A meta-analysis of evidence based clinical trials was done for more than 15 studies coupled with data from the mushroom research projects reports based in Kenya was done to determine the properties and use of Microalgae (spirulina)

**Results:** Spirulina provides high biological protein, essential fats, vitamin B12, micro nutrients iron, potassium, calcium and phosphorus. Spirulina has been introduced to some communities in Western parts of Kenya and has proven to have good acceptance, thus making it a possible prospect for a nutrition supplement. Spirulina has been consumed predominantly for nutritional, immune-boosting, and detoxifying purposes. The most frequently self-reported health beneficial effects of supplementation include: increased immunity, higher vitality, improved hair and skin quality and better general wellbeing. Furthermore, pre-existing medical conditions, namely renal failure,
hypertension, arthritis, hypothyroidism, HIV/AIDS have consistently reported improved health benefits of Spirulina consumption. Case reports from clinical trials show that Spirulina has the potential to be widely accepted as a safe nutritional and dietary supplement.

**Conclusion:** Micro algae as a small scale crop for nutritional enhancement and livelihood development plays a key role in household food security and reduction of malnutrition

**Key Words:** Functional foods, malnutrition, dietary supplement, livelihoods.

**SY I.04: PRENATAL INFANT FEEDING INTENTIONS AND ACTUAL FEEDING PRACTICES DURING THE FIRST SIX MONTHS POSTPARTUM IN RURAL RWANDA: A QUALITATIVE, LONGITUDINAL COHORT STUDY**

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**Background:** Despite the efforts of the Rwandan government to improve nutrition conditions, chronic malnutrition among under-5 children continues to be a public health concern. This study aimed to gain insights into mothers feeding intentions, the underlying reasons, actual practices and factors facilitating or impeding exclusive breastfeeding (EB) for the first six months of child’s life in Muhanga District, Rwanda.

**Methods:** This qualitative, longitudinal study recruited 39 pregnant women attending prenatal consultations during the last trimester of pregnancy in two rural health centers. They were interviewed once during pregnancy to explore their feeding intentions. Additional interviews were held within the first week, 4th, and 6th months postpartum exploring actual practices, critical transition points, facilitating or impeding factors. Interviews were recorded, transcribed and thematically analyzed using Atlas.ti software.

**Results:** The majority of participants intended to breastfeed within the first hour after birth, and to breastfeed exclusively for the first six months. In practice, 34 participants initiated breastfeeding within the first hour after birth, and 12 complied with EB. Impeding factors include perceived breastmilk insufficiency, pressure from family members, mothers’ concerns over their infants’ health issues, mothers’ heavy workload, use of herbal remedies, poverty and food insecurity while mothers’ awareness of the advantages of EB, their confidence in their ability to breastfeed, health professionals’ and social support from CHWs and family members were facilitators for EB.

**Conclusion**

Most participants intended to breastfeed exclusively for the first six months. However, there was a gap between intentions and practices. There was interplay of barriers impeding women from breastfeeding exclusively for the first six months. EB promotion interventions should consider supporting and equipping breastfeeding mothers with skills to deal with perceived breastmilk insufficiency and targeting influential community and family members. Finally, nutrition-sensitive interventions should not be overlooked.

**Keywords:** Breastfeeding intentions, exclusive breastfeeding, child nutrition.

**SY I.05: DIETARY ADEQUACY AND NUTRITION STATUS AMONG SCHOOL GOING ADOLESCENT GIRLS IN LILONGWE CITY, MALAWI**

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**Introduction:** Adequate nutrition for optimum health and development is important for adolescent girls who at this
phase normally experience a spurt in physical growth and development. In Malawi, as in several developing countries, nutrition studies have mainly focused on young children, leading to inadequate information related to adolescent girls’ dietary intake and how it affects their nutritional status.

**Purpose of the study:** The purpose of the study was to assess the dietary adequacy and nutrition status of school going adolescent girls in Lilongwe, Malawi

**Methods:** This was a cross-sectional, comparative study which compared adolescent girls in public and private schools in Lilongwe. A total of 179 students were randomly selected for the study. A structured questionnaire was used to collect data on socio-demographic and socio-economic characteristics. Dietary adequacy was determined using a 24 hour dietary recall, food frequency questionnaire and dietary diversity score. Nutrition status was determined using BMI. Data was analysed using SPSS version 20, Microsoft excel and Nutri-survey software.

**Results:** The majority of the girls in both public (76.3%) and private schools (72.9%) had a normal BMI for age and there was no significant difference between the two school types (P>0.05). There were a few cases of under-weight in public (1%) and private schools (1.4%) The most frequently consumed food group in private (50%) and public (58.65%) schools were cereals while the least consumed were legumes in private (5.7%) and public (3.3%) schools. Adolescent girls in both private and public schools did not meet the RDA’s for iron (P=0.97) and calcium (P=0.91).

**Conclusion and recommendation:** The dietary intake of girls in public and private schools shows no significant differences. The intake of calcium and iron is unacceptably low and may lead to nutritional deficiencies. Short and long term interventions to improve nutrient intake need to be implemented.

**SY II: DATA GENERATION AND KNOWLEDGE SYSTEMS**

**SY II.01: MYCOTOXIN EXPOSURE LEVELS OF RURAL EASTERN CAPE PREGNANT WOMAN AND ITS EFFECT ON INFANT BIRTH ANTHROPOMETRIC MEASURES AND GESTATIONAL AGE**

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**Background:** In rural areas of the Eastern Cape (EC), South Africa, the majority are reliant on maize-subsistence farming. This maize has high levels of mycotoxins including fumonisin (FB), deoxynivalenol (DON) and zearalenone (ZEA).

**Aim:** To determine maternal exposure to DON, ZEA and FB, and its effect on anthropometric measures and gestational age of infants at birth. A longitudinal study with snowball sampling was used. Women consuming only home-grown maize was included. Maternal maize consumption was determined with a validated cultural specific food frequency questionnaire (FFQ) and exposure were calculated based on mycotoxin levels of maize. One kilogram maize were collected from participating households and analysed by LC-MS/MS for mycotoxin concentrations. Infant birth weight, length and head circumference (HC) was measured along with gestational age (GA). Birth outcomes were stratified into tertiles (tertile 1=lower third, tertile 2=middle third and tertile 3=upper third).

**Results:** Mean maternal raw maize intake (n=92) was 785.0 g/day (± 513.8 g/day). Exposure levels for FB were higher than for DON and ZEA. Median exposure for FB was higher than the Probably Maximum Tolerable Daily Intake (PMTDI=2µg/kg body weight), with interquartile ranges reaching 52 µg/kg per day. Median DON and ZEA exposures were lower than the PMTDI. General linear regression indicated a significant (p<0.05) difference between tertile 1 and the other tertiles regarding HC and GA (p<0.001). For birth weight, significance was between tertile 3 and the other tertiles. Gestational age (p<0.05) was significantly affected in tertile 1 of the ZEA exposed group. With maternal FB exposure in tertile 1, significant effects were seen on infants’ weight (p<0.001), HC (p<0.05) and GA.

**Conclusion:** Infants have a lower birth weight when mothers are exposed to DON and FB, smaller HC when exposed to DON and FB and lower GA with exposure to DON, ZEA and FB.

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SY II.02: PRELACTEAL FEEDING AND ASSOCIATED FACTORS IN ETHIOPIA: SYSTEMATIC REVIEW AND META-ANALYSIS

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Background: Prelacteal feeding is giving any solid or liquid foods other than breast milk during the first three days after birth. In Ethiopia, fragmented and inconsistent findings were reported. Therefore, the main objective of this meta-analysis was to estimate the pooled prevalence of the prelacteal feeding and its associated factors in Ethiopia.

Methods: The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guideline was followed. Articles were systematically searched through different searching mechanisms. Quality assessment was done using JBI-MAStARI. A total of 28 studies was extracted and analyzed using STATA 14. The random effect model was used; whereas subgroup analysis and meta-regression was performed to identify the probable source of heterogeneity. Both Egger’s, and Begg’s test were used to check publication bias. Pooled odds ratio were assessed.

Results: The totals 28 studies were included in meta-analysis. The Meta analysis result showed that the pooled prevalence of prelacteal feeding practice in Ethiopia was 25.29 % (CI: 17.43, 33.15) with severe heterogeneity (\(I^2 = 99.7, p <0.001\)). Antenatal care \([\text{OR}=0.25, 95\% \text{ CI: 0.09, 0.69}]\), counselling on infant feeding \([\text{OR}=0.37, 95\% \text{ CI: 0.22, 0.63}]\), Timely initiation of breastfeeding \([\text{OR}=0.28, 95\% \text{ CI: 0.21, 0.38}]\) and urban residence \([\text{OR}=0.47, 95\% \text{ CI: 0.26, 0.86}]\) were decrease the risk of prelacteal feeding practice while home delivery \([\text{OR}=3.93, 95\% \text{ CI: 2.17, 7.10}]\) increases the risk of prelacteal feeding practice in Ethiopia.

Conclusions: In Ethiopia, one fourth child was given prelacteal foods. Mothers who gave birth at home are more prone to give prelacteal foods. Whereas, Antenatal care visit, timely initiation of breastfeeding, counseling on infant feeding and being urban residence decrease prelacteal feeding practices in Ethiopia. Therefore, the government and health institutions should focus to increase maternal health service utilization and promote infant and young child feeding practices according to the guideline.

Keywords: Prelacteal feeding, Pooled prevalence, Ethiopia, Associated factors

SY II.03: FOOD INSECURITY AND NUTRITIONAL STATUS OF ELDERLY CAREGIVERS WITHIN THE RURAL HOUSEHOLDS OF MPHARANE IN LESOTHO

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Keywords: Food and nutrition insecurity, elderly population, nutrient analysis, coping strategies, socio-economic

Background: The ageing population is increasing globally, which contributes towards the growing share of non-communicable diseases (NCDs) of the overall social and economic burden. Majority of Africans reach old age after a prolonged period of poverty due to multiple dynamics such as famine, indirect impact of HIV and AIDS and insufficient access to food. Dietary and nutritional approaches are important in the management of NCDs. The objectives of study were to determine socio-economic conditions, dietary diversity, nutritional adequacy, coping strategies, and health status in relation to food insecurity and nutritional status of an elderly population in Mpharane.

Methods: The sample size was 260 participants (both men and women) > 60 years. Data on socio-demographic conditions, 24-Hour food recall, coping strategies, health status, food frequency and anthropometric measurements were collected.

Results: Results indicated that all participants resided with grandchildren. Majority of grandmothers headed the households and they were the principle providers. All participants were unemployed and 61% had a shortage of money to buy food. Nutrient analyses indicated deficient intakes in energy, protein and calcium. All participants used all 15 coping strategies, indicating a high level of food insecurity. The BMI results indicated 66% of participants were overweight, 61% obese and 14% were underweight.
Conclusion: Overall, demographic pressures and unemployment increased financial strains which contributed to high levels of poverty resulting in food and nutrition insecurity and poor nutritional status of elderly people.

SY II.04: DEVELOPMENT OF A COMPREHENSIVE DATABASE FOR THE IN-HOSPITAL TREATMENT OF COMPLICATED SAM ACROSS SUB-SAHARAN AFRICA - SAMAC STUDY
Janet Carboo, Martani Lombard, Robin Dolman, Cristian Ricci

Introduction: Case fatality rates of severe acute malnutrition (SAM) in health facilities across sub-Saharan Africa have been up to 30-50%, despite WHO treatment guidelines. This has been attributed to limited/ poor quality data, as well as inconsistencies in guideline implementation. A large standardized multi-country database, focussed on in-hospital treatment procedures will provide valuable information regarding guideline development, proper monitoring and evaluation of SAM treatment.

Aim: To develop a comprehensive standardized database for capturing data on treatment procedures of complicated SAM in children 0-59 months.

Methods: The database was developed using Microsoft Access version 2016. It consists of multiple datasets, each capturing data on different aspects of SAM treatment from admission to discharge. It has a well-structured, user-friendly data imputation interface. The structure and concept of the data imputation form was adapted from three published WHO documents on improving in-hospital treatment. The database has built-in quality control features to minimise imputation error. Additionally, SAS version 9.3 is used for data management and analysis as well as statistical modeling.

Results: The database was developed, piloted and underwent several modifications to include in-depth detailed data. This was conducted between 2017 and 2018. It contains different datasets on patients’ demographics, admission characteristics, therapeutic feeding, medications, micronutrient and electrolyte correction, blood transfusion, rehydration, daily progress, health professionals involved in care and discharge information. It also reports on mortality, length of stay and re-admission. Approximately 1000 records from Ghana, Botswana and South Africa have been inputted into the database thus far. More countries are anticipated to be included soon.

Conclusion: This database will serve as a useful resource on the true reflection of SAM treatment across sub-Saharan Africa and provide valuable opportunities for statistical modeling.

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SY II.05: UTILIZATION OF MORINGA OLEIFERA LEAVES IN THE PRODUCTION OF SOY BEAN-MAIZE PORRIDGE COMPLEMENTARY FOOD FOR CHILDREN BELOW 5 YEARS
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Background: Malnutrition accounts for half of the deaths among children under five years in developing countries. Persistent levels of malnutrition are partly attributed to inadequate dietary intake and limited meal diversity. To improve nutrient diversity, *moringa oleifera* has been suggested as a means to increased intake of some essential nutrients and health promoting phytochemicals.

Objective of the study: The aim of this study was to develop a *Moringa* based complementary food for children 6-59 months.

Methodology: The raw materials used in this study were; maize grains, soybean grains and *Moringa oleifera* leaves. The raw materials were separately processed into powders and later used in formulations. The maize flour, soybean flour and *Moringa* flour were formulated into five portions generated from nutrient survey. The formulation included; F5 (50:30:20), F4 (55:30:15), F3 (55:35:10) F2 (55:40:5) and F1 (55:45:0) for maize, soybean and *Moringa* leaf powders respectively. Formulation F1 was used as the control sample. The nutritional and physicochemical properties of the different formulations, as well as their sensory properties and storage stability were determined using standard methods.

Results: Increasing the amount of *moringa oleifera* leaves powder resulted in a significant (p ≤ 0.05) increase in the crude protein (15.33±0.11%), crude fiber (7.38±0.72%), iron (4.33±0.14%) and vitamin A content (535.28±67.63)
µgRAE). Results showed that the most acceptable moringa formulation was that with 5% *Moringa* flour. The percent contribution of the moringa formulation towards nutrient requirements of children 6-59 months was; iron (43.3), protein (109.5), vitamin A (µgRAE) (142.) and energy (44.9).

**Conclusion:** Addition of *moringa oleifera* leaf powder reduces the acceptability of soy-maize products but increases nutritional properties of the complementary flour. Therefore, lower concentrations of *moringa oleifera* leaves powder can be used in the formulation of acceptable complementary foods with adequate contribution towards nutrient requirements of children below 6-59 months.

**Key words:** *Moringa oreifera*, porridge, soy bean, maize, sensory acceptability

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**SY II.06: BODY SIZE PERCEPTIONS AND FOOD CHOICE AMONG NORMAL AND OVERWEIGHT MOTHERS AND CHILDREN IN MALAWI**

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**Introduction:** Overweight in mothers and children in sub-Saharan Africa is rapidly increasing and may be related to body size perceptions. In many African countries, overweight is considered a sign of wealth, health, strength, and fertility. We examined mothers’ perceptions of their own and their child’s body size and their food choices.

**Methods:** We enrolled 271 mother-child dyads. Mothers were 19-48 years old and children were 6-59 months old. Twenty-nine percent (n=78) of mothers were normal while 71% (n=193) were overweight. Forty-four percent (n=120) of children were normal and 56% (n=151) were overweight. Interviewers used a set of 7 adult female and 7 child body silhouette drawings to measure mothers’ perceptions of their own and their child’s current, preferred, and healthy body sizes and how these affected food choices. The silhouettes ranged from underweight to obesity. Chi-squared tests compared body size perceptions to actual body size. Open-ended responses were categorized by weight status then grouped into themes.

**Findings and Interpretations:** About 66% of normal vs 72% overweight mothers selected their body size image correctly; 67% normal and 68% overweight preferred overweight body size; 96% normal and 94% overweight selected overweight as being healthy. Mothers of normal weight children (57%) vs of overweight children (46%) selected their children’s silhouette incorrectly; 70% vs 48% preferred overweight body sizes for their children; and 89% vs 94% said overweight silhouettes were healthy. Mothers said they and their children could eat larger quantities or more frequently, increase consumption of fatty/oily foods and drinks such as sodas, sweetened yoghurt, and milk to achieve overweight body size.

**Conclusions:** Mothers strongly preferred overweight body sizes for themselves and their children and described consumption of fried foods and sugary beverages as a way to increase body size. Body size preferences should be considered when designing overweight prevention interventions in Malawi.

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**SY III: EXPLORING THE POTENTIAL OF AFRICAN FOODS IN NUTRITION AND DISEASE**

**SY III.01: FOOD-TO-FOOD FORTIFICATION WITH MORINGA LEAF POWDER AND BAOBAB FRUIT PULP IS EFFECTIVE IN TREATING MILD OR MODERATE ACUTE MALNUTRITION**

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**Introduction.** Diet quality is a major determinant of nutritional status. Underutilized food resources could be valued to improve children’s diet and prevent malnutrition but also cure acute malnutrition.

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*The 4th FANUS Kigali Conference
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“Nutrition in Action for Sustainable Development in Africa”*
**Purpose.** This study examined the effectiveness of food-to-food fortification with moringa leaf powder and baobab fruit pulp in the management of mild or moderate acute malnutrition.

**Methods.** Sixty-three 6 to 59 months old children affected by mild or moderate acute malnutrition were randomly selected in the district of Tangueta in Northern Benin and assigned to a case or a control group. During two weeks, children in the case group were gathered every morning in a nutritional rehabilitation home and fed each 400g of fermented sorghum porridge enriched with 10g of moringa leaf powder and 5g of baobab fruit pulp. Children in the control group had their usual food only. Participants’ nutritional status was monitored using anthropometry. Recovery rate and average weight gain were compared between the two groups.

**Results.** Daily consumption of the fortified food during two weeks has not significantly increased children’s weight in the case group compared to the control group. However, average weight gain in the case group was 9.85 g/kg/day and the recovery rate was 62.50% among children who consumed the fortified food till the end of the intervention.

**Conclusions.** Moringa leaf powder and baobab fruit pulp may be promoted at scale as local and affordable fortifying foods to improve children’s diet at home as well as in nutritional rehabilitation centres. Assessment of their effect on micronutrient deficiencies, such as iron deficiency, is also recommended. Mapping of potential food vehicles is needed in different regions of Benin and other countries where moringa and baobab trees are available. To enhance the effectiveness of the fortified foods, potential adverse factors, like parasitic infection, should be taken into account.

**SY III.02: FINGER MILLET AND ROSELLA PRODUCTS BOOST NUTRITION AND HEMOGLOBIN STATUS OF CHILDREN WITH SICKLE CELL DISEASE IN BUDALANGI KENYA**

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**Background:** Sickle cell disease is a common genetic cause of illness and death. Affected individuals are at high risk of severe acute malnutrition due to inadequate nutrient dense diets. Communities in western Kenya are more vulnerable and rely on blood transfusion and Ready-to-use-foods. These foods are imported, expensive and most of the time unavailable, blood for transfusion and medication is hard to access.

**Objective:** The objective of this study was to produce nutritious and acceptable finger millet based Ready-to-use-food and Roselle powder.

**Methodology:** locally procured materials, Finger millet and soya beans were sorted, washed, germinated, sun-dried, roasted and milled. Groundnuts were sorted, washed, sun-dried, roasted, de-hulled and pasted. The flours, paste, sugar, oil palm and minerals were mixed and re-pasted to a smooth consistency, packed and labeled. Dry Roselle calyx were ground into powder, sieved, packed and labeled. Resultant products were subjected to nutrient analysis using standard methods. Action research was used in Budalang, the paste product branded “Tamuu Fimsnuts” was added to porridge and Roselle drink were fed to children suffering from sickle cell disease. Children’s weight-for-age and hemoglobin levels were determined before and after using the products.

**Results** showed protein for “Tamuu Fimsnuts” was higher than that in commercial product, 20.1%: 13.8% respectively. Energy Kcal% 4452 was within most set limits 250 – 500 of existing RUTFs. The study products would on average cost US$ 25.02 compared to US$ 56 for EPZ-Kenya. Roselle had 8.5mg/100g iron, 4.69mg/100g ascorbic acid. Preliminary use showed high acceptability, no vomiting, and no diarrhea.

**Conclusions and recommendations:** This study indicates promising high potential of using Finger millet and Roselle to produce sustainable, and affordable nutritious health promoting products. Further studies are recommended to use Sorghum, pearl millet, other legumes so as to give more options for different areas and to determine efficacy of the products.

**Key words:** Finger millet, legumes, Roselle, Ready-to-use-foods, Sickle cell disease
SY III.03: MODULATION OF SOME BIOCHEMICAL INDICES BY IRVINGIA GABONENSIS SEEDS AND SOLANUM AETHIOPICUM LEAVES IN ALLOXAN INDUCED DIABETIC RATS.

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Background: In sustaining development in Africa vegetables play important roles in human nutrition, apart from the fact that we derive most of our recommended daily needs of mineral and vitamins from them. They are consumed most of the times in relatively small quantities as a side dish or a relish with staples in developing countries like Nigeria. Diabetic, obesity and anemia have become public health problems. The cost of drugs given to the diabetic patients is also a major concern, since there are traditional plants that can be used for the management of these diseases, such as Solanum aethiopicum (SA), and Irvingia gabonensis (Ig). It is therefore very necessary to scientifically find their chemical composition and effects on selected biochemical indices of alloxan induced diabetic rats.

Methodology: Seven groups of 5 rats each were studied; group 1 was control, groups 2-4 were fed with 5, 10 and 15g/kg body weight (BW) of pulverized SA leaves while Groups 5-7 were fed 5, 10 and 15g/kgBW of grounded IG seeds. All the groups were given rat chow and water ad libitum. At the end of twenty-one days biochemical analyses (lipid profile and haematological indices) were carried out using standard methods.

Results: Serum total cholesterol levels decreased in all the treated groups, there was decrease in Low density lipoprotein level except those fed 5g and 15g SA (5.88% and 11.82% respectively). There was increase in high density lipoprotein levels for all the treated rats except those fed 15g IG diet. Triglycerides(TG) levels increased in all the treated rats, except 15g BW of IG which showed reduced TG. Packed cell volume increased in all groups of rats except for those fed 5g BW SA diet. Red blood cell increased generally except for rats fed 5g of SA and 5g BW IG respectively. The white blood cell increased in all groups of rats except those rats fed 5g BW SA. There was a general increase in heamoglobin contents with the highest in group fed 15g BW (SA & IG). Generally, body weight decreased for all the treated rats except those fed 10g BW (SA & IG) which increased by (0.76 and 0.52% respectively). Blood sugar decreased in all the treated rats.

Conclusion/Recommendation: SA and Ig had high nutritive values and positive effects on blood sugar level and other parameters. This study needs to be extrapolated in human study.

Key words: hypolipidermia, anemia, diabetes mellitus, Irvingia gabonensis, Solanum aethiopicum

SY III.04: BORASSUS AETHIOPUM-FORTIFIED BREAD REDUCES METABOLIC RISK PARAMETERS AMONG CARDIOVASCULAR DISEASES OUTPATIENTS

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Background: Dyslipidemia and hypertension are leading causes of morbidity and mortality in cardiovascular diseases (CVDs) patients. Borassus aethiopum is a common tropical fruit in Ghana with phytochemicals; flavonoids, phenols; providing health benefits.

Objective: To evaluate the effects of Borassus aethiopum-fortified bread on metabolic risk parameters among CVDs outpatients in Ghana.

Methods: A single-blinded randomized placebo-controlled trial was conducted by administering borassus-fortified bread (150 g) and indistinguishable placebo (150 g white flour bread) daily to 122 CVDs outpatients for 90 days. The participants were divided in 1:1.1 ratio to receive borassus-fortified bread (n=63) or placebo (n=59). Efficacy was assessed by measuring weight, height, waist circumference (WC), metabolic age, visceral fat (VF), blood pressure, and biochemical parameters including serum Total Cholesterol (TC), Triglycerides, High-density lipoprotein (HDL),
Low-density lipoprotein (LDL) at baseline and end of study. Questionnaire was used to assess socio-demographic, medical and lifestyle history and medication usage of participants.

**Results:** There was significant difference in mean waist circumference (before: 98.3±14.6cm versus after: 95.9±15.8cm, P=0.030), BMI (before: 31.4±6.9 Kg/m² versus after: 28.0±5.8 Kg/m², P=0.027), visceral fat (before: 10.4±3.2 versus after: 9.9±3.0, P=0.013) and metabolic age (before: 61.6±13.4years versus after: 59.3±13.0years, P=0.010) among experimental group. There was also significant reduction in TC, LDL and HDL within the experimental group before (TC: 5.9±1.1, LDL: 3.4±1.1, HDL: 2.2±0.5) and after the intervention (TC: 4.9±1.1, LDL: 2.8±0.9, HDL: 1.5±0.4) (TC:P=0.001, LDL:P=0.016, HDL:P<0.001, all values in mmol/L), but no significant values in control group.

**Conclusions:** The borassus-fortified bread significantly improved metabolic risk parameters of CVDs among participants at the end of the study, which reflects overall benefit for outpatients with CVDs. The metabolic effect of the borassus-fortified bread could beneficially help in the management of cardiovascular diseases and other related complications in patients.

**Recommendations:** Further studies are needed to confirm current findings. Also, we recommend industrial utilization of the borassus fruits into other food products to promote health.

**SY III05: AMARANTH LEAVES AND SKIMMED MILK POWDERS IMPROVE THE NUTRITIONAL, FUNCTIONAL, PHYSICO-CHEMICAL AND SENSORY PROPERTIES OF ORANGE FLESHED SWEET POTATO FLOUR**

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**Introduction:** Vitamin A deficiency (VAD) and under nutrition are major public health concerns in developing countries. Diets with high vitamin A and animal protein can help reduce the problem of VAD and under nutrition respectively.

**Objective of the study:** Improving the protein (quality and quantity), calcium and iron content of orange fleshed sweet potato (OFSP) flour.

**Methodology:** In this study, composite flours were developed from orange fleshed sweet potato (OFSP), amaranth leaves and skimmed milk powders; 78:2:20, 72.5:2.5:25, 65:5:30 and 55:10:35. The physico-chemical characteristics of the composite flours were determined using standard methods while sensory acceptability of porridges was rated on a nine-point hedonic scale using a trained panel.

**Results:** Results indicated a significant (p < 0.05) increase in protein (12.1 to 19.9%), iron (4.8 to 97.4 mg/100 g) and calcium (45.5 to 670.2 mg/100 g) contents of the OFSP-based composite flours. The vitamin A content of composite flours contributed 32 to 442% to the recommended dietary allowance of children 6-59 months. The composite flours showed a significant (p < 0.05) decrease in solubility, swelling power and scores of porridge attributes with increase in substitution levels of skimmed milk and amaranth leaf powder.

**Conclusion:** The study findings indicate that the OFSP-based composite flours have the potential to make significant contribution to the improvement in the nutrition status of children 6-59 months in developing countries.

**Keywords:** Functional properties; orange fleshed sweet potato; vitamin A; porridge; skimmed milk

**SY IV: NUTRITION AND HEALTH IMPLICATION OF THE CURRENT FOOD SYSTEM IN AFRICA**

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The 4th FANUS Kigali Conference
LEMIGO Hotel
“Nutrition in Action for Sustainable Development in Africa”
SY IV.01: NUTRITIOUS INDIGENOUS FOOD INGREDIENTS FOR COMPLEMENTARY FOOD FORMULATIONS AS A PATHWAY TO FIGHT AGAINST INFANT MALNUTRITION IN BENIN: A REVIEW

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Background: Infant and young child malnutrition is a major public health concern in developing countries. In the West African subregion, the use of local food resources for infant and young children’s food formulations is strongly encouraged.

Objective: This paper reviews indigenous Beninese food resources as potential ingredients for complementary infant foods with the aim to develop affordable formulations for low-income households in each agro-ecological zone of the country.

Design: Potential ingredients were selected on their documented nutritional value. The selected foods encompass 297 plant products from home gardens or collected from natural vegetation and 50 animals, either domesticated or from the wild.

Results: The compiled data reveal that the distribution of the available nutritious food resources was unbalanced between agro-ecological zones. Best documented plant protein providers were Glycine max, Balanites aegyptiaca leaves, Amaranthus hybridus leaves, Adansonia digitata kernels, and Ceratocantha sesamoides leaves, which all contain more than 200–320g kg−1 DW protein. Among the major minerals, calcium is essential for bone structure and function, with a daily requirement of 5 g kg−1 DW for infants. For food complementation, preference should be given to Citrus limon peel, Moringa oleifera, Amaranthus viridis, Adansonia digitata leaves, and Grewia mollis fruits, which all contain more than 3 g kg−1 DW Ca. Iron is an essential mineral for humans and its recommended intake for infants is 0.116 g kg−1 DW Fe given for 5% of dietary iron bioavailability. Best haem iron providers were grasshoppers, termites, snails and fish; best non-heme iron providers were seeds of Parkia biglobosa, and Adansonia digitata pulp and leaves.

Conclusions: Based on this review, local foods for the development of complementary food formulas for Beninese infants and children may be selected for each agro-ecological zone. The approach used is exemplary for other sub-Saharan African countries in need of complementary infant foods.

Keywords: local food resource; infant food; standards; nutritional value; Benin

SY IV.02: PROTEIN QUALITY OF COMMONLY CONSUMED EDIBLE INSECTS IN A RESOURCE-LIMITED COUNTRY: A CASE FOR ZIMBABWE

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Background: Consumption of edible insects as an alternative animal protein-source is a potential solution to curb protein-deficiency. Entomophagy has been expressed in both developed and developing countries, and previous

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Objective: To evaluate crude protein content, protein-efficiency-ratio (PER) and protein-digestibility (PD) of three commonly consumed edible insects in Zimbabwe.

Design: In a 20-day mice-feeding trial four groups of Balb C 21 days-old mice were fed with protein-formulated diets consisting 1)Imbrasia belina, 2)Locusta migratoria, 3)Encosternum delegorguei and 4)casein (control group). Kjeldhal method was used to evaluate crude protein of the edible insects. Crude protein content, PER and PD was determined. Analysis was by ANOVA.

Results: Crude protein was high in Locusta migratoria (71.2%), Imbrasia belina (57.7%) and Encosternum delegorguei (31.3%). PER was lower in insect samples L. migratoria (2.3), I Belina (1.96), E. delegorguei (2.0) compared to casein (2.5) and the difference was significant. PD was comparable to casein (96%), I. belina-92%, L.migratoria-90% and E. delegorguei-92%. was high and comparable to that of casein (96%).

Conclusion: High protein quality of edible insects commonly consumed in Zimbabwe is comparable to casein. High digestibility of the three edible-insects indicated ease of absorption of insect-protein and potential in efficient utilisation by body tissues. I. Belina and E. delegorguei conceivably are limiting in amino acids that support building and growth of body tissues. Edible insects are a good source of quality protein that could meet protein requirements for communities to curb protein deficiency.

Key words: Protein Efficiency Ratio, Digestibility, Protein quality, Edible Insects
SY IV.04: FOOD TREE AND CROP PORTFOLIOS: ADDRESSING HARVEST AND NUTRIENT “GAPS” IN LOCAL FOOD SYSTEMS

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Background: Food trees provide a variety of nutrient dense foods including fruits, vegetables, nuts, seeds and oils, which have the potential to complement and diversify staple based diets.

Objective: To better incorporate these local tree products into food systems and thereby addressing challenges of seasonal food availability, World Agroforestry developed a methodology for selecting ecologically-suitable and nutritionally-valuable food tree and crop species for production on farms.

Design: Harvest months of location specific food tree and crop species are mapped against food insecurity periods. In addition to filling harvest ‘gaps’ the portfolio addresses certain nutrient ‘gaps’ by matching the identified tree foods with nutritional data. Food composition data play a key role in linking agriculture to nutrition, particularly the nutrient composition of indigenous and underutilised species, for which such information is often lacking. To address this data and knowledge gap, ICRAF have compiled, standardized and aggregated food composition data following international standards. To simplify the nutrient content information, the foods are scored for whether they are a high source (+++), source (++) or present, but moderate or low (~) for the nutrients iron, folate, vitamin A (retinol equivalent) and Vitamin C. Additional food composition information on macronutrients, minerals and vitamins for over 80 food trees and crop species is covered in an open access database.

Results: Altogether sixteen portfolios with on average thirty species, have been established for site specific locations in Kenya, Uganda and Ethiopia. Moreover, the project identified several community entry points for distributing and disseminating information and planting material for the portfolios, thereby leveraging agriculture for nutrition.

Conclusion: The portfolios present a sustainable food-based approach to address micronutrient deficiencies by increasing the quality of local diets. In addition, the food composition data compiled for these species provides a repository for prioritizing domestication programs to mainstream available nutritious foods.

Key words: agroforestry, underutilised crops, food composition, nutrition, food-based approach sustainable diets

SY IV.05: ANTIOXIDANT PROPERTIES OF FREE AND BOUND PHENOLIC ACIDS FROM BRAN, SPENT GRAIN AND SORGHUM SEEDS

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Introduction: Phenolic antioxidants have become an indispensable group of food additives because of their abilities to control the rate and extent of lipid oxidation in foods as well as their capacity to increase the shelf-life of food products. Based on their origin, they are classified as synthetic and natural antioxidants. However, synthetic phenolic antioxidants are known to exhibit several adverse effects including toxicity, carcinogenicity and liver damages. Therefore, the use of natural phenolic antioxidants in the food industry has increased and research on natural antioxidant additives has become essential as they pose no health risk to the consumers.

Purpose of Study: This study aims to investigate the phenolic contents and the antioxidant activities of free and bound phenolic extracts from sorghum bran, spent grain and seeds.
Methods: Free and bound phenolic acids were isolated from sorghum bran, spent grain and seeds. Their phenolic acid (PA) profiles were assessed by HPLC and their antioxidant properties using FRAP, ABTS and DPPH assays.

Results: These studies showed that syringic (0.06-2.65 mg/100g of flour), vanilic (0.47-2.63 mg/100g) and p-hydroxybenzoic (0.38-1.75 mg/100g) acids were the major free PAs. Ferulic acid (1.20-6.37 mg/100g) was the major bound PA along with small amounts of protocatechuic, p-hydroxybenzoic and syringic acids. Free PA mixture from bran had the highest total phenolics and antioxidant activities (8.41 μmol Fe²⁺ Equivalent/g, 23.48 μmol TE/g flour, IC₅₀: 0.08 mg/ml for FRAP, ABTS and DPPH assays, respectively). PA content and composition in the mixture contribute significantly to their antioxidant activity. Positive correlations were found between total phenolics, p-hydroxybenzoic, syringic acids and antioxidant activities.

Conclusion: Free and bound PAs from bran and spent grain especially the free PA from bran, have significant antioxidant and free radical scavenging activities. These could be potentially used as rich sources of natural antioxidants in the preparation of functional foods.

Keywords: sorghum, bran; spent grain; antioxidant activity; free phenolic acids; bound phenolic acids; ferulic acid.

SY IV.06: ASSESSMENT OF THE KNOWLEDGE OF MOTHERS ON BABY FRIENDLY INITIATIVES AND ITS EFFECT ON BREASTFEEDING IN SOUTH WESTERN NIGERIA

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Background: The death of so many children globally could be prevented yearly by teaching and adopting appropriate breastfeeding practices by mothers.

Objective: To assess the knowledge of mothers on baby friendly initiatives during antenatal care in Southwestern Nigeria.

Design: The study was cross sectional and 183 consenting mothers were selected during immunization clinic in Primary Health Care Centres. Pretested questionnaire was used to elicit information on socio economic characteristics, antenatal, breastfeeding practices and knowledge on baby friendly initiative. SPSS IBM version 22.0 was used to analyzed the descriptive and inferential statistics.

Result: Mean age of mothers and formal education was 29.5±5.1 and 13.2 ±3.3 respectively. About half (42.1%) were business women, 21.9% were civil servants. Majority (97.8%) of mothers attended antenatal care, had between 6-10 classes (46.6%) and 75.4% gave birth to their children in hospitals. Half (55.2%) received assistance and initiated breastfeeding less than one hour of birth and almost all (90.2%) were given colostrum. Exclusive breastfeeding rate was 35.5%, 61.7% breastfed on demand and for at least 12 times/day (43.7%). Only 53.6% and 28.4% of mothers can detect the early cues of hunger of their babies and expressed breastmilk for infants respectively. The major baby holds for breastfeeding was the cradle hold (86.9%) while only 12% are aware of the football hold (12.1%) and cross cradle (15.8%). More than half (61.2%) received support from grandmothers. Mean score for knowledge on baby friendly initiative was 17.0±3.4. Correlation analysis shows a significant relationship between baby friendly initiative and breastfeeding practice (r=0.171; p< 0.01).

Conclusion: Knowledge on BFHI significantly influence breastfeeding practices, it is recommended that breastfeeding classes at antenatal classes should highlight the baby friendly initiative step by step instead of a general talk on breastfeeding.

KEYWORDS: baby friendly initiative, antenatal care, mothers and knowledge

SY V: LEVERAGING SMALL BUSINESSES TO IMPROVE NUTRITION IN AFRICA (GAIN Sponsored Symposium)

SY V.01: WHAT DO SMES HAVE TO DO WITH FOOD AND NUTRITION?

Daniel Alberts

ABSTRACT NOT RECEIVED
SY V.02: BUILDING VALUE CHAINS FOR ORANGE-FLESHED SWEET POTATO
Speaker TBC, CIP
ABSTRACT NOT RECEIVED

SY V.03: SUPPORTING NUTRITION ENTREPRENEURS
Peiman Milani
ABSTRACT NOT RECEIVED

SY V.04: MARKETPLACE FOR NUTRITIOUS FOODS: PROGRAM AND KEY FINDINGS FROM RESEARCH
Lucia Zigiriza
ABSTRACT NOT RECEIVED

SY VI: NUTRITION AND NCDS AND DATA GENERATION

SY VI.01: CHILD SURVIVAL IN A CONTEXT OF ENDEMIC MALNUTRITION: A COHORT OF CHILDREN ADMITTED TO THE NUTRITIONAL SUPPLEMENTATION CENTER IN EASTERN DRC BETWEEN 1995 AND 2002.
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INTRODUCTION: Recent publications showed that 45% of all deaths of children are attributed to malnutrition.
OBJECTIVE: To evaluate the mortality rate in a cohort of children being followed for moderate malnutrition in a rural area.
METHODOLOGY: This is a cohort study on children admitted at Buhandahanda Nutritional Center between 1995 and 2002. The enrollment of these subjects was carried from March to August 2018. Each child received SCB porridge (400 to 500 Kcal daily - 6 weeks). Clinical signs of morbidity were investigated daily (fever, diarrhea, vomiting, cough, dyspnea). Kaplan-Meier curve was plotted to estimate the probability of survival after admission, and log-rank test was calculated for the uni-varied analysis to compare probability of survival between different characteristics. The time-dependent Cox proportional hazard model was used for multivariate analyze after verification of the proportional risk hypothesis using the Schoenfeld Test.
RESULTS: In total, we identified 373 subjects in the database encoded at the time for 884 episodes (2.4 episode by child). The proportion of boys was 52.5%. The average age at admission was 50.7 months. We had a 3.0% rate of lost to follow-up. The survival after nutritional supplementation at the center in 1995-2002 is more than 85% in 2018. Our results did not find any significant differences in survival because of reasons for admission to the center (Log-Rank, p = 0.82). Forty deaths (5 during treatment and 35 post-treatment period) were recorded, giving an overall mortality rate of 11.0% (or 7.1 deaths per 1000-person years). We didn’t observe any factors associated with mortality (nutritional status, morbidity or socioeconomic factors). The causes of death was: Malnutrition (25%), Malaria (20%), convulsive diseases (13%), Gastroenteritis (8%), Anemia (8%), Diabetes (3%), Cancer (3%) and others (13%).
CONCLUSION: The mortality rate is low compared to that reported in others studies. Childhood diseases and convulsive diseases unaccounted for 74% of deaths. Others studies are needed to explore the relationship between childhood malnutrition and convulsive diseases.
Keywords: moderate malnutrition, mortality, convulsive diseases, DRC
SY VI.02: CLINICAL SIGNIFICANCE OF THE HETEROGENEOUS ANTHROPOMETRY-BASED CASE DEFINITIONS OF SEVERE ACUTE MALNUTRITION IN CHILDREN: RESULTS OF THE MULTI-CENTRIC OPTIDIAG STUDY AND POLICY IMPLICATIONS


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Introduction: While both WHZ<-3SD and MUAC<115mm are recommended by WHO as independent criteria to identify children suffering from Severe Acute Malnutrition (SAM) and to refer them to treatment, using MUAC as a sole indicator to identify SAM children is becoming increasingly popular. Indeed, some long-standing, yet controversial, expert statements articulate that SAM children with a low MUAC are most at risk, and that adding WHZ to screening or treatment protocols would present no benefit for detecting mortality risk.

Objective: In order to elucidate this, the OptiDiag study aimed to describe the nutritional status and morbimortality risks associated with the different case definitions of SAM using novel biomarkers.

Methods: We conducted a multi-centric cohort study in uncomplicated SAM children with low MUAC alone, low WHZ alone, and the combination of low MUAC and low WHZ, in Bangladesh, Burkina Faso, and Liberia. Alongside routine anthropometric measurements, we collected a range of indicators of clinical and nutritional status, among which some novel biomarkers of body metabolism and mortality risk, such as serum leptin, bioimpedance parameters and stable isotope ratios in hair.

Results: The 3 groups included patients with low MUAC only (n =161), low WHZ only (n =138), and both low MUAC & low WHZ (n =152). At diagnosis, and in line with a range of other clinically significant indicators, leptin levels were lower in patients with reduced WHZ (308.8±28.8 pg/mL, p=0.019) and with both low MUAC & low WHZ (244.9±17.4 pg/mL, p<0.0001) than in children with low MUAC alone (414.0±27.7 pg/mL).

Conclusions: Rather than restricting admission and discharge criteria to the sole use of MUAC our results confirm the need to retain low WHZ as an independent diagnosis criterion for SAM and to reinforce health systems accordingly, in line with the most recent WHO recommendations.

SY VI.03: MULTI-SECTORAL “ACTION TEAMS” HELP DISTRICT OFFICERS IMPLEMENT NUTRITION POLICIES AND STRENGTHEN COORDINATION ACROSS SECTORS FOR NUTRITION IN TANZANIA.

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Introduction: Tanzania introduced a National Multi-sectoral Nutrition (MSN) Action Plan and an implementation structure including nutrition officers and MSN leadership committees in regions and districts. Factors affecting local translation of policy have not been examined. We explored “MSN action teams” as a low-cost strategy to support intersectoral collaboration in 5 districts.

Methods: We trained 5 Regional Nutrition Officers to each mentor one District Nutrition Officer to form an action team with 2-3 officers from other sectors. Teams were mentored to plan goals and activities aligned with MSN policy, and interviewed 4 times over 1 year to learn from their experiences. Transcribed interviews with 31 regional and district officers were analyzed thematically.

Results: Most Nutrition Officers organized teams across health, agriculture, community development, and education.
departments. Regional support was instrumental for providing teams with official status and credibility. Officers outside the health sector felt their work aligned with nutrition but were initially unaware of policy to guide actions. MSN action teams were effective in developing joint initiatives and enhancing communication between implementation staff and leadership, across sectors. Teams improved marketing and organization of nutrition interventions, including vitamin A distribution and school gardening, by leveraging team members’ existing communication channels and community partnerships. Elements that contributed to success included (1) supportive relationships among key regional and district officers; (2) time and flexibility for team meetings; (3) persistence and creativity to overcome funding and transport barriers; and (4) ongoing contact with Regional Nutrition Officer mentors to address emergent challenges.

Conclusions: Local governments may benefit from an “action team” approach to prioritizing MSN initiatives. Recommendations for creating enabling environments include official recognition of the importance of coordinating nutrition actions across departments, structuring teams with flexibility based on availability and commitment of mentors and team members, and additional support to develop mentoring capacity.

Funding: UKAID

SY VI.04: HOUSEHOLD DIETARY DIVERSITY IMPACT OF WOMEN CONTROL OVER INCOME FROM AGRICULTURE IN ZAMBIA
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Background: The role of women empowerment in household food security is well acknowledged in literature. However, empirical evidence on the impact of women economic empowerment on household food security and how this pathway is influenced by household agricultural commercialization remains scarce. This article examines impact of women control over agriculture income on household dietary diversity in view of agriculture commercialization levels in Zambia.

Objective: To examine differential impact of women empowerment in the control of agricultural income on household dietary diversity taking into account the household level of commercialization.

Methodology: The study applies ordered probit model to examine the relationship between food security and women empowerment and other social demographic characteristics. An interaction term between women empowerment and commercialization is introduced in the model to analyse the effect of level of commercialization. The study uses data from the Rural Agricultural Livelihoods Survey (RALS) conducted in 2015 by the Indaba Agricultural Policy Research Institute (IAPRI) in collaboration with the Central Statistical Office and the Ministry of Agriculture. The 2015 RALS is nationally representative and has 7,934 households.

Results: Results show that women control over agricultural income has positive and significant impact on household dietary diversity for households that consume relatively more diversified diets compared to those that consume less. However, agricultural commercialization tends to subvert women control over income resulting in positive but less significant impact on household dietary diversity.

Conclusion: Improving HDDS can be achieved by empowering women with control over use of revenue from agriculture. Evidently, crop commercialization and improvement in household income are critical for improving household access to food measured by HDDS. However, men tend to take more control of income from agriculture with increased household crop commercialization suggesting intra-household gender power differences that need to be addressed alongside interventions to improve household diversity

Key Words: Women empowerment, agricultural income, household dietary diversity, agricultural commercialisation, Ordered Probit, Zambia

SY VI.05: VALIDATION OF A DIGITALLY DISPLAYED PHOTOGRAPHIC FOOD PORTION SIZE ESTIMATION AID AMONG WOMEN IN URBAN AND RURAL MALAWI
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INTRODUCTION: Easy-to-use tools to facilitate portion size estimation in low-income countries are needed. This study validated digitally displayed photographic portion size estimation aids (PSEAs) against a weighed meal record and compared findings with an atlas of printed photographic PSEAs and actual prepared food PSEAs in Malawi.

METHODS: Three hundred women aged 18–45 years enrolled in Blantyre and Chikwawa districts. These were equally divided by urban/rural residence and years of education (≤4 years and >4 years). Participants served themselves water and five prepared foods, which were weighed separately before the meal and again after the meal to measure any leftovers. Participants returned the following day and completed a meal recall. They estimated the quantities of foods consumed using three different PSEAs in a randomized order.

RESULTS: Responses for digital and printed PSEAs were highly correlated (>91% agreement for all foods, Cohen’s κ=0.78–0.93). Overall, digital and actual food PSEAs had a similar level of agreement with the weighed meal record at the group level. The proportion of participants who estimated within 20% of the weighed grams of food consumed ranged by type of food from 30–45% for digital PSEAs and 40–56% for actual food PSEAs. Digital PSEAs consistently underestimated grams and nutrients across foods, whereas actual-food PSEAs provided a mix of under- and overestimates that balanced each other to produce accurate mean energy and nutrient intake estimates. Results did not differ by urban and rural location or participant education level.

CONCLUSIONS AND RECOMMENDATIONS: Digital PSEAs require further testing in low-income settings to improve accuracy of estimations because they offer several logistical advantages over other PSEAs.

SY VI.06: ASSESSMENT OF ZINC, IRON AND COPPER STATUS IN TYPE-2 DIABETES PATIENTS IN MAKUENI, KENYA

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BACKGROUND: Micronutrient deficiencies are a risk factor for increased morbidity and mortality and have devastating effects on the physical and mental well-being of the population. Kenya is facing the double burden of malnutrition. Iron (Fe) and zinc (Zn) deficiencies are of public health concern. Non-communicable diseases (NCDs) contribute to a significant share of the disease burden, with diabetes reported as one of the major NCDs. Zn and Fe improve metabolic control and insulin sensitivity among diabetics.

OBJECTIVE: To assess the zinc, iron, and copper status, and possible associations with the nutritional profile of Type-2 diabetes (T2DM) patients in Makueni, Kenya.

METHODS: A cross-sectional study was conducted in three randomly selected public hospitals in Makueni, Kenya between September-November, 2018. Data collection was done using: structured questionnaires; 24-hour recall; anthropometric measurements (weight, height, waist/hip circumference, biceps & triceps skinfolds and MUAC); collection of whole blood samples for analysis of blood glucose, plasma zinc, haemoglobin, serum ferritin, transferrin receptor, alpha-1-acid glycoprotein, C-reactive protein, hepcidin, serum copper, total cholesterol; triglycerides, high density lipoprotein; and, blood pressure assessment.

RESULTS: In total, 160 T2DM patients were included in the study. Preliminary results show a prevalence of 27.2% of anaemia in the study population. This patient population shows that 37.8% and 28.2% is overweight and obese respectively with 66.5% having increased risk of suffering other NCDs. The design and findings on predictor factors to zinc and iron status in T2DM will be presented in detail, to share the state-of-the-art.

Keywords: micronutrients, zinc, iron, type 2 diabetes
SY VII.01: PRODUCTION AND EVALUATION OF COMPLEMENTARY INFANT FOOD FROM PIGEON PEA (*cajanus cajan*) HALF RIPE PLANTAIN (*musa paradisiaca*), AND CRAYFISH (*euastacus spp*).

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**Background:** It is essential for infants to receive appropriate, adequate and safe complementary foods. This will ensure right transition from breastfeeding to family foods. Complementary foods sold in Nigeria are usually expensive and unaffordable to the common man. The available watery gruel often lacks basic nutrients for the growing child.

**Objective:** The study evaluates the nutrient, anti-nutrient and sensory properties of complementary foods formulated from half-ripe plantain (*musa paradisiaca*), pigeon pea (*cajanus cajan*) and crayfish (*euastacus spp*).

**Methods:** 1kg each of the samples, (half ripe plantain, pigeon pea and crayfish) were purchased and processed into flour. Five composite blends of the flours were formulated at different ratios; 90:10, 80:20, 70:30, 60:40 and 50:50. The protein source (crayfish) was kept constant in all the blends. Chemical Analysis was carried out on the composite blends and comparison was drawn with the control sample (Maize based Cerelac, a commercially sold brand).

**Results:** The formulated diets were significantly higher (p<0.05) in moisture (9.57%), protein (26.24%), ash (4.79%), carbohydrate (75.39%) in relation to the control sample (0, 15%, 3% and 65%) respectively. The control sample was higher in fat(10%) and fiber(4.5%) respectively. There was higher calcium(600mg) and potassium(635mg) in the commercial formula than the formulated blends(calcium 22.15mg & potassium 14.86mg). The result of the anti-nutrients showed significant increase (p<0.05) in the phytate(0.81mg/100g) and tannin(2.22mg/g) but decrease in the cyanide(0.025mg/kg) content of the formulated blends. Sensory evaluation showed no significant (p>0.05) difference in the general acceptability of the sample blends and control.

**Conclusions:** The nutrient composition of the product was comparable to that of a popular commercial product (cerelac). Formulated blends are available, affordable and could be used as alternative to the expensive commercial products, to improve nutrition of infants and growing children.

**Keywords:** Complementary food, Production, Evaluation, Infants.

SY VII.02: PARTICIPATORY FARM DIVERSIFICATION AND NUTRITION EDUCATION INCREASE DIETARY DIVERSITY IN WESTERN KENYA

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**Introduction:** The suitability of a community-based participatory approach to increase dietary diversity through agricultural activities and nutrition education in Vihiga County, Western Kenya, was assessed. The project consisted of 1) a diagnostic survey, 2) participatory development of activities to improve nutrition, 3) a baseline survey 4) participatory implementation of the activities and 5) an endline survey.

**Methods:** The diagnostic survey was conducted in 10 sub-locations which were pair-matched and split into five intervention and five control sub-locations. One group per intervention sub-location took part in workshops to identify and plan agricultural activities to improve nutrition. Before the activities were implemented, a baseline survey collected dietary intake data of women and small children in all 10 sub-locations. Groups received agricultural training and nutrition education on their self-selected activities (kitchen gardening and poultry raising). The nutrition education activity also targeted other community members in the intervention sub-locations. After one year of implementation
an endline survey on dietary intake was done that stratified households as direct beneficiaries (participating in development and implementation of activities; receiving agricultural and nutritional training), indirect beneficiaries (living in intervention sub-locations and partly receiving nutrition education) and control (control sub-locations). The project’s impact was assessed using the difference-in-difference (DID) technique inside a multiple linear regression.

**Results:** Our findings show a significant, positive impact of the intervention on the mean dietary diversity score of children and women in the direct beneficiaries (DID=0.7, p=0.000; DID=0.5, p=0.041) and on children in the indirect beneficiaries (DID=0.4, p=0.020) as well as on MDD (Minimum Dietary Diversity) for children of the direct and indirect beneficiaries (DID=0.2, p=0.039 and DID=0.2, p=0.018) and on the MAR (Mean Adequacy Ratio) of women of the direct beneficiaries (DID=0.2, p=0.045).

**Conclusion:** Participatory farm diversification and nutrition education significantly increase dietary quality of women and small children in Western Kenya.

**SY VII.03: VITAMIN D STATUS OF PREGNANT AND NON-PREGNANT WOMEN IN COTONOU: A COMPARATIVE STUDY**

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**Introduction:** Considered a hormone, vitamin D is essential for maintaining body’s phosphocalcic homeostasis. Its requirements are increased during adolescence and pregnancy. It is brought by diet or can be produced by the skin under the action of ultraviolet rays. However, sunny countries are not spared from a vitamin D deficiency in their population.

**Objective:** To compare vitamin D status of pregnant women and non-pregnant women in Cotonou (Benin).

**Method:** We included 50 pregnant women received in consultation or hospitalized at the University Clinic of Obstetrics Gynecology and 30 non-pregnant selected out of hospital from April to October 2017, all free from pathologies that can lead to vitamin D deficiency. A blood sample was taken for the determination of 25-OH-Vitamin D by radio-immuno-diagnostic. Vitamin D deficiency was determined by a serum concentration of 25-OH-vitamin D < 20 ng / mL.

**Results:** Mean age was 29.4 ± 4.9 years in study population. Prevalence of vitamin D deficiency was 72% in pregnant women compared to 40% in non-pregnant women (OR=3.65, CI [1.3; 10.4], p=0.014). Deficiency was associated with sun exposure less than one hour in all participants. It was significantly greater in 2nd trimester of pregnancy, with skin color (clear) in pregnant women, and with body mass index (≥ 30 kg/m²) in non-pregnant women (p<0.05). Pregnant women with a deficit developed symptoms during pregnancy (91%). Deficit was also found in all pregnant women with pre-eclampsia and was associated with pregnancy complications.

**Conclusion:** Vitamin D deficiency in pregnant women was high. A large-scale study will have to be conducted to better appreciate the extent of the deficit at the national level. Based on our results and the importance of this vitamin for pregnant, a nutrition education project on vitamin D for gestational management should be implemented.

**Key words:** Vitamin D, deficiency, pregnancy, pregnancy complications

**SY VII.04: DENTAL, SKELETAL AND NON-SKELETAL FLUOROSIS AND ASSOCIATION WITH DIETARY CALCIUM INTAKE AMONG LACTATING WOMEN IN ETHIOPIAN RIFT VALLEY**

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Background: Dental and skeletal fluorosis is widely distributed in the Rift Valley of Ethiopia, where drinking water contains fluoride >WHO limit. Adequate calcium intake may mitigate excess fluoride in the body.

Objective: To assess prevalence of dental, skeletal and non-skeletal fluorosis and association with dietary calcium intake among lactating women in the Rift Valley.

Methods: A total of 280 mothers were included with non-response rate of 3.6%. All mothers underwent dental fluorosis examination using Dean’s Index by qualified dentist. Skeletal and non-skeletal fluorosis assessment was carried out by qualified physiotherapist using physical exercises and asking about clinical symptoms of fluorosis. Dietary calcium intake was measured by estimating daily calcium intake using food frequency questionnaire. Logistic regression analysis was done to identify predictors of fluorosis symptoms indices. Values of p<0.05 with 95% confidence level were considered statistically significant.

Results: Average daily calcium intake was 406mg. More than half (56.3%) of the subjects had very mild to severe dental fluorosis. The prevalence of skeletal fluorosis was 34.4%. Overall, 124 (45.9%) mothers complained of ≥ 2 symptoms of skeletal and non-skeletal fluorosis. Mothers whose dietary calcium intake was ≤ 400mg/day had 2.9 times greater risk of developing muscular weakness than those with higher intake [AOR=2.9 (95%CI:1.32, 6.29)]. The study also showed that mothers who had high parity level had 2.5 more odds of developing muscular weakness than those mothers who had low parity level [AOR=2.5 (95%CI:1.12, 5.59)]. Also, the odds of developing muscular weakness was 1.7 with each passing year of age [AOR=1.7 (95%CI: 1.49, 1.96)].

Conclusion and recommendation: Dental and skeletal fluorosis was prevalent in these women. Dietary calcium intake was low and an independent predictor for fluorosis symptoms. This suggests the need for innovative approaches providing additional calcium to mitigate the toxic effects of excess fluoride in Ethiopian Rift Valley.

Keywords: Calcium, Fluorosis, Ethiopian Rift Valley, Women.
SY VIII: NUTRITION AND NCDS

SY VIII.01: THE PREDICTORS OF OVERWEIGHT AND OBESITY AMONG CHILDREN 24-59 MONTHS OLD IN INFORMAL SETTLEMENT IN NAIROBI- KENYA: A CROSS-SECTIONAL STUDY

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Background: The prevalence of overweight and obesity among poor populations is on the increase. Childhood obesity is a public health concern worldwide. Information on this condition among children living in poor populations is scarce in Kenya.

Objectives: To determine the prevalence and predictors of overweight and obesity among young children living in Kibera informal settlement, Nairobi.

Methods: Cross sectional study conducted among 398 mothers / children 24-59 months old dyads. WHO age and sex specific Weight for Height (WFH) Z - score cut off points were used to determine overweight and obesity. Feeding practices were determined based on a 24-hour dietary intake and a 7-day food frequency. Information on physical activity was collected using the Children’s Physical Activity Questionnaire (CPAQ). Predictors of overweight and obesity were determined using Linear Stepwise Regression Analysis (P<0.05).

Results: The prevalence of overweight and obesity among the children was 7.1%. The mean daily intake of energy (1602 kilocalories), carbohydrate (378.5g) and fat (27.4 g) were higher than the RDI. The RDI for dietary fibre and polyunsaturated fatty acids (PUFA) was attained by less than 20% of the children. The most frequently consumed foods were cereals, mean 5.8; vegetables mean 5.8 and milk mean 6.3 days per week respectively. Fruit consumption was low; mean 2.9 days per week. Children were frequently involved in sedentary activities and screen time; mean 10.6 hours and 21.2 hours per week respectively, despite having met the recommended hours for moderate to vigorous physical activity. The main predictors of overweight and obesity were screen time (1.30; P<0.001); followed by sedentary activities (0.96; P<0.001) and carbohydrate consumption (0.01; P=0.033).

Conclusion: Prevalence of overweight and obesity is high among the children due to the high amount of time spent on sedentary activities and screen time and poor dietary practices.

Key words: Overweight. Obesity, dietary practices, sedentary activities, screen times, physical activities; underfives, informal settlements

SY VIII.02: NUTRITIONAL COMPOSITION AND ANTI-DIABETIC POTENTIALS OF RAW AND PROCESSED FINGER MILLET (ELEUSINE CORACANA L. GAERTN) USING IN VITRO MODELS

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Background and Objective: Diabetes is a huge and rising global burden. Consumption of whole gains such as millet has shown beneficial effects on diabetes prevention and management. This study assessed the anti-diabetic potentials of raw and processed finger millet

Methods: Finger millet was purchased, cleaned and portioned into three. A portion of the millet was ground into flour while the other portions were either fermented or sprouted for 120 hours each, and stored in Ziploc bags for further analysis. Proximate, mineral and anti-nutritional factors were determined using standard methods of AOAC. Antioxidant and anti-diabetic potentials of the millet were determined using in vitro models.

Results: The raw finger millet contained in g/100g, crude protein (8.48), crude protein (1.39), crude fats (1.27), crude fibre (0.65), carbohydrate (76.88), and in mg/100g, calcium (111.00), iron (11.40), zinc (1.35), magnesium (165.00), manganese (0.37) and chromium (0.03). The fermented and sprouted samples contained in g/100g, crude protein (4.28-16.81), ash (1.79-2.18), crude fats (1.05-1.60), crude fibre (1.12-2.11), carbohydrates (66.03-79.36), and in mg/100g, calcium (96-218), iron (7.32-13.85), zinc (0.9-2.85), magnesium (117-249), manganese (0.13-0.86) and chromium (0.06-0.09). Phytochemicals in the sprouted sample contained higher concentrations in g/100g, of total flavonoid (0.03), glycosides (0.12), terpenoids (0.86) and steroids (0.02), than the raw and fermented samples having (0.01) total
flavonoids, (0.1-0.11) glycosides, (0.66-0.64) terpenoids and (0.00-0.01) steroids. However, total phenolic content (0.15g/100g) was higher in the fermented sample than in the raw (0.1g/100g) and sprouted sample (0.07g/100g). Thus, the fermented finger millet flour had better scavenging abilities on DPPH (2,2-Diphenyl-1-picryl hydrazyl) free radicals, Abts (2,2-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid)) and ferric reducing antioxidant power (FRAP).

Conclusion: The sprouted finger millet flour showed a superior anti-diabetic property, having higher nutrients and phytochemicals content, while the fermented finger millet flour acted as a better antioxidant due to its high phenolic content, hence, it can be used to fight oxidative stress and its related complications that occur in diabetes.

SY VIII.03: THE BIGGER, THE BETTER? BODY IMAGE PERCEPTION AMONG HEALTHY ADULTS IN KUMASI, GHANA

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INTRODUCTION: Body image perception has been linked to obesity-related habits. However, there is a paucity of literature on body image perception in the Kumasi population. This study aims to assess prevalence of body image misperception, weight preference and body image dissatisfaction (BID).

METHODS: From July to September 2018, 302 participants aged 25 to 60 years (Asante by ancestry) were screened and recruited as part of the wider GONG study from urban Oforikrom Municipality in Kumasi. Trained field workers collected sociodemographic and anthropometric data. Stunkard Figure Rating Scale was used to measure image perception.

RESULTS: Data from men (n= 126, 41.7%) and women (n=176, 58.3%) in Ayeduase, Ayigya, Oforikrom, Kotei and Bomso towns were collected. Mean age was 38.17±9.6 years. Mean BMI and WC were significantly higher for females than males (BMI; 28.79±4.96 vs 23.63±3.12; p-value < 0.001, WC; 93.71±13.12 vs 81.75±10.05; p-value < 0.001 respectively). Results revealed that 56% of the population misperceived their weight status. Among obese persons, 26% thought they were normal and 91% misperceived their weight. Females were significantly more dissatisfied with their bodies than males (64.8% and 50.8% respectively, p-value= 0.018). Overall, 50% of participants preferred an overweight/obese spouse with more than half of males (54.8%) and 46.6% of females desiring an overweight/obese spouse. Whereas the image with BMI 23.1kg/m² was most chosen (28.8%) as healthy, participants (29.8%) chose the image with BMI 26.2kg/m² as ideal body size they wished to be. Our results concur with previous studies that some African ethnic groups prefer large body sizes especially for their women.

CONCLUSION: The results highlight the need for relevant interventions including public education on weight status and transformation of sociocultural practices to improve body image and by extension health.

KEYWORDS: body image perception, body image dissatisfaction, urban population, Africa.

SY VIII.04: HEALTHY EATING AND ACTIVE LIVING FOR DIABETES-GYCEMIC INDEX (HEALD-GI): A PRAGMATIC RANDOMIZED CONTROLLED TRIAL

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Background: Rigorous evidence is needed to support uptake of evidence-based recommendations to include low glycemic index (GI) foods in daily meal planning as an effective dietary self-care strategy for people with type 2 diabetes (T2D).

Objective: To evaluate the effectiveness of a 12-week lifestyle intervention with web-based GI-targeted nutrition education on dietary intake and GI-related knowledge among adults with T2D.

Methods: Participants were randomized to a control group (n=34) that received standard printed copies of Canada’s Food Guide and Diabetes Canada’s GI resources or an intervention group (n=33) that received those same materials, plus an online platform with six self-directed learning modules and supplementary print material. Each module consisted of a customized video, links to reliable websites, chat rooms, and quizzes. Evidence-based GI concept information included GI values of foods and advice for low-GI shopping, recipes, and cooking tips by a Registered Dietitian. Preferred supports through email, text messaging, phone calls, or postal mail to reinforce participants’ learning were also made available. The primary outcome, average daily dietary GI intake, was assessed using 3-day food records. Additional measures including GI knowledge and self-efficacy, glycated hemoglobin A1c, lipids, systolic blood pressure, body mass index, waist circumference, and computer proficiency, were assessed at baseline and at three months post-intervention.

Results: Participants (N=67) were 64% men; mean (standard deviation [SD]) age 69.5 (9.3) years, with mean diabetes duration of 19.0 (13.7) years, BMI 30.1 (5.7) kg/m2, and A1c 7.1 (1.2)% at baseline. Mean daily GI intake decreased in the intervention group by 2.79 (7.77) compared to a 0.76 (6.48) increase in the control group (adjusted mean difference [95% CI]; -3.77 [-6.95, -0.58]). Mean GI knowledge 2.14 [0.59, 3.69], understanding of GI concept 1.65 [0.85, 2.44] and self-efficacy for consuming low-GI foods 1.29 [0.51, 2.07] increased among the intervention group (p<0.01) compared with the control group.

Conclusion: The web-based GI-targeted education program improved the quality of carbohydrate consumption among adults with T2D and may have been mediated through increases in knowledge and self-efficacy. Web-based nutrition education may be an effective alternative in this population.

SY VIII.05: BURDEN, RISK FACTORS AND MATERNAL AND OFFSPRING OUTCOMES OF GESTATIONAL DIABETES MELLITUS (GDM) IN SUB-SAHARAN AFRICA (SSA): A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction/purpose: The burden, determinants and outcomes of GDM in SSA are not well understood. We summarized existing evidence on the prevalence, risk factors and complications of GDM in the region.

Methods/approach used: PubMed was searched from inception to January 31st 2019. Studies were included if carried out in SSA and were available as abstracts or full texts. Interventional studies and those only including qualitative data were excluded. We employed random effects modelling to estimate the pooled GDM prevalence and risk ratios (RRs) for risk factors and outcomes of GDM and their 95%CI.

Results summary: 283 papers were identified in the initial search, 40 of which met the inclusion criteria. Data on GDM burden suggest a pooled prevalence of 8% (95%CI: 6-10%). Family history of type II diabetes and previous history of GDM, macrosomia, stillbirth and abortion were important risk factors of GDM. In addition, being overweight or obese, over 25 years of age or hypertensive increased the risk of GDM. In terms of complications, GDM more than doubles the risk macrosomia (RR; 95%CI: 2.2; 1.1-4.4), it also leads to a nonsignificant increase in the burden of caesarean section births.

Conclusions/recommendations: Existing evidence indicates a high burden of GDM in SSA, but more studies are needed to document locally important risk factors as well as maternal and offspring outcomes. Interventions aimed at maintaining normal pre-pregnancy BMI or slowing the rate of weight gain in early pregnancy might lead to reductions in GDM burden in SSA.
SY VIII.06: SUPPLEMENTING LAYERS FEED WITH GARLIC OR TEA SIGNIFICANTLY REDUCES EGG YOLK CHOLESTEROL

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Background: Available statistics show that egg consumption has increased in Nigeria within the past ten years. Egg yolk is one of the major sources of dietary cholesterol, which has been implicated in the etiology of atherosclerosis.

Purpose of Study: This study was conducted to evaluate the effect of garlic and tea on the performance, egg traits and laying parameters of laying hens.

Methods: Black leghorn hens, Yafa breed, aged 21 weeks were fed basal diet (commercial feed) supplemented with garlic at 1 and 2 % levels and tea at 1 and 2 % levels. Feeding was done for 4 weeks after a one-week acclimatisation period on test and control feeds. The effects of supplementation on the number and weight of eggs layed, the weight of hens and the weight of egg yolk were determined. Also determined were the total triglycerides, HDL-, LDL-, and total cholesterol content of egg yolk.

Results: Feeding of hens for 4 weeks with test and control diets resulted in non-significant changes (p>0.05) in the weights of birds, weight of eggs and egg yolk. 2 % garlic supplementation resulted in a non-significant increase in the number of eggs layed. All the garlic supplemented feeds resulted in significant reductions (p<0.05) of total cholesterol, total triglyceride, LDL- and HDL-cholesterol. With exception of the 1 % tea supplemented diet, the other tea supplemented diet resulted in significant reductions in the cholesterol levels tested. 1 % tea supplementation had no significant effect on LDL-cholesterol concentration of egg yolk (p>0.05). The combination of garlic and tea resulted in significant reductions of total-, LDL- and HDL-cholesterol (p<0.05) but not total triglycerides (p>0.05). The control diets had in most cases non-significant effects on the lipid parameters tested. Anti-cholesterolemic agents found in garlic and in tea flavonoids could be responsible for the reduced cholesterol content of egg yolk from test layers.

Conclusion: The results show that garlic and tea have great potential when low cholesterol egg is desired.

Keywords: Egg yolk, Cholesterol, garlic, tea, hens
ABSTRACTS FOR CLOSING SESSION
THURSDAY 28th AUG

RESEARCH, KNOWLEDGE GAPS AND NEEDS FOR FOOD & NUTRITION SECURITY AND SUSTAINABILITY IN AFRICA

TOPIC: CAN AFRICAN SCIENCE BE COMPETITIVE ON WORLD STAGE?
Professor Andrew Prentice. MRC Unit The Gambia @LSHTM

Can African Science be Competitive on the World Stage? If the answer to this is currently ‘no’ or perhaps ‘rarely’ then we need a roadmap to change the answer. Thankfully, African science, though it still has serious ground to make up, is progressing at pace driven by the powerful aspirations of young people across the continent and by gradually improving educational systems and institutions. This presentation will provide a brief ‘landscape analysis’ of science in Africa, and highlight some of the best examples as well as the greatest challenges. Exemplars of success will be showcased together with the work of trans-African organisations that are dedicated to enhancing the indigenous science base in Africa.

TOPIC: REPORT OF CONSULTATIVE DIALOGUES ON OVERWEIGHT AND OBESITY IN WEST AND SOUTHERN AFRICA
Dr Mphumuzi Sukati Senior Nutrition and Food Systems Office

ABSTRACT NOT RECEIVED

TOPIC: IMPROVING THE QUALITY AND RELIABILITY OF FOOD COMPOSITION DATA IN AFRICA: THE ROLE OF ACADEMIA.
Professor Henrietta Nkechi Ene-Obong FAO AFROFOODS Coordinator

Food composition data (FCD) are quantitative estimates of the energy, macronutrients, micronutrients and other bioactive compounds in foods of plant and animal origin. They are fundamental to Scientists and Practitioners working to implement sustainable responses to global food and nutrition challenges as well as help to inform policy. Food composition data are published in both printed forms, as Food Composition Tables (FCT) and electronic format, as Food Composition Databases (FCDB). FCT/DBs are generated through chemical/microbial analyses, calculation and imputation; however, researchers have described FCD in Sub-Saharan Africa (SSA) as missing, incomplete, outdated and unreliable. The aim of this address is to describe the various actors in the generation, compilation and use of FCD, the three conditions for obtaining good quality and reliable FCT/DB, the status and challenges of FCT/DB in the SSA region, the consequences of poor quality FCD, and practical solutions to these challenges, with special attention on the role of Nutrition Societies and particularly the Academia in solving these problems. It is hoped that at the end of this presentation, awareness will be created, perceptions changed and concrete actions taken by all stakeholders to contribute to the generation of good quality and reliable FCD on locally available food resources for multi-sectoral evidence-based policies and programmes for the improvement of food and nutrition challenges of Africa.

TOPIC: ARE WE TRAINING OUR NUTRITION PROFESSIONALS TO RESPOND TO NUTRITION-RELATED CHALLENGES IN AFRICA?
Professor Edelweiss Wentzel-Viljoen PhD RD (SA) RNT(SA)

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The double-burden of disease is evident in every country in Africa. Undernutrition and malnutrition remains a problem while mortality linked to NCDs are increasing. In addition, hospital malnutrition is a serious problem in African countries. The recent Lancet article (2019) on the Global Burden of Disease confirms the role of healthy eating habits in the prevention of NCDs. In 2017, 11 million deaths and 255 million DALYs were attributable to dietary risk factors. There is an outcry to universities and training institutions to change their teaching and learning environment (students must move out of the classrooms) and decolonise programs and research methodologies. At the same time, interprofessional training is advocated as the future, although practical implementation can be difficult. The role of professional bodies and regulatory councils are extremely important to lead the changes needed for the optimal training of nutrition professionals. In addition to providing guidelines on the skills and competencies needed, employers want ‘experts’ at entry-level of the nutrition professions.

Where should the nutrition professionals deliver their services on the continuum of care? At the individual level, community level or public health nutrition level? Should there be more than one cadre of nutrition professionals and should there be different levels?

This presentation will set out to explore the different drivers that should be considered to develop training programs for nutrition professionals to respond to nutrition-related challenges in Africa.

**TOPIC: INVESTING IN TOMORROW’S AFRICAN FOOD SCIENTIST & TECHNOLOGIST: THE ROLE OF THE PRIVATE SECTOR**

Joelle Abega-Oyouomi, Managing Director Nestlé R&D Centre Abidjan

ABSTRACT NOT RECEIVED

**CLOSING CEREMONY & PERFORMANCE**

CHAIRPERSON: Professor Ngozi Nnam - President Federation of African Nutrition Societies (FANUS)
CO-CHAIRPERSON: Professor Johann Jerling, Director, African Nutrition Leadership Programme (ANLP)

Summary Issues from FANUS Officials
Closing Speech by Director Plan for Modernisation of Agriculture (PMA)
Remarks by IUNS Africa Representative
Closing Speech by Representative of Rwanda Government
ABSTRACTS FOR POSTER PRESENTATIONS

SUB-THEME: MALNUTRITION; FORMS, TRENDS, CAUSALITIES, INNOVATIONS AND COST

P01: PREVALENCE OF THE DOUBLE BURDEN OF MALNUTRITION IN HOUSEHOLDS OF NIAMEY CITY IN NIGER

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Background: The double burden of malnutrition can be a reality in Niger urban area.
Objective: Assess the prevalence of double burden of malnutrition in Niamey city according to the socioeconomic level of households.
Design: A selection of neighborhoods according to the socioeconomic level of households has permitted to consider two neighborhoods supposed to be those of affluent households (Plateau and Recasement) and two neighborhoods supposed to be those of disadvantaged households (Talladjé and Koira Tégui). In each neighborhood, 25 randomly selected households were surveyed. Into the households, one mother and all her children with 2 to 11 years were chosen for anthropometric measurements. For double burden of malnutrition determination, approach used by Zeba in Ouagadougou was privileged for which, the double burden of malnutrition in household is the presence of a mother who is overweight / obese (according to the BMI) and at least one under-nourished child according to one of the three index (Weight / Height, Height / Age and Weight / Age).

Results: The prevalence of double burden of malnutrition in Niamey city is 23% and it is not signficante between neighborhoods that are supposed to be socio-economically different. So that it is 28% at Talladjé, 20% at koira Tégui, 32% at Plateau and 12% at Recasement.
Conclusions: This study, although carried out on a small scale, showed that the "double burden" families in which coexist a child with a global deficiency and a mother who is over weighted or obese are observed in Niger and in urban areas. The problem of over- and under-nutrition is not simply a problem of the rich or the poor, respectively, because there is no significant difference between neighborhoods that are supposed to be socio-economically different. These results demonstrate research needs in large scale on double burden of malnutrition in Niger.
Keywords: acute malnutrition; body mass index ; chronic malnutrition ; double burden ; under weight index ; Niamey ;Niger

P02: ESTIMATING TOTAL CALORIE INTAKE OF SCHOOL-AGE CHILDREN DURING SCHOOL HOURS

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Introduction and Purpose: The school is where children develop independent food intake and dietary habits without supervision. The calories school children consume during school hours invariably add up to their total daily calories,
and this consequently affects their overall nutritional status. This study sought to estimate the total calorie intake of school-age children (5-12 years) during school hours in selected private and public schools.

**Methods:** A cross-sectional study was conducted among 160 participants from four schools in the Ledzokuku constituency, Accra, Ghana. A 2-day 24-hour dietary recall was taken to assess dietary intake to be converted into nutrient intake using Microdiet (version 3.0). Weight and height of the children were measured using standard procedures to be interpreted using the World Health Organization (WHO) standards.

**Results:** The mean age of the school-age children was 10.44 ± 1.73 years. The mean Body Mass Index (BMI)-for-age was 17.74 ± 3.13 kgm², with 54.4% of the children having a normal BMI-for-age. However, private school children were more overweight and obese but less wasted than public school children. The mean daily calories and calories consumed during school hours were 1824.26 ± 520.89 kcal and 580.35 ± 278.534 kcal respectively. Children in private schools had significantly higher daily calorie intakes (p < 0.001) and calorie intakes during school hours (p < 0.001) compared to those in public schools. School hours contributed 31.54 ± 11.67% to the daily total calorie intake, which was significantly more (p < 0.001) in private school children compared to public school children. Only 26.9% of the school-age children satisfied their Estimated Energy Requirements (EARs).

**Conclusion:** Calories consumed during school hours contributed to over 30% of the daily calorie intake among school-age children, with private school children having significantly higher intakes than public school children.

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**P03: PREVALENCE AND CORRELATES OF COMPLICATED SEVERE ACUTE MALNUTRITION RELAPSE AMONG CHILDREN LESS THAN FIVE YEARS AT MWANAMUGIMU NUTRITION UNIT, MULAGO HOSPITAL – UGANDA.**

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**Introduction:** Despite numerous efforts to improve treatment outcomes of patients admitted with complicated severe acute malnutrition (SAM), a relatively high number relapse after recovery. These are readmitted and retaken through the whole elaborate treatment and rehabilitation process of inpatient therapeutic care (ITC). The correlates of relapsing with complicated SAM were unclear and to the best of our knowledge no study had investigated them yet.

**Method:** Data on 1098 children under 5 years was analyzed in this comparative cross-sectional study. At univariable analysis, categorical variables were summarized using proportions while means and standard deviations were used for continuous variables. Chi-square statistics were computed at bivariable analysis. Binary logistic regression models were constructed and odds ratios as well as their 95% confidence intervals were estimated. A multivariable binary logistic regression model was then run.

**Results:** Six percent of the children <5 years admitted at the unit were complicated SAM relapses and it took them on average 8 months to relapse. Children with unemployed mothers were 3 times more likely to relapse with complicated SAM than children with employed mothers (AOR: 3.27; CI: 1.43 – 7.50)

**Conclusion:** Our study showed that the prevalence of complicated SAM relapse (6%) among children under five years at the unit is slightly above that reported in the clinical reports (5%) and that reported in a CMAM program in Sub Saharan Africa (1.9%) but less than that reported in another CMAM program in S. Eastern Asia (17.8%). The major factor found to be significantly associated with complicated SAM relapse was having an unemployed mother. Implementers need to pay closer attention to unemployed mothers during rehabilitation, consider having relapse rate as a program performance indicator, properly ascertain relapse status and improve diagnosis during admission.

**Key words:** Complicated Severe Acute Malnutrition, Inpatient Therapeutic Care, Relapse, Community-based Management of Acute Malnutrition
P04: EFFECT OF A NOVEL SUPPLEMENTARY PORRIDGE ON THE NUTRITIONAL STATUS OF INFANTS AND YOUNG CHILDREN DIAGNOSED WITH MODERATE ACUTE MALNUTRITION IN UGANDA: A CLUSTER RANDOMISED CONTROL TRIAL

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Sub-theme: Malnutrition; forms, trends, causalities, innovations and cost.

Introduction: Moderate acute malnutrition (MAM) and anaemia is prevalent among infants and young children (IYC) in Uganda. A lack of consensus regarding the most effective strategy for managing MAM among IYC, resulted in comparing the effect of MSBP (an active malt, extruded maize and soy sorghum supplementary porridge developed for the purpose of the study) as intervention, to an extruded maize and soy micronutrient fortified blend (CSB+) as control and current standard care. Outcome measures were anthropometric status and haemoglobin levels.

Methods: A double blind cluster randomized control trial with eight to ten conveniently sampled consenting mother-IYC pairs per cluster, were randomly assigned to intervention (n=110) or control (n=110) for three months. Weekly anthropometric measurements were taken. Haemoglobin levels were measured at baseline and end line. Mean length-for-age, weight-for-age, length-for-weight, and mean haemoglobin levels of the treatment and control groups were compared using the independent t-test. The z-test was used to compare proportions of the outcome indicators between the treatment and control groups.

Results: Difference in mean weight-for-age z-scores in the treatment group improved when compared to control (p = 0.01). The change in mean haemoglobin levels was lower in the treatment versus control group (p = 0.01). The proportion of IYC recovering from MAM between treatment and control did not differ significantly (p = 0.055).

Conclusion: Recovery rates after supplementation with MSBP versus CSB+ resulted in similar weight-for-length and haemoglobin levels. Therefore, MSBP has the potential for being up scaled in the management of IYC with MAM in Uganda.

Key words: supplementary porridge, moderate acute malnutrition, haemoglobin, length-for-weight

P05: MATERNAL SOCIO-DEMOGRAPHIC CHARACTERISTICS AND ASSOCIATED COMPLEMENTARY FEEDING PRACTICES OF CHILDREN AGED 6 TO 18 MONTHS WITH MODERATE ACUTE MALNUTRITION IN ARUA, UGANDA

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Sub-theme: Malnutrition; forms, trends, causalities, innovations and cost.

Background: There is a paucity of published data regarding maternal socio-demographic characteristics and associated complementary feeding practices of moderately malnourished infants and young children (IYC) in sub-Saharan Africa. This association was investigated in Arua, Uganda.

Methods: A cross-sectional baseline survey was conducted among 204 conveniently sampled mothers of IYC aged 6 to 18 months with moderate acute malnutrition (MAM) earmarked for dietary supplemetation in four randomly selected sub-counties to determine their socio-demographic characteristics by means of a validated questionnaire. A 24-hour recall was used to evaluate complementary feeding practices in terms of minimum dietary diversity (MDD), minimum meal frequency (MMF) and minimum acceptable diet (MAD). Associations were determined using multivariate logistic regression analysis.

Results: The majority (70.1%) of mothers had a primary school education, with 15% having no formal education. Foods especially prepared or purchased for IYC, excluding home-based diets, was provided by 42.6% of the mothers. The MDD and MMF of IYC was 13.2% and 41.2% respectively. MMF and MDD for MAD was met by 6.9% of IYC.
Maternal level of education and MMF was significantly associated (p = 0.003), while the provision of foods especially prepared or purchased for IYC was significantly associated with MMF (p = 0.003). Maternal care was significantly associated with MAD (p = 0.004).

**Conclusion:** Optimal complementary feeding practices were not met by the majority of mothers. Maternal level of education and care of IYC were strong predictors of MMF. Nutrition education and care should be promoted among mothers of IYC with MAM to improve MDD, MMF and MAD.

**Keywords:** Maternal education, maternal care, complementary feeding practices, moderate acute malnutrition

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**P07: ASSOCIATION OF PHYSICAL ACTIVITY DURING THIRD TRIMESTER PREGNANCY AND BIRTH WEIGHT AT TERM IN BUTAJIRA, ETHIOPIA, 2017**

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**Background:** Low birth weight is an important public health issue in both developed and developing countries accounting for nearly 80% of neonatal deaths globally. It is the main factor influencing child survival and occurrence of chronic diseases in adult life. In Ethiopia prevalence of low birth weight varies from 10-28% attributed often engagement in heavy physical activities and physical exertion during pregnancy particularly in poor communities.

**Objective:** To assess maternal physical activity level during third trimester and its association with birth weight of newborns at term in rural Ethiopia 2017.

**Methods:** A community based cohort study was employed on 247 pregnant mothers during third trimester. The mothers were selected using simple random sampling technique using list obtained from a large cohort site for demographic and surveillance study. Data were collected using structured questionnaire. Birth weight was measured within 72 hours of delivery. Data were entered using Epi-Data 3.1 and all statistical tests were done using STATA version 14 software.

**Results:** Out of 247 cohort of third trimester mothers, 235 were included in the final analysis among which 124(52.77%) and 111 (47.23%) of the mothers engaged in moderate and vigorous physical activities during their third trimester respectively. The prevalence of Low birth weight was 21.62% and 9.68% among newborns of mothers with vigorous and moderate physical activity levels respectively. After adjustment for important determinants of birth weight, doing vigorous physical activity [AOR=2.48:95% CI= (1.01-6.09), prolonged standing [AOR=3.37:95% CI (1.14-9.93)] and squatting [AOR=2.61:95% CI (1.04-6.54)] during third trimester had significantly negative association with birth weight at term.

**Conclusion and Recommendation:** Almost one in two mothers were engaged in either moderate or vigorous intensity physical activities during third trimester. The major identified predictors for low birth weight were doing vigorous intensity physical activity, physical activities done by standing for longer hours and squatting position during third trimester. Thus to improve child birth weight, pregnant women need to be counseled to reduce vigorous intensity physical activity, standing and squatting during third trimester.

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**P08: NUTRITIONAL STATUS AND SOCIO-ECONOMIC FACTORS AMONG PREGNANT TEENAGERS IN ASHANTI REGION, GHANA**


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**Background:** Poor nutrition during pregnancy can have dire consequences on birth outcomes and maternal health, but for the adolescent, the effect may be compounded because they need nutrients to continue growing as well as provide for growing foetus.
Objective: To identify the impact of socio economic factors on nutritional status of pregnant teenagers.

Design: A cross-sectional comparative study involving 416 pregnant adolescents (13 to 19 years) who were recruited from selected health centres in rural and urban Ashanti Region and between 1 to 32 gestational weeks of pregnancy. Assessment of dietary intake and nutritional status and their factors was done, and blood samples were taken for biochemical analysis.

Results: Preliminary findings shows the mean age of the population was 17.5 years old, with close to 20% having been pregnant before. More than three-fourth had no income, only 10% were married and less than 20% had secondary education. Using MUAC cutoffs, less than 10% were underweight. However, the overall prevalence of anaemia using haemoglobin cutoffs was 66.1% in rural settings and 74.1% among the urban girls. Only 9.8% of the rural and less than 1% of the urban adolescents had high dietary diversity.

Conclusion: About 26% and 17.2% of the participants have had repeated pregnancies in rural and urban settings respectively, indicating that many had their first pregnancies much younger. Only 39.4% of the girls had completed secondary education at the time of interview and it is likely that low educational achievement is contributing to teenage pregnancies in Ghana. Since most girls will have finished basic education by the time they are 15 years, not having secondary education may mean they end up becoming pregnant during their teenage years. The proportion of girls with low haemoglobin or anaemic is high and unacceptable. Much more analysis of the data will be done to understand what is going on, and also to determine the drivers of poor nutrition: that is, poverty, household food security and hunger and other socio-economic indicators.

Keywords: pregnant teenager, nutrition, rural, urban, maternal, birth outcomes.

P09: INVESTIGATING NUTRITIONAL STATUS AND OTHER FACTORS ASSOCIATED WITH BIRTH OUTCOMES IN PREGNANT ADOLESCENTS IN THE ASHANTI REGION OF GHANA

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Background: Nutrition preceding, during and after pregnancy is a significant and non-negligible factor as it contributes to fetal outcomes and may eventually lead to lifelong consequences. Pregnancy during adolescence is globally considered “a high-risk-pregnancy”, due to increased risk for maternal and foetal complications owing to anatomical immaturity and competition for nutrients between mother and foetus. The widespread of unhealthy birth outcomes in Sub Saharan Africa is attributed to micronutrient deficiencies. The different traditional practices, taboos influence women’s dietary behaviors during pregnancy.

PURPOSE The study investigated longitudinally among pregnant adolescents, dietary intake, nutritional status, and factors that influence decision making on nutrition and household food insecurity, and to explore factors that influence uptake of, compliance to, and effectiveness of nutrition interventions offered to pregnant adolescents, and how all these influence birth outcomes.

METHOD The cross-sectional comparative study involved 416 pregnant adolescents (12 to 19 years) who were between 1 to 32 gestational weeks of pregnancy in rural and urban areas in Ashanti Region. Phase 1 assessed nutritional status using the Anthropometrics, Biochemical, and Dietary assessment. Phase 2 explored the sources of temporal variations in food intake and dietary behaviour among pregnant adolescents such as nutrition knowledge, attitudes and practices, food insecurity issues, socio-cultural practices and beliefs, values and taboos were assessed using interviews and focus group discussions. Phase 3 involved data on birth outcomes, maternal morbidity and mortality. Currently, data collection of phases 2 and 3, data analysis of continuous variables, Independent-Sample T Test to determine associations between the dichotomous variables, ANOVA to compare means between continuous variables, correlation and regression analyses to determine associations between exposure and outcome variables and risk and protective effect of various exposures on birth outcomes are being carried out.

EXPECTED OUTCOME It is expected that the study will identify the determinants of dietary intake that affect nutritional status of pregnant adolescents which are believed to be concealed in deep socio-cultural nutrition practices. Findings of the project will also bridge the gap on adolescent nutrition and pregnancy outcomes, identify some new interventions to address these and provide opportunity for policy interventions to make current interventions more effective.
P010: PREDICTORS OF EXCLUSIVE BREAST-FEEDING AMONG WOMEN IN FORMAL EMPLOYMENT ATTENDING CHILD WELFARE CLINIC AT JARAMOGI OGINGA ODINGA TEACHING AND REFERRAL HOSPITAL

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Introduction: Breast-feeding lays the foundation for healthy growth and child development. Despite the documented benefits of exclusively breast-feeding (EBF), studies have found that several predictors influence the duration of breast-feeding. While studies have attributed factors such as lack of work place support, maternal socio-demographic factors and knowledge to the practice of EBF among working women, few researches have assessed the predictors of EBF among women in formal employment in Kenya.

Purpose of the study: To determine the predictors of EBF among mothers in formal employment attending child welfare clinic at the Jaramogi Oginga Odinga Teaching and Referral Hospital.

Methods: Descriptive cross-sectional design was used to study 391 women in formal employment with infants aged up to one year using purposive sampling and three tools to collect the data: researcher and administered structured questionnaire, key informant interviews and focus group discussions. Statistical package for social sciences (SPSS) version 20 was used to analyze data.

Results: Fifty one percent of the women practiced EBF. The study identified three elements as predictors of EBF; mothers who had attained tertiary level of education were 3 times more likely to EBF their babies (aOR = 2.50, 95%CI [0.86-7.28], p<0.009); those knowledgeable on the benefits of EBF to the mother (aOR=3.22, 95% CI [1.63-6.35], p<0.001) and those who that delivered in public hospitals (aOR=12.48,95%CI [1.46-10.7],p<0.021). Women who were more knowledgeable on risks of failure to EBF their babies had higher odds of EBF (aOR=4.10, 95% CI [2.07-8.12], p<0.001). Major constraints that hindered women from practicing EBF are resumption to work after delivery, lack of work place breast-feeding facilities and long working hours.

Conclusions/recommendations: Women in formal employment sector are knowledgeable on EBF and several challenges hinder them from practicing EBF. There is urgent need for strategies that will enhance EBF for women in formal employment.

Key Words: Exclusive breast-feeding, Kenya, Predictors

P011: THE POTENTIAL ROLE OF BAOBAB IN FOOD SECURITY IN KILIFI AND KITUI COUNTIES OF KENYA

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Introduction: The Baobab tree, which dominates specific geographical areas in Kenya in form of a Y shaped belt, has in the recent past become of interest in sustainable utilization for economic and nutritional empowerment due to the high nutritional value of its fruit pulp. The belt cuts across Kitui and Kilifi counties, which are marginal agricultural potential areas with a population vulnerable to malnutrition and recurring food insecurity episodes whose prevalence are unknown. Furthermore, the status and potential role of baobab in food security and household’s income is unknown and undocumented.

Method: A cross-sectional study was designed to evaluate the current food security and nutritional status of households and the potential role of baobab in food security and household’s income.

Results: Most (91.2%) households were food-insecure. Stunting (28.6%), wasting (11.6%) and underweight (25%) rates among children were high. About 14.8% of the caregivers were underweight, 18.1% were overweight and 8.8% were obese. About 92.1% and 53.7% of the household in Kitui and Kilifi County respectively used baobab fruit mainly by cracking the hard shell and sucking the chalk powder off the seed and spitting the seed out. Only 43.5% used
baobab leaves in Kilifi whereas none of the household in Kitui used leaves. Baobab fruit is subject to seasonal changes, fruiting and leafing of the baobab tree coincides with the hunger gap in these counties. The overall income from baobab contributed to only 2.05% of the total income in Kilifi and 0.8% in Kitui County.

**Conclusion** The study demonstrates the huge untapped subsistence and commercial potential of baobab among households in the study areas. Creating awareness on the significant potential of baobab is necessary in the realization of its benefits. A failure to demonstrate this potential will lead to its continual underutilization.

**Keywords:** Dietary diversity, Household income, Malnutrition, Nutrient intake

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**P012: NUTRITION PRACTICES OF SCHOOL AGED CHILDREN 8-13 YEARS IN BUNGOMA COUNTY, KENYA**

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**Introduction:** Globally, malnutrition among school aged children (SAC) is a public health concern with more than 200 million school aged children stunted. Adequate food and nutrition is a human right and all children have the right to adequate nutrition which is essential for the attainment of the highest standards of health. Good nutrition practices are crucial for forming good eating habits to provide the much needed nutrients for long term health, growth and cognitive development. School age is a dynamic period of growth and development, forming a strong foundation for good health and a productive adult life. At school age, children develop their nutrition practices which are important in mitigating the occurrence of nutrition related chronic diseases later in life, associated with poor eating habits.

**Purpose of the study:** The study will seek to determine the nutrition practices of school aged children, 8-13 years in Bungoma County, Kenya.

**Objectives of the study:** It will do this by looking at the factors that influence the SAC food choices, their dietary intake, their nutrition status and comparing their nutrition status and dietary intake.

**Methods:** 384 children will be enrolled for the study. Anthropometric measurements, 24 hour dietary recall and food frequency questionnaires will be used for data collection. Multi-stage sampling will be used to determine the schools and children to be included in the study. Data will be computed using Epi-info 2002 software to convert it to nutritional indicators to group the children into different nutritional categories of nutritional status

**Key words:** malnutrition, school aged children, nutrition practices
Position at work. Further research is needed to assess how mothers can be supported to breastfeed exclusively even after returning to work.

**P014: FOOD SECURITY STATUS AND ASSOCIATED FACTORS OF ADULTS LIVING WITH HIV ATTENDING BWEYOGERERE HEALTH CENTRE III IN WAKISO DISTRICT, UGANDA**

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**Background:** Food security poses a challenge to Human Immune-deficiency Virus positive populations and affects their quality of life. Food security status and associated factors are not well studied in Uganda.

**Objective:** The main objective of the study was to determine the food security status and associated factors of adults living with HIV attending Bweyogerere Health Centre III (BHCIII), Wakiso district.

**Methods:** A cross sectional study was conducted at BHCIII among 274 adults living with HIV employing both quantitative and qualitative methods of data collection. Study participants were sampled consecutively as they came to the health facility. A pre-tested semi-structured questionnaire and a focus group guide were used to collect data. Food security was assessed using a modified Global Food Security Index. Prevalence Ratios (PRs) at the 95% confidence interval were generated using a Modified Poisson Regression model with robust standard errors via Generalized Linear Models, family (Poisson) and link (log) to establish the factors associated with food security.

**Results:** The prevalence of food security was found at 36.1% (95% CI: 30.44% - 41.82%). Results showed that receiving medication at the clinic (Adjusted PR: 1.51; CI: 1.11, 2.07) and obtaining water from a well/spring and borehole respectively (Adjusted PR: 1.55; CI: 1.09, 2.20 and Adjusted PR: 1.80; CI: 1.11, 2.94) were associated with increase in food security. Not earning an income or not having a spouse earning an income (Adjusted PR: 0.67; CI: 0.45, 0.99) and falling sick at least once in a month (Adjusted PR: 0.56; CI: 0.42, 0.76) were associated with a reduction in food security.

**Conclusion:** The food security status among this HIV infected population was worryingly low. Measures to address food security especially through creation of income generation activities are warranted to boost the financial situation of these HIV infected patients and enable them access healthy diets.

**P016: FACTORS ASSOCIATED WITH ENROLMENT OF CHILDREN AGED 6-23 MONTHS INTO THE MATERNAL AND CHILD HEALTH AND NUTRITION PROGRAMME, KOTIDO DISTRICT UGANDA: A MIXED METHODS DESIGN**

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**Introduction:** Karamoja sub-region scores poorly on key development and health indicators including nutrition. The Maternal and Child Health and Nutrition (MCHN) programme, a stunting prevention programme was therefore introduced in 2005 to curb and reduce stunting levels. Enrolment levels for children aged 6-23 months into the MCHN programme is low and yet factors associated with enrolment levels have not been investigated in Kotido district, Uganda.

**Objectives:** The study determined the individual, health systems and programme factors associated with enrolment of children aged 6-23 months into the MCHN programme in Kotido district, Uganda. Experiences about the programme were also explored.

**Methods:** This was mixed methods study. Mothers with children aged 6-23 months were selected using a 2-stage cluster sampling method. Structured questionnaires were administered to 326 respondents. Modified Poisson regression analysis was used to determine independent factors associated with enrolment of children into the programme. All factors with p-value less than 0.2 at bivariate level were integrated in the multivariate model and associations were considered significant at P < 0.05. Qualitative data was collected using key informant and focus discussion guides and analyzed using thematic analysis.

**Results:** The proportion of children who were enrolled into the programme was 77%. The mean age of respondents was 29 years. Almost all respondents had no formal education (95.4%). Multivariate analysis showed that waiting time (APR:0.82; 95% CI:0.72-0.93), availability of food at health facility (APR:1.12:95% CI:1.03-1.23), staff conduct (APR:0.89;95% CI:0.82-0.96), distance to the Food distribution Point (APR:0.79:95% CI: 0.68-0.92 and perceived...
Maternal and Child Health service quality (APR: 0.74; 95% CI: 0.64-0.86) were significantly associated with enrolment into the programme.

**Conclusion:** There is need to decentralize the programme such that underserved areas are reached in order to achieve a greater positive impact on nutrition indicators in Kotido district. Waiting time should be reduced by allocating time for different wards.

**P017: INFANT AND YOUNG CHILD FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN 0-23 MONTHS OLD IN UYO LOCAL GOVERNMENT AREA, AKWA IBOM STATE, NIGERIA.**

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**Background:** The rate of child morbidity and mortality is yet to be abated, especially in the African regions. However, optimal infant and young child feeding (IYCF) practices offers the needed protection against malnutrition and its attendant health problems in children.

**Objective:** To evaluate Infant and Young Child Feeding Practices and nutritional status of 400 children, 0 – 23 months old in Uyo Local Government Area, Akwa Ibom State.

**Methods:** This was a cross sectional study conducted with a structured interviewer administered questionnaire. The IYCF were assessed using the WHO/UNICEF guidelines for assessing Infant and Young Child Feeding Practices. Nutritional status indices: Height-for-Age, Weight-for-Age and Weight-for-Height were derived from weight and height measurements using WHO Anthro Software version 3.2.2. All data was analysed using SPSS version 22 statistical software. Chi-square test was used to investigate for significant relationships between IYCF practices and rates of malnutrition with regards to stunting, underweight and wasting.

**Results:** The IYCF practices observed in this study comprised of 61% early initiation of breastfeeding; 39.1% exclusive breastfeeding; 6.7% continued breastfeeding; 30.3% timely introduction of complementary feeding; 47.5% minimum dietary diversity; 100.0% minimum meal frequency for children 6-8 months; 70.0% minimum meal frequency for children 9-23 months. Prevalence of stunting, underweight and wasting were 36.8%, 11.9% and 8.6% respectively. Height-for-Age was significantly related to exclusive breastfeeding (p=0.50) and continued breastfeeding (p=0.44).

**Conclusion and Recommendation:** Infants and young child feeding practices are sub-optimal in Uyo Local Government Area. It is therefore important to identify and address hindrances to these practices.

**Keywords:** Exclusive breastfeeding; Complementary feeding; Dietary diversity, Stunting; Underweight.

**P018: THE APPRAISAL OF THE NUTRITIONAL CHALLENGES OF PERSONS WITH DISABILITIES IN MODUPE COLE MEMORIAL CHILD CARE AND TREATMENT HOME IN LAGOS STATE SOUTH WEST NIGERIA.**

Ogbonna K P¹, Otobo V C²


**Background:** Disability is an impairment that may be cognitive, developmental, intellectual, mental, physical, sensory or some combination of these. It substantially affects a person’s life activities and may be present from birth or occur during a person’s lifetime. Some examples of common disabilities are vision impairment, hearing impairment, mental retardation, autism spectrum disorder, cerebral palsy and so on. In Nigeria today, with the level of exposure and improvement in knowledge of health, food and nutrition, there are still series of problems facing persons with disabilities.

**Objective:** To examine the nutritional challenges of persons with disabilities in Modupe Cole memorial child care and treatment home in Lagos State South West Nigeria.

**Design:** the design used for the study was a descriptive survey design.
Result: Data collected was analyzed using mean, mean ratings from 2.50 and above were considered as agreed upon while items with mean ratings of 2.49 and below were considered as disagreed upon. Findings revealed that the inability of some of the persons with disability to masticate and swallow food as well as uncontrollable food drops from the mouth was the major nutritional challenges faced by the inmates.

Conclusion: it was recommended among others that the care givers be given continuous and updated information and training regarding feeding pattern, management and care of persons with any form of disability. Also, adequate remuneration should be provided for the care givers as this will help to motivate and boost their morale to care for the inmates.

Keywords: appraisal, nutritional challenges, disability, inmates, adequate nutrition, treatment, care, malnutrition, Nigeria.

P019: PREVALENCE OF MALNUTRITION AMONG CHILDREN IN KADUNA STATE, NIGERIA

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Sub-theme 1

Objective: The World Health Organization quotes malnutrition as a major single threat to the world’s public health. The study assessed the anthropometric indices of the under five children from the three senatorial districts in Kaduna State.

Materials and Methods: The study is a cross sectional descriptive survey. Proportionate sampling technique was used to select 420 children from a population of 1, 172,437 (three senatorial districts in Kaduna State), aged 6 - 59 months. The age of the children was determined through their birth certificate. The nutritional status was assessed using a structured questionnaire, anthropometric parameters of sex, age, weight, height based on World Health Organization (WHO) classification of malnutrition, mild (weight for height ratio between -1SD to -2SD) moderate (-2SD TO-3SD) and severe (less than -3SD) while 24-hour food recall were obtained on the children looking at the breakfast, lunch and dinner. The data obtained was coded and entered into Excel spread sheet and transferred back to SPSS version 16.0 for analysis. Frequency distribution and percentages were used to present anthropometric status of the children.

Results: Sex distribution of children studied was (53.8% female and 46.2 % male. Anthropometric assessment showed the prevalence of different categories of malnutrition among the children severe stunting (38.6%) moderate stunting 31.4% while 30% of the children were normal. Severe underweight was (41.24%, moderate underweight 35.2% and normal was (23.6%) while severe wasting was (21.26%, moderate wasting 26.4% while 51% were normal. Twenty-four (24) hour dietary recall showed the food or diet of the children is monotonous in nature as it dwells more on maize and maize product.

Conclusion: Severe malnutrition exists among children in Kaduna State therefore, there’s need for improvement in the diet and nutritional status of children in the State and the nation at large, knowing the out- come of malnutrition as it affects survival and health, education, productivity and the economy of the nation.

Keywords: Malnutrition; anthropometry; children; senatorial District; Kaduna State; Nigeria.

P020: EFFICACY OF ACUTE MALNUTRITION MANAGEMENT AMONG CHILDREN BETWEEN 0 TO 59 MONTHS -A GHANAIAN BASED STUDY IN THE ASHANTI REGION

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Introduction: Malnutrition is the major cause of morbidity and mortality among children under five years. Thus, ensuring positive nutrition rehabilitation outcomes is essential. The study assessed the efficacy of acute malnutrition management among children less than five years at In-Patient Care (IPC) and Out Patient Care (OPC) Centers in terms of recovery rate, length of stay and mortality rate.
Methods: A retrospective study was conducted at three nutrition rehabilitation centers in the Ashanti Region namely the Komfo Anokye Teaching Hospital, Agogo Presbyterian Hospital and Agogo CMAM center. Clinical records of 100 children from 0 to 59 months, who were managed for acute malnutrition at the study sites from 1st January to 31st December 2013 were retrieved. Data collected included socio-demographic characteristics, anthropometric measurements, feeds offered, recovery, length of stay, mortality and defaulter rate.

Results: The prevalence of severe acute malnutrition among participants was 92% while 8% had moderate acute malnutrition. At IPC, weight gained by children on discharge was significantly different (P<0.001) from admission weight. At IPC, majority (37%) of the children spent 8-14 days while for OPC majority (42.8%) spent one week. At IPC, recovery and mortality rates were 82.6% and 11.6% respectively while, defaulter rate was 5.8%. At OPC, recovery rate was 21.4%, defaulter rate was 71.4%, non-response rate was 7.2% and no death was recorded.

Conclusions: Children treated at IPC had better recovery rate and lower defaulter rate than children at OPC. However, mortality rate was higher at IPC than OPC. Compared to Global Sphere Standards (GSS), both IPC and OPC sites did not meet the acceptable ranges for recovery and defaulter rates of malnourished children.

P021: KNOWLEDGE AND INVOLVEMENT OF MARRIED MEN IN COMPLEMENTARY FEEDING IN IBADAN SOUTH-WEST LOCAL GOVERNMENT AREA OF OYO STATE, NIGERIA

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Introduction Nursing mothers have usually been the target of health education intervention approaches on infant feeding practices with little success. The important role of men in family welfare including Complementary Feeding (CF) cannot be over-emphasised in many sub-Saharan African countries because of the authority they wield. However, this role has been undermined in many instances as men are left out of interventions that can improve their involvement in all aspects of family life. Little is known about the level of male involvement in CF even though basic necessities to provide nourishing CF are under the control of men as the head of the households.

Purpose of the study This study was set out to investigate the knowledge and level of involvement of married men in CF in Ibadan South West, Nigeria. The study was meant to provide baseline information on the knowledge gaps and information needs of men on their level of involvement in CF.

Method and Approach Used A descriptive cross-sectional study design was adopted and multi-stage sampling technique was used to select 290 married men randomly from selected communities in the local government area. A validated interviewer-administered questionnaire with 29- and 20-point scales was used to measure knowledge and level of involvement, respectively. Data were analysed using descriptive and inferential statistics with level of significance set at p≤0.05

Summary of Results Age was 39.0±8.4 years. Only 0.4% of respondents could correctly define CF and 67.9% had poor knowledge but only 45.0% were poorly involved in CF practice. There was no significant difference between knowledge and level of involvement in CF practice.

Major Conclusion and Recommendations Knowledge of married men on CF was poor but many were found to be involved in some activities that could indirectly influence CF. Community based infant feeding programme that will include men is suggested.

P022: STUDY ON THE NUTRITIONAL STATUS OF STREET CHILDREN IN PERI-Urban Centers

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Background: Children’s nutritional status offers valuable insights into the future of a society’s well-being. Street children are vulnerable to poor health and malnutrition due to high nutrient needs and energy expenditure.
Purpose of the study: The purpose of this study was to assess the health and nutritional status of street children in Accra, Ghana.

Methods: A total of 300 children (210 males and 90 females) aged 10-17 years were recruited for the study. Anthropometric measurements included height, weight, mid-upper arm circumference (MUAC), triceps and calf skinfolds. Quality of diet and nutritional habits (number of meals per day and frequency of consuming particular foods) were studied using a 24-hr dietary recall and food frequency questionnaires.

Results: The mean age of the children was 14.8 years. About 74.7% of them had at most primary education. The majority (65%) of the children lived on their own and the major economic activity engaged by them was hawking and the average earnings per day were about US$ 1.00. The mean caloric intake of respondents was 1395±483.63 Kilo Calories. Mean intake of Vitamin A and Iron among the children were (1054.63±1222.84 RE) and (18.16±10.28 mg/day) respectively. Mean calcium intake among the children was (424.57±200.29 mg/day). Children who were stunted formed 17.7% of respondents, 92.7% of respondents had normal range of Body Mass Index (BMI) and 5.3% were underweight. Generally, BMI was higher in females compared to males.

Conclusion: Based on the findings, it can be concluded that street children are not adequately nourished and are highly susceptible to micronutrient deficiencies as well as stunting and underweight. This calls for immediate action to put measures in place to combat this issue of public health concern.

Keywords: Street children, Anthropometry, Nutritional status, Health and Ghana

P023: EARLY ADMISSION AND BETTER EFFECTIVENESS OF SEVERE ACUTE MALNUTRITION TREATMENT DELIVERED BY COMMUNITY HEALTH WORKERS COMPARED TO TRADITIONAL OUTPATIENT MODEL.

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INTRODUCTION: Community Health Workers(CHWs) have an active role in screening and referral of children with severe acute malnutrition(SAM) as part of the integrated community case management programs(iCCM). Distance to scarce Health Facilities(HFs) hinders children’s access to outpatient treatment and could have an influence on their severity at admission.

METHODS: Randomized intervention study in Kita(Mali) during twelve months since February 2015. CHWs were trained for 2 weeks with a refresh 6 months after beginning. 552 children 6- to 59 months were assessed by 17 CHWs versus 378 at 7 HFs. Inclusion criteria: Mid-Upper Arm Circumference(MUAC) <115mm or Weight-for-Height(WHZ) <-3 Z-score or presence of oedema and without severe complications.

RESULTS: There were more children with oedema at admission in the HFs group(3.7% vs. 0.4%, p<0.001; ORsex,age=10.585 [95%C.I. 2.222–50.416, p=0.003]). Considering only new admissions and relapses without oedema, MUAC measurements were higher in CHWs group reflecting a less severe condition (Mean: 115.7±6.6 mm vs.113.5±5.8, p<0.001; Median: 115 [interquartile 112-120] vs. 114 [110-118]). Of those children admitted with a MUAC<115mm(HFs: 53.3% vs. CHWs: 45.4%; p=0.031), there were more children with a measurement <110mm: 60.8% vs. 39.6%, p<0.001; ORsex,age,WHZ=2.246 [1.475–3.563, p<0.001]).

There were slightly more children in HFs group staying in treatment more than 40 days(54% vs. 47%; p=0.073) but there are significantly higher proportion not attending all visits(26.7% vs. 17.4%, p=0.002; RRsex,age=1.618 [1.110–2.358, p=0.012]).

CHWs’ discharge outcomes compared to HFS were: cured 95.3% vs. 88.7%; defaulted 3.7% vs. 9.8%; death 0.4% vs. 1.5%. Children treated at HFs had higher risk of not-being cured (RRsex,age,oedema=2.589 [1.110–2.358, p=0.001]) and higher risk of defaulting (RRsex,age,oedema=2.984 [1.589–5.604, p=0.001]).

CONCLUSION: SAM treatment delivered by CHWs allow to an early admission of children achieving better outcomes compare to traditional outpatient approach.

KEYWORDS: Community-based management of acute malnutrition(CMAM), integrated community case management(iCCM), Community Health Workers, Severe Acute Malnutrition(SAM)
P024: NUTRITION KNOWLEDGE, FOOD HABITS AND PREVALENCE OF STUNTING AMONG MALE ADOLESCENTS (10-18 YEARS) IN URBAN SECONDARY SCHOOLS OF ENUGU STATE, NIGERIA

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**Background:** Adolescence is a period in human life cycle when what is consumed is predetermined more by peer influence and school environment than the home. Problem however, arises when the nutritive value of the food, the preparation environment and the nutrient content of portion size consumed are compromised thereby predisposing them to malnutrition.

**Objective:** This study assessed the nutrition knowledge, food habit and the prevalence of stunting among male adolescents in urban secondary schools of Enugu state, Nigeria

**Methods:** A total of 1147 adolescent boys sampled using multistage sampling technique from 5 out of 30 secondary schools in Nsukka urban area participated in the cross-sectional study design. Information on their background, nutrition knowledge, food habit and frequency of consumption foods were obtained using validated structured interviewer administered questionnaire. Height and weight of the boys were measured using standard procedure and the anthropometric indices derived thereof compared with WHO growth reference standard for the age group. Data from the questionnaire were analyzed using SPSS (Statistical Package for Service Solution) version 22 and presented as frequencies, means and percentages.

**Results:** About 55% of the respondents had adequate (70/100) nutrition knowledge. Breakfast was skipped by 40.7% and 35.3% lunch. Half (54.1%) ate three meals per day and less than 30% snacked. Consumption of animal protein was low, 35.2%, 33.8%, 35.5% and 39% occasionally consumed fish, milk, egg, and yoghurt, respectively. Only 28.8% consumed vegetables daily. The prevalence of stunting at -3SD was 11.3%, moderate stunting 30.7%, 56.0% had normal height–for–age, 2.0% were tall–for–age

**Conclusion:** More than half of the boys had adequate nutrition knowledge but stunting was high among them. There is need for nutrition education programs in boys’-only secondary schools.

**Key words:** Nutritional knowledge, food habit, stunting, adolescent boys

P025: THE SUB-URBAN AREAS: HOW DO MOTHERS FEED THE YOUNG

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**Background:** The milk of any specie is best suited for its young. This explains why the WHO recommends exclusive breastfeeding during the first six months of human life and thereafter nutritionally adequate, safe, and appropriately-fed complementary foods with continued breastfeeding till the child is 2 years or more.

**Objective:** This study assessed infant and young child (0-24 months) feeding (IYF) practices of mothers living in sub-urban areas of Lagos state, Nigeria.

**Methods:** A total of 303 mother/child pairs were selected using the multi-stage sampling from 6 local government areas. Data on their background, socio economic and demographic variables; IYF and effect on child’s nutritional status were obtained with structured interviewer administered questionnaire. Anthropometric indices of the children derived, were compared with the reference standard. Data from the questionnaire were analyzed for descriptive statistics using SPSS version 22 and t-test determined the relationship between variables.

**Results:** About 48% babies were fed immediately after birth, 37% not breastfed within first hour, 50% one hour after, and others after 24 hours. The reasons included: breast milk did not flow (34.7%), illness (14.9%) and 5.6% did not want baby to consume colostrums. Less than half (40%) of babies were fed fluid other than breast milk within 3 days after delivery. The first food fed infants was mainly breast milk and coconut water, 27.7% of mothers did practice EBF attributed to duration, 44.6% completed the 6 months duration. Complementary foods were introduced to 51.8%
of the children before 6 months of age. There was a positive correlation between mothers’ education and complementary feeding practices \((r = 0.12; p<0.05)\) and education with children stunting \((r = 0.23; p<0.05)\).

**Conclusion:** There was sub-optimal adherence to the WHO recommendations on IYF among the mothers. Intervention should among others address the reasons for non-adherence.

**Key words:** Sub-urban, IYF practices, mothers.

**P026: SUBSTANDARD DISCHARGE RULES IN SEVERE ACUTE MALNUTRITION MANAGEMENT PROTOCOLS: A LONG-OVERLOOKED SOURCE OF INEFFECTIVENESS FOR PROGRAMS?**

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**Introduction:** Currently implemented national and generic Community-based Management of Acute Malnutrition (CMAM) protocols deviate from WHO recommendations in many ways as regards discharge rules.

**Objective:** The objective of this work was to describe the impact of these varying rules on apparent cured rates, and on the proportions of children discharged as cured while still acutely malnourished.

**Methods:** We used a dataset consisting of the weekly anthropometric measurements observed in a large cohort of children affected by Severe Acute Malnutrition (SAM). In this cohort, from a unique pilot program in Rajasthan, 7398 uncomplicated SAM children received standard outpatient care during 8 weeks, independently of their intermediary nutrition status, with very little loss to follow-up. In applying to this single dataset a variety of discharge rules, inspired by existing national protocols or by widely promoted suggestions for protocol simplifications, we simulated the numbers of children assessed as cured, and their actual status at the time they were considered as cured.

**Results:** Our simulations showed dramatic variations in apparent cured rates depending on the discharge rules applied, from <50% until >90%. Increase in apparent cured rates was mostly the result of protocol-driven misclassification of children as cured while they are in fact still acutely malnourished according to standard case definitions. Observations from real-life programs applying substandard discharge rules confirmed the real nature of the problem.

**Conclusions:** An overlooked, variable and often dramatic proportion of malnourished children is misclassified as cured by CMAM programs, mostly because of substandard discharge rules set by protocols. This avoidable issue, which is likely to affect the risks of relapse and poor health outcomes, precludes us from getting a valuable assessment of the effectiveness of real-life SAM management programs around the world. In the short term, an upgrade of African protocols is urgently required to avoid massive erroneous discharge.

**P028: INFANT FEEDING PRACTICES IN THE ASHANTI REGION**

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**Background:** Appropriate infant and young child feeding (IYCF) practices provide numerous benefit to both child and mother. This cross-sectional study assessed IYCF knowledge and practices of mothers living in some rural areas of Ghana.

**Methods:** This baseline study for a complementary feeding intervention was carried out with mothers-infant pairs from 6 Community-based Health Planning Services zones/health centres in Ahafo Ano South district, Ashanti region, Ghana. A total of 379 mother-infant pairs participated in the study. Data on infant feeding knowledge and practices, child care, antenatal and postnatal experiences were collected using an interviewer-administered structured questionnaire.

**Results:** Majority (52.5%) of the mothers were between 26 and 39 years old, with a mean age of 27 years. Most (37.3%) participants engaged in farming, while 26.7% were unemployed. Majority of the participants (59.6%) were attended to by a Nurse/Midwife whilst 22.9% were attended to by Traditional birth attendant or Village Health Volunteer at birth. Only 11.2% of respondents were attended to by a doctor. Majority knew the importance of breastfeeding, with over half (53.2%) mentioning the importance of colostrum. However only 31.6 % practiced exclusive breastfeeding for 6 months with close to a third starting complementary feeding within 1 month of birth. Of
the foods given before six months, 50% gave only water while close to 30% gave water, koko and other breastmilk
substitutes. Slightly over a third of mothers initiated complementary feeding at 6 months.

**Conclusion:** The findings suggest a low proportion practicing exclusive breastfeeding and timely initiation of
complementary feeding, calling for interventions to improve infant and young child feeding knowledge and practices.

**Keywords:** Exclusive Breastfeeding, Complementary feeding, challenge, feeding practices

*P030: BODY COMPOSITION ASSESSMENT AMONG ADULTS IN THIKA, KIAMBU COUNTY, KENYA*

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**Background:** Research has shown that body composition is directly related to health. Altered body composition, can
greatly increase the risks of conditions such as cardiovascular disease and diabetes. Bioelectrical Impedance Analysis fosters early detection of an improper balance in the body composition, which allows for earlier intervention and prevention.

**Methods:** This was a cross sectional analysis of body composition for adults who volunteered to be screened during
a Nutrition week in Kiambu County, Kenya. A total of 301 adults were included in the assessment. Body Mass Index (BMI) and Body composition (body fat %, bone mass, muscle mass, visceral fat and water %) were measured using bioelectrical impedance analysis.

**Results:** The age of the participants ranged from 18-99 years (mean 42.19±16.57 years). Most of the participants were males (53.5%). More than half (53.2 %) of the participants had a poor BMI, 37.2 % had high total body fat percentage, 12.6% had excess levels of visceral fat and 26.6% had poor water hydration status. Age (OR=0.095; p value < 0.001; CI 0.033-0.272) and visceral fat (r= 0.74; p value < 0.001) were significantly associated with the BMI. Females had a significantly higher BMI (p < 0.001). Visceral fat was also positively correlated with age: r= 0.74; p value < 0.001.

**Conclusions:** Sex, age and BMI were important determinants of body composition. Increased physical activity, appropriate dietary practices are crucial in maintaining a healthy BMI and body composition. For timely intervention regular nutrition screening should be promoted among different populations.

**Key Words:** Bioelectrical Impedance Analysis, Body composition, Body fat percentage, Body Mass index.

*P032: BARRIERS TO BREASTFEEDING AMONG ADOLESCENT MOTHERS IN EKITI, NIGERIA*

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**Introduction:** Teenage mothers are on the increase and babies born by them who are breastfed have reduced risk of morbidity and mortality. Despite the benefits derived from breastfeeding, the practice dwindles.

**Purpose:** This study aimed to assess the barriers to breastfeeding practice among adolescent nursing mothers.

**Methods:** Descriptive study was conducted purposively among 105 adolescent nursing mothers of infants 0-2 years attending General Hospital in Ikere Ekiti, Nigeria. Information was elicited on socioeconomic characteristics, mother’s knowledge about breastfeeding, practice and barriers to practices. Interviewer administered questionnaire was used to collect data which was analysed using both descriptive and Inferential Statistics on SPSS version 22. Knowledge was assessed on a 5-point Likert scale while Practice and Barriers were on a 2-point scale. Significance was taken at p≤0.05.

**Results:** Age of the adolescent mothers was 17.34±1.59years. 63.8% were from nuclear family and 63.8% from household size ≤6. Age of babies was 7.61±4.27months, 56.2% were female children, 44.8% had babies in the hospital and 87.6% virginal delivery. Out of the 90 points obtainable from the 18 breastfeeding knowledge statements, 15.2%
were rated high and 22.9% rated high. For the 7 statements on practice, 18.1% were rated poor while 33.3 were rated good. Barrier to breastfeeding practice ranked highest was community barriers, followed by Individual barriers, Institutional, Interpersonal and Policy as the least. Significant association existed between age of child (p=0.012), type of delivery (p=0.03), barrier (p=0.023) and practice of breastfeeding. Those who had virginal delivery were four times more likely to breastfeed their babies than those who did caesarian section. (OR=4.23, 95%CI=2.54-4.33).

**Conclusion/Recommendation:** It was concluded that community (prelactal feeding), interpersonal (aged women influence) and personal (breast management) issues are barriers to breastfeeding of babies of adolescent mothers. Efforts should be made to address these issues for effectiveness of breastfeeding practice.

**Keywords:** Adolescents, Mothers, Breastfeeding, Babies, Barriers

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**P033: PERCEIVED AND ACTUAL NUTRITION STATUS OF WOMEN IN A HIGHER INSTITUTION IN NIGERIA**

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**Introduction:** Overweight and obesity are life-threatening Public Health issues which pose a risk to health.

**Purpose of study:** The study was aimed to assess the perceptions of overweight and obesity among science and non-science women in Obafemi Awolowo University, Ile-Ife, Nigeria. It also assessed the nutritional status, nutritional knowledge and dietary habit of the women.

**Methods:** The cross-sectional survey was conducted purposively among 300 women; 150 each from science and non-science based faculties. Self-administered questionnaires were used to elicit information on socioeconomic variables, perception about overweight and obesity, food intakes and nutritional knowledge of the women. Weight and Height were measured using bathroom scale and stadiometer respectively. Data were analysed using both descriptive and inferential statistics on SPSS version 22.

**Results:** Mean age was 28.33±5.3 years with 61.3% within 20-29 years age range. More of non-science women perceived nutrition status lower than actual (P=0.001). None perceived herself as obese among both groups whereas 9.3% and 5.3% were obese among science and non-science women respectively. Likewise, 24.0% and 14.7% were overweight which were higher than self-reported. Only 22.7% of non-science women strongly agreed that there are risks associated with overweight and obesity as compared to 42.7% among science women. Perception in general was significantly higher among science than non-science women (P=0.002). More of non-science women daily skipped breakfast, took carbonated drinks and ate less of fruits. Surprisingly, no significant difference in the nutritional knowledge of the two groups, however, practice of healthy diet was lower among non-science women. Younger women in both groups were more likely to have better perception about self than younger women (OR=2.79, 95%CI=2.41-3.24, OR=1.82, 95%CI=1.65-1.99) respectively.

**Conclusion/Recommendation:** It was concluded that perception of overnutrition was lower among non-science women and the risks associated. It is therefore recommended that nutritional status monitoring should be intensified among non-science women.

**Keywords:** Overweight, Obesity, Women, Perception

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**P034: DETERMINANTS OF IRON DEFICIENCY ANAEMIA AMONG SUPPOSEDLY HEALTHY WOMEN OF REPRODUCTIVE AGE IN ILE–IFE, NIGERIA**

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Introduction: One of the nutritional deficiencies in the world of public health concern is iron deficiency anemia.

Purpose of Study: This study assessed the iron deficiency and nutritional status and consumption pattern of iron-rich foods among women of reproductive age in Obafemi Awolowo University, Ile–Ife, Nigeria.

Methods: Cross-sectional study was purposively conducted to select 161 women. Structured questionnaire was used to collect information on the personal characteristics and Food Consumption Pattern (FCP). Anthropometry of weight, height, waist and hip circumference was done using digital bathroom scale, stadiometer and tape measure respectively. Body Mass Index (BMI) and Waist-Hip Ratio (WHR) were determined using WHO standards. Iron status was determined using haemoglobin (Hb), serum ferritin (SF) and C-reactive protein (CRP) indicators. Data were analyzed using descriptive and inferential statistics on SPSS version 22.

Result: Mean age, weight and height were 24.0±5.32, 51.9±7.4 and 1.7±0.7 respectively. About 20.0% were underweight, 1.9% overweight, 9.3% had WHR of ≥ 0.85. Iron status showed that 29.8% had SF level of ≤ 15ug/l, 44.7% haemoglobin level of <12g/l and 2.5% had high risk of Cardiovascular Disease judged by CRP. For FCP, 11.8% were rated high. However, there was no significant relationship between SF, Hb, CRP and FCP likewise with BMI (p>0.05). Whereas, significant relationship existed between WHR and SF (p=0.05), Age, CRP (p=0.029) and SF (p=0.013), Marital Status and SF (p=0.05). Women >30years are more likely to have higher SF than younger women (OR=1.059, 95%CI= 0.285–3.930) and women with WHR>0.85 are twice more likely to have higher SF (OR=2.038, 95%CI=0.129–1.79).

Conclusion: The study concluded that, there are other factors responsible for iron deficiency aside the investigated among the women.

Recommendation: Further research is needed to determine the causes of low Hb status of the women in the study area.

Keywords: Iron deficiency, Women, Reproductive age, Body Mass Index, Waist-to-Hip Ratio

P035: ASSESSMENT ON THE IMPLEMENTATION OF INFANT AND YOUNG CHILD FEEDING IN EMERGENCY (IYCF-E) DURING THE 2017 EL NINO INDUCED DROUGHT IN CHIFRA DISTRICT, AFAR REGIONAL STATE, ETHIOPIA.

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Introduction: Infant and Young Child Feeding in Emergencies (IYCF-E) concerns the protection and support of safe and appropriate feeding for children 0-<24 months of age in emergencies that improve child survival and growth. A situation analysis conducted by Ministry of Health with its partners in Ethiopia showed a lack of IYCF-E focused interventions.

Objectives: The objective of this study was to assess the challenges of Infant and Young Child Feeding in Emergency (IYCF-E) implementation during the El Nino induced drought in 2017 in Chifra District, Afar Regional State, Ethiopia.

Methods: A qualitative study design was used to collect data from mothers with children under two years old, men, health officials, and Non-Governmental Organizations (NGO) experts. About 41 study subjects participated in four Focus Group Discussions (FGDs) and ten Key Informant Interviews (KIs) using semi-structured discussion and interview guides supported by relevant literature, government and organization reports.

Results: Implementation of IYCF-E was poor due to a knowledge gap despite availability of guidelines. Other factors affecting the poor implementation included misconceptions regarding appropriate child feeding, the importance placed on pre-lacteal feeding, women’s work burden, lack of clear communication, coordination, and networking.

Conclusion and recommendation: Protection and promotion of infant and young child feeding is important during emergencies. There is need for increased accountability, coordination and monitoring mechanisms to make this work effectively. Operational research is recommended to identify barriers and opportunities to protect, promote and support optimal infant and young child feeding in emergencies.

Keywords: Infant and young child feeding, emergency, drought
P036: SINGLE AND MULTIPLE ANTHROPOMETRIC FAILURE AMONG UNDER-FIVE CHILDREN OUT-PATIENTS IN ADEOYO MATERNITY TEACHING HOSPITAL, IBADAN, NIGERIA

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Background: Determination of undernutrition using conventional nutrition indices like wasting, stunting, and underweight, among under-five children, is acceptable. Nonetheless, this method is being superseded by a construct that allows calculation of prevalence of specific, concurrent and overall undernutrition. This allowance helps to identify more undernourished children and further reclassifies undernutrition into single and multiple anthropometric failures.

Aim: To assess single and anthropometric failure among under-five children out-patients in Adeoyo Maternity Teaching Hospital, Ibadan, Nigeria.

Methods: A descriptive cross-sectional study was used to assess and obtain data from 154 mother-child pairs. Anthropometric data were coded and analyzed with IBM Statistical Package for Social Sciences and Emergency Nutrition Assessment – WHO Anthro. The Composite Index Anthropometric Failure was used to disaggregate growth failures. Level of significance was set at 95% CI.

Results: The prevalence of conventional nutrition indices which includes wasting, stunting, and underweight were 14.9%, 26% and 21.4% respectively. Also, the prevalence of overall undernutrition, which is a composite of single and multiple anthropometric failures, was 37.7%. 62.3% had neither single nor multiple growth failure. Overall undernutrition recognised more undernourished children than conventional nutrition indices by 22.8%, 11.7%, and 16.3% for wasting, stunting, and underweight respectively. Wasting, Stunting, and Underweight, strictly singular, were 4.5%, 11.7%, and 2.6%, respectively. Concurrence of wasting and underweight was 4.5%, while concurrence of stunting and underweight was 8.4%. The concurrence of the three growth failures, that is, wasting, stunting, and underweight was 5.8%. There was a weak negative correlation (-0.228) between weight-for-height and height-for-age.

Conclusions: This study has made a contribution to understanding the need for a closer look at the manifestation of undernutrition. It reveals the possibility of concurrence of conventional nutritional indices as well as usage of inclusive, overall undernutrition, to estimate undernutrition.

Keywords: Wasting, stunting, and underweight; CIAF; concurrent undernutrition; under-five children.

P037: HOUSEHOLD FOOD INSECURITY, COPING STRATEGIES AND NUTRITIONAL STATUS OF CHILDREN (24-59 MONTHS) IN IBADAN, NIGERIA

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Background: During periods of recession, households employ some coping strategies in order to augment for nutritional deficiency; a consequence of food insecurity. There is usually a decline in certain macroeconomic indicators such as gross domestic product (GDP), capacity utilization, household income, and inflation, with the attendant increase in the rate of unemployment.

AIM: The objective was to assess the household food insecurity, coping strategies and nutritional status of children (24-59 months) in Ibadan.

Methodology: A community-based descriptive cross-sectional study was conducted among 360 households with children (24–59 months). For each representative household, household food insecurity access scale, coping strategy, 24-hr dietary recall and anthropometry were used to assess household food insecurity and nutritional status of the respondents.

Results: Of the 360 households, food insecurity access scale indicated 54.7% of households were moderately food insecure while 11.4% were severely food insecure. This was found to be associated with mother and fathers’ educational level and household monthly income (p<0.05). Consequently, the prevalence of wasting, stunting and under-weight among children aged 24–59 months were 15.5%, 26.1%, and 18.3%, respectively. However, age groups 36-47, 24-35 and 24-35 had highest prevalence in wasting, stunting and underweight respectively. A negative
correlation was identified between food security status and height-for-age as well as weight-for-age. A statistically significant relationship was found between food security status and coping strategy with a high percentage of respondents who relied on less preferred and less expensive foods, ration money to the household, reduce the number of meals consumed by the household and had mothers who limit their intake as coping strategies. **Conclusion:** This study revealed that household food security affects a child’s nutritional status coupled with the coping strategy employed to ameliorate the effect of the food insecurity experienced. **Key words:** Household Food Insecurity, Coping Strategy, Nutritional Status, Under-5

**P038: SCHOOL FEEDING PROGRAMME INITIATIVE: DIETARY DIVERSITY OF SCHOOL-FED PUPILS IN OSUN STATE, NIGERIA**

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**Introduction** Childhood under-nutrition has remained a major public health problem especially in developing countries like Nigeria. Dietary diversity is a diet-based strategy aimed at increasing intake of multiple micronutrients.

**Purpose of the Study** This study assessed the dietary diversity of primary school pupils participating in the school feeding programme in Osun State.

**Methods** Multistage sampling technique was used to select 410 pupils from 18 schools. A structured interviewer’s administered questionnaire was used to obtain information on the personal and family characteristics of the respondents. The 16-food group Individual Dietary Diversity Score (DDS) was used to obtain information on dietary diversity of the respondents. DDS was classified as <6 food-groups =Low DDS; 6-10 food-groups =medium DDS; >10 food-groups =high DDS. Data was analyzed using frequency counts, percentages, means, standard deviations and Chi-square methods.

**Results** Results showed that 53.2% of the pupils were females, with mean age of 9.7±1.5 years, 52.4% of the mothers were traders and 65.4% of the fathers were artisans. Majority (74.6%) were from monogamous homes with mean family size of 7.0±2.8 members and 67.1% received feeding allowance daily. Commonly consumed foods were from cereals (100.0%), oils and fats (100.0%), spices, condiments and beverages (100.0%), other vegetables (100.0%), legumes, nuts and seeds (89.3%) as well as roots and tubers (70.0%). Majority (93.4%) had medium DDS while 5.6% and 1.0% had high and low DDS respectively with a mean DDS of 8.39±1.4%. There was no significant relationship between DDS and family type, family size, fathers’ occupation and mothers’ occupation while there was a significant relationship between DDS and the feeding allowance received by the respondents.

**Conclusion and Recommendation** The study concluded that majority of the pupils had medium DDS, thus the school meals should be more diversified, with variety introduced into the menu to improve the DDS.

**P039: MOTHERS’ AND CAREGIVERS’ KNOWLEDGE AND CARE PRACTICES AND CHILD UNDER FIVE NUTRITIONAL STATUS IN NORTH DAYI DISTRICT, GHANA**

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**Introduction:** Inadequate nutrition in the early years of life can affect child morbidity and mortality, lower intellectual attainment, and also have long-term health consequences in adulthood.

**Purpose of study:** This study investigated maternal/caregivers’ knowledge, care practices, attitudes and dietary practices as determinants of child nutritional status in the North Dayi District.

**Methods:** A community-based descriptive cross-sectional study design was used. A multi-stage sampling technique was used to select the respondents for the study. Data was analyzed using descriptive and inferential method. Pearson’s chi-square test and logistic regression was used to show any association between the independent and dependent variables at a significance set at 5% (p≤0.05).
Results: Analysis of child nutritional status showed that 7% of children were severely underweight, 29% were moderately underweight, 5.5% were severely stunted and 27% moderately stunted. Also, 4.0% of the children were severely wasted and 39% moderately wasted. The results indicated that 82% of the respondents had adequate knowledge on nutritional issues. About 67% of mothers practiced exclusive breastfeeding. 45% of the children had moderately diverse diets and 29% had high dietary diversity. Chi-square test showed that underweight (Weight-for-Age) was significantly associated with mothers’ educational level (P=0.001), mothers’ occupation (P=0.003) and mothers’ age (P=0.034). Multiple regression analysis showed that only age of mothers had a statistically significant association with child underweight (OR=1.177, P-value=0.001). Chi-square test also showed that stunting was associated with and mothers’ educational level (P<0.0001) and mothers’ occupation (P=0.023). Similar findings were observe for wasting (P<0.0001). Underweight was significantly associated with dietary diversity (p<0.0001).

Conclusion: There are high levels of malnutrition in the North Dayi District of Ghana. Maternal characteristics and child dietary diversity are significantly associated with child nutritional status. Interventions to tackle child malnutrition should promote dietary diversity and also focus on improving maternal circumstances.

P040: DIETARY PATTERNS CHARACTERISED WITH ANIMAL SOURCE FOODS CONSUMPTION PREVENT STUNTING AMONG CHILDREN BELOW 5 YEARS OF AGE IN KAPCHORWA DISTRICT, UGANDA

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Background: In 2017, the Global Nutrition Report stated that globally 155 million children are stunted and 42 million children are overweight. The HealthyLAND project investigated linkages between dietary patterns and stunting of children below five years of age.

Methods: In 2016, a nutrition baseline survey was conducted among 411 small holder farm households in Kapchorwa District, Uganda. Anthropometric measurements were taken from the children below five years to assess the stunting prevalence in the project area. Primary caregivers were interviewed in regard to the children’s diet. The results of the semi-quantitative 24h recalls (n=377, only children 6-59 months old) were included in a Principal Component Analysis with Varimax rotation. Nominal regression analysis was used to detect which of the obtained factors (dietary patterns) were significantly associated with the dependent variable ‘stunting’.

Results: Stunting prevalence was 30.5%. Six factors (dietary patterns) were retained with eigenvalues >= 1.2, accounting for 39.7 % of the total variance. The age adjusted regression model showed that dietary patterns characterised by high intake of (1) dairy, eggs, sugar and bread or (2) red meat, juice drinks and ground nuts are associated with a reduced chance to become stunted (OR=0.7, 95%CI=0.55-0.91, p<0.01 and OR=0.8, 95%CI=0.56-1.0, p<0.05, respectively). Pearson chi-square statistic suggests a good fit of the model (p=0.344).

Conclusion: In Uganda, the consumption of animal source foods as well as sugar and bread are associated with a higher wealth status. At the same time consumption of bread, sugar and meat is associated with nutrition transition resulting in a risk to become overweight or obese. Diversification of agriculture production including a sustainable production of animal source foods linked with nutrition education is needed to support families to prevent both stunting as well as overweight and obesity and its related diseases.

P041: DOUBLE BURDEN OF MALNUTRITION AT THE HOUSEHOLD LEVEL – RESULTS FROM A CROSS-SECTIONAL STUDY IN KAPCHORWA DISTRICT, UGANDA

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Background: The presence of double burden of malnutrition at household level has been widely researched in numerous developing countries around the globe. However, limited knowledge is available about the prevalence of double burden at household level, i.e. coincidence of stunting and wasting as well as overweight and obesity, and its determinants in rural areas sub-Saharan Africa’s. This study aimed to identify possible risk factors for double burden of malnutrition at household level in Kapchorwa District, a rural area in Uganda.

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Methods The dataset compassed 155 households living in Kapchorwa District, including data of mothers, fathers, and children (< 5 years of age). Anthropometric measurements were used to classify the children and their parents according to their nutritional status. Cross tables, as well as binary logistical regression, were conducted to determine factors influencing the chance of the households to be affected by double burden of malnutrition.

Results The overall prevalence of double burden was 9%. The dominant pairing was an underweight child together with an overweight adult, mostly the mother. Stunting occurred more often than wasting in the households affected by double burden. Regressions analysis indicated that urban village area, greater household size, higher educational level (≥ 12 years of education) of mother, female-headed households, higher dietary diversity scores, and improved living conditions were positively correlated with double burden.

Conclusions Multisectoral actions, in form of public health nutrition interventions and broader awareness campaigns for healthy nutrition, are needed to tackle the nutrition-related burdens in smallholder farm households. Further studies are needed to better understand the double burden of overweight and underweight in households in other rural areas of Uganda and to implement targeted interventions to improve the nutritional status of all family members.

P042: MALNUTRITION IN URBAN POOR SETTING OF TANZANIA MAINLAND
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Introduction: Globally, there has been an increased concern on poor nutrition and health among people living in urban poor setting as a result of urbanization. In 1967, Tanzania had a population of 12.3 million people which has rapidly increased to 44.9 million by 2012 of which 30% lives in urban and 60% of those lives in slums. Addressing urban nutrition is in line with four sustainable development goals: 3 Good Health and Wellbeing, 10 Reduced Inequalities, 11 Sustainable Cities and Communities and 13 Climate Action.

Objectives: To understand nutrition, health and WASH situation in slums and identify what community-based actors implementing nutrition, health and WASH interventions in urban slums for successful design, implementation, uptake and influence of maternal and childhood health and nutrition.

Methods: Search of grey and published material (2000-2019) in urban poor setting in Tanzania, policies, data sources and stakeholders focusing on maternal, adolescent and child health, nutrition and WASH. Overall 34 papers and 14 policies were reviewed, five datasets identified and mapped nine organisations working in urban poor settings.

Results: Stunting prevalence in slums ranged from 43-56%. Nine percent of mothers practiced exclusively breastfed and the average age for initiation of complementary foods was 3.2 ±1.12 months. Only 8% of informal settlement were connected to the central sewage system network. 52.6% of water at household was contaminated by E. coli. Prevalence of diarrheal diseases in under-fives was 60% and 30% died of diarrhoea. Only 2 out of 14 reviewed policies partially addressed urban poor situation and none of the identified stakeholders had addressed urban poor nutrition.

Conclusion: There is an urgent need to address nutrition, health and WASH situation of urban poor under-five, adolescents and mothers. Stakeholder need to integrate nutrition in their programs and national policies and planned intervention should adress their problems and need.

P043: ACCEPTABILITY OF MULTIPLE MICRONUTRIENT POWDERS (MNPS) AMONG MOTHERS OF CHILDREN 6 TO 23 MONTHS IN MAKONI DISTRICT, ZIMBABWE
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Background: Multiple micronutrient powders (MNPs) have been developed as alternative way of providing micronutrients to populations where other interventions are difficult to implement. Objectives: To assess the
acceptability of multiple micronutrient powders by mothers and caregivers of children 6-23 months in Makoni district, Zimbabwe.

**Methods:** The cross-sectional survey of mothers and caregivers (n=211) and two focus group discussions (FGDs) (n=24). Purposive sampling was used to select 8 clinics. Quantitative data was analysed using SPSS version 21 and using content analysis by themes in Excel for qualitative data.

**Results:** Acceptability of MNPs was high (66.1%) despite mothers reporting some changes in taste and colour of food mixed with MNPs. Mothers and caregivers from households with incomes below USD182 were more likely to accept MNPs [OR 3.11, 95 CI (1.21, 8.02), P=0.019]. There was more acceptability (63.5%) of MNPs among mothers from rural areas compared to urban counterparts (P=0.001). The FGDs revealed that most of the mothers were not willing to pay for MNPs in this study.

**Conclusions:** There was overall high acceptability of MNPs, and rural mothers had higher acceptance compared to urban counterparts. Low household income was associated with high acceptability of MNPs. Overall, considering that MNPs appear to be a “supplement for the poor” there is need for increased awareness and behaviour change communication interventions to address this misconception among mothers and caregivers.

**Keywords:** Fortification, acceptability, micronutrient deficiency, Zimbabwe

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**P044: THE DETERMINANTS OF STUNTING AMONG CHILDREN AGED 6-23 MONTHS IN MUTARE, ZIMBABWE**

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**Background:** Stunting under 5 is one of the most significant hindrances to human development. In order to mitigate the effects of stunting in Mutare, knowledge on the determinants in vital. **Objectives:** To investigate the determinants of stunting in children 6-23 months of age in Mutare, Zimbabwe

**Methods:** The cross-sectional survey involved 141 mother-infant pairs 6-23 months. Height was measured using the UNICEF height board. World Health Organization (WHO) standards were used to compute height for age Z scores categorized as stunted (<-2) and not stunted (≥-2). An interviewer administered questionnaire was using to collect variables. Data was analysed using SPSS version 21. Association between the variables was assessed using the Pearson ChiSqured test and binary logistic regression. The level of significance was set at P< 0.05.

**Results:** Stunting affected 24.8% of the children with more females affected than boys (P=0.660). Exclusive breastfeeding was at 85%, dietary diversity was at 30.5% and the minimum acceptable diet was 95.7%. Low dietary diversity (P=0.021), child morbidity (P=0.004), low birth weight (P=0.001), early initiation to complementary food (P=0.002), poor pregnancy diet (P=0.001), unemployment (P=0.006) and renting (P=0.023) were determinants of stunting.

**Conclusions:** In Mutare children’s birth weight, health status and feeding practices, mother’s nutrition during pregnancy, employment and household ownership were significant predictors of stunting in children 6-23 months. Interventions that involving nutrition education, nutrition sensitive agriculture and women empowerment are likely improve linear growth in children 6-23 months in this setting.

**Keywords:** Stunting, determinants, children 6-23 months, mothers, Zimbabwe

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**P045: THE NEED TO SHIFT FROM IRON AND FOLIC ACID SUPPLEMENTATION DURING PREGNANCY TO MULTIPLE MICRONUTRIENTS: TANZANIA AND GLOBAL EVIDENCE.**

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**Introduction:** Although the burden of maternal undernutrition is declining, micronutrient deficiencies particularly iron and vitamin A remains unacceptably high affecting approximately half of the world’s population, low- and middle-income countries carrying the biggest burden. Strong evidence exists indicates that multiple micronutrient supplementation (MMS) offers additional benefits for pregnancy outcomes as compared to iron-acid (IFA).
Objectives: To present evidence from Tanzania and global supporting the need to shift from the use of iron and folic acid to multiple micronutrients supplementation to improve maternal and new-born micronutrient status and health outcomes.

Methods: Review of existing published and grey literature on maternal supplementation with multiple micronutrients and health outcomes in Tanzania and other countries. Papers were searched from different sources (Science direct, google scholar, Hinari and PubMed). The review covered fifteen papers published from 1998 to 2018 in Tanzania and global data from a recent meta-analysis and Cochrane review which included 18 randomized controlled trials.

Results: Supplementation with MMS reduces neonatal mortality for girls by 15%, low birth weight by 19%, small-for-gestation-age by 8% and preterm birth among underweight pregnant women by 22%. MMS reduces maternal hypochromic microcytic anaemia and improves the infant’s micronutrients status.

Conclusion: Based on high-quality evidence, we conclude that MMS has a positive impact on maternal and child health and effort is needed to replace iron and folic acid with MMS.

P046: KEY BARRIERS AND ENABLERS OF EXCLUSIVE BREASTFEEDING OF CHILDREN BELOW SIX MONTHS OF AGE IN FOUR DISTRICTS OF SOUTHERN KAROMOJA, UGANDA

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Introduction: Concern Worldwide implemented a social and behaviour change component for improving health and nutrition behaviours among participants of the ‘Resiliency through Wealth, Agriculture, and Nutrition in Karamoja’ (RWANU) project, a large-scale project implemented in four districts of Karamoja, Uganda, from 2012-2017. Exclusive breastfeeding (EBF) is key to optimal nutrition and health during the first six months.

Purpose: To investigate key barriers and enablers of improving (EBF) of infants <6 months in four districts in Karamoja.

Method: In April 2016, Concern Worldwide conducted a barrier analysis survey using the established ‘Designing for behavior change’ approach in four districts (two communities each) where the RWANU project operated. Data were collected of 55 ‘Doers’ and 52 ‘Non-Doers’: mothers of infants aged 6-8mo who did/did not practice the desirable behavior when their child was <6mo. A p<0.05 of the odds ratio and/or absolute percentage point difference of ≥15% between doers and non-doers were used to identify key barriers/enablers.

Results: Responses of Doers and Non-Doers differed in seven of 12 determinants investigated. Enablers included confidence in breastfeeding their baby exclusively for six months; beliefs that breastmilk has no disadvantages, is the most adequate food for a baby and that EBF prevents child malnutrition and diarrhea. Barriers included perceived breastmilk shortage due to insufficient maternal food intake or sickness, and time challenges. Many Non-Doers felt ‘on their own’ with little approval from their social group and they felt ‘bad’ about not practicing EBF.

Conclusions/ recommendations: Social and behavior change programs should continue to promote EBF, its importance and tips for overcoming (perceived) breastmilk shortage. Interventions should involve the wider community to foster an enabling social network for better support, available time and to reduce maternal mental stress. Maternal nutrition during lactation needs strengthening.

P047: OBESITY AMONG ADOLESCENTS IN OYO STATE, SOUTH-WEST, NIGERIA

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Background: Adolescent obesity has been on the increase worldwide and its rising trends are apparent in developed and developing countries of the world and little is still known about its prevalence among Nigerian adolescents’ population.

Aim: To assess the form of malnutrition present among adolescents in Oyo state, Nigeria.

Method: This descriptive cross-sectional study was carried out among adolescents in Oyo State, South-West Nigeria involving a total of 1273 apparently healthy male and female in-school adolescents. A semi-structured self-administered questionnaire was used to obtain information from respondents on socio-demographic characteristics,
eating habits, physical activity and anthropometry. Dietary intake of respondents was assessed using 24-hour dietary recall. Frequency and percentage as well as T-test, Correlation and Chi-square test was used to present results, level of significance set at 5% using SPSS version 20.

Results: The prevalence of overweight and obesity were 3.8% and 0.5% respectively. A high (17.4%) prevalence of underweight was however found among respondents. There was a significant difference in anthropometric parameters such as weight, waist and hip circumferences, waist – Hip – Ratio and Percentage Body fat (p=.000) between gender. Overweight and obesity was higher among females (4.7% and 0.5% respectively) while underweight was higher among males (24.5%). Mean nutrient intake was significantly different between male and female adolescents in this study (p<0.05). There was a significant association between gender and BMI –for–Age (p=.000). There was also a significant but weak positive correlation between age and percentage body fat (r = .194).

Conclusion: Prevalence of obesity among adolescents in Oyo State was lower than most found in literature while underweight was high. Hence, nutrition education is needed to create awareness about healthy eating habits and lifestyle complemented by physical activity and also, proffering innovative, albeit, realistic campaigns to curb the daunting menace of malnutrition in the African population.

Keywords: Prevalence; Obesity; Adolescents; Nigeria

P048: PRENATAL INFANT FEEDING INTENTIONS AND ACTUAL FEEDING PRACTICES DURING THE FIRST SIX MONTHS POSTPARTUM IN RURAL RWANDA: A QUALITATIVE, LONGITUDINAL COHORT STUDY

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Background Despite the efforts of the Rwandan government to improve nutrition conditions, chronic malnutrition among under-5 children continues to be a public health concern. This study aimed to gain insights into mothers feeding intentions, the underlying reasons, actual practices and factors facilitating or impeding exclusive breastfeeding (EB) for the first six months of child’s life in Muhanga District, Rwanda.

Methods This qualitative, longitudinal study recruited 39 pregnant women attending prenatal consultations during the last trimester of pregnancy in two rural health centers. They were interviewed once during pregnancy to explore their feeding intentions. Additional interviews were held within the first week, 4th, and 6th months postpartum exploring actual practices, critical transition points, facilitating or impeding factors. Interviews were recorded, transcribed and thematically analyzed using Atlas.ti software.

Results The majority of participants intended to breastfeed within the first hour after birth, and to breastfeed exclusively for the first six months. In practice, 34 participants initiated breastfeeding within the first hour after birth, and 12 complied with EB. Impeding factors include perceived breastmilk insufficiency, pressure from family members, mothers’ concerns over their infants’ health issues, mothers’ heavy workload, use of herbal remedies, poverty and food insecurity while mothers’ awareness of the advantages of EB, their confidence in their ability to breastfeed, health professionals’ and social support from CHWs and family members were facilitators for EB.

Conclusion Most participants intended to breastfeed exclusively for the first six months. However, there was a gap between intentions and practices. There was interplay of barriers impeding women from breastfeeding exclusively for the first six months. EB promotion interventions should consider supporting and equipping breastfeeding mothers with skills to deal with perceived breastmilk insufficiency and targeting influential community and family members. Finally, nutrition-sensitive interventions should not be overlooked.

Keywords: Breastfeeding intentions, exclusive breastfeeding, child nutrition.

P049: SOCIAL–CULTURAL FACTORS AND COMPLEMENTARY FEEDING OF CHILDREN 6-23 MONTHS AMONG THE MAASAI IN NAROK SOUTH KENYA.

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INTRODUCTION: Successful complementary feeding practices during infancy and early childhood are known to be key in ensuring effective, long-term nutritional well-being. It is recommended that appropriate complementary feeding should start from the age of six months with continued breastfeeding up to two years or more. Studies show a link between feeding practices of children and their nutritional status. Good complementary feeding could prevent another 6% of deaths. The main causes of high rates of malnutrition are the combination of various diseases and inadequate intake of nutrients. The Maasai socio-cultural beliefs and practices have been shown to influence their infant feeding hence determines their nutritional status.

METHOD: A cross-sectional analytical study design was adopted. A total sample of 400 mothers and children were selected using simple random sampling. Data was collected using an infant and young child WHO semi-structured questionnaire and focus group discussion (FGDs) guides. ENA for SMART, 2011 software was used to analyze anthropometric data. Quantitative data was analyzed using statistical packages for social sciences (SPSS) version 20. Statistical significance was set at p value less than 0.05. Chi-square test was used to test for associations. Complementary feeding practices was interpreted based on the WHO Infant and Young Child Feeding indicators.

RESULTS: The prevalence of malnutrition of stunting, wasting and underweight among the children of what age was 37.3%, 9.8% and 17.8% respectively. Comparison of the prevalence of malnutrition between the boys and girls revealed that stunting and underweight was significantly higher in the girls (stunting, 33.3%; underweight, 14.1%) compared to the boys (stunting, 26.8%; underweight, 11.3%). On the other hand, a larger proportion of the boys had low weight for height (8.9%) compared with the girls (11.0%).

CONCLUSION: The findings will assist the ministry of health in developing policies that will go ahead in curbing high malnutrition rate in the country.

P050: THE STUDY OF THE DURATION OF MANAGEMENT OF A MALNOURISHED CHILD USING CAW MILK

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Introduction: Malnutrition is a big issue in under five children mainly in poor and families with conflicts. In Rwanda each health center has a nutritional care which serves caaw milk and nutritional education for families with malnourished children. Each child is given seven liters of caaw milk per week. Initially, nutrition care protocol included the supplement of caaw milk, SOSOMA and Ready-to-Use Therapeutic Food but from the year of 2015 to 2017, the children were given caaw milk only.

Purpose of the study: A study was conducted to assess the duration of managing a malnourished child when caaw milk is used only.

Methodology: The study evaluated children who were in follow up at health centers in 2017. The qualitative and quantitative methods were used. The non-probability sampling was used and adopted a purposive technique. Data were collected on 57 malnourished children admitted in nutrition service at Musanze health center where 21 were in severe while 36 were in moderate malnutrition. All malnourished children were given seven liters of caaw milk per week during their follow up period. The Weight-for-Age and the Mid-Upper Arm Circumference were used to screen a children. All collected data were analyzed by means of Statistical Package for the Social Sciences (SPSS).

Results: The study showed that when caaw milk is only used, the duration of taking a child from severe malnutrition to good nutrition took approximately double (7months) compared to World Health organization (WHO) nutrition care protocol (4months).

Conclusion: In addition, the study described the other WHO methods for nutritional care like feeding an infant when his mother died during delivery and when the mother completely lack breast milk. The caaw milk only is not enough
as it takes longer than period expected by WHO. Therefore, balanced diet together with cow milk can change nutrition status.

**Keywords:** Malnutrition, Severe malnutrition, moderate malnutrition, malnutrition management

**P051: INFLUENCE OF VIDEO-BASED NUTRITION EDUCATION ON NUTRITIONAL KNOWLEDGE AND DIETARY HABITS OF UNDERGRADUATE STUDENTS IN VOM, PLATEAU STATE, NIGERIA**

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**Background:** Good nutrition can be achieved by healthy food choices which are influenced by good nutrition knowledge and healthy dietary practices, however many undergraduates around the world make food choices without acquiring essential knowledge and skills to make healthy choices. The purpose of this study was to determine the influence of video-based nutrition education on nutritional knowledge and dietary habits of students in two tertiary institutions in Vom, Plateau State, Nigeria.

**Method:** The quasi-experimental study involved 340 undergraduates (experimental (EG): 170 and control (CG): 170) from two tertiary institutions. A semi-structured questionnaire was used to collect information on socio-demographic characteristics, nutrition knowledge and dietary habits at baseline and endline. Nutrition knowledge (NK) was assessed on a 78-point scale categorized as poor (<20), fair (20-39) and good (≥40). Dietary habit (DH) was assessed on a 68-point scale categorized as poor (<34), fair (34-50) and good (>50). EG was exposed to four weeks nutrition education using video that captured food groups; dietary recommendations; healthy food choices; diet, diseases and weight management. Data were analyzed using descriptive statistics and student t-test at p=0.05.

**Result:** Age of CG (23.66±3.36 years) and EG (22.56±3.14 years) was similar, majority (58.9%) were males in both groups. NK score increased from 27.20±5.52 to 37.27±5.46 and decreased from 26.23±5.87 to 26.16±5.88 for EG and CG respectively. Respondents with good NK increased from 2.9%-34.7% in EG but decreased from 1.2%-0.6% in CG. DH score increased from 48.81±4.10 to 49.18±3.89 in EG and declined from 48.96±3.32 to 48.95±3.45 in CG. Respondents with good DH increased from 32.7%-34.1% but decreased from 37.1%-36.5% in EG and CG. There was a significant difference (p<0.05) in the NK and DH of the EG when compared with the CG.

**Conclusion:** Video-based nutrition education increased the nutrition knowledge and dietary habits of undergraduates; usage is hereby recommended in nutrition education.

**Key words:** Nutrition knowledge, dietary habits, video-based nutrition education

**P052: DIVERSITY OF COMPLEMENTARY FOODS AND ANTHROPOMETRIC CHARACTERISTICS OF CHILDREN AGED 6-23 MONTHS IN ISEYIN, NIGERIA**

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**Introduction:** Child malnutrition remains unacceptably high in Oyo State and co-exists with poor Complementary Feeding Practices (CFPs). Yet, there is a dearth of state-specific data linking these poor CFPs to the high burden of malnutrition, thereby limiting efforts to sustain advocacy and behavioural changes.

**Purpose:** This study was designed to identify the relationship between dietary diversity during complementary feeding phase and anthropometric characteristics of children aged 6-23 months in Iseyin, Oyo State, Nigeria

**Methods:** This descriptive, cross-sectional study adopted a three-stage simple random sampling to select six wards, 30 communities, and 390 mother-child (6-23 months) dyads. Information on socio-demographic characteristics of mothers and CFPs was obtained using a semi-structured questionnaire. A 24-hour dietary recall was conducted to assess Minimum Dietary Diversity (MDD) and Minimum Meal Frequency (MMF). The MDD score was categorised

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into low (<4 MDD score) and adequate (≥4 MDD). Low MMF was considered as MMF of ≥2 for 6-8 months, ≥3 for 9-23 months with breastfeeding and ≥4 for 9-23 months without breastfeeding. Weight and length of children were assessed; Z-scores for weight-for-height, height-for-age and weight-for-age were determined using the WHO Anthro software. Data were analysed using descriptive statistics and Chi square test at p=0.05.

**Results:** The mean ages of mothers and children were 28.58±5.8 years and 14.5±5.1 months, respectively. The majority (72.3%) commenced complementary feeding at six months. The mean MDD score was 2.38 ±1.34 and 76.7% had low MDD score. The mean MMF was 2.37±1.18 and only 46.9% attained appropriate MMF for their age. The prevalence of stunting, wasting and underweight among children was 38.2%, 18.5% and 23.8%, respectively. The likelihood of stunting was 3.5 times higher in low MDD compared to adequate MDD.

**Conclusion and recommendation:** Inadequate dietary diversity contributes to the high burden of stunting among infants in Iseyin. Increased effort to improving complementary feeding practices is suggested.

**Keywords:** Malnutrition, dietary diversity, complementary feeding, stunting

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**P053: NUTRITIONAL RISK AND ASSOCIATED FACTORS OF ADULT IN-PATIENTS AT A TEACHING HOSPITAL ON THE COPPERBELT PROVINCE IN ZAMBIA**

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**Background:** Nutritional risk and under-nutrition are common problems among medical and surgical patients. In hospital, malnutrition is frequently under-diagnosed and untreated thereby contributing to morbidity and mortality. The purpose of this study was to determine the prevalence of nutritional risk among adult inpatients at a teaching hospital in Zambia. In addition, the study sought to establish factors associated with nutritional risk. **Methods:** A hospital-based cross-sectional study comprising of 186 consecutive in-patients aged 18–64 years admitted in medical and surgical wards was conducted at a teaching hospital. Out of one hundred and ninety eight (198) patients eligible to participate, complete data were collected from 186, representing a response rate of 93.9%. The Malnutrition Universal Screening Tool was used to collect data over a period of six months. Evaluated patients were dichotomized into no risk and nutritional risk. Binary logistic regression was performed to identify variables associated with nutritional risk. **Results:** The mean age of adult in-patients was 40.72±14.4 years. Majority of the patients were male (61.8%), while 38.2% were female. Results indicate that 59.7% of hospitalized patients were at nutritional risk. Vomiting, weakness, appetite decrease, dysphagia and weight loss were significantly associated (p=0.019, p=0.008, p<0.001, p=0.007, and p<0.001 respectively) with nutritional risk. However, weight loss and appetite decrease were the most significant factors associated with nutritional risk (OR=50.16, 95% CI=5.75–36.70, p<0.001 and OR=28.06, 95% CI =1.49–8.12, p<0.001 respectively). **Conclusion:** Results suggest that close to 60% of adult inpatients at the teaching hospital were at nutritional risk. Nutritional risk is an issue of major concern at the teaching hospital and is associated with a number of variables. **Recommendations:** Identification of nutritional risk using Malnutrition Universal Screening Tool among adult inpatients is feasible in resource-poor settings like ours.

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**P054: BREASTFEEDING SELF-EFFICACY AND BREASTFEEDING KNOWLEDGE OF LACTATING MOTHERS ATTENDING ADEYOYO MATERNITY TEACHING HOSPITAL YEMETU IBADAN, OYO STATE, NIGERIA**

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**Background:** Breastfeeding is a skill that requires knowledge and ability to endure when difficulties arise while breastfeeding self-efficacy is the confidence a mother has in her ability to breastfeed her infant. Most mothers do not
breastfeed their infant exclusively for 6 months in Nigeria. It is not clear whether breastfeeding knowledge or self-efficacy may be playing a role and few studies have examined the relationship between breastfeeding self-efficacy and breastfeeding knowledge among lactating mothers in Nigeria.

**Objectives:** This study assessed the relationship between breastfeeding self-efficacy and breastfeeding knowledge among lactating mothers in Ibadan.

**Methodology:** A descriptive cross-sectional study was carried out with a total of four hundred and nineteen lactating mothers with infants aged 0-6 months. These mothers were randomly selected during the immunization clinic in Adeoyo Maternity Teaching Hospital in Ibadan, Oyo State, Nigeria. A semi-structured interviewer-administered questionnaire was used to obtain information on socio-demographic characteristics, breastfeeding knowledge, breastfeeding attitude, breastfeeding self-efficacy. Data were analyzed using descriptive statistics such as frequencies, percentages, Mean ±SD and inferential analysis such as chi-square, correlation at P < 0.05.

**Results:** The mean age of the mothers and infants was 28.8 ±5.3 years and 2.1 ±1.5 months respectively. Majority (76.4%) of the mothers had high breastfeeding self-efficacy. Mothers who had good breastfeeding knowledge were (82.8%) and positive breastfeeding attitude (23.2%). A significant positive correlation was observed between breastfeeding self-efficacy and breastfeeding knowledge; breastfeeding attitude and breastfeeding knowledge. Age of Mothers and breastfeeding knowledge was not positively correlated while breastfeeding attitude and breastfeeding self-efficacy were not also positively correlated.

**Conclusion:** Breastfeeding knowledge was observed to positively influence breastfeeding self-efficacy.

**Recommendation:** Early education on the importance of optimal breastfeeding practice should be given to mothers to build their confidence ability on exclusive breastfeeding.

**Keywords:** breastfeeding, knowledge, self-efficacy

**ISOTOPE ASSESSMENTS IN NUTRITION**

**P01: INFLUENCE OF MOTHERS' BODY COMPOSITION ON BREAST MILK INTAKE BY INFANTS.**

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**Introduction:** Despite advice, people are reluctant to practice exclusive breastfeeding (EA), which could help reduce infant mortality. Indeed, they are skeptical about mothers’ ability to produce sufficient milk for infant’ normal growth. The deuterium oxide « Dose to mother » technique assesses breast milk intake by infants and mother’ body composition.

**Purpose:** To determine the existence of a relationship between exclusively breastfeeding mothers’ body composition and breast milk intake by infants.

**Methods:** Study was conducted between 2011 and 2014 in Bamako. A sample of 71 mother-child pairs was followed from the 3rd to the 12th month postpartum. By an FTIR 3976 saliva samples were analyzed.

**Results:** AE was practiced by 42.3% and 16.66% of mothers respectively in the 3rd and 6th month. Mean milk intake were 1125.17 ± 369 kg / day and 947.00 ± 383 kg / day. Among of these mothers 18.8% had energy deficiency and muscular atrophy and 50% fat depletion. The denutries exclusively breastfeeding mothers’ lactation was comparable to obese and normal mothers’ lactation. The T-test showed that mothers’ body composition had not influence on the breast milk intake by infants. However milk intake was significantly correlated (r = 0.344 and p = 0.004) with the frequency of feedings.

**Conclusion:** Changed of mother’ body composition during exclusive breastfeeding didn’t harm not only their own health, but regardless of this body composition, breast milk intake by their babies was largely sufficient to allow them to grow normally.

**Key words:** Deuterium, infant, breast milk, exclusive breastfeeding, body composition, Mali.

**SUB THEME: MULTI-SECTORAL COORDINATION OF NUTRITION INITIATIVES**
P01: INTEGRATED AGRICULTURE, NUTRITION EDUCATION AND MARKETING WITH BIOFORTIFIED ORANGE-FLESHED SWEETPOTATO (OFSP) IN RURAL TANZANIA FOR IMPROVED MATERNAL KNOWLEDGE, FOOD SECURITY AND DIETARY INTAKES

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**Objectives:** The aim of this ag-nutrition integrated intervention was to contribute to improved dietary diversity (DD), nutrition, food security and incomes of smallholder households (HH) with children under-five years.

**Methods:** The M&E strategy of the intervention assessed the overall effectiveness and sustainability of the OFSP delivery approach linking agriculture to nutrition behavior change and communication at community level. A total of 140 clubs were established and run by 157 trained community health workers (CHWs) with 2,663 active members. There were 21,876 caregiver attendances to 1,167 club meetings. A total of 27,676 eligible HH received OFSP seeds together with brochures containing messages on OFSP production utilization. Cross-sectional surveys among 549 mother-child (6-59 mos) pairs at baseline and 547 mother-child pairs at endline examined the effect of the project’s intervention on participating HH. The 24-month intervention linked beneficiaries to quality OFSP seed sources, received improved monthly nutrition education at community-level caregivers’ group meetings. Indices were developed to assess HH wealth, child caregivers’ knowledge on VA and nutrition, health seeking behavior and childcare practices, access and frequency of consumption of VA rich foods and, HH and young child DD.

**Results:** The intervention had a positive impact on production (0.8% at baseline vs 42% at endline; P< 0.001) and consumption (0.4% vs 46%, P< 0.0001) of OFSP. There was a significant 23% (P< 0.001) increase in caregiver knowledge on nutrition and VA. The average health-seeking and childcare knowledge score of caregivers at endline improved by 28% (P< 0.001) compared to baseline. There were improvements in HH DD with 72% increase (P< 0.0001), young child DD at 18% increase (P< 0.01) as well as and young child VA intake between baseline and endline. The project significantly improved food security among beneficiary HH where low food insecurity (score of 0-2) improved from 32% at baseline to 53% during endline (P< 0.0001).

**Conclusions:** The positive agricultural and nutrition outcomes documented throughout the intervention period was a result of HH members being empowered to adopt OFSP technologies and management practices as well increased active participation in nutrition club meetings.

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P02: STAKEHOLDER AND NUTRITION ACTIONS MAPPING IS A USEFUL TOOL TO FOSTER COMMON RESULTS FRAMEWORK AND MUTUAL ACCOUNTABILITY IN THE IMPLEMENTATION OF THE NATIONAL POLICY OF NUTRITION SECURITY IN NIGER.

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**Introduction:** Stakeholder and Nutrition action mapping is an analytical tool to help improve nutrition coordination.

**Objective:** To determine priority CNAs in Niger, get an overview of who is doing what and where in nutrition and to better identify gaps in estimated coverage of target population and geographic areas of the selected Core Nutrition Actions (CNAs).

**Methods:** CNAs were selected through multi-stakeholders’ consultations. Data from the 8 regions of Niger were collected in 2015, processed and analysed using the Scaling-up Nutrition Planning and Monitoring Tool. Geographical and beneficiary coverage were estimated using information obtained at the district level. The process was led by the High-Commission of the 3N Initiative, the Government body in charge of multi-sectoral coordination in nutrition.
Summary of results. CNAs were implemented by various Government bodies and more than 60 NGOs with support of UN agencies. Most of the actors were not implementing a minimum required package of interventions with a sufficient coverage to make significant impact on nutritional status. CNAs implemented through health facilities (Vitamin A, Iron, Folic acid and Zinc supplementation; deworming; treatment of severe and moderate acute malnutrition) have high level of coverage (>75%). In contrast, the coverage of exclusive breastfeeding, family planning, local food production, nutrition education, hand washing, cash/transfer was very low (<25%). While the coverage of CNAs across districts varies, most CNAs where only reached a small percentage of the target populations.

Conclusion/Recommendations. The results have been used for the development of the National Nutrition Security Policy (NNSP) and its multisectoral action plan. Lessons learned are being used to help inform and improve planning of core nutrition actions and discussion around scaling up nutrition actions for the elimination malnutrition. Ongoing update of the mapping is useful for monitoring the implementation of the NNSP action plan, and foster common results and mutual accountability among actors.

Keys words: Core Nutrition Actions Coverage, Multi-stakeholders coordination, target groups, Nutrition Security Policy, Niger

P03: USING DATA FROM COMMUNITY BASED NUTRITION PROGRAM (CBNP) TO INVOLVE STAKEHOLDERS FOR ADDRESSING MALNUTRITION IN NYANZA DISTRICT, SOUTH PROVINCE, RWANDA, 2018

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Background: Recent evidences showed that malnutrition may be influenced by interrelated social, environmental and economic factors. Community Based Nutrition Program (CBNP) is one of interventions implemented in Rwanda to reduce malnutrition which engaging multisectoral stakeholders, determinants of CBNP are not monitored regularly to be used by stakeholders.

Objectives: We conducted this study to calculate the CBNP determinants, identify the bottleneck among determinants of CBNP.

Methods: We conducted a cross-sectional study involving secondary analysis of surveillance data reported through the CBNP from July to September, 2018. We conducted descriptive analysis, and calculated availability of tools, utilization of service, adequate and effective quality of service delivered by using the monitoring form as presented in CBNP protocol.

Results: During the period July-September 2018, the CBNP screened 29,950 children (87%), of these, 98(3%) were malnourished, tools available were 26(85%), those who attended session regularly were 24,559 (82%) and 15,574 (52%) received effective quality service. The bottleneck was identified to availability of tools used to conduct session of CBNP and effective quality of service delivered on the CBNP sessions.

Conclusions/Recommendations: Our study identified the bottleneck on availability of tools used to conduct CBNP session, and to effective quality of service delivered to the participants. In order to mitigate the challenge of shortage of tools, we recommend the Ministry of health and partners to provide tools required at all sites of CBNP and implementers should be strengthened how to conduct a session of CBNP by following all steps recommended.

Keywords: CBNP, Malnutrition, surveillance data, stakeholders, Nyanza District
P04: HIDDEN HUNGER ALLEVIATION IN AFRICA: PERSPECTIVE ON INTELLIGENT MODELS

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Introduction/Background: Nowhere are the linkages between hidden hunger and nutritional food security stronger than in Africa, where per capita food production, vegetable intake and micro nutrient requirements have steadily declined for the past three decades. In Africa, abuses and mismanagement in the field of nutrition often lead to low quality of live, low life expectancy, high infant and maternity mortality rate among other vices. Most of the endemic diseases caused by nutritional hidden hunger; blindness, anemia, pneumonia, scurvy and malaria are still rife with resulting high rural under-development, under-employment and rural urban migration. Rapid population growth, economic and social decline are brutal driving forces behind the brain drains in Africa. This has led to the explosion of city populations at a rate faster than social services, essential nutrition, infrastructures and employment opportunities can be provided. The ranks of the urban unemployed are filled with unemployable job seekers. Cultures are lost, as dignity and identity are washed away in the hidden nutritional food insecurity tribulations sweeping over the continent. Too seldom do we consider this nutritional hidden hunger as causes of these factors in Africa.

Purpose of Study: This study seeks to alleviate nutrition hidden hunger food insecurity using different agronomic intelligent model studies that significantly improved vegetable productivity, intakes, income, health, employment and could solve nutrition hidden hunger menace for food security purposes in the Continent.

Methods and Results: Summarized are our six different intelligent agronomic model studies spanning over three decades that significantly improved vegetable productivity, intakes, income, health, employment and could solve nutrition hidden hunger menace for food security purposes in the Continent. What is needed is commitment to utilize these findings.

Conclusion: Governments must come to understand that if they are to succeed against this hidden hunger nutrition food insecurity war, they must enlist the understanding, then the active cooperation and the assistance of the people who are most affected by the crisis, not only on the international levels, but on local villages and most importantly on individual family units.

Keywords: Hunger, Alleviation, Africa, Nutrition, Models

P05: MAINSTREAMING CROP BIODIVERSITY CONSERVATION AND UTILIZATION TO IMPROVE NUTRITION IN BUSIA COUNTY

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Background Busia county, western Kenya, where environmental conditions suitable for growing all crops exist, malnutrition levels comprise 26.6% stunting, 13.9% underweight and 10.1% wasting comparable to semi-arid areas. Micro nutrient deficiencies such as Zinc, Iron and Vitamin A are widespread.

Objective To address this, a multi-agency, multi-institutional and multi-sectoral approach was undertaken. The objective was to mainstream crop biodiversity conservation and utilization to improve nutrition within Busia county. Biodiversity offers opportunities for diversifying food sources beyond the traditional crops and animals used by man for food. Yet utilization and conservation of biodiversity and genetic diversity for improved nutrition and wellbeing could be reinforced by supporting policy frameworks at both the national and county levels.

Method As part of mainstreaming biodiversity, stakeholders in Busia county were involved in developing and facilitating enactment of a biodiversity policy at the county assembly. The process involved task force formation, cross-sectoral and stakeholder sensitization, consultations, mobilization and lobbying at the county assembly level.
Results The policy currently under implementation under the county Ministry of Agriculture Livestock and Fisheries in the county underpins promotion of and incorporation of highly nutritious indigenous foods in local public procurement for schools and hospitals. Mainstreaming was undertaken by provision of analytical data on the nutritional value of crop biodiversity, raising awareness of the value of biodiversity, and using scientific evidence to support marketing and to lobby for supporting policy frameworks at both national and county levels. So far, nutrient analysis of 18 foods has been undertaken and data incorporated in the updated food composition table. 15 field days have been held to promote utilization and conservation of indigenous foods, 25 farmer groups have been linked to local schools and hospitals to provide indigenous vegetables under contractual arrangements while a biodiversity policy has been enacted in the county assembly to support utilization and conservation of local biodiversity.

Key words: Biodiversity, Indigenous food, mainstreaming

P06: HISTOPATHOLOGICAL EFFECT OF SHEABUTTER EFFLUENT ON AFRICAN CATFISH (CLARIA GARIEPINUS)
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Introduction: Malnutrition is one of the major social problems across the globe today. Promotion of dietary diversity has been identified as one of the major ways of tackling malnutrition, hence protection of food environment and promotion of nutritious food consumption are essential in promoting the quality health condition.

Purpose of the study: The study was carried out to examine the effect of Shea butter effluent on Clarias gariepinus (African catfish).

Methodology: Histopathological effect of Shea butter effluent was investigated using African cat fish (Clarias gariepinus) of the mean weight 17g and standard length of 10cm. Range finding bioassay was carried out to determine the toxicity level of Shea butter effluent. The fishes were exposed to lethal concentrations of Shea butter effluent (0.045, 0.050, 0.055, 0.060 part per thousand (ppt)), for 96 hours. Also, sub lethal toxicity for 28 days in a renewal bioassay was carried out. Results: The median lethal concentration (LC50) was 0.058ppt at 96 hours of exposure. Behavioural reactions exhibited by the fish species after exposure to the effluent were: erratic swimming, air gulping, and loss of balance in fish exposed to higher concentrations of shea butter effluent. The observed pathological lesions of the gills included primary and secondary lamellae distortion, epithelial necrosis, lamellae aneureism, curling of secondary lamellae and epithelial lifting. Necrosis, nuclear alteration, fatty degeneration, increased sinusoidal space, congested central vein was observed in the liver of the fish exposed to effluent. All the fishes held in control stock showed inappreciable histological degradation.

Conclusion: Shea butter effluent was highly toxic to Clarias gariepinus, therefore indiscriminate discharge of Shea butter effluent into water bodies should be abolished to avoid contamination and food poisoning when such fishes are consumed.

P07: MAY A “NARRATIVE PREVENTION” APPROACH FEED DISEASES PREVENTION IN UNPROTECTED AND DATA POOR COUNTRIES?

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Purpose of Study: We discuss toxicological risk factors (in food/nutrition security, consumers’ products, environmental health and food safety from farm to fork) and experiences of relevant risk analysis-driven bottom up activities in unprotected and data poor sub-Saharan African Countries.
Methods: With the “narrative prevention” approach, the value of bottom up context specific knowledge on toxico-logical risk factors for malnutrition is discussed with regards to food/nutrition security, consumers’ products, environmental health and food safety (from farm to fork).

Results and conclusion: Exempla of diagnostic risk analysis (at the market, at school, when eating outside, at home, in the farm, while walking in the environment) underline how - if properly science-driven- new knowledge in data poor countries can be generated through direct experience (e.g. citizen science) of local empowered communities (e.g. health literacy) in an “awareness-empowerment vortex”.

Keywords: awareness, empowerment, environmental health, food safety, food security, non-communicable diseases, nutrition security, One Health, risk analysis, toxicology.

P08: NO SINGLE SECTOR CAN DO IT: A MULTISECTOR APPROACH TO IMPROVING DIETARY DIVERSITY IN NORTHERN NIGERIA

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Background: Most of Nigeria’s households (HHs) are trapped in a vicious cycle of poverty and undernutrition. More than 91 million Nigerians live on less than US$2.12 per day and 40.6% of children under five suffer from chronic malnutrition.5,6 Northwest and northeast Nigeria have higher than average acute and chronic malnutrition rates.

Methods: Between 2013 and 2018, Catholic Relief Services (CRS), with funding from USAID, implemented the Feed the Future Nigeria Livelihoods Project in northern Nigeria. The project used a multisector and innovative approach to lift 42,000 very poor households out of poverty. The project promoted optimal nutrition and water, sanitation & hygiene (WASH) services focusing on the first 1000 days through a comprehensive behavior change communication package, capacity building, and services delivery. This was complemented by nutrition-sensitive interventions including promotion of home gardens and small livestock, vocational & technical skills training, smart grants for small businesses, savings groups, conditional cash transfers, livelihood planning support (caseworker model) and strengthening of state and local government institutions.

Results: Women Dietary Diversity Score (WDDS) assesses the number of (pre-determined) food groups which were eaten by a woman the previous day or night. It indicates changes in the micronutrient adequacy of women's diets, a dimension of diet quality. Minimum Acceptable Diet (MAD) is the proportion of children 6–23 months of age who receive a diet with minimum diversity and feeding frequency. Both WDDS and MAD are proxy measures of nutritional status. Between 2015 and 2018, MAD increased from 7% to 44% while WDDS increased from 3.8 to 5.5 food groups.

Conclusions: This success can be attributed to the incremental and synergistic impact of combining nutrition-specific and nutrition-sensitive approaches.

Keywords: multisector, women’s dietary diversity score, child minimum acceptable diet, vulnerable households, nutrition, behavior change, hygiene

P09: STAKEHOLDER ENGAGEMENT IN IDENTIFYING AND ADDRESSING IMPLEMENTATION BOTTLENECKS IN IRON - FOLIC ACID SUPPLEMENTATION PROGRAMS IN EAST CENTRAL UGANDA

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1 World Poverty Clock 2018
   National Population Commission and ICF Macro.
Introduction In East-Central Uganda, 41.1% of pregnant women suffer from anemia. According to the Uganda National Anemia Policy (2002) and the Uganda Anemia Control and Prevention Strategy (2017—2022), pregnant women are expected to take iron-folic acid supplements (IFAS) for 90 days or more to prevent anemia and associated complications such as low birth weight, preterm birth and sepsis. Only about 12% of pregnant women comply with this recommendation. Antenatal care (ANC) provides the only contact point for women to receive IFAS supplements.

Purpose of the program. To improve IFAS for pregnant women using an implementation science approach in Iganga and Buyende districts.

Methods/approach used: A bottleneck assessment was conducted, using a structured participatory process. This exercise involved mapping district and healthcare facility level service delivery systems and processes to assess barriers and opportunities of IFAS implementation. Participants included key stakeholders in the IFAS service delivery system, including line ministries, National Medical Stores, Office of the Prime Minister, implementing partners and academia. Service delivery and supply chain systems were discussed in-depth, identifying strengths, weaknesses and barriers, as well as the people, roles, and responsibilities at each level in the system.

Summary of results; Implementation bottlenecks in the systems were identified and prioritized, with the three highest bottlenecks ranked as:
1. Uncoordinated health education for IFAS at maternal, newborn, and child health service delivery points (service delivery system)
2. Recurrent stock-out of IFA supplements (supply chain system)
3. Low male involvement in supporting women to seek ANC services (user system)

Conclusions and recommendations
The three priority bottlenecks involve three interconnected systems that need to be considered and strengthened to improve uptake and adherence to IFAS. A research protocol to investigate use of quality improvement approach in addressing the priority bottlenecks has been developed.

ESTABLISHMENT OF A MANUAL OF PROCEDURES FOR MICROBIAL CONTROL OF DRIED AND KILICHI MEAT IN CHAD AND CAMEROON

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Background: Meat is a high source of protein which is needed in our diet and contains all the essential amino acids and vitamins A, B12, B6, D and E. In Central Africa, meat consumption is important for the reduction of the malnutrition rate; unfortunately, several outbreaks of foodborne infections have been associated with the consumption of meat. Meat is often processed by drying for longer preservation by the addition spices and sundried (kilichi).

Purpose: The main objective of this study was to establish a microbial control protocol for dry meat and Kilichi meat in Chad and Cameroon.

Methods: This was carried out in the Laboratory for Public Health Research Biotechnologies and the Food and Drug Safety Laboratory of the Biotechnology Center of Yaoundé and the Laboratory of the Institute of Livestock Research for Development of N’Djamena from 02 May 2015 to 15 February 2016. The microbiological analysis was done in according to the criteria of EU regulation, specific standards (EC) No 1441/2007 on meat. The results of the surveys, the reports and the quality management system of meat enabled us to establish the manual of procedure of microbial control of meat with the proposed easily applied methods.
Results: The results showed that 66.25% of meat sellers were not knowledgeable with good hygiene and processing practices. The E. coli record a mean of 3.1 log_{10} ufc/g of dry meat from N'Djamena and 2.2 log_{10} ufc/g of dry meat from Yaoundé.

Conclusion: The microbial meat control procedure manual established, with proposed easily applied methods, can be used for quality control management of meat.

Keywords: Manual, control protocol, dry meat, Kilichi, N'Djamena, Yaoundé.

A SYSTEMATIC REVIEW OF DIETARY AND MICRONUTRIENT INTAKE OF WOMEN OF REPRODUCTIVE AGE AND PREGNANT WOMEN IN SELECTED SUB-SAHARAN COUNTRIES

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BACKGROUND: Over 220 million people in Sub Saharan Africa are undernourished and one third have micronutrient deficiencies, with women being the most affected. Nutrition action is to be intensified if the Sustainable Development Goals are to be achieved, to end all forms of malnutrition by 2030 and address the nutritional needs of adolescent girls, pregnant and lactating women by 2025. However, there is scarcity of dietary intake data at a national level.

OBJECTIVE/METHODOLOGY: This systematic review demonstrates the dietary intake of iron, vitamin A, iodine, zinc and folate for Women of Reproductive Age (WRA) and Pregnant Women (PW), between 15-49 years old, in Kenya, Ethiopia, Tanzania, and Zimbabwe, Angola and Democratic Republic of Congo and the availability of data. Data was searched using Scopus, PubMed and national public health websites for articles published between 2008 and 2018.

RESULTS: Thirty-six studies were included in this review; 12 national and 24 sub-national; 16 from Ethiopia, 13 from Kenya, 4 from Tanzania and 2 from Zimbabwe, 1 from Angola and nil from the Democratic Republic of Congo. The mean intake of iron, vitamin A, zinc and folate was below the Recommended Daily Allowance (RDA) for Ethiopian, Kenyan, Tanzanian and Zimbabwean women. Excluding the mean iron intake of Ethiopian women and mean vitamin A intake of Ethiopian and Kenyan PW where the RDA was met. Recent Demographic Health Surveys in all countries showed high household iodized salt coverage. Diet diversity studies showed between 31-56% of Kenyan WRA consumed <5 food groups, 2% of Kenyan PW consumed ≤3 food groups and between 35-51% of PW in Ethiopia consumed ≤3 food groups.

CONCLUSIONS: There is limited dietary intake data available for women in the selected Sub Saharan African countries. Where data is available, there is inadequate intake of key micronutrients and a lack of diet diversity.

LIFESTYLE AND ENVIRONMENT AND TRANSGENERATIONAL HEALTH IN NIGERIA

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Introduction: Birth weight has been associated to the risk of NCDs in adult life. Many of the determinants of birth weight are related to maternal suboptimal nutrition and infants' deficiency of some essential trace elements such as copper (Cu), iron (Fe), manganese (Mn), selenium (Se) and zinc (Zn), and also to maternal environmental exposures to toxic pollutants such as cadmium (Cd) and mercury (Hg). Very low birth weight infants (VLBW, <1500 g birth weight) are particularly susceptible to deficiencies or toxicity of trace elements, due to their rapid growth, relatively low mineral stores at birth, poor absorption, excess intestinal and renal losses and high vulnerability to oxidative stress. There is paucity of information on the effect of environmental contaminants on somatic parameters.
Purpose of the study: We hypothesize that higher environmental contaminants (lead and other trace metals) and household pesticides) in the umbilical cord blood, will lead to worse birth outcomes and affect the physical growth of the children.

Methods/approach: Contaminants (As, Cd, Hg, Pb) and nutrients (Cu, Fe, Mn, Se, Zn) in cord blood of 30 low birth weight newborn (and 30 regular weight newborns as control) and serum of mothers were determined.

Results & Conclusions: Maternal diet, anamnestic data of mother and infant (pre, peri, post conceptional phases, caesarean or spontaneous delivery), lifestyle and other possible co-factors associated with maternal history (BMI, parity, age, diseases e.g. diabetes, hypertension, .., drugs e.g. antibiotics, ..) were also determined and specific interventions to improve health in pre, peri, post conceptional phases and protect newborns from increased risks of NCDs in adult life have been discussed.

SUB THEME: NUTRITION POLICIES, POLITICS, AND NUTRITION GOVERNANCE IN AFRICA

P01: RESEARCHING THE OBESOGENIC FOOD ENVIRONMENT, ITS DRIVERS AND POTENTIAL POLICY LEVERS IN GHANA

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Introduction and Purpose: There are complex reasons driving the poor dietary patterns and low consumption of healthy foods as reflected in high rates of poverty and unemployment, as well as poor nutritional literacy and unsupportive food environments. As the external food environment is influenced by food policies across a wide range of sectors, such as agriculture, trade, commerce/industry and finance, it is therefore imperative to identify ways of increasing consideration of nutrition in such policy making.

This study is in three phases. Phases one and two which have been carried out already involved the identification of frequently consumed foods and tracking these foods through the food-value chain system respectively. Phase three, which is currently ongoing, seeks to interrogate the policy incentives that shape this food supply in Ghana.

The study seeks to understand current policy incentives and priorities across sectors and jurisdictions, and the mechanisms for decision making (governance structures) and influences that underlie these food policy priorities.

Methods: A political economy analysis approach will be used to describe current food system governance. Interviews are currently being conducted with key informants in various sectors including agriculture, trade, industry and academia. The interviews will then be transcribed and analysed. Available policy documents at the local and national level; including regulation pertaining to agriculture, food system, spatial planning, health systems, gender and the informal economy; retrieved from government websites and consultations with key departments, will also be identified and analysed.

Expected results: At the end of the research, it is expected that there will be a better understanding of the various food policies as well as the roles of related stakeholders in Ghana; and come up with ways to increase consideration of nutrition in food policy making across levels of government.

P02: NEXUS BETWEEN PROMOTION, ADMINISTRATION AND ENFORCEMENT OF FOOD LEGISLATION FOR SUSTAINABLE NUTRITION AGENDA IN NIGERIA.

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Background: In Nigeria, food nutrition and safety control systems often have a sectorial or fragmented structure. Typically, under such arrangements the food nutrition and safety control responsibilities are shared between several government ministries such as health, agriculture, commerce, environment and trade among others. As the country’s economy develop, its participation in the global food economy and its capital investment in the agricultural sector increases. That gives consumers access to both common and exotic foods throughout the year there by increasing food nutrition / safety challenges. In developing countries like Nigeria, persistent malnutrition leaves children weak, vulnerable, and less able to fight such common childhood illnesses as diarrhoea, acute respiratory infections, malaria, and measles. Adolescents and adults also suffer adverse consequences of food insecurity and malnutrition. Household dynamics may become disrupted because of a preoccupation with obtaining nutritious food, which may lead to anger, pessimism, and irritation among other vices.
Objective: This paper reviewed the way forward for the lingering food nutrition and safety crisis in Nigeria and examine the effect of various policies on food nutrition.

Design: Secondary data were collected from relevant MDAs and stakeholders and were analysed using descriptive and inferential statistics.

Results: The results showed that, Poverty exacerbates food nutrition/safety problems in many ways and contributes to: unsanitary conditions in rapidly growing urban centres; lack of access to clean water; unhygienic transportation and storage of foods; low education levels among consumers and food-handlers, leading to reduced information on food safety and nutrition.

Conclusions: The study concluded that, In order to mitigate the effects of food nutrition insecurity on the people there should be proactive actions on the side of the policy makers. It is recommended that, to improve or modernize the food nutrition and safety systems, the capacity and efficiency of many MDAs need to be improved to control the food safety standards.

keywords: food; legislation; sustainable; nutrition; agenda; nigeria.

P03: POLICY IMPLEMENTATION BY LEADERS IN HOMA BAY COUNTY TO CURB MALNUTRITION FOR WOMEN LIVING WITH HIV/AIDS

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Background: From the early days of the Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) pandemic, it has been acknowledged that effective leadership is crucial in mounting a successful response at the community, national and global levels. Without effective leadership to implement policy, progress and success is almost impossible. Homa Bay County in Kenya has been ranked as having the highest rate of HIV/AIDS in Kenya with a prevalence rate of 26%. This is nearly 4.5 times higher than the national prevalence. Malnutrition rates are also high amongst women living with HIV/AIDS and there have been cases of recurrent malnutrition. Homa Bay County Government therefore came up with a multisectoral AIDS strategic plan 2014/2015 to 2018/2019 and policies that were specific to the needs of the people of Homa Bay County.

Objective: To find out effectiveness of nutrition policy implementation by leaders in Homa Bay County to curb malnutrition in women living with HIV/AIDS. Were the leaders implementing the Homa Bay Aids strategic plan that was specific to the needs of the people of Homa Bay County. Why is it that there was recurrent malnutrition amongst women living with HIV/AIDS?

Design: The study was done in Homa Bay County in Kenya. It was a case study where the researcher had in-depth interviews with the officers in the County specifically the County nutrition officer (CNO), sub-county nutrition officers (SCNO) and sub-county AIDS and STI coordinating officers (SCASCO). Analysis was done by transcribing the entire recorded interviews.

Results: Most of the leaders were aware of the Homa Bay AIDS strategic plan as well as other national policies that were geared towards improvement of the nutritional status of women with HIV/AIDS. However, due to funding challenges most policies were still not effectively implemented. The Development partners were not committed to steering and coordinating implementation of policies but instead concentrated mainly on reducing prevalence and advocacy. Therefore, due to lack of commitment from development partners who fund most projects most leaders do not implement set policies but instead cascade directives that they have been given to the various stakeholders without questioning or adding their input for better results. This led to ineffective policy implementation that had direct negative effects on nutritional status, food production, household income, spending patterns and ultimately food security.

Conclusions: The government should provide more funding for effective implementation of policies that are localized to the people. The leaders should be directly involved in the budgeting and direct implementation of policies. The design and implementation of policies should involve all stakeholders/leaders so that they are more committed to curb malnutrition.

Keywords: Food security, malnutrition, policy, HIV/AIDS, women, leaders
P04: SCHOOL LUNCHES - REDUCING MALNUTRITION VIA PROMOTING NUTRITIOUS PRO-VITAMIN A MAIZE IN GHANA
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Background: Pro-vitamin A maize is one potential technology that has the capacity to help address problems of malnutrition in Ghana. The high prevalence of Vitamin A deficiency (VAD) in Ghana may be due to the fact that most of the cereals and the root and tuber crops consumed are low in bio-available Vitamin A. Pro-vitamin A maize if adopted offers a unique opportunity to impact positively on the nutrition of malnourished people, especially children. Childhood malnutrition is a major problem in Ghana and contribute to child mortality. Since maize is a major staple in Ghana, a feasible approach to minimize VAD is to promote the utilization of yellow/orange maize varieties that have high levels of vitamin A. The potential exists therefore to address the problem of malnutrition through increased utilization of yellow/orange Vitamin A maize varieties.

Objective: The aim of this intervention is to improve nutritional food security of school children through introduction of yellow/orange Pro-vitamin A Maize food sources into school lunches under the school feeding program via tweaking policy in Ashanti Region of Ghana.

Methodology: The study utilized mixed method approach involving multi-stakeholder engagements, baseline survey and setting up of demonstration plots using participatory approaches in the communities.

Results: Preliminary findings from the baseline study revealed that 65% of farmers were growing white maize type thus creating a room for great impact if the yellow/orange vitamin A maize varieties are adopted. Innovative Platforms were successfully formed in most of the targeted project communities involving all value chain actors. About 74% of the schools in the targeted communities embraced the introduction of Pro-vitamin A maize into their School feeding program in collaboration with government agencies.

Conclusion: The promotion and introduction of bio-available Vitamin A maize into school feeding programs would improve health and development of children.

SUB THEME_ HUMAN CAPITAL DEVELOPMENT AND NUTRITION

P01: INFLUENCE OF VIDEO-BASED NUTRITION EDUCATION ON NUTRITIONAL KNOWLEDGE AND DIETARY HABITS OF UNDERGRADUATE STUDENTS IN VOM, PLATEAU STATE, NIGERIA

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Background: Good nutrition can be achieved by healthy food choices which are influenced by good nutrition knowledge and healthy dietary practices, however many undergraduates around the world make food choices without acquiring essential knowledge and skills to make healthy choices. The purpose of this study was to determine the influence of video-based nutrition education on nutritional knowledge and dietary habits of students in two tertiary institutions in Vom, Plateau State, Nigeria.

Methods: The quasi-experimental study involved 340 undergraduates (experimental (EG): 170 and control (CG): 170) from two tertiary institutions. A semi-structured questionnaire was used to collect information on socio-demographic characteristics, nutrition knowledge and dietary habits at baseline and endline. Nutrition knowledge (NK) was assessed on a 78-point scale categorized as poor (<20), fair (20-39) and good (≥40). Dietary habit (DH) was assessed on a 68-point scale categorised as poor (<34), fair (34-50) and good (>50). EG was exposed to four weeks nutrition education using video that captured food groups; dietary recommendations; healthy food choices; diet, diseases and weight management. Data were analyzed using descriptive statistics and student t-test at p=0.05.

Results: Age of CG (23.66±3.36 years) and EG (22.56±3.14 years) was similar, majority (58.9%) were males in both groups. NK score increased from 27.20±5.52 to 37.70±5.46 and decreased from 26.23±5.87 to 26.16±5.88 for EG and CG respectively. Respondents with good NK increased from 2.9%-34.7% in EG but decreased from 1.2%-0.6% in CG. DH score increased from 48.81±4.10 to 49.18±3.89 in EG and declined from 48.96±3.32 to 48.95±3.45 in CG. Respondents with good DH increased from 37.1%-36.5% in EG and CG. There was a significant difference (p<0.05) in the NK and DH of the EG when compared with the CG.

Conclusion: Video-based nutrition education increased the nutrition knowledge and dietary habits of undergraduates; usage is hereby recommended in nutrition education.
Introduction. This study explored basic nutrition knowledge of head teachers as one of the factors that influence adoption of the Uganda Guidelines on School Feeding and Nutrition Intervention Program (GSFNIP). Adoption variables: awareness scores and implementation levels were generated from the GSFNIP. Head teachers’ nutrition knowledge was evaluated using the questionnaire previously developed. School demographics and organizational environment, as well as head teachers’ personal characteristics, were obtained. Correlation analysis, multiple linear regression and logistic regression analyses explored relationships among variables. Results. Nutrition knowledge correlated with awareness scores ($r = 0.2$, $p < 0.01$), but not with implementation levels ($r = -0.04$, $p > 0.05$). The multiple regression models had a large strength for awareness score ($Adjusted R^2 = 0.42, F [12, 186] = 13.12, MSE = 2.9, p < 0.001$) and implementation levels ($Adjusted R^2 = 0.30, F [9, 189] = 10.4, MSE = 694.5, p < 0.001$) as dependent variables. Nutrition knowledge was a significant predictor ($\beta = 0.158, p = 0.006$) of increased awareness on GSFNIP. Awareness instead was a significant predictor of implementation levels ($\beta = 0.246, p < 0.001$). Nutrition knowledge was not a predictor of implementation levels ($\beta = -0.032, p = 0.621$). The logistic regression of school meals on similar variables was inadequate and significant (Nagelkerke $R^2 = 0.25, \chi^2[10] = 37.4, p < 0.001$). Awareness score ($\hat{\beta} = 1.22, p = 0.033$), but not nutrition knowledge ($\hat{\beta} = 1.00, p > 0.05$) was a predictor of availability of meals at schools.

Conclusion and Recommendations. Results suggest that head teachers’ nutrition knowledge influenced the adoption of GSFNIP by increasing their awareness. Future nutrition interventions should consider improving nutrition knowledge of head teachers before their inception in schools.

P03: WEIGHT BIAS AMONG PRIMARY AND SECONDARY SCHOOL TEACHERS IN ZIMBABWE – FINDINGS FROM THE “BRIGHT MINDS EAT RIGHT” CAMPAIGN

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Background: The prevalence of overweight and obesity has been increasing globally in both developed and developing countries, and in countries such as Zimbabwe, it has given rise to a double burden of malnutrition particularly among school-age children. Whilst societal norms and perceptions on weight have been changing due to education, bias among teachers may have severe social ramifications on students. Despite the growing body of research on obesity over the past decades, few studies have focused on weight bias among teachers and none has ever been conducted in Zimbabwe. This paper assessed implicit and explicit weight bias among primary and secondary school teachers.

Methods: A cross-sectional survey assessing BMI, body (dis)satisfaction, weight theories, anti-fat attitudes and beliefs about obese persons was conducted among teachers between May and December 2018. Findings presented are preliminary results from data collected to date.

Key findings: 68% of teachers were overweight/obese; 36% showed moderate to high body dissatisfaction. On implicit weight theories, 86% believed that one’s weight is malleable. However, on beliefs about obese persons, 71% believe weight is not under one’s control. 42% demonstrated to strong anti-fat attitudes and 23% had “fat phobia”. A moderate correlation was noted between BMI and body shape ($R = 0.5$); and weak correlations noted between gender and anti-fat attitudes ($R = 0.3$); body shape and implicit weight theories ($R = 0.3$).

Conclusions: Teachers are among the key actors for promotion of healthy eating habits and fight against obesity. The prevalent belief among teachers that weight among obese persons is not under their control may imply that teachers...
perceive such individuals to have lesser willpower and/ or control. Therefore, school nutrition education campaigns need to incorporate materials for educating the educator to ensure that the classroom/school environment is free from weight bias.

P04: STRENGTHENING CLINICAL NUTRITION CAPACITY IN MALAWIAN HEALTHCARE FACILITIES: LESSONS LEARNED IN IMPLEMENTING DIETETIC SUPERVISED CLINICAL ROTATIONS
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Objective: To share an innovative model in strengthening clinical nutrition capacity by implementation of dietetics-clinical internships in Malawi

Introduction: Despite evidence supporting the importance of dietetic interventions in recovery of hospitalized patients, many countries, including Malawi still lack dietitians. Hence, the Feed the Future Innovation Lab for Nutrition implemented a novel dietetic program at a tertiary hospital in Malawi.

Methods: The program focused on twenty weeks of clinical rotations in critical care, pediatric and adult nutrition. Rotations were developed by referencing global standards. Mentoring and supervision of the students was done by the establishment of two posts; supervising dietitian (SD) and clinical coordinator (CC). The SD and CC mitigated the absence dietetic preceptors in the hospital by providing clinical nutrition expertise and a medical background in the context of Malawian healthcare practice respectively. A six-week exchange program imbedded in the program gave interns an opportunity to practice with resources for critical care nutrition that were not available in Malawi. Dietetic interns actively participated in medical rounds, journal clubs, case management and presentations alongside other health professionals.

Results: The first four graduates of the program have been assigned to newly created posts in the first dietetics department in a Malawian tertiary hospital. Early outcomes of their interventions in the hospital, performed within the 20-week internship include, 530 patients screened, over 200 complex cases managed and more than 20 scholastic presentations to 286 health professionals. For the first time, dietitians have spearheaded the development of national clinical nutrition guidelines.

Conclusion: The implementation of dietetic rotations, responsive to the need for clinical nutrition expertise is poised to bridge a gap in the management of patients requiring clinical nutrition support. Early success of the program is anchored by buy-in from the Malawian government.

P05: HUMAN CAPITAL DEVELOPMENT AND EDUCATION: A STRATEGY FOR SUSTAINABLE INCOME AMONG UNIVERSITY UNDERGRADUATES IN EDO AND LAGOS STATE, NIGERIA

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Introduction/Background: The decline of Human Capital and education attainment in Nigeria, such as skill, values, qualifications and productivity capacity reflects in the rise in unemployment, poverty, robbery, kidnapping, ritual practice for quick money, among others. These related social ills constitute a hydra-headed monster that plagues Nigerians today. These scenario is a serious source of concern and worry. The study was conducted to assess Human Capital Development and Education; a strategy for sustainable income among University Undergraduates in Edo and Lagos State, Nigeria.

Purpose of the study: The purpose of the study was to determine; (1) the different types of Human Capital (2) Education that incorporates lifelong skills in the Universities in Edo and Lagos State, Nigeria. (3) The strategies for sustainable income among University Undergraduate in Nigeria.

Methods: The study was carried in Universities of Benin and University of Lagos Nigeria. The study was guided by 3 research questions and 2 hypotheses. A sample of three hundred (300) respondents from Universities in Edo and Lagos State, Nigeria were selected randomly. The data was analyzed using mean and standard deviation and t-test to test the null hypotheses at 0.05 level of significance.
Result: The result showed that there is a significance difference between male and female university undergraduates that are taught lifelong skills and those not taught. Therefore, the null hypotheses were rejected. Based on the findings, among the recommendations stated, is that Nigerian government should raise education fund for the universities to equip their workshops for effective teaching.

Conclusions: The study concluded that University Education should include Human Capital Development courses to enhance lifelong skills and productivity capacity in the work place.

Keywords: Human capital, education, strategy, sustainable, income, undergraduate

**P06: NUTRITION HUMAN RESOURCE NEEDS ASSESSMENT FOR EFFECTIVE MULTI-SECTORAL ACTIONS: THE CASE OF ETHIOPIA**

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Introduction; The global malnutrition challenges may require multi-sectoral solutions suited to the local context. The underlying causes of malnutrition, and hence sustained solutions to the problem lie to a large extent in the non-health sectors which require Nutrition Human resource as a key input. The purpose of this assessment was to identify current and future nutrition human resource needs of the National Nutrition Program (NNP) implementing sectors and estimate economic return of investment on the human resources in Ethiopia

Methods; A nationally descriptive cross sectional study design employed a combination of quantitative and qualitative methods was done from February to April 2018. Data was collected from 375 Key informants working at different administrative levels using structured questionnaire. The one health model was used to project nutrition professionals needs whereas qualitative and quantitative date were analyzed using thematic coding and SPSS version 22, respectively.

Summary of results; The nutrition professionals needed for the country was estimated to be 11436, 12421, and 14660 for year 2018, 2025 and 2030 respectively. The 2018 projection density was equivalent to 520 professionals per 5 million populations. About 45% (5,139) of 2018 nutrition professionals demand reflected was for Health sector and the remaining 55% demand was for other six key implementing sectors. The deficit (81%) will not be satisfied by 2030 with current enrollment rate if the sectors decided to fill the reflected demand. Moreover, the economic return of investment for filling nutrition human resource gap to operationalizing suggested structure was found to be 400%.

Major recommendations; The assessment finding suggested low density of nutrition professionals for Ethiopia compared to west African countries. Given huge economic return, implementing sectors in the country need to allocate budget and open up positions for nutrition human resou...
and on the other hand very serious for 50% of the schools. Of the meals analyzed, 10 were of poor quality, with total coliforms (90%) and staphylococci (20%) exceeding standards. There was no presence of Salmonella sp. None of the meals served to school children included the five food groups required for nutritional balance. Only iron requirements of schoolchildren between 4-8 years and those of boys aged 9-13 years were covered. Vitamin C requirements were covered in 4-8 years in both sexes.

Conclusion: Hygienic and nutritional qualities of meals served did not comply with the recommendations. Although the Togolese government has taken many steps to improve school feeding, efforts are still needed to ensure adequate hygienic and nutritional quality of school feeding.

Keywords: Food, Hygiene, School environment, Togo

P08: EDUCATION ON SAFE, NUTRITIOUS AND WHOLESOME LUNCHES IN PRIMARY SCHOOLS OF CAMEROON

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Background: Latest data (2016) concerning the enrolment of students in prenursery schools (3-5 years old) and primary schools (5-11 years old) in Cameroon estimate in average to 4829204, the number of children registered each year in private and public schools accros the country. Children spent between 5 to 8 hours, and most often take their lunch at school canteens, markets or streets vendors. No nutritonal educational program is implemented. The present pilot project aimed at developing and testing a training educational program in nursery and primary schools situated in four councils of Yaoundé city.

Methods: A survey was carried out to understand eating habits of childrens at lunch time. Focus groups meeting and practical demonstrations were done with parents during their parent teachers association meetings. An heigth weeks training program were designed and delivered to children in primary schools. Pre and post test data were recorded during surveyed and analyzed. Scores were calculated for each sections of the questionnaires for each schools . The Z-test were carried out and the Kirkpatrick’s four level training evaluation model used to analyze the effectiveness of school training.

Results: More than 70% of children brings their lunch from home. Bread, fried eggs, spaghetti, yoghurt, beans, butter, biscuits, chocolate and wheat/maize doughnuts are the most eaten foods items. Their lunches are not nutritionaly balanced. Foods are not packed in hygienic conditions. Some students does not brings drinking water. Their knowledge on foods categories was found to be poor, as well as for hygien measures. Important improvement was noticed in post test data.

Conclusions: Despite some weaknesses oberved in the methodological approche, the nutrition education program were proven to be a powerful tool to help children at their tender ages to adopt best practices

Keywords: Nutrition education – food poisoning – good hygien practices - lunch

P09: NUTRITION EDUCATION FOR MOTHERS ON PULSE USE IN COMPLEMENTARY FOOD IMPROVED GROWTH OF THEIR CHILDREN AGED 6-24 MONTHS IN SIDAMA ZONE, SOUTHERN ETHIOPIA

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Background: Poor complementary feeding (CF) is one reason for undernutrition in under-5 children. Pulses provide quality protein when blended with cereal and are good sources of micronutrients. In Ethiopia, few children consume pulses. Thus, the aim was to provide nutrition education for mothers on pulse-incorporated CF to improve nutritional status of children (6-24 months).

Method: The study was conducted on 771 mother-child pairs. Trained Health Extension Workers (HEWs) provided a 9-month nutrition education to Intervention Group (IG) mothers on pulse use for CF. Anthropometry was done on children at baseline, midline, and endline and analyzed using WHO Anthro software. Repeated measure ANOVA and descriptive statistics were used to present the data and p<0.05 was considered statistically significant.

Results: At baseline, intervention and control children were similar in all
anthropometry indices: 14.4% in (IG) and 25.8% in (CG) were wasted. At endline, the prevalence of wasting had increased in CG (29.7%) over time, while IG (11.8%) declined from baseline (p=0.001). One-third were underweight at baseline in both groups but by endline, the IG had decreased prevalence of underweight (11.7%) while CG did not (p=0.001). For MUACZ-score, at baseline, over one-third (35%) of all children had lower MUACZ-scores; at endline, this declined slightly in both groups but more CG had low MUACZ-scores than IG (p=0.001). At baseline, about half of children in both groups (50%) were stunted. At endline, the prevalence of stunting increased in both groups (IG= 67% & CG= 74.5%) but, the prevalence of stunting increased more in the CG than in the IG (p=0.02). Conclusion: This study found that nutrition education delivered through HEWs was successful in improving young children's nutritional status. Our study showed that delivering nutrition education through HEWs on use of pulses in CF is an effective way of improving growth of children in low-income countries.

Key words: Anthropometry, Nutrition Education, Pulses, Stunting, Underweight, Wasting

P010: THE NUTRITION KNOWLEDGE OF PRIMARY SCHOOL TEACHERS IN HARARE, ZIMBABWE
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Background: Teachers are central to delivery of nutrition education and promotion of physical activity among primary school learners. It’s important to understand the perceptions of teachers towards nutrition education in primary schools.

Objectives: To assess the nutrition knowledge and perceptions of primary school teachers in Harare, Zimbabwe.

Methods: A cross-sectional survey was conducted involving 30 teachers from 8 primary schools. Weights and heights were measured using weight scale and stadiometer respectively. World Health Organisation (WHO) standards were used to compute body mass index (BMI) categories. Nutrition Knowledge Scores (NKS) were categorized as: Low (<50), Adequate (≥ 75).

Data was analysed using SPSS version 20. Association between the variables was assessed using the independent samples T test and Pearson correlation coefficient tests. The level of significance was set at \( P < 0.05 \).

Results: Overweight affected 20% of the teachers [males 25% vs. females 19.2%] and 40% [males 25% vs. females 42.3%] were obese. Male teachers were significantly taller than the women (\( P = 0.001 \)). Overall the teachers had adequate (62.7 ± 9.2). nutrition knowledge; There was no significant differences in NKS by gender [Males (69.4±6.7) and Females (61.4±9.2); \( P=0.123 \)]. The teachers with adequate NKS had positive perceptions on their physical appearance, body shape, weight (\( r = 0.288, r = 0.356, r = 0.484 \)) and a negative correlation was between NKS and nutritional status (\( r = -0.218 \)). Majority (83.3%) of the teachers agreed that inclusion of nutrition education in the primary school curricula was important.

Conclusions: Despite the good nutrition knowledge scores most of the teachers were overweight and obese. The results showed that there was relationship between the teachers’ NKS and physical appearance, body shape, weight and nutritional status. Training of teachers on nutrition will likely improve the teachers’ health, their nutrition knowledge and delivery of nutrition education in schools.

Keywords: Obesity, nutrition education, perceptions, teachers, Zimbabwe

SY 7 P011: EFFECTS OF A DIABETES NUTRITION EDUCATION PROGRAMME ON DIABETES KNOWLEDGE AND DIETARY BEHAVIOURS: APPLICATION OF MIXED METHODS RESEARCH
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Background: Diet is a cornerstone of diabetes treatment. There is need to verify if diabetes dietary interventions produce the desired effects in order to optimise outcomes and resources.

Aim: To describe the effects of a nutrition education programme (NEP) on diabetes knowledge and intake of starchy foods and vegetables and fruit among adults with type 2 diabetes mellitus (T2DM).
Methods: Mixed methods research with the qualitative domain nested in the quantitative one. T2DM participants (n=41) of the intervention arm of a one-year randomised control trial (intervention) implemented at two community health centres in Moretele sub-district, North West Province, South Africa took part. The intervention comprised: 8-weekly training sessions and follow-up sessions (monthly and bi-monthly). The intervention aimed to improve glycaemic control (HbA1c) through improved dietary behaviours and behaviour mediators such as diabetes knowledge. Quantitative data (diabetes knowledge and dietary intake) were measured at baseline, 6- and 12-months for all participants (n=82) with structured questionnaires. Analysis of covariance adjusted for baseline, age, gender and clinic assessed NEP effects. Qualitative data on intervention participants’ experience with the NEP were obtained at the end of the 8-weekly training component and at 12 months using open ended questionnaires and focus group discussions. Study had ethical approval (no. 215/2009).

Results: Quantitative data revealed significant lower starchy food intake (median servings) [9.3 vs. 10.8 (p=0.005); 9.9 vs. 11.9 (p=0.017)] and improved diabetes knowledge scores [+0.95 (p=0.033); +2.2 (p=0.000)] at 6- and 12-months respectively in the intervention group compared to the control group. Intake of vegetables and fruits in this group was also higher (not significantly different from the control group). Qualitative data indicated that intervention participants perceived themselves to have learnt new things, reduced starchy food portions and increased their intake of vegetables and fruits. They were also highly satisfied with the NEP.

Conclusion: Quantitative results were in agreement with those from the qualitative domain thereby confirming data validity. Qualitative methods contributed additional insight that helped to understand the outcomes.

Key words Type 2 diabetes mellitus; nutrition education programme; mixed methods research; intervention, South Africa

P012: LEVEL OF IMPLEMENTATION OF NATIONAL SCHOOL MEALS AND NUTRITION STRATEGY IN KAKAMEGA COUNTY, KENYA

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Introduction: The national school meals and nutrition strategy was put in place since 2017. Its aim was to address the food security of pre-primary and primary school going children put in place by the coordination of three ministries. The other aims of this strategy were to improve overall school enrolment and increase primary school completion rates.

Purpose: The purpose of the study was to determine the level of implementation of the national school meals and nutrition strategy in Kakamega County, Kenya

Objectives: To establish the level of knowledge of the national school meals and nutrition program, to determine the level of implementation of the strategy and to find out the challenges faced in implementation of the national school meals and nutrition program in Kakamega County.

Methods: The study adopted a descriptive-cross sectional design. Purposive sampling was used to identify 2 sub-counties in Kakamega County. Multi-stage simple random sampling was then used to identify schools and a class in the school. Key informants, including ministry staff at policy level, directors of education at county, and ministry staff at implementation level were participants in the study. Data was collected by use of questionnaires focus group guides and observation checklist guides and analyzed then presented in bars and pie charts. The finding of this study will be helpful in foreseeing the challenges faced in implementation of national strategies and will similarly prompt further researches in the same area thus creating a wide understanding.

Key words: National school meals and nutrition program, implementation, Kakamega County

P013: NUTRITION KNOWLEDGE AND NUTRITION STATUS OF UNIVERSITY OF ZIMBABWE STUDENTS IN 2012 AND 2019: A COMPARATIVE STUDY

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Background: Understanding nutrition knowledge, nutrition perceptions of college students helps to formulate effective interventions to preventing diet-related diseases. Objectives: To assess the nutrition knowledge and nutritional status of University of Zimbabwe students in 2012 and 2019.
Methods: A cross-sectional survey was conducted involving 200 students. Weights and heights were measured using weight scale and stadiometer respectively. WHO standards were used to compute body mass index (BMI) categories. Nutrition Knowledge Scores (NKS) were categorized as: Low (<50), Adequate (≥ 50). Data was analysed using SPSS version 21. Association between the variables was assessed using the independent samples T test and Pearson ChiSquared tests. Level of significance was set at P < 0.05.

Results: Overweight affected 11.5% and 13.5%, while 5.5% and 7.0% were obese in 2012 and 2019 respectively. Obesity prevalence increased between 2012 and 2019 (P=0.001). Overall KNSs were adequate 63.1±14.6 in 2012 and 64.7±13.1 in 2019. There were significant differences in NKS by gender in 2012 (P=0.024) and 2019 (P=0.039), and obesity status in 2012 (P=0.001) and in 2019 (P=0.001). Those with adequate NKS had positive perceptions on their nutrition status (P=0.021) and (P=0.004) in 2012 and 2019 respectively.

Conclusions: Although the students had adequate nutrition knowledge, there was notable high prevalence of obesity among the students in 2019 compared to 2012. Therefore, social behavior change communication interventions are recommended to promote adoption of healthy diets and lifestyles among university students.

Keywords: Obesity, nutrition knowledge, perceptions, college students, University of Zimbabwe

P014: OCCUPATIONAL HAZARDS AMONG FARMERS WORKING IN SMALL SCALE TOMATO FARMS IN WEST REGION OF CAMEROON

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Introduction: Agriculture is undoubtedly the back-bone of the Cameroonian economy and other economic activities thrive only if production in this sector is assured. It has been estimated that approximately 25 million agricultural workers worldwide experience unintentional pesticide poisoning yearly. Unfortunately, limited information exists about the health and safety of the farmers. The aim of this study was to describe the occupational health and safety (OHS) conditions of farmers working on small scale tomato farms in the western region of Cameroon.

Method: A cross-sectional research method was used to collect data from tomato farmers in May 2017, using a questionnaire developed by the research team.

Results: A total of 104 tomato farmers from small scale farms participated in the study. The analysis revealed that the occupation is male dominated (86.5%). The training and use of personal protective equipment (PPE) among farmers were rare (35.6%) and farmers were mostly exposed to chemical hazards. The farmers reported the following work-related health problems: skin irritation, backache, impairment of central nervous system (CNS), visual problems, and respiratory difficulties.

Conclusions: The OHS conditions on small scale tomato farms are mostly poor, thus predisposing farmers to the risk of work-related health problems. Exposure to occupational hazards can be significantly reduced if the required PPE are available, and efficiently used.

P015: DIETARY DIVERSITY, PREVALENCE OF HUNGER AND COPING STRATEGIES OF HOUSEHOLDS FROM RURAL COMMUNITIES IN LIMPOPO PROVINCE

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Introduction: With the continual increase in food prices, especially those of staple foods, most households need to employ food deprivation coping strategies to survive. The main aim of the study is to investigate dietary diversity, household food security and coping strategies to food deprivation by households in Limpopo Province.

Methodology: The design was a descriptive survey where purposive sampling was used to select study areas and the sample from two rural communities in Limpopo provinces. The project was submitted for ethical clearance at the
Stellenbosch University (Ref #: N16/06/083). Further permission was obtained from Traditional Leadership of the villages and participants signed consent for their participation and that of the children.

**Results:** A total 280 households, 2520 participants of which 17% were children under 12 years participated. 23.6% of households were food secure, 39.6% at risk of hunger while 36.8% were food insecure. 74.7% of the households had low, and 4.5% poor dietary diversity. The coping strategies occurring at least for 3 days (mode) in a week were: reliance on less preferred and less expensive foods (53.9%); reduce portion sizes until month end (36.4%); reduce number of meals eaten in a day (33.6%); and limit portion size at mealtimes (25%).

**Conclusion:** High levels of food insecurity and poor dietary diversity was reported in these two communities and household employ various approaches to cope with food deprivation.

**P016: SCHOOL FEEDING PROGRAMME INITIATIVE: DIETARY DIVERSITY OF SCHOOL-FED PUPILS IN OSUN STATE, NIGERIA**

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**Introduction** Childhood under-nutrition has remained a major public health problem especially in developing countries like Nigeria. Dietary diversity is a diet-based strategy aimed at increasing intake of multiple micronutrients.

**Purpose of the Study** This study assessed the dietary diversity of primary school pupils participating in the school feeding programme in Osun State.

**Methods** Multistage sampling technique was used to select 410 pupils from 18 schools. A structured interviewer’s administered questionnaire was used to obtain information on the personal and family characteristics of the respondents. The 16-food group Individual Dietary Diversity Score (DDS) was used to obtain information on dietary diversity of the respondents. DDS was classified as <6 food-groups =Low DDS; 6-10 food-groups =medium DDS; >10 food-groups =high DDS. Data was analyzed using frequency counts, percentages, means, standard deviations and Chi-square methods.

**Results** Results showed that 53.2% of the pupils were females, with mean age of 9.7±1.5 years, 52.4% of the mothers were traders and 65.4% of the fathers were artisans. Majority (74.6%) were from monogamous homes with mean family size of 7.0±2.8 members and 67.1% received feeding allowance daily. Commonly consumed foods were from cereals (100.0%), oils and fats (100.0%), spices, condiments and beverages (100.0%), other vegetables (100.0%), legumes, nuts and seeds (89.3%) as well as roots and tubers (70.0%). Majority (93.4%) had medium DDS while 5.6% and 1.0% had high and low DDS respectively with a mean DDS of 8.39±1.4%. There was no significant relationship between DDS and family type, family size, fathers’ occupation and mothers’ occupation while there was a significant relationship between DDS and the feeding allowance received by the respondents.

**Conclusion and Recommendation:** The study concluded that majority of the pupils had medium DDS, thus the school meals should be more diversified, with variety introduced into the menu to improve the DDS.

**ASSESSMENT OF FOOD PLATE WASTE OF BOARDING SECONDARY SCHOOL STUDENT IN OSUN STATE NIGERIA**

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**Background:** Plate waste in school meal can invariably affect the nutritional status of an individual. High levels of waste can lead to malnutrition related complications such as anorexia nervosa and underweight in adolescents.

**Objective:** To assess food plate waste of students in boarding Secondary School, and determines the contributing factors.

**Design:** One school was purposively selected, from which 195 students were randomly selected. Two week and two weekend days food consumption data was assessed. Data were analyzed using descriptive tools and t-test analysis.

**Results:** Half (57.4%) of the respondent were female, while 42.6% were males, half (51.3%) of the respondent were from the Junior Secondary classes and 48.7% from the Senior Secondary class. The mean respondent age was 11.2±4.9 while the household size was 4.6±2.1. About 48% of the student were underweight, while 48.9% were normal and 3.1% were overweight. Mean consumption was 3141.10±358.37 (weekdays) and 3176±580.62 (weekend), while mean
wastage was 201.77±220.96 (weekdays) and 212.50±253.81 (weekend). Wastage was found to be different for each meal examined in the course of the four days. The highest wastage was on breakfast 75.82±110.40 which was pap and moinmoin, while the least was 6.83±31.01 for cornflakes and milk. For lunch, the highest was 48.14±77.86 (Eba and Mixed Okro), while the lowest was 30.26±50.80. Moreover, the highest mean wastage for dinner was 40.73±62.68 (Jollof Spaghetti) while the lowest was 16.29±40.51 (Spiced Indomie). Reasons for wastage were taste (70.3%), poor appearance (57.9%), insufficient time to eat (41.1%), and incorrect temperature (32.3%). The t-test analysis revealed that there was a significant difference in wastage of food among male and female students (t = 25.5) at the 95% significant level.

Conclusions: Taste and appearance contribute to waste of food and it is recommended that the sensory quality of food be considered in preparation of school meal.

Keywords: Food plate, School meal, Waste, Students, Boarding school.

P018: EFFECT OF PSYCHO-EDUCATIONAL NUTRITION INITIATIVE ON DIETARY INTAKE AND PREGNANCY OUTCOMES IN WESTERN KENYA

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Background: Maternal nutrition is critical as it lays fundamental foundation for the successful outcome of pregnancy. Kenya’s high rates of undernutrition among women are due to sub-optimal feeding practices, inadequate nutrient intake and insufficient knowledge on nutritionally adequate diets leading to poor pregnancy outcomes. This study assessed nutrient intakes and pregnancy outcomes among pregnant women exposed to a psycho-educational nutrition initiative in Migori County.

Methods: A Prospective Cohort study design and simple random sampling was used to obtain a sample of 150 pregnant women who were enrolled into the Intervention Study. Simple random sampling was used to obtain the required sample of pregnant women in each selected health facility. Data was collected by 24 hour recall, anthropometric measurements and health records and was analyzed by Nutri-Survey and SPSS and tested using t-tests and regression model.

Results: Protein, fat, carbohydrate, fiber, vitamin C, calcium, iron and zinc had statistically significant differences between their means at baseline and post-intervention (6.366, 6.041, 8.010, 7.1, 5.143, 3.011, 6.470, .399, 5.714 respectively) at p≤ 0.05. Only vitamin A intake had no significant difference between their means at baseline and after intervention. Mean gestation age at recruitment was 21.21 weeks while that for gestation age at delivery was 37.74 weeks. The mean weight gain was 5.98 kg and mean birth weight was 3097.83 g. there was a significant effect of psycho-educational nutrition initiative on nutrient intake and pregnancy outcomes at 5% confidence level.

Conclusion: The intervention had a significant effect on nutrient intake and pregnancy outcomes and should be strengthened in the health care system to improve nutrition knowledge and dietary practices for enhanced nutrient intakes and pregnancy outcomes.

Key words: Pregnant women, Psycho-educational nutrition initiative, Nutrient Intake, Pregnancy Outcomes

SUB THEME: NUTRITION AND NCDs

P01: PREVALENCE AND RISK FACTORS OF NON-COMMUNICABLE DISEASES AMONG ADULTS IN EKET LOCAL GOVERNMENT AREA, AKWA IBOM STATE

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Objective: The world pattern of disease is changing at an alarming rate especially in Sub-Saharan Africa including Nigeria where communicable diseases, the leading cause of death is currently being replaced by non-communicable diseases (NCDs). The aim of this study was to determine the prevalence and risk factors of NCDs among adults in Eket Local Government Area of Akwa Ibom State of South-South Nigeria.

Methods: A cross-sectional study design was employed among 550 participants (18-60years) involved in two Medical Outreaches carried out for residents of Eket, a peri-urban area. The data was collected using a WHO steps approach, physical (weight, height, waist and hip circumferences) and biochemical (blood pressure and fasting blood sugar)
measurements. Prevalence rates were calculated while Pearson correlation coefficients and least square regression analysis were used to assess the NCD risk factors.

**Results:** The prevalence estimates of the risk factors were 4.5% for smoking, 5.8% for harmful use of alcohol, 55.2% for low physical activity, 69.7% for insufficient fruit and vegetable intake, 59.1% for abdominal obesity, 82.6% for overweight and obesity, 25.1% for raised blood pressure and 10.1% for raised blood sugar. Over 75% of the study participants had an average of two NCD risk factors. The female gender was significantly associated with an increased risk for abdominal obesity and being overweight or obese but were protective of smoking and binge drinking. It is also pertinent to observe that BMI significantly correlated to WHR of the respondents (r = 0.31, p < 0.01). Also, the risk of hypertension increased with age while raised blood pressure was a strong correlate for having raised blood sugar.

**Conclusion:** The prevalence of non-communicable diseases risk factors was high in the study thus the need for focused intervention programmes to reverse the trend.

**P02: RISK FACTORS OF METABOLIC SYNDROME AMONG MIDDLE AGED ADULTS IN THE KPANDO MUNICIPALITY: A CASE-CONTROL STUDY.**

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**INTRODUCTION AND OBJECTIVES:** Metabolic syndrome (MetS) which previously was relatively uncommon among Africans south of the Sahara, is increasingly becoming a public health concern in recent times. It refers to the co-occurrence of several known cardiovascular risk factors, including insulin resistance, obesity, atherogenic dyslipidemia and hypertension. This study’s intent was to determine the prevalence of MetS, its components and compare the dietary diversity of cases and matched controls.

**METHODS:** An age to sex one-to-one case-control study, involving 152 middle aged adults aged 45-65 years was conducted. Metabolic syndrome was determined by both World Health Organization (WHO) and International Diabetic Federation (IDF) criteria. Anthropometry, lifestyle habits, physical activity and dietary diversity were assessed. A t-test and chi-square test were used to compare continuous and categorical variables respectively between the two groups and odds ratio to determine the association between risk factors and metabolic syndrome.

**RESULTS:** The overall prevalence of MetS by the WHO and IDF criteria was 34.2% and 44.7% respectively. The prevalence was found to be higher in cases (67.1%) than in controls (1.3%) with just a few cases (32.9%) being able to control their metabolic syndrome status. Comparing cases to controls, high central obesity (98.7% vs 36.8%), high BP (90.8% vs 2.6%), and high FBG (72.4% vs 1.3%) were observed. Consumption of highly diversified diets was higher among controls (77.6%) compared to cases (10.5%), just like consumption of moderately diversified diets (case: 82.9% vs. controls: 19.8%).

**CONCLUSION:** A third (WHO criteria) to almost half (IDF criteria) of the study participants had MetS. The triad of high central obesity, high BP and high FBG were mostly responsible for MetS in this study population. Protective health effects can be obtained from reducing/maintaining body weight and healthy lifestyle changes such as good nutrition and physical activity.

**P03: RELATIONSHIP BETWEEN DIETARY ANTIOXIDANT MICRONUTRIENTS INTAKE, SERUM ZINC AND CARDIOVASCULAR RISK FACTORS AMONG TYPE 2 DIABETES OUTPATIENTS**

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**Background:** Oxidative stress is linked with pathogenesis and cardiovascular complications of type 2 diabetes mellitus.

**Objective:** To determine the relationship between antioxidant micronutrients intake, serum zinc and cardiovascular risk factors among type 2 diabetes outpatients.

**Methods:** In a cross-sectional study among 152 type 2 diabetes outpatients, dietary intake of antioxidant micronutrients was assessed using triplicate 24-hour recall, biochemical indices, including fasting blood glucose (FBG), glycated hemoglobin (HbA₁c), lipids profile and serum zinc were determined appropriately.
**Results:** When compared to recommended dietary intake (RDI), no female participants met daily vitamin E (0.0%), only 1 (2.7%) male participant met daily vitamin E. Also, 17 (14.8%) female participants met daily zinc intake, and 1 (2.7%) male participant met daily zinc intake, indicating poor status of these nutrients. For vitamin C intake, 54.8% of female participants had inadequate, while, 54.1% of male participants had inadequate daily requirement. Poor antioxidant intakes did not influence serum zinc. FBG ($r = -0.206, P = 0.05$), HbA1c ($r = -0.227, P = 0.033$) had a significant negative correlation with serum zinc. Other CVDs risk factors were not significantly associated with antioxidants micronutrients intake and serum zinc ($P>0.05$).

**Conclusions:** Dietary antioxidants intake was very low among studied type 2 diabetes outpatients but was not associated with antioxidant status. Reduced serum zinc level was observed, and this was weakly associated with increasing blood glucose, which could increase risk of developing diabetes complications including cardiovascular diseases (CVDs) and other co-morbidities.

**Recommendations:** Dietary management of diabetes in Ghana needs a critical look at to increase effectiveness and hence reduce the burden of the disease. Inclusion of recommended daily antioxidant micronutrients such as zinc, vitamin E and C can be a nutritional therapy to reduce risk of cardiovascular diseases in diabetes mellitus.

**P04: PREVALENCE OF DYSLIPIDEMIA AND AHEROGENIC RISK AMONG GHANAIAN TYPE 2 DIABETES OUTPATIENTS**

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**Background:** Dyslipidemia is a major risk factor of cardiovascular diseases, which in turn contributes to diabetes complication including; heart and liver disease, as well as 68% of mortality among type 2 diabetes.

**Objective:** To determine prevalence of dyslipidemia and atherogenic risk and their relationship for CVDs outcome among people with Type 2 diabetes.

**Methods:** A cross sectional study was conducted on type 2 diabetics. Anthropometric such as weight, height, body mass index, and waist circumference were measured in 152 type 2 diabetics. Biochemical indices, including glycated hemoglobin, fasting blood glucose, coronary risk, atherosclerosis risk, and lipids profile were measured in 152 type 2 diabetics.

**Results:** Generally for study population, 37 (24.3%) were males and 115 (75.7%) were females in a ratio 3:1. Prevalence of uncontrolled hyperglycemia was 74.3%. The prevalence of single dyslipidemia, combined dyslipidemia and mixed dyslipidemia were 63.8%, 15.8%, and 1.3% respectively. Also, 35.3% of participants had high coronary risk and 5.3% had high atherosclerosis risk. Coronary risk was strongly associated with TC ($r=0.690, P<0.001$) and LDL-C ($r=0.783, P<0.001$). Additionally, atherosclerosis risk was strongly associated with TG ($r=0.817, P<0.0001$) and VLDL-C ($r=0.817, P<0.001$). An increase in total cholesterol was associated with 2.6-folds increased odds of coronary risk (OR=2.6, 95% CI=1.9-3.7, $P<0.001$); an increase in triglyceride was associated with 2-folds higher coronary risk (OR=2.5, 95% CI=1.3-4.8, $P=0.004$), and high LDL-C was associated with 5-folds higher coronary risk (OR=4.9, 95% CI=2.9-8.1, $P<0.001$).

**Conclusions:** The findings revealed uncontrolled blood glucose, and high atherogenic dyslipidemia was among type 2 diabetics, which was significantly associated with high coronary disease risk and atherosclerotic risk.

**Recommendations:** Management of diabetes in Ghana needs a critical look at to increase effectiveness and hence reduce the burden of the disease. Early initiation of Lipid lowering therapy through diet and drugs among diabetics should be encouraged and routinely monitored.

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**P05: WORK STRESS, OBESITY AND HYPERTENSION AMONG HEALTH WORKERS IN Ogun STATE**


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**Background:** Stress have been found to be an important part of work and life, its influence on health status cannot be overemphasized.
Objective: This study assessed work stress, obesity and hypertension among health workers in Ogun State, Nigeria.

Methods: A total of 687 health workers from secondary health facilities participated in the study. A pre-tested, structured questionnaire was used to obtain information on demographic and socio-economic characteristics. Effort-reward imbalance (ERI) questionnaire was used to assess work stress. Anthropometrics such as height, weight, waist, hip circumferences and blood pressure levels were measured using standard procedures. Data was analysed using descriptive and inferential statistics.

Results: The result showed that 80.5% of the respondents were females, 36% were between 31-40 years, 79.3% were married and 65.1% had 3-5 persons living in the households. Also, 46.6% of the respondents were nurses, medical doctors were 5.7% and 47.7% were allied health workers. Majority (91.8%) had post-secondary education, 35.7% earned over ₦100,000 monthly and 26.1% had additional source(s) of income. Respondents reported stress with respect to moderate (63.8%) and high (9.6%) levels of over-commitment to work while 10.9% were moderately stressed and 41.2% were highly stressed as a result of effort-reward imbalance. Overweight and obesity were respectively 28.5% and 11.6% among respondents while 51.8% have central adiposity. Blood pressure was elevated in 31.3% and 28.9% were hypertensive. Work stress was found to be significantly associated with central adiposity and hypertension at p<0.05.

Conclusion: This study revealed a high level of work stress among respondent as well as central adiposity and hypertension. There is therefore need for targeted health promotion program to reduce work stress, obesity and hypertension among health workers.

P07: PREVALENCE OF METABOLIC SYNDROME AMONG PRIMARY HEALTHCARE WORKERS IN ODEDA AND ABEOKUTA SOUTH LOCAL GOVERNMENT AREAS OF OGUN STATE, NIGERIA

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INTRODUCTION: Metabolic syndrome is a group of risk factors that raises the risk of developing cardiovascular diseases and other non-communicable diseases (NCDs).

PURPOSE OF THE STUDY: Thus, this study assessed the prevalence of metabolic syndrome among primary healthcare workers.

METHODOLOGY: An exhaustive sampling method was used to select 220 eligible respondents. A pre-tested semi-structured questionnaire was used to obtain information on socio-economic and demographic characteristics of the respondents. Waist and hip circumference were taken using standard procedures while abdominal obesity was calculated from the measurements. Systolic and diastolic blood pressure were measured. Fasting blood sample of the selected subjects were collected and analyzed for haematological variables using standard biochemical method. Data were analyzed using frequency, percentage, mean, standard deviation, correlation and Chi-Square Tests.

RESULTS: The results revealed that majority (76.4%) of the respondents were female, 40.9% were aged 31-40 years. The respondents were predominantly Yoruba’s (98.2%) and 35.5% had Ordinary National Diploma for educational level. The prevalence of metabolic syndrome was 33.2% among the respondents. Abdominal obesity and high blood pressure was found to be 58.2% and 38.7% respectively. Fasting blood glucose was elevated (≥110mg/dL) in 20% of the subjects. Total cholesterol was on borderline-high (200 – 240 mg/dL) in 5.6% of the subjects; triglyceride was normal among the subjects, low high-density lipoprotein (HDL) cholesterol was observed in 77.5% of the subject while low-density lipoprotein was above 159 mg/dL in 15.5% of the subjects. The presence of metabolic syndrome were significantly associated (p≤0.05) with gender, age, abdominal obesity and waist to hip ratio.

CONCLUSIONS: The study concluded that the respondents had elevated fasting blood glucose, high blood pressure, high abdominal obesity and poor HDL cholesterol. These may be responsible for the high prevalence of metabolic syndrome among the respondents.

RECOMMENDATION: Abdominal obesity should be discouraged among the primary healthcare workers through enlightenment programmes on the health risk of abdominal obesity.
Background: Diabetes mellitus poses an unyielding crisis for the healthcare system, incurring costs and disease burden for adults and children.

Objective: To determine the effect of dry turmeric rhizome (Curcuma longa) powder on haematological and histological properties of diabetic rats.

Design: Twenty adult male rats (150-180g) induced with diabetes mellitus using alloxan monohydrate were alloted into four groups (A [control], B, C and D) of five rats each and fed 0mg/kg BW, 1000mg/kg BW, 3000mg/kg BW and 5000mg/kg BW of sun-dried pulverised turmeric rhizome daily respectively for 21 days while receiving usual food and water ad libitum throughout the experiment. Proximate analysis of sample was done while blood, liver and pancreas of the rats were taken for biochemical and histological analysis using standard methods. Statistical analysis was done using SPSS version 21.

Results: Proximate composition of the sample showed carbohydrate (69.12%), crude fats (2.46%), moisture (5.50%), crude protein (10.27%), crude fibre (7.26%) and ash (5.37%). Fasting blood glucose after treatment showed dose dependent decreases (18.17-79.28%) in treated groups. Haematological parameters after treatment showed dose dependent increases in packed cell volume, red blood cell and haemoglobin in treated groups with significant effects in group D (p < 0.05). There were dose dependent decreases in white blood cells (8.48-11.99%) in all groups. Treatment also resulted in dose dependent reduction in neutrophils and increased lymphocytes respectively in treated groups with significant effects in group D (p< 0.05). Histological analysis of the pancreas of the control group showed evidences of inflammation when compared with the treated groups.

Conclusions: Turmeric rhizome in addition to hypoglycaemic and anti-inflammatory potentials, has immune and blood boosting properties while maintaining liver and pancreas health.

Recommendation: Further investigation should be carried out in human diabetics and the result integrated into nutrition education.

Keywords: consumption, turmeric, haematological, histological, diabetic, rats

P09: DO POLICE OFFICERS IN KUMASI, GHANA HAVE HIGH PREVALENCE OF METABOLIC SYNDROME AND CARDIOVASCULAR RISK FACTORS?
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INTRODUCTION: Police officers constitute an occupational group that is prone to high incidence of cardiovascular disease and this could be associated with job stress, irregular food habits, lack of regular exercise, and inadequate sleep among others. This study assesses the prevalence of metabolic syndrome and other cardiovascular risk factors among Police officers and how these are associated with dietary intake.

METHOD: A total of 120 Police officers were recruited for this study of which 63 (%) were females and 57 (%) were males. A 3- day repeated 24-hour dietary recall was used to assess dietary intake while biochemical analyses were conducted from participants’ venous blood samples.

RESULTS: For the actual nutrient intake, police officers recorded excess intake of total calories, carbohydrate and sodium. Also both genders recorded inadequate intake of potassium, vitamin E and fibre. There was a weak positive correlation between potassium and waist circumference (r= 0.212, p= 0.020); sodium and SBP (r= 0.204, p= 0.026) and vitamin C and SBP (r= 0.222, p= 0.015). Binary regression showed total cholesterol as a risk factor for metabolic syndrome and a point increase in total cholesterol leads to about 4.9 risk of one developing metabolic syndrome (TC: OR= 4.9, 95% CI= xxx, p- value < 0.001). Overall prevalence of metabolic syndrome among the study participants was 35.8%. With regards to prevalence of obesity among male and female officers were 43.9% and 36.5% respectively and dyslipidemia between males and females were 43.9% and 85.7% respectively.

CONCLUSION: Police officers were generally overweight, over a quarter had hypertension and about two-thirds had dyslipidemia, making their risk for metabolic syndrome high. Studies to elucidate possible causes are required. Also, routine medical screening and nutritional support are recommended.

P010: FERTILIZER USAGE AND ACCUMULATION OF CADMIUM IN FERTILIZERS USED IN ETHIOPIA
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**Introduction/Background:** The presence of heavy metal trace elements (such as Arsenic, Cadmium, Mercury and Lead) in relatively low concentrations in conventional fertilizers is non-essential and can be toxic to plants threatening food production and the environment; and consequently to the animal-human health and productivity.

**Purpose of study:** The aim of this study is to evaluate fertilizer usage and accumulation of cadmium in fertilizers used in Lasta district in Ethiopia.

**Methods:** Samples of fertilizers used in the area including Urea, Diammonium Phosphate (DAP) and a blended fertilizer Urea Diammonium Phosphate Ammonium Sulphate with Borax (NPSB) were collected, wet digested in acids and total concentrations of cadmium were determined using Inductively Coupled Plasma Optical Emission Spectrometry.

**Results:** The total contents of cadmium in Urea, Diammonium Phosphate and NPSB were found to be (4.3 ± 0.05), (7.98 ± 0.05), and (66.1 ± 0.50) in mg/kg respectively. The concentrations in DAP and especially in NPSB are found to be higher than allowed limits of cadmium in fertilizers in China, Canada and USA.

**Conclusion and recommendations:** Long term applications of such impure fertilizers in current composition may lead to accumulation of cadmium in the food system. The high concentration of toxic heavy metals in fertilizers may lower the value of food produced by and may cause poison effects to animal-human health and productivity. Thus, the quality of fertilizers used ones country has to be regulated periodically for both essential and non-essential trace metal levels for sustainable use in food production.

**Keywords:** Agriculture; Fertilizers; Toxicity; Food and Nutrition; Non-Communicable Disease

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**P011: PREVALENCE OF OBESITY AND HYPERTENSION AMONG YOUNG ADULTS ATTENDING KAKAMEGA COUNTY GENERAL HOSPITAL**

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**Introduction:** The prevalence of obesity in adolescents and young adults has been increasing substantially in the developing countries and may lead to hypertension being experienced at an early age.

**Purpose of the study:** The study aimed at determining the prevalence of obesity and their associations with high blood pressure among young adults of secondary school going age in Kakamega County thus help in creating awareness to the changing dynamics in life styles among this age group.

**Methods:** A cross-sectional design was used in the study. The height and weight were measured and body mass index (BMI) calculated according to the World Health Organization recommendations. Blood pressure of the participants was also measured. Statistical Package for Social Sciences version 20.0 was used to analyze the data. A student t-test was used to determine significance difference in obesity and hypertension among the students. Pearson correlation test was used to determine any association between obesity and hypertension among the different gender. The categorical data was analyzed using Chi Square test.

**Results:** Two hundred and fifty eight (258) of the number recruited (320) with complete data were analyzed. Among the participants, 178 of them (69.0%) were females and 70 (31.0%) were males. The prevalence of obesity among the participants was 3.1%. The prevalence of overweight was 16.3%. The prevalence of the prehypertension was 25.2%. Pearson correlation analysis between BMI and systolic blood pressure and diastolic blood pressure showed a positive correlation respectively. Chi square was performed to determine association between BMI status and blood pressure status.

**Conclusions and recommendations:** There was a high prevalence of obesity, overweight and hypertension with a strong association between obesity and hypertension. Intensified awareness should be created to the changing dynamics in life styles among the adolescent age group to help curb high prevalence of obesity and hypertension.

**Key Words:** Prevalence, Obesity, Hypertension, Kenya, Adolescents

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**P012: PREVALENCE AND FACTORS INFLUENCING OVERWEIGHT AND OBESITY AMONG UNDERGRADUATES IN UNIVERSITY OF BENIN, BENIN CITY, NIGERIA**

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**Background:** Obesity is rising to alarming levels around the world and is considered as a public health problem due to its prevalence among the different age groups. Obesity is a global problem affecting both developed and developing
countries and a leading cause of death worldwide. Research has shown that childhood obesity is a serious health problem across the globe as there is decline in both school and home based physical activity among children.

**Objective:** to determine the prevalence and factors influencing overweight/obesity among undergraduates in University of Benin, Benin city Nigeria.

**Design:** descriptive survey design was employed in the study. A multistage sampling technique was used to sample 255 students from the University. Five (5) research questions were raised and three (3) null hypotheses formulated and tested at 0.05 level of significance. Dietary habits and lifestyle questionnaire were filled by the students. Anthropometric indices; body mass index (BMI) was used to classify overweight and obesity of the respondents. Weight and height of respondents were obtained using a bathroom scale and a calibrated height tape measure respectively. Descriptive and inferential statistics was used to analyze data collected.

**Results:** Findings revealed that the prevalence of overweight is high (68%) among students of university of Benin, eating habit (36%) has more influence on overweight and obesity than lifestyle (21%) and physical activity (26%). Variables such as gender p =0.023, and socio-economic status, p=0.773 have significant influence on overweight and obesity.

**Conclusions:** The study concluded that the prevalence level of overweight is high among undergraduate students in university of Benin. It was recommended, among others that, the private and public sectors should mobilize all available resources to reduce the increasing body mass index in university students and public health strategies to prevent obesity should begin with school

**Keywords:** Overweight, Obesity, Prevalence, Factors, Undergraduates, University, Nigeria

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**P013: NUTRITIONAL KNOWLEDGE AND PRACTICES IN THE MANAGEMENT OF CATARACTS AMONG PATIENTS ATTENDING SABATIA EYE HOSPITAL, KENYA**

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**Introduction:** According to WHO, cataract is the leading cause of visual impairment and blindness globally. Cataract induces damage to the eye through mechanisms like oxidative stress. High intake of food sources of antioxidants and vitamins has shown protective association with incidence or progression of cataract while poor diet, excessive alcohol intake and high carbohydrate intake has a harmful association with cataract. Numerous studies predict a rise in the total number of blind people. Information from this study will be key in the global initiative of eliminating avoidable blindness and impaired vision.

**Purpose:** To establish nutritional knowledge and practices in the management of cataracts among patients attending Sabatia eye Hospital, Kenya.

**Methods:** A cross-sectional research approach will be used and the study population will be all patients with ocular complications. Study sample shall be selected purposively i.e. all cataract patients on follow up at the time of the study attending Sabatia Eye Hospital. Data shall be collected using semi-structured questionnaires and focus group discussions and validation done by pre-testing on a representative group of cataract patients. Data obtained will be analyzed using STATA and descriptive statistics like frequency, percentage, mean, median and standard deviation will be used to summarize and describe the data.

**Key words:** nutrition, cataract

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**P014: KNOWLEDGE AND MANAGEMENT MEASURES OF HYPOGLYCEMIA AMONG DIABETES MELLITUS PATIENTS IN UNIVERSITY COLLEGE HOSPITAL, IBADAN, NIGERIA**

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**Introduction:** Hypoglycemia refers to occurrence of an abnormally low blood glucose levels subsequently exposing diabetic individuals to latent harm and is a major factor limiting the glycemic management of patients with diabetes mellitus.

**PURPOSE OF THE STUDY:** The general objective of the study was to assess the knowledge and management measures taken to overcome hypoglycemia among diabetes mellitus patients attending the Medical Out Patient Clinic at the University College Hospital, Ibadan.
METHODS: This cross-sectional study involved 70 patients selected using simple random sampling procedure from diabetic outpatients attending University College Hospital, Ibadan, Nigeria. Information on sociodemographic characteristics, clinical history, knowledge and management measures of hypoglycemia was collected using a semi-structured, interviewer-administered questionnaire. Knowledge was assessed using 12-point scale classified as poor (<6) and good (≥6). Data were analyzed using descriptive statistics such as mean, frequency and percentages.

SUMMARY OF RESULTS: Age of patients was 60.0±9.97 years and 84.1% were female. Majority (71.7%) of the patients had Type 2 diabetes mellitus, 3.3% had Type 1 diabetes mellitus, while others (25%) were not sure. Current management of patients included diet and drug therapy (44.8%); diet, drug and insulin therapy (53.7%) and diet therapy only (1.5%). Most (78.6%) patients had good knowledge on hypoglycemia and 59.6% knew blood sugar is low at <70mg/dl. Practices to manage hypoglycemia by patients included intakes of soft drinks (87.8%), sugar (57.6%), glucose (35.5%) and paid visit to physician (35.5%).

CONCLUSION: Diabetic patients attending University College Hospital have good knowledge of the management of hypoglycemia and major management practice is the use of soft drinks. Not all were informed about hypoglycemia, hence, increased efforts to educate diabetic patients on hypoglycemia through health education and dietary counseling to enable them manage in an effective way would suffice in reducing the risks associated with hypoglycemia as a barrier in diabetes management.

P015: SALT INTAKE AND HYPERTENSION AMONG MEN WITH UNKNOWN STATUS OF HYPERTENSION AGED 25 TO 64 YEARS OLD IN RURAL AREAS OF LILONGWE

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Background: Hypertension is a major risk factor for cardiovascular diseases, which are responsible for 12% of deaths in Malawi. Evidence has shown that salt intake, one of the causes of hypertension if reduced can lower blood pressure (BP).

Objective: To assess the relationship between salt intake and hypertension among men with unknown status of hypertension.

Methods: A cross sectional design among 20 men, using a modified World Health Organization (WHO) STEP wise approach to the surveillance of chronic diseases framework was conducted using a semi structured questionnaire to obtain demographic, knowledge, attitudes and behaviour (KABs) information. Food samples were collected using duplicate food collection method and analyzed using Flame Atomic Absorption Spectrophotometry to quantify total salt intake. Salt added during cooking was collected using food disappearance data method.

Results: Knowledge scores concerning the relationship between salt and hypertension were low (13%), with low favourable attitudes (58%) and practices (54%) towards consuming recommended amount of salt. Average salt intake was 12.4 ± 5.5 g/day (4.9g ± 2.2 of sodium/ day), higher than global salt consumption and WHO recommendations. Salt added during cooking was the predominant source of salt (87%), with salt from processed foods being 9% and naturally occurring foods 4%. Amongst the foods consumed, bread had the highest contribution to salt intake. Only 20% of the participants were hypertensive with a negative non-significant association existing between high salt intake and systolic BP (r = -0.297, p = 0.204) and diastolic BP (r = -0.150, p = 0.527), despite 95% of the participants having high salt intake. Having knowledge concerning salt consumption did not translate to low salt intake.

Conclusion: Despite having no relationship between salt intake and hypertension, the study recommends effective awareness concerning salt intake as a risk factor for hypertension and salt reduction strategies, taking into account the dietary sources and unfavourable KABs.


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Background: Diabetes is a chronic metabolic disease characterized by elevated levels of blood glucose that leads to the development of life-threatening complications. A healthy meal plan can delay and prevent complications from diabetes. However, feeding habit of the patients is not well known in many developing countries including Ethiopia.

Objective: The objective of this study was to assess the dietary practice and associated factors among diabetic patients who are on treatment follow up in Felege Hiwot referral hospital, Northwest Ethiopia.

Methods: An institution-based cross-sectional study was conducted from March to April 2017 at Felege Hiwot referral hospital, Northwest Ethiopia and 385 participants were selected using a systematic random technique. Quantitative data were collected using a pre-tested and structured questionnaire. To supplement their experiences, views and perception participants were selected purposely for in-depth interviews. Data were analyzed by logistic regression and; p-value < 0.05 with 95% CI were considered statistically significant. The qualitative data was analyzed line by line with quantitative findings.

Results: Of 385 diabetes patients; the majority of them were type2 diabetes (74.5%) and the mean (SD) age was 42.5 (±15.13). The overall proportion of poor dietary practice among diabetes patients was 46.8% (95% CI: 41.1-52.0). Living in rural (AOR=3.75; 95% CI : 2.12-6.63), duration of diabetes less than 5 years (AOR=2.81; 95% CI: 1.22-6.50), didn't get nutrition education (AOR=5.88; 95% CI: 3.30-10.48), poor social support (AOR=3.84; 95% CI : 1.74-8.46) and didn’t make choices on food when they ate out (AOR=3.49; 95% CI: 2.09-5.81) were significantly associated with poor dietary practice.

Conclusion: Considerable numbers of diabetes patients in this study were non-adhered to the recommended diet and to improve their dietary practice; attention should be given to nutrition education.

Keywords: Bahir Dar, Diabetes, Diet, Ethiopia, practice.

P018: KNOWLEDGE, ATTITUDE AND PRACTICE OF SICKLE CELL SCREENING AMONG HEALTH WORKERS IN TORORO DISTRICT, EASTERN UGANDA

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Introduction: Tororo has a high prevalence (19.6%) of sickle cell trait. In 2016, the Ministry of Health in Uganda rolled out a sickle cell screening programme (SCSP) for the new born children among health workers (HW) in the district. Training focused on screening, diagnosis and management of sickle cell disease. We assessed HW's knowledge, attitude and practice towards SC screening 2 years following the roll out of the SCSP in Tororo district.

Methods: A cross sectional survey was conducted in June, 2018 among HWs randomly selected from 38 health facilities. Knowledge was determined using 10 items and data considered good for scores above 5 and poor for scores below 6. Attitude towards SC screening was reported to be positive. Only 62.2% (112) reported screening clients for SC. 51% made client referrals, 36.5% did premarital counselling and 12.2% conducted SC awareness campaigns. Sickle cell screening practice was based on 4 practice questions. Factors associated with good knowledge and practice were determined using prevalence ratios (PR) with corresponding 95% confidence intervals (CI) using a generalised linear model with the family of Poisson and a log link and robust standard error were obtained. Qualitative data were analysed using manual thematic analysis.

Results: Nearly two-thirds (116, 64.4%) of HWs were female and rural residents (113, 64.9%). Overall, good knowledge about SC screening was low (125, 69.4%). Attitude towards SC screening was reported to be positive. Only 62.2% (112) reported screening clients for SC. 51% made client referrals, 36.5% did premarital counselling and 12.2% conducted SC awareness campaigns. Urban-residence (aPR=1.11, 95% CI; 1.03-1.19), higher income level (aPR= 1.30, 95% CI; 1.13-1.47) and prior training in SC screening (aPR= 1.09, 95% CI; 1.01-1.20) were key determinants of good knowledge.

Conclusion: Over all, knowledge and practice of SC screening is low. Attitude of HWs towards SC screening was positive. Premarital screening and awareness campaigns were irregular.

P019: SOCIO-ECONOMIC STATUS, KNOWLEDGE, AWARENESS AND ATTITUDES OF THE SWAHILI COMMUNITY IN RELATION TO DIETARY HABITS, OBESITY AND LIFESTYLE DISEASES

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Introduction: Lifestyle diseases were thought to be diseases of the affluent but poor populations are now equally affected. This is largely due to the environment in which they reside and socio-economic circumstances that influence their diets and physical activity patterns.

Purpose: The study aimed at determining the association between socio-economic status, knowledge, awareness, and attitudes and the prevalence of obesity, diagnosed diabetes and hypertension in the Swahili community.

Methodology: A cross-sectional study design was administered. Cluster sampling was used to randomly pick the 207 households. Data was collected using a semi-structured researcher administered questionnaire. Knowledge, awareness and attitudes were addressed using questions on balanced diet, healthy eating and healthy body weight. Socio-economic status was addressed by questions on educational levels, occupation and income. Data analysis was done using the Statistical Package for the Social Sciences version 20 computer software.

Results: About 36.8% of the individuals had at least primary education. Most (69.1%) of the women were housewives while the men had businesses and others were employed. They had average knowledge and were aware of healthy eating, obesity, diabetes and hypertension. Diagnosed diabetes in both Old Town and Kisauni districts was predicted by obesity, knowledge on obesity and knowledge on diabetes (p= 0.000). In Old town, the major predictors of hypertension were obesity, knowledge on obesity and physical inactivity (p= 0.044).

Recommendation: There is need to develop educational policies and programs to create awareness and knowledge among the members of affected communities.

Key words: Socio-economic status, knowledge, awareness, attitudes

**P020:** PREVALENCE OF CARDIOMETABOLIC DISEASES AND CORONARY RISK AMONG HEALTHY ADULTS IN KUMASI, GHANA

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**INTRODUCTION:** The rising prevalence of cardiometabolic conditions, obesity, type 2 diabetes, atherosclerotic dyslipidemia and hypertension, have led to increasing disability adjusted life years consequently reducing productivity and economic growth. This study aims to assess prevalence of cardiometabolic diseases and coronary risk in the Kumasi population.

**METHODS:** From July to September 2018, 302 participants aged 25 to 60 years (Asante by ancestry) were screened and recruited as part of the wider GONG study from urban Oforikrom Municipality in Kumasi. In addition to sociodemographic and anthropometric data, trained field workers collected venous blood samples for biochemical analyses.

**RESULTS:** Data was obtained from 176 women (58.3%) and 126 men (41.7%) of mean age 38.17±9.6 years. Mean BMI and WC were significantly higher for females than males (BMI; 28.79±4.96 vs 23.63±3.12; p-value < 0.001, WC; 93.71±13.12 vs 81.75±10.05; p-value < 0.001 respectively). Prevalence of obesity (BMI ≥ 30), central adiposity, hypertension and dyslipidemia were 22.5%, 40.7%, 28.5%, 64.5% respectively. Type 2 diabetes prevalence was low (FBS ≥ 7 mmol/l = 1.3%, HbA1c ≥ 6.5% = 4.1%). Prevalence of metabolic syndrome (NCEP ATP III) was 5.3% and coronary risk (TC/HDL-C ratio) was high in 36.1% of study population. Coronary risk was strongly associated with LDL (r= 0.921, p-value < 0.001), HDL (r = -0.758, p-value < 0.001), and TC (r= 0.892, p-value < 0.001). Binary logistic regression showed that high TG and high LDL had significant effects on increased coronary risk (OR= 14.2, 95% CI= 1.3-153.5, p-value = 0.029 and OR= 121.4, 95% CI= 15.4-958.3, p-value < 0.001 respectively).

**CONCLUSION:** The results emphasize the need for increased obesity prevention and weight management efforts and a critical look at reasons for elevated blood lipids to improve cardiometabolic and subsequent cardiovascular health.

**KEYWORDS:** GONG, cardiometabolic disease, coronary risk, urban population, Africa.

**P021:** CONSUMPTION OF CAFFEINATED DRINKS AMONG ADOLESCENTS IN SAGAMU, SOUTHWEST, NIGERIA

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INTRODUCTION: In recent times, use of psychoactive substances (including caffeine) has been on the increase in the developing world, including Nigeria. The consumption of caffeinated drinks is often intended entirely or partly for the physical and mental effects of caffeine. Adolescents are at an increased risk of excessive caffeine consumption and its adverse health consequences. This study therefore assessed caffeinated drink consumption and its influencers among adolescents in Sagamu, Ogun state.

METHOD: A cross-sectional descriptive study was carried out among 344 in-school adolescents in Sagamu township selected via multistage sampling. Data were collected using a semi-structured self-administered questionnaire and analysed with SPSS version 20.0. Relevant descriptive and inferential statistics were calculated with level of significance (P) set at <0.05.

RESULT: Respondents' mean age was 14.49 ± 1.37 years; 60.2% were male. Majority (75.9%) consumed at least one can in a week and 72.1% have been consuming it for more than a year. 67.8% always felt a strong urge to consume caffeinated drinks and 48.9% admit to meal skipping after caffeinated drinks consumption. Reasons for consumption included: to aid personal study (64.4%), social gathering (47.6%), thirst (47.1%), performance enhancement (34.1%), alertness (30.6%) and hunger (17.7%). Reported side effects were: insomnia (47.4%), aggressive behaviour (39.4%), nervousness (37.1%), vomiting (29.4%), hallucinations (28.8%), palpitations (27.6%), irritability (17.9%) and dizziness (4.4%). Frequency of consumption was associated with participation in sporting activities (p < 0.05).

CONCLUSION: There was a high level of consumption of caffeinated drinks among adolescents in Sagamu. School-based health education programmes should be intensified to help curb the menace of excessive consumption of caffeinated drinks among adolescents.

P022: ANTIOXIDANT AND ANTIMALARIAL POTENTIAL OF THE AQUEOUS AND ETHANOL RIND EXTRACTS OF Citrullus lanatus (WATERMELON) FRUIT

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Introduction: Watermelon (Citrullus lanatus) of the family Cucurbitaceae is a flowering plant. The exocarp is the thick rind, the outer surface of the fruit and mesocarp and endocarp is the freshly coloured center of the fruit. The nutritional benefits of watermelon fruit have been documented. However, the Ethnomedicinal use of its rind in the treatment of malaria has not been scientifically proven. Consequently, this study was aimed at evaluating the phytochemical constituents and antiplasmodial activities of the aqueous and ethanol rind extracts of C. lanatus.

Methods: Fresh watermelon fruits rind were separated from the fruits. The dried and grinded green-rind, white-rind and the whole exocarp (made up of the white and green portion of the rind) were extracted into aqueous and ethanol extracts. Phytochemical constituents and in vitro antioxidant activities of the extracts were determined using standard protocols. Antiplasmodial effect of the extracts on Plasmodium berghei infected mice was determined using the Petter’s classical 4-day suppressive test.

Result: Phytochemical screening result revealed the presence of alkaloids, anthraquinones, phenols, coumarins, cardiac glycosides, flavonoids, tannins, saponins, steroids and terpenoids in the extracts of the green-rind, white-rind and whole exocarp of the rind. The white-rind had significantly higher (p < 0.05) total phenol, alkaloids, flavonoids, proanthocyanidins and tannins content. The green-rind however, showed significantly higher (p < 0.05) saponins and ferric reducing antioxidant potential. The whole exocarp had the highest total antioxidant capacity. This was further evidenced by the lower IC50 values recorded for DPPH radical scavenging activity. Treatment of the P. berghei infected mice with aqueous and ethanol extracts of C. lanatus whole exocarp resulted in dose – dependent suppression of parasitaemia with the highest percentage suppression observed at 500 mg/kg body weight relative to the infected control.

Conclusion: The study therefore suggests the integration of watermelon rind as functional foods in the management of malaria infection.
P023: PREVALENCE OF HYPERTENSION AND PROGNOSIS OF ASSOCIATED DYSFUNCTION ON SPECIFIC ORGAN FUNCTION AMONG GHANAIAN ADOLESCENT STUDENTS

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Background: The prevalence of hypertension among adolescents has become an emerging health problem across the globe, and lack studies in Ghana.

Objective: To determine prevalence of hypertension among adolescent students and prognosis of associated dysfunction on specific organ function among adolescent students.

Methods: A cross-sectional and multi-stage sampling method was used to select 909 adolescents from the three SHS in Ashanti region of Ghana, between October 2016 and March 2017. Participants were screened for elevated blood pressure. A total of 142 participants had high blood pressure and were used for this study. Anthropometries; body mass index (BMI), percent body fat (%BF), visceral fat (VF), waist circumference (WC) and blood pressure levels were measured with recommended instruments and biochemical and haematological parameters were assessed. Sociodemographic data was taken with questionnaire.

Results: Out of 909 adolescent students, prevalence of high blood pressure from first screening was 9.1%. However, upon second screening from those with high blood pressure from the first screening, prevalent rate for high blood pressure had declined to 1.21%. Hypertension was higher in males (10.7%), compared to females (4.5%, P=0.658). There were no significant differences between BMI (P=0.847), %BF (P=0.501), VF (P=0.195), WC (P=0.450) among hypertensive, pre-hypertensive and normotensive participants. There was no significant mean difference between urea (P=0.236), creatinine (P=0.995), serum sodium (P=0.126), serum chloride (P=0.516), worm potassium (P=0.878) and alanine aminotransferase (ALT) levels (P=0.397) and blood pressure status. Total cholesterol (P=0.765), triglycerides (P=0.381), HDL (P=0.777) and LDL (P=0.768) was not significantly associated with blood pressure status.

Conclusions: Participants had high blood pressure level. Despite the prevalence of high blood pressure among adolescent population, it had no impact to cause any dysfunction in kidney, cardiovascular and liver.

Recommendation: Appropriate healthy diet and lifestyle therapeutic education are needed to prevent early and/or future complication of hypertension among adolescents.

P024: EVALUATION OF NUTRITIONAL STATUS, NUTRITION KNOWLEDGE AND ATTITUDE OF PEOPLE LIVING WITH HIV/AIDS ATTENDING SPECIAL TREATMENT CENTRE (STC) IN NATIONAL HOSPITAL ABUJA, NIGERIA.

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Introduction: Nutritional knowledge and attitude are important factors of dietary practices and are, thus, potential targets for appropriate planning of nutrition care programmes for people living with HIV and AIDS (PLWHA).

Purpose of the study: To evaluate the nutritional status, knowledge, and attitude of people living with HIV/AIDS (PLWHA) attending Special Treatment Centre (STC) in National Hospital Abuja.

Method: A total of 270 PLWHA attending STC were recruited using simple random sampling by balloting without replacement to select the number required for the study in each visit for 2months until the sample size was obtained. Information collected included, knowledge, attitude, socioeconomic characteristics, anthropometric measurement and biochemical variables. Data were analysed using descriptive statistics, Chi-square and regression.

Result: The study revealed that 41.1% had poor knowledge of nutrition, 29.1% had both fair and good knowledge while 0.7% had an excellent knowledge. 52.8% had a positive attitude of nutrition. 52.7% and 43.1% of PLWHA were asymptomatic and symptomatic respectively. 66.5% were moderately anaemic and their skinfold status showed 56.0% were malnourished. Low education and being self-employed had a significant (P<0.01) influence on the CD4+ count of PLWHA. Gender (being female) and age (being young) had a significant (P<0.01) influence on their BMI, while only being female significantly (P<0.01) influenced the skinfold thickness of the PLWHA. Self-employed and being female were the strongest (P<0.01) positive predictors of nutrition knowledge, while their attitude on nutrition was significantly (P<0.01) predicted by being female, however, low education and being single had a negative influence on the attitude of the PLWHA towards nutrition.
Conclusion: Therefore, good nutrition knowledge with proper education, occupation (good paying job) and high income are important tools in the care process, which when in place and sustained will promote a healthy people living with HIV, thereby leading to a healthy nation.

P025: DIETARY INTAKE AND PREVALENCE OF DENTAL CARIES AMONG 5-YEAR-OLD CHILDREN IN URBAN AND RURAL AREAS OF UASIN-GISHU COUNTY, KENYA: A CROSS-SECTIONAL STUDY

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Introduction: Dental caries is a major public health problem associated with diet and nutrition affecting 60-90% of children globally with the burden in both industrialized and less industrialized countries undergoing nutrition transition.

Objective: The aim of this study was to assess the relation between the dietary intake and nutritional status on dental caries prevalence of 5-year-old school children in urban and rural areas of Uasin-Gishu County.

Method: In this study, 382 five year old children and their parents/caregivers were sampled from urban and rural schools in Uasin-Gishu County to participate in the study. Dental caries status was assessed based on the criteria proposed by WHO for oral health surveys. Structured questionnaires was used to gather information on demographic and socio-economic status. A quantitative food frequency questionnaire was used to collect data on dietary intake. Dietary intake data was analyzed using ENA for SMART and the rest of the data was analyzed using SPSS Version 21.

Results: The prevalence of dental caries stood at 39.3% with a mean dft of 1.55 and 60.7% being dental caries free. Nutrient requirements for protein, vitamin C, calcium, and phosphorus, but did not meet the requirements for energy, folate, vitamin A, and iron. Many children from urban than rural areas consumed sweets/candies at 33.5% and 15.3% respectively.

Children from urban areas (288) had the highest mean dft of 1.83±1.37 while those from rural areas (154) had a mean dft score of 1.16±1.13. This was significantly different (p<0.05). Overweight was higher in the urban population compared to the rural population at 13.64% and 8.96% respectively. The prevalence of underweight was higher in rural areas at 10.7%, stunting at 14.6% and wasting at 6.8%.

Conclusion: There is inadequate intake of Energy, Vitamin A and Iron in the diet consumed by the 5-year-old both in the urban and rural areas of Uasin – Gishu County, Kenya. Children should be fed on nutrient rich foods and cariogenic foods should be consumed occasionally.

Key words: Dietary Intake, Dental Caries, Cariogenic Foods, Nutritional Status

P026: EFFECT OF SUB-CHRONIC ADMINISTRATION OF SYNRIAM (ARTEROLANE MALEATE AND PIPERAQUINE PHOSPHATE) ON SELECTED KIDNEY FUNCTION INDICES IN ALBINO RATS

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Introduction: Consequent upon the prevailing cases of malaria around the world and subsequent development of antimalarial drugs as regimen. The global prevalence of kidney failure due to drug toxicity is on the rise.

Purpose of the study: The study was conducted to investigate the toxic effect of sub-chronic administration of Synriam on the histology of the kidney and some biochemical indices of renal function in male albino rats, Rattus norvegicus at varying doses of the drug.

Methods: A total of 30 male rats, average weight 171g ± 12g were randomized into five groups, A (control), B, C, D and E (experimental groups), 6 rats in each group. They were fed with pelleted rat feed and clean tap water once daily. Group A was administered 0.2ml of distilled water while the other groups were respectively administered 4mg/Kg, 8mg/Kg, 16mg/Kg and 32mg/Kg body weight of Synriam daily for 28days. 24hours after the last administration, all the animals were sacrificed by jugular puncture and the blood of each animal was collected. The one way ANOVA was used for analysis at 0.05 significance level.

Result: Analysis showed that there was no significant difference (p>0.05) in their plasma urea and creatinine concentration among the test groups but there were significant increases (p<0.05) in their electrolytes concentrations
when compared to the controls. There was a progressive deterioration of the kidney tissues with increasing dose of the test drug as opposed to normal kidney tissue in the control. The deterioration in the kidney suggests nephropathy and alteration in ultra-filtration, which is evident by the increasing concentration of electrolytes in the plasma.

**Conclusion:** The use of this drug within the range of doses appeared to cause increasing damage to the kidneys. Overdose for a long period of time may cause damage to human kidney, hence, strict compliance to prescription is advised.

Keywords: Toxicity, Synriam, sub-chronic, histology, kidney

**P027: COMPUTER PROFICIENCY AND WEB-BASED LIFESTYLE INTERVENTION USE AMONG OLDER ADULTS WITH TYPE 2 DIABETES**

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**Background:** Web-based information technologies can serve as an accessible and powerful medium for engaging, educating, and empowering individuals with chronic diseases such as type 2 diabetes (T2D). Participants, however, need to be proficient in certain domains of computer and Internet use in order to access and utilize web-based interventions for chronic disease management. Older adults are most likely to have chronic diseases, and may be less proficient with technology, thus limiting access to such educational technologies.

**Objective:** To assess baseline computer proficiencies of adults with T2D prior to participating in a web-based lifestyle intervention program.

**Methods:** A sample of older adult T2D patients participating in a lifestyle intervention (N=67) completed a validated Computer Proficiency Questionnaire (CPQ) for evaluating competencies in the domains of computer basics, printing, communication, Internet use, calendaring software and multimedia use. Average responses to items on a 5-point scale were summed to produce subscale and composite CPQ scores. Socio-demographic information was collected by questionnaire and use of email, website, chat room during a 12-week lifestyle intervention were assessed. Linear regression was used to determine relevant predictors of computer proficiency and t-tests were used to compare mean differences between CPQ scores by age and education.

**Results:** Participants were 64% men; mean age 69.5 (9.3) years, with mean diabetes duration of 19.0 (13.7) years. The CPQ subscales demonstrated excellent internal consistency reliability with subscales Cronbach’s alpha coefficients ranging from 0.89 to 0.91. Average subscale scores were: basic computer skills (4.9±0.3), Internet use (4.3±1.0), communication (4.3±0.7), printer (4.3±1.3), calendar (3.9±1.5), entertainment (3.8±1.6) and overall composite CPQ score was 25.4 ± 4.9 out of 30.0. Age and education were independently associated with composite CPQ score (p<0.001). Age and education were independently associated with the composite CPQ score (p<0.001).

**Conclusion:** Computer proficiency was very high among this sample of older adults with T2D, which helps to explain their use of the web-based intervention at baseline. Healthcare providers supporting this population might consider augmenting support services with web-based diabetes self-management but should consider the individual level of computer and technology proficiency.

**P028: ASSESSMENT OF ZINC, IRON AND COPPER STATUS IN TYPE-2 DIABETES PATIENTS IN MAKUENI, KENYA.**

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**BACKGROUND:** Micronutrient deficiencies are a risk factor for increased morbidity and mortality and have devastating effects on the physical and mental well-being of the population. Kenya is facing the double burden of malnutrition. Iron (Fe) and zinc (Zn) deficiencies are of public health concern. Non-communicable diseases (NCDs)
CONTRIBUTE TO A SIGNIFICANT SHARE OF THE DISEASE BURDEN, WITH DIABETES REPORTED AS ONE OF THE MAJOR NCDs. Zn AND Fe IMPROVE METABOLIC CONTROL AND INSULIN SENSITIVITY AMONG DIABETICS.

OBJECTIVE: TO ASSESS THE ZINC, IRON, AND COPPER STATUS, AND POSSIBLE ASSOCIATIONS WITH THE NUTRITIONAL PROFILE OF TYPE-2 DIABETES (T2DM) PATIENTS IN MAKUENI, KENYA.

METHODS: A CROSS-SECTIONAL STUDY WAS CONDUCTED IN THREE RANDOMLY SELECTED PUBLIC HOSPITALS IN MAKUENI, KENYA BETWEEN SEPTEMBER-NOVEMBER, 2018. DATA COLLECTION WAS DONE USING: STRUCTURED QUESTIONNAIRES; 24-HOUR RECALL; ANTHROPOMETRIC MEASUREMENTS (WEIGHT, HEIGHT, WAIST/HIP CIRCUMFERENCE, BICEPS & TRICEPS SKINFOLDS AND MUAC); COLLECTION OF WHOLE BLOOD SAMPLES FOR ANALYSIS OF BLOOD GLUCOSE, PLASMA ZINC, HAEMOGLOBIN, SERUM FERRITIN, TRANSFERRIN RECEPTOR, ALPHA-1-ACID GLYCOPROTEIN, C-REACTIVE PROTEIN, HEPcidIN, SERUM COPPER, TOTAL CHOLESTEROL; TRIGLYCERIDES, HIGH DENSITY LIPOPROTEIN; AND, BLOOD PRESSURE ASSESSMENT.

RESULTS: IN TOTAL, 160 T2DM PATIENTS WERE INCLUDED IN THE STUDY. PRELIMINARY RESULTS SHOW A PREVALENCE OF 27.2% OF ANAEMIA IN THE STUDY POPULATION. THIS PATIENT POPULATION SHOWS THAT 37.8% AND 28.2% IS OVERWEIGHT AND OBSESE RESPECTIVELY WITH 66.5% HAVING INCREASED RISK OF SUFFERING OTHER NCDs. THE DESIGN AND FINDINGS ON PREDICTOR FACTORS TO ZINC AND IRON STATUS IN T2DM WILL BE PRESENTED IN DETAIL, TO SHARE THE STATE-OF-THE-ART.

KEYWORDS: MICRONUTRIENTS, ZINC, IRON, TYPE 2 DIABETES

P029: PROXIMATE COMPOSITION AND EFFICACY OF DIFFERENT CONCENTRATIONS OF PASSIFLORA EDULIS EXTRACT ON THE GLYCEAMIC CONTROL OF ALLOXAN-INDUCED TYPE II DIABETIC RATS

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BACKGROUND: Diabetes Mellitus, an endocrine disorder characterized by hyperglycemia and impaired insulin secretion, results from defects in insulin secretion or insulin action disorder or in both. It is the major cause of morbidity in developing countries (Ravi, Rajasekaran and Subramanian, 2005). According to Córdova et al., (2005), some studies have shown the functional properties of the passion fruit peel, especially those related to the content and type of fiber. Due to these characteristics and functional properties, passion fruit has no longer been considered an industrial waste since it can be used in the development of new products.

METHODS: Twenty-four (24) rats were assigned into 4 groups based on their equalised body weight. Three groups were induced with alloxan to make them diabetic while a normal group was not induced with alloxan. They were fed with diets pelleted with 2.5% and 5% of Passiflora Edulis extract (i.e. the juicy pulp and seeds). A normal group and a diabetic control group did not have Passiflora Edulis extract in their diet. Feed intake, weight, blood glucose, urinary glucose and urinary protein were determined.

RESULTS: There was also a significant decrease in the fasting blood glucose concentration of the treated rats when compared with the diabetic control rat (P< 0.05).

CONCLUSION: Therefore, passion fruit (Passiflora Edulis) has been shown to be efficacious by producing anti-hyperglycemic activity on the blood glucose of the diabetic albino rats.

RECOMMENDATION: Thus further studies are recommended to see if much higher concentrations of passion fruit extract can better reduce the blood glucose of diabetic rats and to know if the anti-hyperglycemic effect of passion fruit as observed in this study could be sustained as this can help to determine its curative effect and can be suggested as an adjuvant therapy for diabetes mellitus.

KEYWORDS: Diabetes mellitus, efficacy, passion fruit, normal and diabetic albino rats.

P030: DIETARY PRACTICES, HABITS AND PHYSICAL ACTIVITY LEVELS OF THE SWAHILI COMMUNITY, KENYA IN RELATION TO OBESITY AND CHRONIC DISEASES OF LIFESTYLE

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INTRODUCTION: Chronic diseases of lifestyle like diabetes mellitus and hypertension appear at greater rates in populations that consumed high fat, high calorie diets and engaged in low or no physical activity. Physical inactivity and unhealthy diets are major contributors of overweight and obesity, which are risk factors for lifestyle diseases.

PURPOSE: This study aimed at determining the relationship between dietary practices, habits, physical activity and the prevalence of obesity, diagnosed diabetes and hypertension in the Swahili community of Old Town and Kisauni districts in Mombasa County, Kenya.
Methodology: A cross-sectional study design was used. Cluster random sampling was done to pick 207 households. Data was collected on food consumption, dietary habits and physical activity. Focus Group Discussions and Key Informants Interviews were used to collect qualitative data.

Results: Dietary habits of the Swahili community involved preparation and consumption of high fat, sugar and coconut milk-based foods. Most (75.8%) of the interviewed members of this community had low physical activity. Their dietary habits and low physical activity levels were associated with obesity, diabetes and hypertension (p<0.05, 95% CI). Physical inactivity levels were associated with obesity [Odds Ratio, 0.49; 95% Confidence Interval, 0.27 - 0.88].

Recommendation: There is need to acquire sustainability of consumption of healthy diets and physical activity through education and provision of physical activity facilities to prevent obesity, a major risk factor for diabetes and hypertension.

Key words: Dietary practices, dietary habits, physical inactivity, obesity, hypertension, diabetes, Swahili, Kenya.

P031: NUTRITIONAL COMPOSITION AND ANTI-DIABETIC POTENTIALS OF RAW AND PROCESSED FINGER MILLET (ELEUSINE CORACANA L. GAERTN) USING IN VITRO MODELS
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Background and Objective: Diabetes is a huge and rising global burden. Consumption of whole gains such as millet has shown beneficial effects on diabetes prevention and management. This study assessed the anti-diabetic potentials of raw and processed finger millet.

Methods: Finger millet was purchased, cleaned and portioned into three. A portion of the millet was ground into flour while the other portions were either fermented or sprouted for 120 hours each, and stored in Ziploc bags for further analysis. Proximate, mineral and anti-nutritional factors were determined using standard methods of AOAC. Antioxidant and anti-diabetic potentials of the millet were determined using in vitro models. Results: The raw finger millet contained in g/100g, crude protein (8.48), ash (1.39), crude fats (1.27), crude fibre (0.65), carbohydrate (76.88), and in mg/100g, calcium (111.00), iron (11.40), zinc (1.35), magnesium (165.00), manganese (0.37) and chromium (0.03). The fermented and sprouted samples contained in g/100g, crude protein (4.28-16.81), ash (1.79-2.18), crude fats (1.05-1.60), crude fibre (1.12-2.11), carbohydrates (66.03-79.36), and in mg/100g, calcium (96-218), iron (7.32-13.85), zinc (0.9-2.85), magnesium (117-249), manganese (0.13-0.86) and chromium (0.06-0.09). Phytochemicals in the sprouted sample contained higher concentrations in g/100g, of total flavonoid (0.03), glycosides (0.12), terpenoids (0.86) and steroids (0.02), than the raw and fermented samples having (0.01) total flavonoids, (0.1-0.11) glycosides, (0.66-0.64) terpenoids and (0.00-0.01) steroids. However, total phenolic content (0.15g/100g) was higher in the fermented sample than in the raw (0.1g/100g) and sprouted sample (0.07g/100g). Thus, the fermented finger millet flour had better scavenging abilities on DPPH (2,2-Diphenyl-1-picryl hydrazyl) free radicals, Aβs (2,2-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid)) and ferric reducing antioxidant power (FRAP).

Conclusion: The sprouted finger millet flour showed a superior anti-diabetic property, having higher nutrients minerals and phytochemicals content, while the fermented finger millet flour acted as a better antioxidant due to its high phenolic content, hence, it can be used to fight oxidative stress and its related complications that occur in diabetes.

P032: KNOWLEDGE AND PRACTICE OF SELF-CARE MANAGEMENT AMONG TYPE 2 DIABETIC PATIENTS IN SOUTH-WEST STATE, NIGERIA.
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Background and Objective: Diabetes is a chronic and lifestyle disease which requires a multipronged approach for its management, wherein self-care practices play an important role. This study assessed knowledge and practice of self-care management among Type 2 Diabetic (T2D) patients in Osun State, Nigeria.
Methods: The study was a cross sectional study, 80 subjects were selected (38 males and 42 females) through a random sampling procedure. A pre tested semi structured questionnaire was administered to obtain socio-demographic characteristics, knowledge and practice of self-care management of diabetes. Fasting blood glucose (FBG) was assessed using glucometer. Descriptive statistics, χ² and inferential statistics were performed on the data at 5% level of significance.

Results: The mean age of the respondents was 64.3 ± 10 years. Less than half of the patients (43.8%) completed tertiary education, whilst 12.5% had no formal education. Middle-income group were 42.5%, while low income were 36.3%. Majority (61.3%) had average knowledge regarding self-care management in diabetes mellitus, while 62.5% and 20% had overall average and good practice of self-care management of diabetes respectively. There was statistically significant relationship between levels of knowledge and levels of practice of self-care management among the type 2 DM patients. Respondents with good knowledge of self-care practices were likely to have good practice (p< 0.05). The mean fasting blood glucose (FBG) was 7.5±3.7mmol/L. About 32.5% had FBG above the targeted range while 67.5% had FBG within the targeted range. Glycemic control was not associated with practice of self-care management in the study (p>0.05).

Conclusion: Regular diabetes education and assessment of the Knowledge and Practice of Self-care management among type 2 diabetes patients is necessary to ensure optimal care for person with diabetes and reduce the co-morbidity and mortality rate.

Key words: Knowledge, Self-care management, Type 2 diabetes mellitus

P033: OBESITY AND ITS ASSOCIATED FACTORS AMONG MALE ADOLESCENTS IN SAGAMU, NIGERIA: IMPLICATION FOR CONTROL OF NON-COMMUNICABLE DISEASES.
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Introduction: Overweight and obesity among adolescents has widely increased in Sub-Saharan Africa including Nigeria with an increasing incidence in males. Obesity is a modifiable risk factor for several non-communicable diseases (NCDs). This study therefore determined the prevalence of obesity and its associated factors among in-school male adolescents in Sagamu, Ogun State.

Methods: A cross-sectional study was carried out among 330 in-school male adolescents in Sagamu, southwest Nigeria, selected via multi-stage sampling technique. Data were collected using a semi-structured, self-administered questionnaire, measuring tape, weighing scale as well as a stadiometer and analyzed using SPSS 20.0. Body Mass Index (BMI) and Waist-Hip ratio (WHR) were calculated. Relevant descriptive and inferential statistics were calculated, with p<0.05. Participation was fully voluntary and strict confidentiality ensured.

Results
The mean age and WHR were 15.9±1.4years and 0.85±0.05 respectively. About 13% of respondents were overweight/obese; 27.8% had central obesity. Central obesity (CO) was higher among age group 15-19years (93%) and associated with age group (p=0.047) and BMI (p=<0.001). Obesity was associated with age 15-19years (p=0.019); meal pattern (p=0.014); maternal education (p=0.048). The mean BMI was significantly increased among those taking after-school lessons (p=0.033), those dropped off at school (p=0.034), those with CO, smoking history, highly-educated mothers and a satisfactory meal pattern. However, it was markedly reduced in those with a history of alcohol consumption.

Conclusions: The prevalence of obesity was low but higher than findings from similar studies in the sub region. Factors associated with obesity were mainly modifiable and socio-demographics. Behavior change communication focused on obesity prevention should be intensified in public schools, with supportive policies for a healthy school environment.

Keywords: Obesity, central, adolescent.

P034: ASSOCIATION BETWEEN ABDOMINAL OBESITY AND NON-COMMUNICABLE DISEASES (HYPERTENSION AND TYPE 2 DIABETES) AMONG ADULTS IN CALABAR METROPOLIS
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Introduction: There are research-based evidences that abdominal obesity is associated with many metabolic disorders like insulin resistance, type 2 diabetes, hyperlipidaemia and hypertension.

Purpose: The study was carried out to assess the relationship between abdominal obesity and non-communicable diseases, particularly, hypertension and type 2 diabetes among the study population.

Methods: A multi-stage, random sampling technique was used to select 500 adults (20-70 years) in Calabar Metropolis that participated in the cross-sectional descriptive study. The WHO STEpwise approach for standardized data collection on non-communicable diseases (NCDs) and their combined risk factors, Version 2.1, was adapted and used to collect information on socio-demographic characteristics, anthropometry (height, weight, waist and hip circumferences), blood pressure and blood sugar levels of the subjects; questionnaire was interviewer-administered. Data collected were coded and entered into the computer and analyzed using SPSS, version 22.0. Data were analyzed using descriptive statistics, Chi-square and logistic regression analysis. Significant differences were accepted at p<0.05.

Results: Half (51%) of the population was single, while 44.8% was married. Self-employed participants were 33.4 %, the unemployed were 32.6 %, and civil/public servants were 29.2 %, while respondents in other forms of employment were (4.8 %). The Chi-square analysis showed that the NCDs marked by parameters of hypertension history, diabetes history, systolic blood pressure, diastolic blood pressure, random blood sugar, body mass index were significantly associated with waist circumference of the males and females. Significantly more abdominally obese diabetic men (72.2%) than abdominally obese diabetic women (62.5%) and more abdominally obese hypertensive men (56.9%) than abdominally obese hypertensive women (41.0%) participated in the population.

Conclusion: This study confirms that individuals with high waist circumferences are at very high risk of NCDs, and should be identified within the population for appropriate intervention.

Keywords: Association, abdominal obesity, hypertension, type 2 diabetes, NCDs, adult population

P035: THE PREDICTORS OF OVERWEIGHT AND OBESITY AMONG CHILDREN 24-59 MONTHS OLD IN INFORMAL SETTLEMENT IN NAIROBI- KENYA: A CROSS-SECTIONAL STUDY

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Background: The prevalence of overweight and obesity among poor populations is on the increase. Childhood obesity is a public health concern worldwide. Information on this condition among children living in poor populations is scarce in Kenya.

Objectives: To determine the prevalence and predictors of overweight and obesity among young children living in Kibera informal settlement, Nairobi.

Methods: Cross sectional study conducted among 398 mothers / children 24-59 months old dyads. WHO age and sex specific Weight for Height (WFH) Z - score cut off points were used to determine overweight and obesity. Feeding practices were determined based on a 24-hour dietary intake and a 7-day food frequency. Information on physical activity was collected using the Children’s Physical Activity Questionnaire (CPAQ). Predictors of overweight and obesity were determined using Linear Stepwise Regression Analysis (P<0.05).

Results: The prevalence of overweight and obesity among the children was 7.1%. The mean daily intake of energy (1602 kilocalories), carbohydrate (378.5g) and fat (27.4 g) were higher than the RDI. The RDI for dietary fibre and polyunsaturated fatty acids (PUFA) was attained by less than 20% of the children. The most frequently consumed foods were cereals, mean 5.8; vegetables mean 5.8 and milk mean 6.3 days per week respectively. Fruit consumption was low; mean 2.9 days per week. Children were frequently involved in sedentary activities and screen time; mean 10.6 hours and 21.2 hours per week respectively, despite having met the recommended hours for moderate to vigorous physical activity. The main predictors of overweight and obesity were screen time (1.30; P<0.001); followed by sedentary activities (0.96; P<0.001) and carbohydrate consumption (0.01; P=0.033).

Conclusion: Prevalence of overweight and obesity is high among the children due to the high amount of time spent on sedentary activities and screen time and poor dietary practices.

Key words: Overweight. Obesity, dietary practices, sedentary activities, screen times, physical activities; underfives, informal settlements

P036: KNOWLEDGE AND PREVALENCE OF RISK FACTORS OF COMMON CARDIOVASCULAR DISEASES AMONG MARKET WOMEN AND MEN IN IBADAN, SOUTH WESTERN NIGERIA

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**Introduction:** Information on risk factors of cardiovascular diseases (CVDs) are scarce in developing countries, including Nigeria, where cardiovascular diseases are rapidly increasing. There is dearth of information among market men and women in Nigeria.

**Purpose of the study:** This study aimed at assessing the knowledge and prevalence of cardiovascular risk factors among men and women traders in a popular market (Bodija) located in Nigeria's biggest city-Ibadan.

**Methodology:** A descriptive cross-sectional design involving 452 respondents (male=99, female=353) was applied. Seventy-five respondents were selected equally from the six sections of shops in the market. A semi-structured, interviewer administered questionnaire was used to elicit information. Systolic and diastolic blood pressure was assessed. Weight, height, and waist circumference (WC) and body fat were also determined.

**Results:** Majority (78.1%) of the respondents were females. Majority 48.1% had been there 10-20 years. The mean Body Mass Index was 26.6±5.5Kg/m², Waist circumference (88.5±13.8 cm), Systolic Blood Pressure (123.8±18.8mmHg), Diastolic Blood Pressure (77.4±13.2mmHg). 34.2% and 23.4% were overweight and obese respectively. 14.8% had undiagnosed hypertension which was more prevalent in respondents aged 30 years and above. Of the females, 73.1% had very high body fat, and 75.3% had their WC at high risk compared to the 11% of the male respondents. Majority (89.4%, 90%, and 76.5%) wrongly claimed that family history of hypertension; diabetes and obesity were not risk factors for development of cardiovascular disease. This was similar in 82.1%, 84.3% and 83.8% regarding overweight, obesity, high blood sugar. About one third 30.5% do not consume fruits daily, and majority 58.2% do not consume vegetable regularly.

**Conclusion:** The knowledge of respondents regarding risk factors of CVDs was poor. Hypertension and obesity were commoner especially in women. The consequences on the long term in the face of this low awareness makes case for increased health promotion.

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**P037:** Diet quality and Hypertension among Women of Reproductive Age in Emekuku, Owerri, Nigeria

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**Introduction:** The rising prevalence of hypertension is worrisome and the Women-of-Reproductive-Age are particularly at higher risks than other age groups. The importance of adequate diet and good nutritional status at all stages of development is well-known, however, how these translate to actions for the prevention and control of diet-related non-communicable diseases particularly hypertension is not known. This study was designed to assess knowledge of risk factors of hypertension and relationship with diet quality among Women-of-Reproductive-Age in Emekuku, Owerri, Nigeria.

**Methodology:** This descriptive, cross-sectional study involved 451 Women-of-Reproductive-Age selected using simple random sampling of households from Emekuku, Nigeria. Information on socio-demography, lifestyle, knowledge, and dietary intake were collected using a semi-structured, interviewer-administered questionnaire. Dietary intake was assessed using 24-hour protocol, diet quality was determined using the Diet Quality Index International method. Blood pressure and anthropometry were assessed using standard. Knowledge was assessed using a 13-point questionnaire classified as poor (0-33%), fair (34-66%) and good (67-100%).

**Results:** Age of respondent is 19.73±8.63 years, 84.2% were 15-24 years. About 45.9% had fair knowledge, 62.7% had high diet quality of which moderation was the best achieved score, 27.3% of the women had family history of hypertension. Mean BMI was 22.01kg/m², 15.7% were underweight. Systolic blood pressure was 114.42mmHg, 4.7% were hypertensive. There is no significant difference between knowledge, diet quality, and hypertension.

**Conclusion:** The prevalence rate of hypertension is of concern given that majority of the respondents are adolescents. Adolescent females may be a vital group to include in women-targeted education intervention programmes.

**Keywords:** child-bearing age, high blood pressure, adherence, nutritional status, knowledge

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**P038:** ASSESSMENT OF THE LEVEL NON-COMMUNICABLE DISEASES AMONG THE YOUTH IN TRANS NZOIA COUNTY, KENYA.

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**Introduction:** Non-communicable diseases (NCDs) have been on the rise in Kenya over the past few years. This has become a major public health concern due to the impacts it has had on the individual’s health and socio-economic...
status as a result of increased health care needs, lost productivity and premature deaths. The four major risk factors of NCDs are: tobacco use, alcohol, physical inactivity and unhealthy diets.

**Purpose of this study:** This study is relevant in increasing the knowledge in the existing literature on the burden of NCDs among the youth and influence policy formulation that aim at reducing the burden of NCDs and also reversing the trends of NCDs. The study will influence behavior change among the youth reducing their indulgence in the risk factors thus improving their overall health.

**Objectives:** To examine the prevalence of behavioral risk factors of NCDs among the youths, the NCDs prevalence and the relationship between behavioral risk factors of NCDs and the prevalence of NCDs.

**Methods:** The study employed purposive sampling for study area and study population. Three sub-counties in Trans Nzoia County were selected by random sampling from the five sub-counties. The respondents’ ages ranged from 18-34 years. A sample of 150 youths was studied. The data collected was cleaned, coded and entered in the SPSS statistical software for data analysis. The mean, standard deviation and percentages and were established. The chi-square was used to establish the relationship between the variables.

**Keywords:** Hypertension, overweight/obesity, stress, health workers.

**Background:** Hypertension is a public health concern and healthcare providers are not exempted from its menace. The objective of this study was: to assess blood pressure patterns, nutritional status and lifestyles of workers in University Teaching Hospital, Jos, Nigeria.

**Methods:** A cross-sectional study was conducted among 283 randomly selected health workers whose socio-demographic, medical and lifestyle characteristics were investigated by a semi-structured, self-administered questionnaire. Respondents’ stress level was measured by International Stress Management Association Questionnaire consisting of 20 points scale categorized into; low stress (≤4 points), moderate stress (5-13 points), and high stress (14-20 points). Weight, height, waist and hip circumferences were measured using bathroom scale, stadiometer and non-stretchable measuring tape respectively. Body Mass Index (BMI) and Waist–Hip Ratio (WHR) were calculated. Blood pressure (BP) was measured using digital sphygmomanometer. Hypertension was defined by BP ≥140/90mmHg. Data were analyzed using SPSS (20.0). Chi-square was used to determine association of the variables. Statistical significance was set at p<0.05.

**Results:** Proportion of male and female respondents was 32% and 68% respectively. Their mean age was 36.72 ±9.47 years. More than half (64.3%) of them were within 30-49 years. Not less than 56.2% had family history of chronic diseases. Prevalence of hypertension and overweight/obesity were 30.1% and 48.9% respectively. More than half (62.5%) of the respondents were moderately stressed and 7.4% highly stressed. Only 21.6% drank alcohol, 2.5% smoke cigarette and 65% did not engage in physical exercise. One quarter (39.1%) consumed fruit regularly. Respondents’ nutritional status was significantly associated to blood pressure patterns (p<0.05). No significant association was found between respondents’ stress levels and blood pressure (p>0.05).

**Conclusions:** Overweight/obesity, moderate stress; low intake of fruits, sedentary lifestyle and hypertension were prevalent among health workers in Nigeria. Regular screening on hypertension, nutrition education on roles of fruit intake, physical exercise for weight reduction and appropriate workload to reduce stress should be promoted among the health workers.

**Keywords:** Hypertension, overweight/obesity, stress, health workers.

**P039: BLOOD PRESSURE PATTERN, NUTRITIONAL STATUS AND LIFESTYLES OF HEALTH WORKERS IN UNIVERSITY TEACHING HOSPITAL, JOS, PLATEAU STATE, NIGERIA**

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**Background:** Hypertension is a public health concern and healthcare providers are not exempted from its menace. The objective of this study was: to assess blood pressure patterns, nutritional status and lifestyles of workers in University Teaching Hospital, Jos, Nigeria.

**Methods:** A cross-sectional study was conducted among 283 randomly selected health workers whose socio-demographic, medical and lifestyle characteristics were investigated by a semi-structured, self-administered questionnaire. Respondents’ stress level was measured by International Stress Management Association Questionnaire consisting of 20 points scale categorized into; low stress (≤4 points), moderate stress (5-13 points), and high stress (14-20 points). Weight, height, waist and hip circumferences were measured using bathroom scale, stadiometer and non-stretchable measuring tape respectively. Body Mass Index (BMI) and Waist–Hip Ratio (WHR) were calculated. Blood pressure (BP) was measured using digital sphygmomanometer. Hypertension was defined by BP ≥140/90mmHg. Data were analyzed using SPSS (20.0). Chi-square was used to determine association of the variables. Statistical significance was set at p<0.05.

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**Conclusions:** Overweight/obesity, moderate stress; low intake of fruits, sedentary lifestyle and hypertension were prevalent among health workers in Nigeria. Regular screening on hypertension, nutrition education on roles of fruit intake, physical exercise for weight reduction and appropriate workload to reduce stress should be promoted among the health workers.

**Keywords:** Hypertension, overweight/obesity, stress, health workers.

**P040: EFFECT OF NUTRITION EDUCATION INTERVENTION ON KNOWLEDGE, ATTITUDES AND DIETARY PRACTICES OF ADOLESCENTS IN RELATIONSHIP TO OVERWEIGHT AND OBESITY IN KENYA**

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**Introduction:** Overweight and obesity are the fifth leading causes of non-communicable diseases. Nutrition knowledge, attitude and dietary practices are associated with overweight and obesity.
Objective: The purpose of this study was to determine the effect of a school-focused nutrition education intervention on the knowledge, attitudes and dietary practices in relation to body weight among adolescent students 15-18 years old attending day schools in Kenya.

Methodology: A Randomized Cluster Controlled Trial in which 4 schools were randomly placed into 2 study arms. Students were randomly assigned to the study arms; 111 per arm. The intervention arm received 8 weeks of nutrition education sessions on healthy eating. Data was collected using self-administered questionnaires at baseline, 8 weeks and 6 months post intervention.

Results: The study arms were comparable in baseline characteristics. There was no difference in nutrition knowledge between the two study arms at 8 weeks (median score 8 (Inter quartile range [IQR] 3) out of a total of 20 scores for both the study arms. At 6 months post intervention, the median score was significantly higher in the intervention (Mann-Whitney U test; -3.402; p<0.01) compared to control arm (Mann-Whitney U test; -0.846; p=0.397). Consumption of selected healthy foods was significantly higher in the intervention than in the control arm at 8 weeks and at 6 months post intervention. Those in the intervention arm were more likely to consume less junk foods at 8 weeks and at 6 months post intervention; for example, consumption of carbonated drinks was significantly lower (Chi-square: 4.53; p=0.03). Attitudes were significantly more positive among those in intervention arm at 8 weeks; a higher percentage of students viewed obesity and overweight as unhealthy (Chi-square: 9.42; p=0.02).

Conclusion: Overall, the intervention improved knowledge and attitudes of the adolescents but dietary practices were sustained for the entire study period.

Key words: Obesity, overweight, knowledge, attitudes, practice, adolescents, nutrition education

P041: NUTRITIONAL KNOWLEDGE AND PRACTICES OF CATARACT PATIENTS ATTENDING SABATIA EYE HOSPITAL, KENYA
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Introduction: According to WHO, cataract is the leading cause of visual impairment and blindness globally. Cataract induces damage to the eye through mechanisms like oxidative stress. High intake of food sources of antioxidants and vitamins has shown protective association with incidence or progression of cataract. The main treatment of cataract is surgery yet studies have shown the cost of surgery and the number of ophthalmologists against the population to be limiting factors to treatment. The results of this study are key in informing decisions about appropriate interventions towards lessening the economic and public health burden of cataract.

Purpose: To establish nutritional knowledge and practices of cataract patients attending Sabatia Eye Hospital, Kenya

Methods: A descriptive cross-sectional research design was used and cataract patients were purposively selected and systematic random sampling was used to sample 310 patients. Data was collected using structured questionnaires, food frequency tables and dietary diversity score sheets. Results were subjected to analysis as frequencies, percentages, chi-square test and correlation. Presentation of findings was done using tables and graphs.

Key words: nutrition, cataract

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Introduction: Malnutrition is a public health problem in the world. A number of studies in high income countries (HIC) suggested that malnutrition in the first 1000 days of life is associated with high risk of non-communicable diseases (NCD) later in adulthood. Despite the growing evidence in HIC, little is known about the long-term outcome of children treated for Severe Acute Malnutrition (SAM) after the program’s exit. A related issue is the lack of data on potential longer-term consequences for the health after nutritional interventions in early life in Low-and Middle-Income countries.
Aim: Our aim was to follow up patients after their treatment for SAM and to describe the longer-term growth outcomes.

Methods: We followed up 520 Congolese (mean age 22 years) who were still alive following SAM inpatient treatment at Lwiro Hospital in Eastern DRC between 1988 and 2007 (median age 41 months) and compared them with 398 age- and sex-matched community controls. Our outcomes of interest were anthropometry and blood markers of Diabetes.

Results: Weight, height (sitting and standing) and hip circumference were significantly lower in cases compared to control. Despite the catch-up growth suggested by a mean BMI of 22 in cases, proportion of low BMI tended to be higher in cases compared to control while that of overweight was similar in both groups. Mean MUAC and leg length tended to be lower in cases. Hb A1C, Waist-to hip and waist-to height ratios but not glycemia were significantly higher in cases compared to control.

Conclusion: Our results suggest that SAM has long-term adverse effects. Survivors have so-called economic growth structures associated with future cardiovascular and metabolic diseases. The potential for catch-up growth suggests that there might be potential for recovery following SAM. Better follow-up care and post-SAM interventions might thereby reducing their risk of NCDs in later life.

P043: CHILDHOOD MALNUTRITION AND BODY COMPOSITION IN ADULTHOOD IN RURAL AREA: CASE OF EASTERN DEMOCRATIC REPUBLIC OF CONGO.
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Introduction: Malnutrition is a public health problem in developing countries. Several researchers report the double burden of malnutrition.

Objective: To assess nutritional status and body composition in young adults with a history of childhood malnutrition.

Methods: This was a case-control study involving 323 subjects, including 195 cases who attended the Buhandahanda nutritional center in the Mitu-Murhesa health district (South Kivu Province, eastern DR Congo) between 1995-2002 and 128 controls recruited from the same villages, matched by age, sex and type of residence. For all subjects, we measured anthropometric parameters (weight, height, Mild Upper Arm Circumference (MUAC)) and body composition using the Tanita-730. Recruitment of study participants occurred between June and August 2018. Proportions were calculated and chi squared test applied to compare body composition with the Physiological model 4C (liquid, fat, musle mass and bone mass).

Results: Females were 49.3% among cases and 49.6% among controls. The mean age in years was 19.2 (4.2) in cases and 19.2 (3.2) in controls (p = 0.43). We found a significantly higher prevalence of wasting (BMI <18.5) in subjects with history of malnutrition (23.3.0% in cases versus 8.0% in controls) (p = 0.003). Wasting was more frequent in men (34.8% of cases vs 9.6% of controls) than women (11.5% of cases vs 6.4% of controls). The proportion of overweight was statistically balanced in both groups but higher in women (27.1% cases and 19.0% controls). Body fat was also higher in the control group 18.2% (8.9) than in cases (15.3% , 7.5) in cases (p = 0.04). The physiological model 4C showed a tendency to increase the water (69%) and a decrease in fat (11%). Muscle mass (17%) and bone mass (5%) remain stable.

Conclusion: This study showed that subjects with a history of malnutrition are at risk for nutritional disorders, particularly men's underweight and obesity in women. Further studies are needed to confirm this result for adults.

Keywords: Childhood Malnutrition- adult- wasted- Obesity- Body Composition

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INTRODUCTION: Recent publications showed that 45% of all deaths of children are attributed to malnutrition.

OBJECTIVE: To evaluate the mortality rate in a cohort of children being followed for moderate malnutrition in a rural area.

METHODOLOGY: This is a cohort study on children admitted at Buhandahanda Nutritional Center between 1995 and 2002. The enrollment of these subjects was carried from March to August 2018. Each child received SCB porridge (400 to 500 Kcal daily - 6 weeks). Clinical signs of morbidity were investigated daily (fever, diarrhea, vomiting, cough, dyspnea). Kaplan-Meier curve was plotted to estimate the probability of survival after admission, and log-rank test was calculated for the uni-variative analysis to compare probability of survival between different characteristics. The time-dependent Cox proportional hazard model was used for multivariate analyze after verification of the proportional risk hypothesis using the Schoenfeld Test.

RESULTS: In total, we identified 373 subjects in the database encoded at the time for 884 episodes (2.4 episode by child). The proportion of boys was 52.5%. The average age at admission was 50.7 months. We had a 3.0% rate of lost to follow-up. The survival after nutritional supplementation at the center in 1995-2002 is more than 85% in 2018. Our results did not find any significant differences in survival because of reasons for admission to the center (Log-Rank, p = 0.82). Forty deaths (5 during treatment and 35 post-treatment period) were recorded, giving an overall mortality rate of 11.0% (or 7.1 deaths per 1000-person years). We didn’t observe any factors associated with mortality (nutritional status, morbidity or socioeconomic factors). The causes of death was: Malnutrition (25%), Malaria (20%), convulsive diseases (13%), Gastroenteritis (8%), Anemia (8%), Diabetes (3%), Cancer (3%) and others (13%).

CONCLUSION: The mortality rate is low compared to that reported in others studies. Childhood diseases and convulsive diseases unaccounted for 74% of deaths. Other studies are needed to explore the relationship between childhood malnutrition and convulsive diseases.

Keywords: moderate malnutrition, mortality, convulsive diseases, DRC.

P045: CHILDHOOD MALNUTRITION AND OLFATORY SENSITIVITY IN ADULTHOOD: CASE OF RURAL SOUTH-KIVU, EASTERN DEMOCRATIC REPUBLIC OF THE CONGO: A CASE-CONTROL STUDY

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INTRODUCTION: Malnutrition is a public health problem in developing countries. The Democratic Republic of Congo is one of countries with a high rate of malnutrition. Malnutrition during childhood affects many human functions including the nervous system. The relationship between malnutrition and olfactory disorders in adulthood is poorly documented.

OBJECTIVE: To evaluate the olfactory sensitivity of young adults with a history of malnutrition during childhood.

METHODOLOGY: A case-control study involving 323 subjects (195 cases who attended the Buhandahanda nutritional center in Miti-Murhesa district health (Eastern D.R.Congo) between 1995-2002, and 128 controls recruited in the same villages as for cases, matched by age, sex and type of residence. The enrollment of the subjects was done between March and August 2018. We assessed the olfactory sensitivity in a subjective way through a questionnaire. The Pearson's test was used for comparison of proportions. with a significance level p = 0.05. A simple logistic regression model was constructed to determine the factors associated with olfactory disorders.

RESULTS: Females participants represented 49.3% and 49.6% of cases and controls respectively. The mean age in years was 19.2 (4.2) in cases and 19.0 (3.2) in controls, p = 0.43. In both groups, the prevalence of olfactory disorders was 74% in subjects with a history of malnutrition versus 66% in controls (p=0.15). The olfactory disorders observed in cases and controls are in descending order (cases / controls): cacoscia (47.7% / 46.9%, p=0.88), Parosmia (43.6% / 39.1, p=0.42) Phantosmia (42.6% / 42.2%, p = 0.94), Hyposmia (21% / 10.9%, p = 0.01), dysosmia (12.8 / 10.2, p = 0.46), and anosmia (7.2% / 7.0%, P =0.96). Only the proportion of hyposmia was significantly higher in the cases than in controls (p = 0.01). Also, the history of edema is the only factor associated with hyposmia OR=2.23(1.1-4.55), p=0.02.

CONCLUSION: Infant malnutrition predisposes to olfactory disorders and kwashiorkor is the most incriminated form. Other studies with objective assessment methods are needed to confirm this association.
Keywords: malnutrition, Olfactory sensitivity, hyposmia, D.R.Congo

P046: LIFESTYLE AND ENVIRONMENT AND TRANSGENERATIONAL HEALTH IN NIGERIA
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Introduction: Birth weight has been associated to the risk of NCDs in adult life. Many of the determinants of birth weight are related to maternal suboptimal nutrition and infants' deficiency of some essential trace elements such as copper (Cu), iron (Fe), manganese (Mn), selenium (Se) and zinc (Zn), and also to maternal environmental exposures to toxic pollutants such as cadmium (Cd) and mercury (Hg). Very low birth weight infants (VLBW, <1500 g birth weight) are particularly susceptible to deficiencies or toxicity of trace elements, due to their rapid growth, relatively low mineral stores at birth, poor absorption, excess intestinal and renal losses and high vulnerability to oxidative stress. There is paucity of information on the effect of environmental contaminants on somatic parameters.

Purpose of the study: We hypothesize that higher environmental contaminants (lead and other trace metals) and household pesticides) in the umbilical cord blood, will lead to worse birth outcomes and affect the physical growth of the children.

Methods/approach: Contaminants (As, Cd, Hg, Pb) and nutrients (Cu, Fe, Mn, Se, Zn) in cord blood of 30 low birth weight newborn (and 30 regular weight newborns as control) and serum of mothers were determined.

Results & Conclusions: Maternal diet, anamnestic data of mother and infant (pre, peri, post conceptional phases, caesarean or spontaneous delivery), lifestyle and other possible co-factors associated with maternal history (BMI, parity, age, diseases e.g. diabetes, hypertension, ... drugs e.g. antibiotics, ...) were also determined and specific interventions to improve health in pre, peri, post conceptional phases and protect newborns from increased risks of NCDs in adult life have been discussed.

P047: EFFECT OF SUB-CHRONIC ADMINISTRATION OF SYNRIAM (ARTEROLANE MALEATE AND PIPERAQUINE PHOSPHATE) ON SELECTED KIDNEY FUNCTION INDICES IN ALBINO RATS
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Introduction: Consequent upon the prevailing cases of malaria around the world and subsequent development of antimalarial drugs as regimen. The global prevalence of kidney failure due to drug toxicity is on the rise.

Purpose of the study: The study was conducted to investigate the toxic effect of sub-chronic administration of Synriam on the histology of the kidney and some biochemical indices of renal function in male albino rats, Rattus norvegicus at varying doses of the drug.

Methods: A total of 30 male rats, average weight 171g ± 12g were randomized into five groups, A (control), B, C, D and E (experimental groups), 6 rats in each group. They were fed with pelleted rat feed and clean tap water once daily. Group A was administered 0.2ml of distilled water while the other groups were respectively administered 4mg/Kg, 8mg/Kg, 16mg/Kg and 32mg/Kg body weight of Synriam daily for 28days. 24hours after the last administration, all the animals were sacrificed by jugular puncture and the blood of each animal was collected. The one way ANOVA was used for analysis at 0.05 significance level.

Result: Analysis showed that there was no significant difference (p>0.05) in their plasma urea and creatinine concentration among the test groups but there were significant increases (p<0.05) in their electrolytes concentrations when compared to the controls. There was a progressive deterioration of the kidney tissues with increasing dose of the test drug as opposed to normal kidney tissue in the control. The deterioration in the kidney suggests nephropathy and alteration in ultra-filtration, which is evident by the increasing concentration of electrolytes in the plasma.
Conclusion: The use of this drug within the range of doses appeared to cause increasing damage to the kidneys. Overdose for a long period of time may cause damage to human kidney, hence, strict compliance to prescription is advised.

Keywords: Toxicity, Synriam, sub-chronic, histology, kidney

SUB THEME: ADVOCACY, COMMUNICATION AND MOBILIZATION

P01: EFFECT OF EXTENSION APPROACHES ON THE ADOPTION OF GOOD COMPLEMENTARY FEEDING PRACTICES BY CAREGIVERS: A CASE OF KAMULI, NAKASONGOLA, AND APAC DISTRICTS OF UGANDA

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Introduction: Stunting currently affects 2.2 million (29%) of children under 5 years in Uganda. This is partly caused by the poor quality of complementary diets.

Objective: To assess the effectiveness of different extension approaches on the adoption of good complementary feeding practices.

Method: Participatory and farmer to farmer extension methods were used to improve knowledge and skills of 108 randomly selected caregivers on formulation of nutritious mixtures from locally produced foods in 3 districts of Kamuli, Apac and Nakasongola. Farmer to farmer extension approach involved trained caregivers training other caregivers on the different classes of foods and different ways of making food mixture formulations while the participatory approach involved researcher-caregiver interaction in training and engagement of caregivers in characterizing different foods and formulating nutritious mixtures. The formulated foods were analyzed for their sensory acceptability and nutritional composition in the Laboratory at the department of Food Technology and nutrition, Makerere University.

Results: Formulated food mixtures pre-intervention were generally low in protein (5.1±0.973%) and high in fiber (13.1±0.692%). Food mixtures formulated post intervention showed a significant increase in protein content (15.2±0.378%) and (14.01±0.11%) and a significant reduction in fiber content (5.6±0.816%) and (6.5±0.24%) for participatory and farmer to farmer extension methods respectively. There was no significant difference (P<0.005) in the sensory acceptability of pre and post intervention food mixtures.

Conclusion: Uptake of proper feeding complementary feeding practices by caregivers is affected by the extension method used.

Key words: Malnutrition, caregivers, complementary feeding, extension methods

P02: POLICY MAKER INVOLVEMENT IN SUSTAINABLE DIETETICS PRACTICE; THE CASE OF BUILDING AND STRENGTHENING NUTRITION CAPACITY IN MALAWI

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Introduction; Local-evidence-informed multi-sectoral, innovative, and targeted interventions are needed to manage the high burden of malnutrition in Malawi. Nutritional leaders must become erudite with principles and applications of the discipline of sustainable change by pursuing a purpose-directed, needs—based, planned and systematically processed long term change, based on scientific knowledge: whilst proactively managing any resistance to change. We present a case of a novel and successful multidisciplinary/sectoral approach in implementation of a five-year project in building nutrition capacity in Malawi, through training of the first ever Malawian dietitians.

Methods: The inception of the project required multiple stakeholder involvement; including engagement of local universities, directors of local hospitals, Ministry of Health-clinical services, HIV/AIDS and Nutrition and Human resource for health. The project aimed at training dietitians and developing an enabling environment to provide a sustainable career path within the public service. The multi-sectoral stakeholders were exposed to traumatic brain injury in-patient care (in hospital wards) and nutrition management practices (in absence of dietetic services) at a tertiary hospital in Malawi. Following which, the stakeholders visited an institution that mirrored an ideal setting of practice, to witness positive outcomes (length of stay, prognosis) in similar patients who would otherwise have a poor prognosis in Malawi.
Results: The multi-sectoral approach led the Malawi government to establish and assign dietitian positions in all tertiary hospitals, request development of clinical dietetic guidelines for practice and initiate efforts to include specialized nutrition support products in the country’s essential medicine checklist.

Conclusion: Promoting sustainable change requires comprehension of the views of those who will be involved in the change and the context or climate where the changes are occurring. The recipient-driven approach used has facilitated an increase in demand for clinical nutrition services therefore shifting the need for supply of these services to a national priority level.

Keywords: clinical nutrition practice, sustainable change, hospital malnutrition, nutrition capacity

**P03: “THEY WILL FEED THEN KILL YOU” FEARS LINKED TO COMMUNITY BASED FEEDING TRIALS IN RURAL MALAWI**

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Background: Zinc and selenium (Se) deficiencies are widespread in Malawi. Deficiency of Zn increases the risks of infectious disease and contributes to the burden of stunting. Deficiency of Se leads to sub-optimal thyroid function and has a range of consequences including impaired cognitive development in children. Biofortification may be a cost-effective strategy to reduce Zn and Se deficiencies. Agronomic biofortification of maize using micronutrient-enriched fertilisers is potentially a cost-effective strategy to address Zn and Se deficiencies among poorer, rural communities in Malawi. GeoNutrition project will conduct community based trials in Wimbe TA in Kasungu district in order to curb Zn and Se deficiencies. The project proposed blood and hair sample collection among school aged children in order to assess SE and Zn status before and after intervention.

Objective: To assess community perceptions of community based feeding trial.

Methods: Qualitative methods were used to gather information using focus group discussions (FGDs) 12 months prior to feeding trials. Six FGDs were conducted among males and females separately in three villages. Content analysis was used to analyze FGDs data.

Results: Both men and women in the sampled villages had mixed reactions on the feeding trials. While some indicated that they would consume the bio fortified maize meal because they trust that Malawi government approves safe interventions for human beings, others feared that their children will be infertile once they consume biofortified maize meal. Others feared blood and hair sampling, they felt it will be used for evil and they will die. Fear of social stigma was another issue, since the community members will consider them lazy because they are consuming free food.

Conclusion: Community members were willing to consume bio fortified maize meal. Intensive community sensitizations will create room for clarification of beneficiaries concerns to increase the success of the feeding trial.

Key words: Formative research, community mobilization, feeding trial, Selenium, Zinc and Biofortification.

**P04: FEARS LINKED TO COMMUNITY BASED FEEDING TRIALS IN RURAL MALAWI**

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Background: Community based trials can provide valuable evidence to assess effectiveness of agriculture to nutrition interventions. However, delivering trials in community settings is challenging especially in populations with little experience of research participation. Formative research to gauge community perceptions and potential areas of concern increases the chances of a successful trial.

Objective: To assess community perceptions of community based feeding trial.

Methods: Qualitative methods were used to gather information using focus group discussions (FGDs) 12 months prior to feeding trials. Six FGDs were conducted among males and females separately in three villages. Content analysis was used to analyze FGDs data.

Results: Both men and women in the sampled villages had mixed reactions on the feeding trials. While some indicated that they would consume the bio fortified maize meal because they trust that Malawi government approves safe
interventions for human beings, others feared that their children will be infertile once they consume biofortified maize meal. Others feared blood and hair sampling, they felt it will be used for evil and they will die. Fear of social stigma was another issue, since the community members will consider them lazy because they are consuming free food. **Conclusion:** Community members were willing to consume bio fortified maize meal. Intensive community sensitizations will create room for clarification of beneficiaries concerns to increase the success of the feeding trial. **Key words:** Formative research, community mobilization, feeding trial, Selenium, Zinc and Biofortification.

**P05: KNOWLEDGE, ATTITUDES, AND PRACTICES OF MOTHERS OF UNDER-5 CHILDREN ON INFANT AND YOUNG CHILD FEEDING IN RURAL COMMUNITY IN BURKINA FASO**

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**Introduction / Background:** Maternal and child under nutrition is the underlying cause of 3.1 million deaths and responsible of 35% of disease burden in children under 5 years. Poor infant and young child feeding (IYCF) practices are one of the proximate cause of malnutrition. In Bobo-Dioulasso, in the southwestern area of Burkina Faso, prevalence of wasting and stunting in under 5 children is 6% and 15.3%, respectively. This study aims to assess the knowledge, attitudes, and practices (KAP) of mothers on IYCF in rural community around Bobo-Dioulasso before the initiation of a communication intervention on optimal IYCF.

**Methods:** A cross sectional study was conducted in January 2017 and included 245 randomly selected mothers. Information was collected using the FAO 2014 guidelines for assessing nutrition-related Knowledge, Attitudes and Practices.

**Results:** More than half (57.1%) of participating mothers were younger than 30 years (SD: +/- 6) and 59.2% of them were illiterate. Mothers have on average three children. In addition had 92% of children were under 24 months. Mothers of under-5 children have good knowledge about exclusive breastfeeding up to 6 months (86.9%) and the benefits of colostrum (91.8%). In addition, almost (98%) all mothers reported that they breastfed their children at birth. About 73.8% of mothers with infants under 6 months gave supplemental water to their infants. In multivariate analysis, illiterate mothers were less likely to have appropriate feeding practices as compared to mothers with at least secondary school education.

**Conclusion:** Participating mothers had good knowledge on IYCF in this area of the country; however, most of mothers with infants under 6 months practiced suboptimal feeding with provision of supplemental water. Education level of mother was a determinant of their feeding practices.

**KEY WORDS:** Infant and young child feeding; Knowledge, attitudes, practices; Mothers of under-5 children; Burkina Faso

**P06: EFFECTIVENESS OF NUTRITION/HEALTH BEHAVIOR CHANGE COMMUNICATION TRAINING, MICRONUTRIENT SUPPLEMENTATION AND LIPID-NUTRIENT SUPPLEMENTS TO IMPROVE CHILD HEALTH IN KENYA**

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**Background:** Despite robust economic growth in the recent decades, 48% of Kenya’s children under five years are chronically malnourished, i.e. stunted. Levels of anemia are increasing with 70 percent of children under five years being affected and Kenya has one of the highest under-5 mortality rates in Sub-Saharan Africa. Nearly half of these deaths (43%) account to mild and moderate malnutrition, another 11% are related to severe forms of malnutrition. Stunting in linear growth occurs mainly during the first 1000 days, from conception through 24 months of age. In recognition of this critical period, there have been few evaluations of the growth impact of interventions that cover most of this window.

**Objectives:** The objective of this study was to evaluate home fortification approaches for preventing maternal and child undernutrition within a community-based health program through Ministry of Health and One Acre Fund
Partnership. The research hypothesizes that folic acid and small-quantity lipid-based nutrient supplements (LNS) provided to women during pregnancy and the first 6 months postpartum, LNS provided to their offspring from 6 to 24 months of age, or both would result in greater child length-for-age z score (LAZ) at 24 months than iron and folic acid (IFA) provided to women during pregnancy and postpartum plus micronutrient powder (MNP) or no supplementation for their offspring from 6 to 24 months.

**Design:** We conducted a cluster-randomized effectiveness trial with 2 arms: 1) women and children both received LNS (LNS-IFAs group), 2) women received IFAs (IFA group). IFA-group was our control. We enrolled 600 women at 20 weeks of gestation within 10 clusters, each comprising the supervision area of a Community Health Volunteer. Data was collected electronically using Mobile Application and extracted into excel spread sheet for cleaning before analysis. Analyses was primarily performed by using ANCOVA F tests and Tukey-Kramer-corrected pairwise comparisons. Home fortification with small-quantity LNS, during the first 1000 days was analyzed to show any improvement on child linear growth and head size in Siaya County. **Results:** Infants in the LNS-IFAS group had higher birth weights (2629 ± 408 compared with 2588 ± 413 g; P = 0.007), weight-for-age z scores (-1.48 ± 1.01 compared with -1.59 ± 1.02; P = 0.006), head-circumference-for-age z scores (HCZs; -1.26 ± 1.08 compared with -1.34 ± 1.12; P = 0.028), and body mass index z scores (-1.57 ± 1.05 compared with -1.66 ± 1.03; P = 0.005) than those in the IFA group; in adjusted models, the differences in length (47.6 ± 0.07 compared with 47.4 ± 0.04 cm; P = 0.043) and LAZ (-1.15 ± 0.04 compared with -1.24 ± 0.02; P = 0.035) were also significant. LNS-IFAs reduced the risk of newborn stunting (18.7% compared with 22.6%; RR: 0.83; 95% CI: 0.71, 0.97) and small head size (HCZ < -2) (20.7% compared with 24.9%; RR: 0.85; 95% CI: 0.73, 0.98). The effects of LNS-IFA on newborn stunting were greatest in infants born before a 10-weeks interruption in LNS-IFA distribution (n = 137; 15.7% compared with 23.6%; adjusted RR: 0.69; 95% CI: 0.53, 0.89) and in infants born to women ≤24 y of age or with household food insecurity.

**Conclusion:** Prenatal lipid-based nutrient supplements can improve birth outcomes in Kenyan women, especially those at higher risk of fetal growth restriction

**Keywords:** Iron and Folic Acid, Lipid-based nutrient supplements, head circumference, mid upper arm circumference, low birth weight, newborn stunting, birth outcomes, effectiveness.

**P07: COMMUNITY MANAGEMENT OF MODERATE ACUTE MALNUTRITION USING FOOD VOUCHERS IN FAR NORTH CAMEROON**

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**Introduction:** The ongoing instability in the Far Northern region of Cameroon has weakened the health system, limiting the ability of health facilities to provide treatment for all children with acute malnutrition.

**Purpose:** USAID funded Helen Keller International (HKI) to test an innovative food voucher program designed to treat moderate acute malnutrition (MAM), as a preventive measure to reduce the number of children visiting health facilities for SAM treatment.

**Approach:** Families of children under 5 with MAM identified in mass screenings were referred to the nearest health facility for confirmation, counseling on feeding and hygiene practices and receipt of a two-week supplementary food voucher redeemable with local vendors. A market assessment was used to identify locally available nutrient-rich foods, which informed the content of the food basket covered by the voucher. Caregivers were instructed to return the child to the health facility every two weeks for three months for examination, counseling and to receive the next voucher. Community health workers (CHWs) conducted home visits to reinforce counseling messages and cooking demonstrations on how to prepare nutritious meals for children.

**Results:** Overall, 517 facility and community health workers were trained in the prevention and management of MAM and 43 vendors were approved to redeem vouchers. CHW made 5,038 home visits and over 1,300 cooking demonstrations to 47,160 participants (30,773 female; 16,387 male). Almost 2,000 children with MAM were enrolled and the recovery rate was 96.8% for a period of three months.

**Conclusions:** This pilot showed that a voucher strategy planned and implemented by local actors, building on existing health capacity and food markets can support rehabilitation of MAM among children.
P08: EFFECT OF NUTRITION EDUCATION ON FOOD LABEL USE AND UNDERSTANDING AMONG UNIVERSITY OF IBADAN UNDERGRADUATE STUDENTS
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Background: Food labels provide information on the nutrient content of food products to promote healthy food choices. However, studies have shown that poor understanding and use of food label among Nigerian adults contribute to increased risk of diet related non-communicable diseases.

Objective: To assess the effect of nutrition education on the understanding and use of food labels among University of Ibadan undergraduate students.

Design: This quasi-experimental study involved 240 University of Ibadan undergraduate students aged 18-35 years. Respondents were classified into intervention (120) and control (120) groups based on their halls of residence using simple random sampling. A lecture-based intervention on food labels was conducted for the intervention group for four weeks. Food label knowledge, and use were assessed using a self-administered, semi-structured questionnaire at Pre- and post-intervention. Knowledge was classified into poor (0-5), fair (6-10) and good (11-16). Independent t-test was used to compare groups while Paired t-test was used to compare pre and post-test results with p<0.05.

Results: About 90% of participants in both groups purchased packaged foods and 85.0% were aware of food labels. Taste (37.5%; 40.0%) and price (31.7%; 36.7%) constituted major influences on purchasing decisions in control and intervention groups respectively. At baseline, name of food (82%; 79%) and best before date (64%; 72%) were the most frequently read label information in control and intervention groups respectively. Knowledge significantly increased from 9.07±2.71 to 13.68±2.08 and students with good knowledge increased from 25.8% to 91.7% in intervention group as against 8.40±2.95 to 8.46±2.95 and 25.8% to 21.7% in the control group. Food label use was 83.3% at baseline and end-line for the control group but increased from 86.7% to 89.2% in the intervention group.

Conclusion: Lecture-based nutrition education increased the food label understanding and use among University of Ibadan undergraduate students.

Keywords: nutrition knowledge, food label, perception, food choice, nutrition education

P09: CARE GROUP MODEL, WHERE ARE WE GETTING IT WRONG?
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Introduction: Dietary diversity (DD) increases nutrient density of complimentary foods. Nutrition education that incorporates cooking sessions improves adoption of dietary diversity. The care group (CG) model was adopted in Malawi to accelerate recommended infant and young child feeding (IYCF) practices.

Purpose: This study was conducted to assess IYCF knowledge and practices, and determine factors that affected implementation of recommended IYCF practices among caregivers under a CG in Lilongwe.

Methods: A cross sectional study reached 180 caregivers of children aged 6-23 months in 8 randomly selected CGs which had been operational for at least a year using a structured questionnaire and 24 hour recall. Data were analysed in SPSS drawing correlations between variables and WHO-IYCF indicators.

Results: Most caregivers (87%) knew the correct feeding frequency and definition of exclusive breastfeeding but only 46% knew about DD. Health surveillance assistants (HSAs) were the main source of information and not the LV. 87.7% of children achieved minimum meal frequency (MMF), 25% minimum dietary diversity (MDD), and 25% minimum acceptable diet (MAD). 65% of caregivers had been visited at home by a lead volunteer (LV). The purpose of home visits included talk about feeding children (56%), check sanitation facilities (35%) and inform about group sessions (9%). Only 22% had ever attended group sessions but no cooking sessions were conducted. Among those that never attended group sessions, 65% reported not being aware, 21% not interested and 13% indicated timing not suitable.

Knowledge of MMF influenced practice (r=0.169, p< 0.05), while knowledge of DD did not influence MDD (r = 0.001, p > 0.05). DD was not different between those that attended group sessions and those who did not at p=0.05.

Conclusion/recommendation: Knowledge of IYCF recommendations was high but low practice. The study recommends proper community mobilisation for group and cooking sessions to improve DD.
**P010: FACTORS INFLUENCING PARENTS’ CHOICES OF CHILDREN’S PACKED MEALS**

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**Background:** Meals consumed at school contribute significantly to children’s dietary intake. Concerns have been raised on the quality of packed meals. Recent studies show that children lunch boxes mainly contain energy dense food items such as crisps and chocolates and very little nutrient-dense items like fruits and vegetables. Several factors are cited as drivers of nutritional quality of the food children eat while at school.

**Purpose:** To describe factors influencing parents’ choice of preschool children’s packed meals in Gaborone.

**Method:** It was a cross sectional study. Purposive sampling was used to select 100 participants from schools in Gaborone, who were primary caregivers of pre-schoolers.

**Results:** The findings revealed that most respondents regularly packed energy dense snacks such as chips and fried extruded maize snacks (61%), fizzy/diluted drinks (50%), amongst parents who often packed sandwiches the filling was usually margarine or jams (50%), processed cheese (29%) and processed meats (29%). Amongst the factors rated as “always important” in parents’ choice of packed meals were preparation time (66%) and the child’s interest (34%). Other factors that parents considered were price (62%) and dietary requirement (52%). Some factors that were not considered important included the brand names (53%), reading food label (37%), and ingredients (70%) by a significant proportion of parents.

**Conclusion:** On the basis of results, it is concluded that preschool children’s parental choices are a big factor, particularly when children are prepared packed lunch from home. It is recommended that schools should have policy on packed meals and there is need advocacy to parents on nutrition quality of packed meals to school and its importance.

**Key words:** packed meals, nutrition knowledge, nutrition quality

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**SUB-THEME: DATA GENERATION AND KNOWLEDGE SYSTEM**

**P01: BREAKFAST EATING HABITS AND ANTHROPOMETRIC CHARACTERISTICS OF PUBLIC PRIMARY SCHOOL CHILDREN IN ILORA, OYO STATE**

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**Background:** Regular breakfast consumption among school-aged children contributes to decreased risk of obesity and chronic diseases, improved cognition and improved nutrient intake. However, studies showed that breakfast consumption among school-aged children is declining globally and fast food consumption is increasing with consequences on learning ability.

**Objective:** This study was therefore designed to assess the breakfast eating habits and anthropometric characteristics of public-school pupils in Ilora, Oyo State, Nigeria.

**Design:** This descriptive cross-sectional study involved three-stage sampling procedure to select six out of 12 public primary schools and 568 pupils using simple random and total sampling respectively.

**Methodology:** A semi-structured, interviewer-administered questionnaire was used to collect socio-demographic characteristics and breakfast consumption information. Weight and height were assessed using standard procedures and analysed using World Health Organization Anthro plus software to obtain the BMI-for-age. Data were analyzed using descriptive statistics and Students t-test at p<0.05.

**Results:** Mean age of pupils was 11.10±1.53 years, 51.9% were females, 97.0% were Yoruba, and 66.5% lived with both parents. Most pupils (90.8%) ate three times daily, 82.6% often ate before going to school, 74.6% ate breakfast before 8.00am and 7.2% always skipped breakfast. Majority of the pupils (72%) preferred rice as breakfast and ate it on the study day. Prevalence of underweight and overweight/obese was 29.7% and 1.1% respectively. There was no relationship between breakfast consumption and Body Mass Index (BMI) of the pupils (p-value = 0.310). Breakfast consumption did not have an effect on the anthropometric characteristics of the respondents (t=1.015, p>0.05).

**Conclusion:** Breakfast consumption among public primary school pupils in Ilora is high, yet underweight constitutes a public health problem among the school pupils. There is no association between breakfast consumption and anthropometric of the pupils, further studies are recommended to provide information on the nutrient adequacy of breakfast consumed.
**Keywords:** Breakfast, eating habits, anthropometric characteristics, primary school children

**P02: ASSESSMENT OF NUTRITIONAL STATUS, KNOWLEDGE, ATTITUDE AND PRACTICES OF INFANT AND YOUNG CHILD FEEDING IN KUMBOTSO LOCAL GOVERNMENT AREA, KANO STATE, NIGERIA**

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**Introduction/Background:** Optimal infant and young child feeding (IYCF) is a prerequisite for good child nutrition, health and development. Despite high burden of malnutrition, there is limited data on the nutritional status, knowledge, attitude and practices of IYCF in Kano State, Nigeria.

**Purpose of Study:** This study assessed caregiver’s knowledge, attitude and practices (KAP) of IYCF and nutritional status of children 0-59 months in Kumbotso Local Government Area (KBTLG), Kano State, Nigeria.

**Methods:** It was a descriptive cross-sectional study which randomly sampled 270 pairs of children 0-59 months old and their caregivers. Data were collected using modified KAP questionnaire developed by the Food and Agricultural Organisation of the United Nations (FAO-UN).

**Results:** Majority (51.1%) of the caregivers are 25-34 years old, 53.7% of caregivers have secondary school education as highest level of formal education. Only 23.7% of mothers initiated breastfeeding (BF) within one hour of birth. While 46.7% of caregivers studied have knowledge of exclusive breastfeeding (EBF), only 15.4% practice EBF. Only 3.3% of the caregivers have knowledge about appropriate complementary feeding practices and 19.26% started complementary feeding at the right time. Only 26.63% of children between 6-59 months of age have adequate dietary diversity. There was 11.35% reported intake of meat/meat products and 15.7% of milk/milk products based on 24-hr recall. Less than half (48.7%) consumed fruits and vegetables. Handwashing before cooking is practiced by 39.63% of the caregivers while 11.48% practices handwashing before feeding child. There was a significant positive relationship between knowledge of BF and BF initiation (r=0.288), practice of EBF (r=0.445) and place of child delivery (r=0.547).

**Conclusion:** Based on the results of this study there appear to be poor nutrition KAP among caregivers of children under 5 years in KBTLG and call for more interventions towards behaviour change for improved IYCF practices.

**Keywords:** Infant and young child feeding practices, breastfeeding, complementary feeding, handwashing, nutritional status, knowledge attitude and practice (KAP).

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**P03: OVERVIEW OF RURAL STORAGE SYSTEMS AND CORRELATION TO NUTRITION IN THE FEDERAL CAPITAL TERRITORY ABUJA NIGERIA.**

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**Introduction:** Agriculture is the single most important innovation in human history. Over the course of thousands of years, it has staved off hunger, allowed populations to leave their hunter-gatherer lives behind and improved in the cultivation and the storage systems that have brings about food systems. While, our current food and agricultural system is falling woefully in short. In 2017, 821 million people were undernourished. About 151 million young children (under the age of five) were too short for their age. One third of women were anemia. And the global obesity epidemic shows no signs of stopping. The important contributory factors are being observed as the poor preservation. Different Children who are undernourished, when they are young end up starting school later, don’t complete as many grade levels, and also earn less as adults. Worse yet, these statistics translate into misery for people who do not even exist yet: poorly-nourished women give birth to poorly-nourished children, perpetuating a downward cycle.

**Purpose of the study:** This study look at the different storage practices, the nutrition practices, farming activities, transportation systems in most of the rural areas in the six areas council of the Federal Capital Territory, Abuja and suggest, good storage systems which will promote a food and quality diet and reduce starvation and too recommends
an innovational design storage systems for the farmers and effective extension services of nutrition management systems for the populace.

**Methodology:** Farm visit, market and household were made into the different areas council too ascertained the different preservation methods, storage facilities available, different focus group discussion were made, pictures were taken too ascertain the different findings on the field.

**Results:** We found out that there are different silo systems, in which different community used to store their crop produces, some dry their agricultural produce on the floor, the information of postharvest management of preservations are lacking, some of the people that we discussed with says that they have not hear any information on nutrition’s plans. The household nutrition’s management was lacking. Most farmers do not take into consideration of the nutrition’s needs of the populace before planting and the different methods of storage and transportation systems of Agricultural products were bad and its affect the nutritional intake of the populace.

**Conclusion** Then the nutrition’s practitioners should spread the information of preservation of food systems, help in improving the nutrition, through cultivation of land and promotion of livestock systems and have a national nutrition plans and investment in the integrating agriculture – nutrition’s farming with transportation activities, link into different nutrition operational strategies, improve the design and implementation of nutritionals programs and policies, helping to reshape the agricultural and food system, and achieve better nutrition for the world’s and most of the vulnerable people. And more of the professional in the agriculture-nutrition field and agriculture – nutrition nexus and step out with nutrition messages by the nutritional’s professionals and fabricators should be able to design silos for good storage systems.

**Keywords:** Agriculture, Nutrition’s, Farmers, Silos, Federal Capital Territory.

**P04: EATING HABIT, NUTRITIONAL STATUS AND EFFECT OF NUTRITION EDUCATION ON NUTRITION KNOWLEDGE OF MEDICAL STUDENTS IN A NIGERIAN UNIVERSITY

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**Introduction:** Good nutrition knowledge is important to healthy food choices and habit among students, with improved nutritional status and health. Nutrition education is a viable tool for improving nutrition knowledge, facilitate dietary behaviour change, as well as medium to deliver nutrition information among students.

**Purpose of the study:** Good nutrition knowledge and practice promote good nutritional status and educational attainment. Medical students, as would-be health professionals require good nutrition knowledge to counsel patients correctly, hence the need to assess their food habit, nutritional status, and effect of nutrition education on their nutrition knowledge.

**Methodology:** This descriptive cross-sectional study involved a total of 202 consenting 500 and 600 Level Medical students of University of Ibadan, Nigeria. Information on socio-economic and demographic characteristics, nutrition knowledge, eating habit, food frequency, 24-hour dietary recall and anthropometric parameters of respondents were collected using pre-tested, semi-structured, self-administered questionnaire pre- and post-intervention. The 500 Level students (experimental group) was given nutrition education while 600 Level students served as control. Data were analysed using descriptive statistics, Chi square test and regression at 5% level of significance.

**Results:** Mean age of respondents was 22.68±2.37years. Many (49% 500L, 39% 600L) respondents skipped breakfast and snacked in-between meals. Mean nutrient intake of experimental group was higher than that of control. Most respondents had inadequate intake of vitamins and minerals, 4.9% & 7% were overweight, 69.6% & 82% had normal weight, 23.5% & 7% were overweight, and 2% & 4% were obese in experimental and control groups respectively. No significant difference was observed in knowledge score of both groups pre-intervention (p>0.05), while experimental group had significantly higher score post-intervention (p<0.05).

**Conclusion:** Nutrition education significantly improved nutrition knowledge and eating habit of the medical students, hence, cascading this intervention among other levels of medical training will improve their nutritional habits and status considerably.

**Keywords:** Nutrition education, Nutritional status, Eating habit, Medical students.

**P05: FEEDING PRACTICES AND NUTRITION STATUS OF UNDER-FIVE (6-23 MONTHS) IN EKITI STATE, NIGERIA

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Background and Objective: Appropriate feeding practices are central to reducing morbidities and mortalities in under-5 children. This study assessed the Feeding Practices and Nutrition Status of under-five children (6-23 months) in Ekiti State, Nigeria.

Methods: The study design was descriptive cross sectional. Sample size of 321 Mother-child pairs was selected through probability sampling methods. A pre-tested semi structured questionnaire was administered to obtain information on socio demographic characteristics, exclusive breastfeeding (EBF) knowledge, minimum dietary diversity (MDD) and minimum meal frequency (MMF). Anthropometric variables were measured by standard methods. Weight-for-age (WAZ), Height-for-age (HAZ), and Weight-for-height (WZH) were determined using the WHO ANTHRO 2005. Descriptive statistics, Chi-square and correlation were performed on the data at 5% level of significant.

Results: The mean age of the mothers and children were 29.62±7.10 years and 14.64±5.24 months respectively. Half of the mothers had secondary education (49.7%) and majority (76.2%) earned less than N10000 monthly. The prevalence of Stunting, Underweight, and Wasting were 12.8%, 16.5% and 11.5% respectively. Mothers who understood the meaning exclusive breastfeeding were 71%. Children who met the recommendation for MDD were 67.9%, whilst children aged 9-17months who ate less than MMF were 68.8%. Mothers’ high knowledge score on the importance of EBF and MDD did not reflect much on the nutritional status of the children.

Conclusion: Prevalence of stunting, wasting and underweight were high among the under-five and the total number of women who applied appropriate water safety practices were less than optimal.

Keywords: Dietary diversity, Complementary feeding, Breastfeeding, Nutritional status, Feeding practices.
Background: Evidence has shown that inappropriate complementary feeding practices lead to stunting. The minimum acceptable diet among infants and young children 6-23 months in Uganda is at 14% while in tooro region it is at 8.8%. Complementary feeding practices have been neglected in the implementation of the infants and young child feeding policy.

Objective: The main objective of the study was to determine the prevalence of appropriate complementary feeding practices and associated factors among infants and young children 6-23 months in fort portal Municipality Kabarole Uganda.

Methods: A community based cross-sectional study was conducted among 206 mothers/caretakers of infants and young children 6-23months using both quantitative and qualitative methods. Probability proportionate to population size sampling technique was used to select the study subjects. A pretested standard WHO questionnaire for assessing infant and young child feeding indicators was adopted for assessing complementary feeding practices. Appropriate complementary feeding was defined as attaining both minimum meal frequency and minimum dietary diversity in the last 24hours. Prevalence ratios and there 95% confidence intervals were generated. Modified poisson regression model was used to generate factors associated with appropriate complementary feeding. Five Focus Group Discussions were conducted to capture participants’ perceptions on appropriate complementary feeding practices.

Results: The prevalence of appropriate complementary feeding was found at 21.4%. Having a formal employment (PR: 7.05; CI: 1.69–29.36), Cohabiting (PR: 2.15; CI: 1.10 – 4.18), and having no child illness (PR: 1.85; CI: 0.88 – 4.35) were associated with appropriate complementary feeding. Qualitative results showed inadequate information and low income as major challenges towards appropriate complementary feeding.

Conclusion: Low appropriate complementary feeding practices of infants and young children 6-23 months was observed. Unless interventions such as; health services access and enterprises for women are put in place the inappropriate complementary feeding practices are unlikely to change.

Key words: Complementary feeding, infants and young children and associated factors.

P08: EFFECT OF FEEDING PATTERNS ON THE MANAGEMENT OF SEVERELY MALNOURISHED CHILDREN UNDER FIVE YEARS ENROLLED IN NUTRITION INTERVENTION CENTRES IN NORTHERN KATSINA STATE, NIGERIA: STRATEGIES FOR IMPROVEMENT.

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Background: Nigeria’s rate of acute malnutrition is among the highest in the world, largely caused by poor family feeding patterns. Nutrition intervention centres (NRCs) are located in eleven (11) states, all in northern Nigeria, with the greatest burdens, where children having Severe Acute Malnutrition (SAM) are managed according to WHO protocol, with Ready to Use Therapeutic Foods (RUTF). Several years after the introduction of Community Management of Acute Malnutrition (CMAM), the rate of SAM is not only extremely high in those states, but is also on steady increase. Katsina is one of those states. It has acute malnutrition rate of 24.3%.

Objectives: To determine the effect of therapeutic and family feeding pattern on the treatment of severely malnourished children under five years, enrolled as in-patients in Nutrition Rehabilitation (stabilization) centres in Katsina State.

Design: A cohort study was conducted on a sample of 84 in – patient SAM children in northern Katsina State, selected through multi-stage random sampling. Anthropometric measurements were used to determine treatment outcomes, 24 hour recall and food frequency questionnaire were used to determine the baseline and post- intervention child feeding patterns from their caregivers, and a 4-point scale questionnaire was given to the health workers to determine RUTF feeding patterns, nutrition-counselling practices, follow up practices and challenges encountered.

Results: Very few SAM children attain full recovery. Family feeding patterns did not change after discharge of SAM patients. RUTF feeding patterns are negatively affected by frequent stock outs, abrupt closure of some centres, sales and abuse of RUTF by caregivers.

Conclusion: Family feeding patterns are unaffected by nutrition counselling. Dietary counselling should be strengthened. Nutrition experts should be involved in the centres rather than nurses and social workers. Government should be highly committed to SAM management.
**P09: EFFECTS OF ROASTING TEMPERATURE AND TIME ON SESAME LIGNAN CONCENTRATION IN MIDLANDS PROVINCE SESAME SEEDS, ZIMBABWE.**

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**Background:** There is inadequate information on the effects of roasting temperature and time on sesame lignan concentration in Midlands Province, Zimbabwe hence the need to do an investigated.

**Objective:** To determine the optimum roasting temperature and time which gives the highest sesame lignan concentration.

**Design:** Study was quantitative in nature. Two brown and two white sesame varieties were conveniently purchased. These were combined to form two composite samples. Quartering procedure was used for mixing. 50g of each sample was roasted at (140°C and 180°C) for 20, 25, and 30 minutes. Lignans were extracted using solvent extraction method and separated by chromatography. All experiments were carried out in triplicate. Statistical analysis was performed using SAS software, GLM procedure. Significance of difference of means at 5% level was determined using one way ANOVA and Tukey test.

**Results:** When exposed to roasting the sesamin concentration increased significantly (P<0.05) in both varieties when roasted at 180°C for 30 minutes with highest concentration being 610.29mg/g and 111.83mg/g in white and brown variety respectively. There was also a significant difference (P<0.05) in sesamolin concentration of unroasted white sesame with 7.22mg/g compared to brown with 18.91 mg/g. However, there was no significant increase (P>0.05) in the sesamolin concentration as the roasting time and temperature increased. As the roasting time and temperature increases sesamol concentration also increases with brown variety having more sesamol concentration of 0.22mg/g at 180°C for 30 minutes.

**Conclusions:** The highest sesamin and sesamol concentration in both varieties is achieved after roasting at 180°C for 30 minutes. Zimbabwean populace may benefit since sesame can be easily incorporated in the diet in levels that are beneficial for human health.

**Keywords:** Sesame seeds, Roasting temperature, Roasting time, lignans, Zimbabwe.

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**P010:**

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**P010: EFFECTS OF ROASTING TEMPERATURE AND TIME ON SESAME LIGNAN CONCENTRATION IN MIDLANDS PROVINCE SESAME SEEDS, ZIMBABWE.**

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**Keywords:** Sesame seeds, Roasting temperature, Roasting time, lignans, Zimbabwe.

**P011: ANTHROPOMETRIC ANALYSIS OF UNDERGRADUATES FOR OVERWEIGHT AND OBESITY IN EKETI STATE, NIGERIA**

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**Introduction:** Overweight/obesity during young adulthood leads to lifelong adverse health consequences. The structuring of private university campuses in Nigeria promotes students’ physical inactivity.

**Objectives:** This study was designed to assess the prevalence and determinants of overweight and obesity and level of hypertension among undergraduates.

**Material and Methods:** Afe Babalola University, Ado-Ekiti, Nigeria was used for this cross-sectional study. A sample of 312 students was used. Data on age, gender, monthly allowance; feeding pattern and physical activity were collected using a pretested self-administered questionnaire. Height and weight were measured and used to calculate the Body Mass Index categorized as underweight (BMI<18.5), normal (BMI=18.5-24.99), overweight/obesity (BMI≥25.0). Waist-hip-ratio (WHR) was obtained from waist circumference (WC) and hip circumference. Blood pressure was measured using an electronic blood pressure monitor with memory. Hypertension was defined as systolic blood pressure (SBP) ≥ 140 mmHg and diastolic blood pressure (DBP) ≥ 90 mmHg. Chi square test was used to established association between variables at 5% level of significance.

**Results:** The mean age of the students was 19.34 years ± 2.23; 27.7% male and 19.6% female received monthly allowance of ≥N40,000.00. Breakfast meals was skipped by 88.2% male and 91.6% female. Exercise was done daily by 19.1% male and 11.4% female. Overweight/obesity prevalence was 25.9% and 39.7% in male and female respectively. The WC and WHR showed that 3.2% and 0.0% male and 15.9% and 21.4% female were respectively at risk. SBP and DBP was higher in overweight/obese than normal participants. Monthly allowance and consumption of carbonated drinks were associated with obesity.

**Conclusion:** There was skipping of breakfast meal, high prevalence of overweight/obesity which was higher in females; BP was higher in males and associated with BMI. Nutrition Education is recommended.

**Key words:** overweight, obesity, meals, blood pressure, university students

**P012: NUTRITION KNOWLEDGE AND BODY MASS INDEXES OF FEMALE BANKERS IN IJEBO ODE LGA, OGUN STATE NIGERIA**

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**Introduction** Challenges such as overweight, poor feeding practices, sedentary nature of work, amongst others are being faced by female bankers.

**Purpose of study** This study assessed nutrition knowledge and body mass indexes (BMI) of female bankers in Ijebu-ode local government area (LGA) of ogun state, Nigeria.

**Methods** Descriptive design using purposive sampling technique was used in selecting 112 female bankers from 17 banks in the study area. Bathroom weighing scale, heightometer and a validated questionnaire were used as instruments for gathering data for the study. Knowledge and practice scale of 0-1.0 was adopted and categorized as high: ≥ 0.70, average: 0.4-0.69 and poor: 0-0.39. Calculated BMI was classified in accordance to WHO, 2015 and statistical data were analyzed using descriptive statistic and Pearson Product Moment Correlation (PPMC). Participants possessed high nutrition knowledge (≥ 0.70) on the following; meaning and classes of nutrients (0.98±0.16), examples of each classes of nutrients (0.95±0.212), functions of each classes of nutrients (0.74±0.36),
good nutrition and adequate diet (0.96±0.19), causes of undernutrition(0.76±0.32), factors predisposes obesity(0.72±0.60). Digestion of each nutrients (0.69±0.47) was averagely scored by the participants. Results also revealed that 2.7%, 17.9%, 62.5% and 17.0% were underweight, normal weight, overweight and obese respectively. Whilst a non-significant (0.85> 0.05) negative relationship (r=-0.18) existed between nutrition knowledge and BMI of the respondents, the relationship that exists between the BMI and marital status of the participants was significant (0.000<0.05) and positive (r=0.357).

**Conclusion and recommendations** Participants possessed high nutrition knowledge but could not adequately consume healthy food, resulting to overweight among them. Healthy eating habit among female bankers should be encouraged those with disordered body mass indexes should also be monitored.

**Key words**: Nutrition knowledge, Body Mass Indices, female bankers.

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**P013: IMPACT OF SEASONAL MALARIA CHEMOPREVENTION ON MALNUTRITION AMONG CHILDREN AGED 3 TO 59 MONTHS IN BAFOULABÉ AND KITA IN MALI.**

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**Background**: The underlying causes of undernutrition are seasonal. Malnutrition coexists with Plasmodium falciparum malaria. They have a marked seasonality and concomitant peaks during the rainy season. Seasonal malaria chemoprevention (SMC) prevents malaria and is associated with reducing risk of malnutrition and weight gain in children. Thus the present study aimed at assessing the prevalence of malnutrition and its seasonal variations in children aged 3-59 months and the effect of SMC on malnutrition in Bafoulabé and Kità was conducted.

**Methods**: Two cross-sectional cluster sampling surveys were conducted in Bafoulabé and Kità districts at the during the rainy season (July 2014) and after the rainy season (December 2014) among children aged 3-59 months. SMC was implemented in the Kità Test District from August to November 2014. Logistic regression was used to assess the effect of SMC on nutrition indicators using the difference-in-differences method.

**Results**: After of rainy season in Kità, the prevalence of wasting decreased by almost half to 8.8% (95% CI:5.2-12.4), and did not decrease in Bafoulabé, 13.7% (95% CI:8.1-19.2), which corresponds to a reducing effect of SMC of 10% (OR = 0.41, 95% CI:0.19-0.62, p=0.031). There was reduction in the prevalence of stunting in both districts, 20.8% (95% CI:15.9-25.6) in Bafoulabé and 18.7% (95% CI:11.9-25.5) in Kità. It was the same for underweight with 13.7% (95% CI:10.9-16.4) in Bafoulabé and 13.0% (95% CI:8.9-17.0) in Kità. Implementation of SMC had no significant effect on stunting OR = 1.45 (95% CI:0.76-2.77;p=0.25) and underweight OR = 1.23 (95% CI:0.77-1.96;p=0.37).

**Conclusion**: SMC has contributed to reducing the prevalence of wasting. The nutritional status of the children was related to seasonality remains problematic.

**Key words**: Emaciation, stunting, underweight, chemoprevention of seasonal malaria, Bafoulabe, Kità.

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**P014: EFFECT OF FORTIFIED NUTRITION PROGRAMME ON PRODUCTIVITY OF FEMALE TEA LEAF PLUCKERS IN MALAWI: A COMPARATIVE STUDY**

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Background: Malawi is second largest tea producer after Kenya in Africa and tea production can be affected by nutrition status of workers. The nutrition status of workers indicates the amount of work effort and effect productivity.

Objective: To compare productivity of female tea pluckers participating in the fortified nutrition programme with non-participants.

Methods: The study compared Lujeri tea estate which implemented the fortified nutrition programme with Naming’omba tea estate which never implemented the programme. It involved 262 female tea pluckers (148 Lujeri and 114 Naming’omba). Weight and height were measured using standard protocols. Energy and nutrient intake were estimated using an interactive 24 dietary recall. Dietary diversity and plucking productivity were also collected.

Results: In both tea estates >70% of female pluckers had normal nutrition status (22.8 kg/m² Lujeri and 22.3 kg/m² Naming’omba). Energy intake was adequate at Lujeri (2672 kcals/day) whilst at Naming’omba it was inadequate (1687 kcals/day). There were significant differences on intake of macronutrients with Lujeri consuming more than Naming’omba (p<0.001). Among micronutrient intakes, vitamin A, folic acid, iron and zinc were adequate among all pluckers at Lujeri whilst iron and zinc intakes only were adequate among pluckers at Naming’omba. There were significant differences on intake of selected four micronutrients with Lujeri consuming more than Naming’omba tea estate (p<0.001). More female pluckers achieved minimum dietary diversity (≥5 food groups) at Lujeri (43%) than Naming’omba (31%). Productivity revealed that Lujeri plucked more green leaf per month (449.49 Kg) compared to Naming’omba (266.2 Kg) and statistically different at p<0.00.

Conclusions: The fortified nutrition intervention was successful in increasing energy and macronutrients intakes, selected micronutrients and dietary diversity of female pluckers. The intervention was indirectly successful in increasing productivity of female tea pluckers. Hence, all Malawi tea estates should consider implementing the fortified nutrition programme.

P015: ASSESSMENT OF NUTRITIONAL STATUS OF INTERNALLY DISPLACED PERSONS IN UROGUA, BENIN CITY, EDO STATE

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Background: The issue of the Internally Displaced Persons (IDPs) has become a global concern and is increasing in an alarming rate in many parts of the world and has become a negative trend to the society, especially at this present time of economic recession leading to malnutrition and other health problems.

Objective: To assess the nutritional status of internally displaced persons in Urogua, Benin City, Edo State.

Design: The study adopted a descriptive survey method while the population comprised of two thousand four hundred and two (2,402) internally displaced children (4-15years) in Urogua community in Ovia North – East Local Government Area of Edo State. A convenient sampling technique was used to select three hundred and forty three (343) IDPs made up of both those of them who visited the health centre in Urogua for treatment and children met at the school premises making a total of 14.28% of the population. Three instruments were used for data collection, these include; (1) A structured Questionnaire developed by the researcher tagged ‘Assessment of Nutritional Status of Internally Displaced Persons Questionnaire (AONSIDPQ). (2) food frequency questionnaire and (3) anthropometric measurement. Four research questions were raised to guide the study while one hypothesis was formulated.

Results: The result revealed that the internally displaced persons are underweight. Findings equally revealed there is no significant difference between male and female IDPs nutritional status (p>0.05).

Conclusions: The study concluded that majority of the IDPs in Urogua, Benin City, Edo State have low nutritional status and low BMI status. It was recommended that the government need to develop a long-term vision and recovery plan for these IDPs to prevent further invasion and eliminate malnutrition.

Keywords: Displacement, Internally Displaced Persons, Nutritional Status
P016: THE INFLUENCE OF CULTURE ON CHILD NUTRITION STATUS IN LURAMBI SUB-COUNTY, KAKAMEGA COUNTY, KENYA

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Introduction: Malnutrition is a significant health problem that has existed for the longest time possible in the various forms that it manifests in. In Kenya, it remains a major problem regardless of ways being availed to tackle this.

Purpose of the study: The research was carried out to determine the relationship between culture and child nutrition in Kakamega County, Kenya with the focus being on Sheywe ward, Lurambi Sub-county. The target population was children under 5 years and their caregivers. The objectives for this study were; to establish the relationship between culture and child nutrition in Kakamega county, to determine the impact of aspects of culture on child nutrition, to find out the negative cultural practices that impact on nutrition and feeding practices of children, to find out the cultural interventions used to avert malnutrition in children and to investigate the mother’s sources of information with regard to infant and young child feeding.

Methodology: The study adopted the analytical cross-sectional study design. Sampling technique used was simple random sampling. A total of 59 households with children of age 0-60 months participated in the study. Questionnaires were used to assess if breastfeeding was practiced exclusively, the type of complementary foods that was given to the infant, and the maternal nutritional knowledge and sources of nutritional knowledge.

Results: The mean number of people in the households that were sampled was approximately 7 people per household. It was established that most of the respondents had gotten primary level of education (60%), followed by 18% getting secondary level of education, 12% had not gotten any formal education while 10% had gotten tertiary level of education. There is a relationship between level of education and understanding of exclusive breastfeeding (p-value=0.029).

Conclusions: The study identified factors such as educational level and marital status played a key role in a child’s nutritional status. It was also established that complimentary feeding started at an early age among a larger majority of the respondents. This study aims to inform programmes targeting nutrition education among mothers and caregivers in the rural and urban setting.

Key words: malnutrition, culture, child, community

P017: SOCIO-SANITARY FACTORS RELATED TO SEVERE ACUTE MALNUTRITION IN TWO (2) INTEGRATED HEALTH CENTRES (CSI) IN THE MADAROUNFA HEALTH DISTRICT (MARADI REGION) IN 2015.


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INTRODUCTION: In Niger, the nutritional situation is precarious with GAM rates well above the alert threshold of 10% and reaching or even exceeding the emergency threshold of 15% in some regions. In 2015, the prevalence of SAM is 6.2% in the Maradi region [SMART]. The fight against this scourge, which is both a public health and a development problem, is therefore an urgent and imperative action. This justifies this work, which has as its general objective to analyze the socio-sanitary risk factors for SAM in children aged 6-59 months.

METHODOLOGY AND RESULTS: This is a transversal and analytical study from July 25 to August 05, 2015. The population is composed of all malnourished children who consulted during the study period at the Safo and Madarounfa CSIs in the urban Madarounfa health district (Maradi region). The sample size is 104 mothers and 104 malnourished children meeting the inclusion criteria.

From this study, it appears that 13.46% of the mothers of the children are in the 17-19 age group, 25% of the mothers married before the age of 15. 72.12% of the children are in the 6-23 month age group and 24.04% are at least 2 episodes of SAM. Significance was observed between the child's age and SAM episodes (P-value= 0.000). 57.70% of mothers are more than 6 km from the CSI. 89.42% of mothers have no education at all. The mother's level of education
has a significant relationship with skilled birth attendance (P-value= 0.03345). Episodes of SAM are significantly related to the child's age and the interreproductive interval with his or her direct eldest child (P-value= 0.006893).

CONCLUSION: The high prevalence of SAM is not only due to inadequate use of health services. Therefore, significantly and sustainably improving the nutritional status of populations requires multisectoral actions to be implemented at scale, supported by political commitment, good coordination and strong involvement of all development actors.

Keywords: Socio-sanitary factors; severe acute malnutrition

P018: AN ASSESSMENT OF DIETARY DIVERSITY AMONG YOUNG NIGERIAN UNDERGRADUATES

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Introduction: Young adults have special nutrients needs for growth and have been shown not to meet the dietary recommendation for their age.

Purpose of the study: This study was carried out to determine the dietary diversity of young adults using undergraduate students of Alex Ekwueome Federal University Ndufu Alike (FUNAI) as a case study.

Methods: This was a cross –sectional descriptive study where 470 undergraduate students between the ages of 17-27 years were selected using a random sampling technique. A semi -structured questionnaire with different sections of socio-demographic profile, weight and height measurements, 24-hour diet recall was the tool for data collection . Dietary diversity (DD) was evaluated based on the number of food groups consumed in the previous 24 hours using a 14-food group model. Terciles were created to categorize individual dietary diversity on a scale of (low: 1-4; average: 5-9; high: 10-14) food groups. The data were analysed using descriptive statistics and Chi-square. Statistical significance was determined at 5% level (P <0.05).

Results: Mean age for respondents was 21.2± 2.49. Mean height, weight and BMI were 1.69 ± 0.03, 64.4 ± 9.2 and 22.7 ± 3.0 respectively. Overall, mean dietary diversity score (DDS) was 5.0 (2.74). About 57.9% of the participants had low DDS (1-4) while 42.1% had average/medium DDS (5-9). There was a significant difference between male and female in their consumption of two food groups: other vegetable, legumes nuts and seeds (p<0.05), but there was no significant difference in DDS between male and female and in their consumption of the other food groups (p>0.05).

Conclusion/recommendation: Dietary diversity is poor among young Nigerian students. To improve the dietary diversity, efforts should focus on nutrition education.

KEY WORDS: dietary diversity, young Nigerians, undergraduate, food groups, FUNAI

P019: ANTHROPOMETRIC STATUS AND LIPID PROFILE OF APPARENTLY HEALTHY OLDER PERSONS IN A LOCAL GOVERNMENT AREA (LGA) OF KOGI STATE NIGERIA

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Introduction: The number of older persons is increasing rapidly and nutrition related disorders/ health risks tend to increase with age.

Purpose: The study assessed the anthropometric status and lipid profile of older persons (≥ 65years) in a LGA of Kogi state, Nigeria.

Methods: This cross sectional study was carried out on 150 older persons using multi-stage random sampling. Ethical approval was obtained from Kogi state ministry of health. Anthropometric status was assessed by body mass index (BMI), waist circumference (WC), mid upper arm circumference (MUAC), calf circumference (CC) and waist/hip ratio (WHR) while lipid profile was for total cholesterol (TC), high density lipoprotein (HDL), low density lipoprotein (LDL) and triglyceride (TG) for all the subjects using standard procedure and compared with recommended cut-off.

Results: Half (50%) of the subjects had normal BMI, 44.1% were either overweight or obese. Some (56.7%) had less risk of abdominal adiposity with WC, while 43.3% were either at risk or substantially at risk. Majority (81.3%) had safe level of WHR. Majority (76% and 95.3%) were overweight with CC and MUAC respectively. The lipid profile indicated that 98.7% had desirable TC, 84% had optimal LDL and 88% had normal TG levels. Some (42%) had high HDL, 32.7% had low. There was no significant relationship (p>0.05) between the anthropometric indices and lipid levels.
profile except for CC and TG (r = 0.086; p < 0.05) and CC with TC (r = -0.168). Total cholesterol strongly correlated with LDL (r = 0.354; p < 0.001). There was also positive correlation (p < 0.001) between BMI and WC, WHR, MUAC and CC.

**Conclusion/recommendations:** Overweight was prevalent in this study and many were in the safe level of lipid profile but the percentage with low HDL is worrisome. Nutrition education and regular screening for the elderly is recommended to always check metabolic risks.

**P020: SOURCES OF AFLATOXIN EXPOSURE IN KISUMU COUNTY, KENYA**

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**Background:** Contamination of foods by aflatoxins is a public health concern in both developing and developed countries because of the effects of the toxins on human health and food safety. According to WHO, 1.8 million Kenyans consume food contaminated with aflatoxins; and 40% of diets in both rural and urban communities in Kenya are likely to be contaminated by the aflatoxins. Cases of aflatoxin poisoning resulting from consumption of contaminated maize have been reported yearly in Eastern Kenya with several outbreaks of aflatoxicosis, the worst having occurred in 2004. However, data on aflatoxin levels in foods in other parts of the country, and in other foods other than maize, is scanty. Limited data is available on aflatoxin contamination in maize and groundnuts in Homa Bay and Rongo, respectively.

**Objective:** The main objective of this study was to establish aflatoxin levels in selected market foods in Kisumu County, Kenya.

**Design:** In a cross sectional survey, 297 solid food samples selected by a combination of cluster and systematic sampling; and 80 milk samples selected from market outlets using the European Model were analyzed for aflatoxin contamination in June-August, 2013. Aflatoxin levels were analyzed using Enzyme Linked Immunosorbent Assay (ELISA) in parts per billion (ppb). Descriptive statistics were used to describe median, IQR and proportions.

**Results:** Aflatoxin B1 and M1 levels in market foods ranged between 0 ppb to 34.5 ppb and 0.012 ppb to 0.127 ppb respectively. Sorghum had the highest aflatoxin median levels (median=14.2; IQR=8.5-19). Processed milk, but not raw milk, had samples with aflatoxin M1 contamination levels above the Codex Alimentarius regulatory limits.

**Conclusion:** Although focus has been on maize and groundnuts, sorghum could be a source of aflatoxin exposure and should be included among crops of concern for aflatoxin exposure. Efforts should be taken to reduce potential exposure both from the commonly suspected sources as well as from both processed and unprocessed milk.

**Key words:** Aflatoxin, Aspergillus, parasiticus, flavus, sampling, ELISA, parts per billion, exposure, maize, groundnuts

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**P021: SOCIO-DEMOGRAPHIC CONTEXT OF UNDERWEIGHT AMONG WOMEN IN Ibadan NIGERIA**

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**Introduction/Background:** The vitality of good nutrition cannot be overemphasized in optimal maternal health, but the increasing burden of malnutrition appears to be threatening the reproductive and care-giving roles of women. Several reports have observed trends in the burden of under-nutrition among women, but the socio-demographic/economic context for such reportage is often unclear particularly in low-income settings. This study aimed at exploring the burden of under-nutrition among women in the light of the socio demographic/economic context of their livelihoods.

**Methods:** Interviewer-administered, semi-structured questionnaire was used to obtain a cross-section of information on socio-demographic and socio-economic characteristics, but anthropometric assessments were
taken (using standardized stadiometer and weighing scale for height and weight respectively) from non-pregnant and non-lactating women of reproductive age (NP-NL-WRA) after duly informed consent and BMI(kg/m\(^2\)) was classified using the World Health Organization cut-off points.

**Results:** While 13.7% percent of the 285 NP-NL-WRA in this study were underweight, the burden of underweight was higher among respondents; 15-19 years of age (41.7%), from rural setting (17.1%), with no parity (18.9%), who are unmarried (18.2%), with primary education only (21.7%), employed but without cash payment (19.2%), who have their cash spending being decided by their husband/head of household (17.2%) and who earn <$3/day (10.6%).

**Conclusion:** Under-nutrition appears ubiquitous among women with deprived socio-demographic/economic livelihoods and context-specific nutrition intervention strategies to optimize maternal health are essential.

**Keywords:** Malnutrition, Demography, Women, Ibadan, Nigeria

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**P022: VITAMIN A, IRON AND IODINE STATUS OF UNDER FIVE CHILDREN IN KADUNA STATE, NIGERIA**

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**Objective:** Micronutrient deficiency has been considered as a major risk factor for child survival in Nigeria, increasing the risk of death from common diseases that affects children. The study assessed the vitamin A, iron and iodine status of children in Kaduna state.

**Materials and Methods:** It was a cross sectional descriptive survey research. Children aged 6-59 months (84 subjects) were selected randomly as a sub sample of 420 children for biochemical analysis. Five milliliters of blood were collected for analysis of serum retinol and hemoglobin determination. Urinary Iodine Excretion (UIE) was based on the iodine concentration in urine samples. Vitamin A as serum retinol was determined using High-performance liquid chromatography (HPLC), Hemoglobin concentration was determined using Atomic absorption spectrometry while the UIE level was analyzed using wet digestion method.

**Results:** Anaemia was more common with female (35.1%) in the study area compared to male (18.93%) with various degree of haemoglobin level. Children aged 25 – 36 months had most deficiency of anaemia (16.66%) while UIE deficiency also affected more female (13.09%) as compared to male (10.7%) for mild UIE. Children aged 13 – 24 months (10.71% mild) were the most affected age group on iodine deficiency. Vitamin A deficiency affected more male (2.38%) as compared to the female (1.19%) and deficiency of vitamin A is found in ages 25 – 36 months only (2.38%).

**Conclusion:** Micronutrient deficiencies are common in children between two to three years in the study area and female children are affected most. Routine screening of children and timely supplementation and intervention will reduce deficiencies in the state and nationwide.

**Keyword:** iron, iodine, Vitamin A, Under-five Kaduna State; Nigeria.

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**P023: ASSESSMENTS AND FOOD SUPPLEMENTS PROVISION IN REDUCING MALNUTRITION AMONG SCHOOL GOING CHILDREN AGED 3-8YEARS**

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**Background:** Malnutrition is a global problem that poses great threat to the health and wellbeing of the child and is even worse in Kenya. From a SMART survey conducted in January 2018, the GAM rate of Mbita was at 6.8%, as the county rates being at 4.1% from a 2016 SMART survey. For this high number of children with malnutrition, these state needs to be averted to help them achieve their full potential in life.

**Objective:** The program is aimed at achieving zero under nutrition among children attending ECDE centres in Mbita sub county Homabay County.

**Design:** To identify the underweight children, monthly assessments are conducted in schools. All the identified children are supported with either supplementary or therapeutic food supplements depending of the Z-score. The supplementary feeds are provided to schools from the sub county Nutrition store. These supplements are administered...
by the class teacher during 10 o’clock break and the supplements are consumed in the presence of the teachers. This school approach came about due to household being marred by sharing and use by unintentional persons in the household.

**Results:** In October last year three schools were assessed with a total population of 124 children being reached. Of the children reached 2 suffered from severe acute malnutrition while 15 were moderately malnourished. After one month of support 5 already had malnutrition corrected and were schedule for discharge from the school.

**Conclusions:** Children respond faster when the right treatment is provide, the school supplementary program has proved that it is effective if implemented. This is a project that can be rolled even in resource limited setup now that it does not require a lot of capital and the impact is great.

**Keywords:** Nutrition assessment, GAM, supplementary feeds, ECDE Centers, Malnutrition

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**P024: CORE AND OPTIONAL INFANT AND YOUNG CHILD FEEDING INDICATORS IN SUB-SAHARAN AFRICA**

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**Background:** In 2008 a standard set of core and optional infant and young child feeding (IYCF) indicators were introduced. However, despite the existence of many national surveys, pooled indicators for the sub-Saharan Africa (SSA) region are not available.

**Objectives:** to determine the status of eight core and six optional IYCF indicators for SSA.

**Methods:** Secondary data analysis of 32 Demographic and Health surveys (DHSs) conducted in SSA since 2010 were included in the analysis. In total the data of 151,575 infants and young children born in the preceding two years of the surveys included. The core and optional indicators were determined following standard approach.

**Results:** The majorities (95.8%) of the children born in the preceding 24 months were ever breastfed and 50.5% initiated breastfeeding within the first hour of birth. Among infants 0-5 months, 72.3% were predominantly breastfed and 41.0% were exclusively breastfed. Continued breastfeeding at 1 year (89.5%) was reasonable high but only 53.7% continued breastfeeding at 2 years and, 60.4% had age-appropriate breastfeeding. About two-third (69.3%) of infants 6-8 months of age received solid, semi-solid or soft food over the previous day across the countries. Among children 6-23 months, 41.9% met the minimum recommended meal frequency while smaller proportions satisfied the minimum dietary diversity (21.0%) and acceptable diet (9.8%). About one-third (37.6%) of the children 6-23 months consumed iron-rich or iron-fortified food over the previous day. Among non-breastfed children, only 15.0% received the recommended 2 or more milk feedings. Thirteen percent were fed with a bottle with a nipple in the previous day. Country level estimates for most indicators showed remarkable variations. Yet, the minimum dietary diversity and acceptable diet indicators were consistently low.

**Conclusion:** Most breastfeeding related indicators, except exclusive and early initiation of breastfeeding, are in acceptable level in SSA. However, complementary feeding indicators are sub-optimal.

**Keywords:** Infant and young child feeding, Breastfeeding, Complementary feeding, Sub-Saharan Africa.

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**P025: DIETARY INTAKE AND NUTRITIONAL STATUS OF ATHLETES ON PERFORMANCE AND INJURY: CASE OF ITEN TRAINING CAMP, RIFT VALLEY, KENYA.**

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**Introduction:** Kenyan athletes are renowned for endurance running in middle and long distance races, winning 40% of international races, Fudge, (2006). Athletes suffer injuries during/prior to competition impacting performance.

**Purpose:** The study assessed association between dietary intake of energy, iron, calcium and nutritional status of athletes who incurred injuries and performance during training.

**Methods:** A cross sectional study design with 282 athletes (192 males, 90 females) aged 18 – 30 years participating in middle and long distance races. Semi structured questionnaire obtain data: socio demographic and economic characteristics, injuries and performance. 24- hour dietary recall method for dietary intake of energy, calcium and iron. Nutri-survey and Food Composition Table for nutrient computation. BMI was measured.

**Results:** The major hindrances to expected athlete performance: injury, loss of breath and fatigue. A positive significant association between gender and injury, more females than males (p=0.002). The male athletes met the calories requirement and RDA for iron and calcium. About 6.3% of females met their energy intake, 12.3% RDA for
calcium but not iron. Adequate intake of energy \((r^2=0.373)\) and nutrition status \((r^2=0.315)\) contributed significantly to performance and injury compared to intake of iron and calcium. A significant difference between BMI of male and female athletes, half of e males (50%) having normal BMI compared to 31.1% females. The female athletes had inadequate intake of nutrients while males should increase iron and calcium intake.

**Conclusion:** Males and female athletes should improve their nutrition status by adequate nutrient intake to perform optimally and reduce injuries.

**Recommendation:** Nutrition education should be incorporated into training activities of athletes

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**P026: DIETARY PATTERNS OF PEOPLE LIVING WITH HIV/AIDS. A CROSS-SECTIONAL STUDY IN SEVEN DISTRICTS OF KARAMOJA SUB-REGION, NORTHERN UGANDA**

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**Introduction:** Good nutrition is a vital component of an effective strategy to control HIV/AIDS. Much of the research on dietary considerations for PLHIV has been based on use of nutrient supplements leading to guidelines, which are nutrient based rather than food-based. These raise questions whether or not there should be food or nutrient-based guidelines which specifically address their needs.

The study examined dietary patterns among people living with HIV (PLHIV) in seven districts of Karamoja sub-region, Northern Uganda.

**Methodology:** The study was descriptive and cross-sectional in design with a sample size of 219 HIV/AIDS adult patients attending ART clinics in seven district hospitals. Participants were selected on a walk in basis between July and September 2018.

Dietary diversity and nutrient intakes were assessed with Quantitative Food Frequency Questionnaire and 24 hour recall. Dietary patterns were described in terms of Individual Dietary Diversity (IDD) as low, medium or high. Nutrient intakes were expressed as percentage fulfilment of the recommended nutrient intake.

**Results:** Overall IDD was low at 44.3%. Those diagnosed with malnutrition were four times more likely \((\text{OR}=4.6, 95\% \text{ CI } 1.7-12.2)\) to have a low diet diversity. The only independent predictor for low diet diversity was being in WHO baseline stage 2 \((\text{OR}=11.3, 95\% \text{ CI } 1.3-84)\). Being diagnosed with TB \((\text{OR}=0.0, 95\% \text{ CI } 0.0-0.3)\) and being currently on treatment \((\text{OR}=0.0, 95\% \text{ CI } 0.0-0.9)\) were protective of a low diet diversity.

All districts had below 90% of their percentage recommended energy intakes. In terms of coping mechanisms, reducing portion size \((p=0.000)\) was the only factor significantly different between underweight and normal clients.

**Conclusion:** The findings suggest that the dietary patterns among the study population need to be addressed to meet the Recommended Nutrient Intakes.

**Key words:** Dietary patterns, People living with HIV, and nutrient intake

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**P027: FACTORS ASSOCIATED WITH FOOD INSECURITY AMONG UNIVERSITY STUDENTS SOUTH EAST, NIGERIA**

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**Introduction:** Food insecurity is a growing public health issue and a barrier to students achieving adequate nutrition. Data regarding food insecurity among university students in Nigeria are scarce. The study assessed the prevalence of food insecurity and associated factors among university students, southeast Nigeria.

**Methods:** A cross-sectional survey of 398 randomly selected students recruited from 2 universities, southeast Nigeria, was conducted. Food security status was assessed using the 10-item United States Household Food Security Scale Module. Anthropometric measurements and socio-demographic data were collected. Multivariate logistic regression was used to identify factors associated with food insecurity.

**Results:** Majority of the students were categorized as food insecure. Of this, about 35.7% and 45% were considered to have low and very low food insecurity, respectively. Food insecurity was significantly associated with monthly allowance \((p=0.029)\), daily amount spent on food \((p=0.001)\), and source of income \((p=0.019)\). The odds of food insecurity was significantly higher for students whose fathers were farmers \((4.6, 95\% \text{ confidence interval [CI]}: 1.453-14.737)\), but lower for those whose mothers were farmers \((0.18, 95\% \text{ CI } 0.059-0.564)\).
**Conclusion:** The result provides an insight into the food security status of university students in Nigeria. The prevalence of food insecurity was high among the students. Therefore, further studies involving different urban and rural or public and private universities in Nigeria is suggested in order to have a deeper understanding of the magnitude and contributing factors among this population group.

**Keywords:** food insecurity, public university, students, Nigeria

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**P028: CHILDHOOD UNDERNUTRITION AND ITS DETERMINANTS AMONG UNDER-FIVE CHILDREN IN NIGERIA**

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**Introduction:** Child undernutrition continues to be a public health problem in Nigeria. Because few studies indicate the determinants of malnutrition among under-5s, re-analysis of nationally representative data could help inform programme planning to meet the national target to reduce stunting and wasting by 20% and 10%, respectively by 2018.

**Objectives:** This study aimed to find determinants of stunting and wasting among 0-59 months old children in Nigeria.

**Method:** A secondary data analysis of the 2011 Nigeria Multiple Indicator Cluster Survey (MICS)7 including all 25,192 children aged 0-59 months old surveyed. Stunting was defined as height-for-age ≤2SD and wasting as weight-for-height ≤2SD of the WHO Growth Standards8. The UNICEF conceptual framework of malnutrition was used to build the regression models, following chi-square tests on the MICS measures of the immediate, underlying or basic causes of undernutrition.

**Results:** The study confirmed that 35.8% and 10.2% of the children were stunted and wasted, respectively. Children who were no longer being breastfed (20%, 47%), absence of recent episodes of fever (12%, 21%), increase in maternal age (22-35%, 4-30%) and education (14-36%, 13-18%) and households with higher wealth index (2-63%, 4-27%) were all at reduced risks of stunting and wasting. Children residing in Northern Nigeria (55-64%, 11-39%) had increased risks of stunting and wasting. Toddlers ≥36 months-old were associated with a reduced risk of wasting.

**Conclusion:** Interventions targeting children ≤36 months-old should include strengthening of the health system and health workers, improving the educational level of women especially in the Northern Nigeria and financial empowerment of women.

**Keywords:** Stunting, Wasting, Risk factors, Children, Nigeria, Developing countries

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**P029: KNOWLEDGE OF FOOD BORNE INFECTION IN RELATION TO FOOD SAFETY PRACTICE AMONG NURSING MOTHERS IN Ogun State, Nigeria.**

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**Introduction:** Food borne illnesses are increasingly linked with unsafe domestic food safety of food handlers including nursing mothers, leading to increase in mortality rate in Africa.

**Purpose of study** knowledge of food borne infection in relation to food safety practice among nursing mothers in Ijebu-Ode Local Government Area (LGA), Ogun State, Nigeria was assessed

**Methods:** Descriptive design using multistage sampling technique was adopted in selecting 286 nursing mothers who attended immunization clinic at the health centers in the study area. A validated questionnaire titled; knowledge of food borne infection and food safety (KFBIFS) was used in gathering data. Knowledge and practice scale of 0-10 was adopted and categorized as high: ≥ 6.0, average: 3.5-5.9 and poor: 0-3.4. Data were analyzed using descriptive statistic and Pearson Product Moment Correlation (PPMC).

**Results:** Majority were between 20-29 years (51.7%) and self- employed (75.2%). Participants possessed high knowledge (≥ 6.0) of the following: food borne infection (8.9± 0.3), causes of food borne infection (9.4± 0.25), signs

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and symptoms of food borne infection (9.5±0.22), personal cleanliness causing food infection (9.0±0.29) and handling of infants food (8.6±0.35). Participants had average knowledge on cleaning of eating materials, cooking utensils, cleaning of environment and infants’ toys (4.9 ±0.50), prevention and treatment of food borne diseases (5.1±0.49). Poor practice of food safety was recorded (3.39± 0.85). A negative correlation (r= -0.16) which was not significant (p< 0.05) existed between the knowledge of food borne infection and the practice of food safety among the nursing mothers.

**Conclusion and recommendation:** Participants adequate knowledge of food borne infection were not translated into high practices of food safety, hence, the need for continuous training on safety of food to ensure adequate practice among nursing mothers.

**Key words:** food borne infection, food safety, nursing mothers.

**P030: DIETARY DIVERSITY, NUTRIENT INTAKE AND NUTRITIONAL STATUS OF PREGNANT WOMEN AGED 18 - 45 YEARS IN DEVELOPING COUNTRIES. A SYSTEMATIC REVIEW**

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**Introduction:** Dietary diversity is essential for maternal health and pregnancy outcome. A diverse diet provides micronutrients essential for a health pregnancy and foetus. The first 1000 days are critical for child development. The aim of this research was to systematically review studies to determine the association of dietary diversity, nutrient intake and the nutritional status of the pregnant women.

**Methods:** The search for the articles included a search on Google scholar, PubMed and Freefull pdf using a predefined inclusion and exclusion criteria. The identified papers were 87. Reference lists of identified papers were also examined. The key words used nutrient intake, nutritional status and minimum dietary diversity score. Most of the articles identified were specifically about dietary diversity and how it determines nutritional status especially to pregnant women. All papers on dietary diversity and determinants in households were considered.

**Results:** A total of 87 articles were identified for screening. A total of 20 out of 87 identified were relevant to dietary diversity, nutrient intake and nutritional status of pregnant mothers aged 18-45 years. Dietary diversity is a proxy indicator of nutrient intake as demonstrated by a variety of studies. However, some studies reported insignificant relationship between maternal dietary diversity and nutritional status. Demographic and socio-economic status was demonstrated to influence dietary diversity despite disagreement from other studies.

**Conclusions:** Dietary diversity influences maternal nutritional status and pregnancy outcome. Public health nutrition interventions involving improving accessibility of affordable nutrient rich foods and fortification of common foods are needed to bolster efforts to improve maternal nutrition in developing countries.

**P031: ANTHROPOMETRIC ASSESSMENT AND BODY COMPOSITION OF UNDERGRADUATE STUDENTS IN A NIGERIAN UNIVERSITY**

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**Objective:** The growing rates of overweight and obesity in developing countries are alarming. The main aim of this study was to determine the prevalence of obesity and overweight in University students using Anthropometric analysis

**Methods:** This study was conducted at the Ambrose Alli University, Ekpoma in Southern Nigeria. A total of 385 university students, 185 males and 200 females participated in the study and they were volunteered participants. Height, weight, Hip and waist circumferences as well as skinfold thickness around the biceps, triceps, subscapular and suprailiac regions were measured using standard procedures.

**Results:** The mean age of the females was 20.7 ± 2.68 while that of males was 21.8 ± 2.31 years. From the data of the weight and height of the subjects obtained, Body Mass Index (BMI) was calculated. 37 (18.5%) and 34 (18.34%) of females and males respectively were underweight. 13.5% of the females were overweight compared to the 8.65% of the males. 2.5% and 1.62% of females and males respectively were obese. A good number of the students were found to have normal weight as indicated by the 65.5% and 71% recorded for the females and male subjects respectively.

On the basis of waist to hip ratio, 136 (68%) of the females studied were at low (L) risk of developing cardiovascular diseases compared to a higher value of 153 (82.70%) of the male population. Correspondingly, higher percentages of females had moderate (M) and high (H) risks (19% and 13% respectively) compared to the 13.51% and 3.78% respectively obtained for the males.
Conclusion: From the data obtained in this study, most of the students were found to have normal weight and are at low risk of developing cardiovascular diseases suggestive of good dietary pattern and high physical activity.

Keywords: Anthropometric assessment, body composition

P032: EFFECT OF DIETARY PATTERN AND NUTRITIONAL STATUS ON ORAL HEALTH OF PATIENTS ATTENDING THE DENTAL CLINIC IN UNIVERSITY COLLEGE HOSPITAL, IBADAN, NIGERIA

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Introduction: Close relationship exist between diet, nutrition and dental health. Oral tissues are nutrition-dependent, therefore good nutrition is essential for good oral health, development and integrity of the oral cavity. Inadequate diets can precipitate oral diseases as public health challenge worldwide.

Purpose of study: The study was carried out to examine the effect of diet, dietary pattern and nutritional status on the oral health of adults attending the Dental Clinic in University College Hospital, Ibadan.

Methodology: A descriptive cross-sectional study was conducted between June and November 2017 among 250 participants, age 18 years and above with or without oral health problem, visiting the dental clinic. Questionnaire was used to obtain information on sociodemographic and socioeconomic characteristics, oral habits and oral health-related dietary problems. Oral diagnosis and medical history were obtained from case notes. Validated Food Frequency and 24-Hour Recall questionnaires were used to collect information on frequency and pattern of food and nutrient intakes.

Result: Participants' mean nutrient intakes were adequate for macronutrients but inadequate for all micronutrients except vitamin A compared to their RDAs. Vitamin C showed statistical significance with Fracture, Vitamin B6 and B12 with Malocclusion, and Potassium and Zinc with Gingivitis. Oral problems affected food intake of 58.4% of participants, while 52.8% reportedly changed their diets due to oral problems. Coping mechanisms included chewing on one side of the jaw/avoiding some foods (40.8%), opting for liquid/soft food (11.2%), stopped eating hard foods (25.6%), meat (14.4%) and fruits/vegetables (7.2%).

Conclusion: Poor dietary pattern and nutritional status are risk factors for poor oral health and presence of oral diseases deteriorated nutritional status of participants. Education on the importance of adequate diet to good oral health is required, and treatment of oral health problems should involve Dietitians/Nutritionists.

Keywords: Dietary pattern, Nutritional status, Oral health, Coping mechanisms

P033: CONSUMPTION, UTILIZATION AND CONTRIBUTION OF CASSAVA PRODUCTS TO NUTRIENT INTAKE OF ADULT IN FEDERAL UNIVERSITY OF AGRICULTURE, ABEOKUTA (FUNAAB) MANDATE COMMUNITIES.

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Introduction: Cassava is Africa’s second most important food staple in terms of per capita calories consumed. It is a basic staple food to more than 70% of Nigerian population and is consumed at least once every day. About 90% of cassava produced in Nigeria is used locally for food, animal feed, industrial and pharmaceutical uses and unquantified quantities for export.

Purpose of the study: The study was carried to describe the socio-economic, the pattern of cassava consumption, forms and uses of cassava products and their contribution of consumption of cassava and cassava product to nutrient intake of rural adults in FUNAAB mandate communities.

Methodology: A total of 300 respondents were selected from the five communities using a 3-stage random sampling technique and 50 respondents were selected from each community. Quantitative and qualitative Data were collected using a structured questionnaire and analyzed using descriptive statistics.

Result: Cassava contributes to about 40%, 32.5%, 2.1%, 20%, 49% of calorie, carbohydrate, protein Calcium and Iron respectively to nutrient intake of adults in FUNAAB mandate communities while the contribution of fat and B vitamins is insignificant to nutrient intake. The forms of cassava that are highly consumed by the respondents are Garri, Eba, Fufu and Lafun While Tapioca, Boiled cassava, Fried cassava, cassava leaves and flour were consumed at lesser rate.
Consumption of cassava products 5-7 days a week by respondents were: Garri (77%), Eba (60%), Lafun (35%), and Fufu (33%).

**Conclusion:** Cassava contributes to about 30% of their calorie and 40% carbohydrate to respondents' nutrient intake with little amount of protein and fat.

**P034: INFLUENCE OF KNOWLEDGE AND DIETARY COMPLIANCE ON THE GLYCEMIC CONTROL AND NUTRITIONAL STATUS OF DIABETES MELLITUS PATIENTS IN IBADAN: A HOSPITAL BASED STUDY**

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**Introduction:** Diabetes Mellitus is a chronic disease which has no cure and is associated with high rate of mortality and morbidity in both developing and developed countries. In spite of the importance of diet in the management of diabetes mellitus, diabetic patients are often unaware of its place in ensuring good glycemic control.

**Purpose of the study:** The study was carried out to determine the influence of knowledge and dietary compliance on glycemic control and nutritional status of 50 patients with type 2 diabetes mellitus in a Faith based Hospital, Ibadan, Nigeria.

**Methods:** The cross-sectional study used semi-structured, interviewer-administered questionnaire to obtain information on respondents’ socio-demographic characteristics, knowledge about diabetes mellitus, dietary compliance and anthropometric measurement (height and weight) to assess their Body Mass Index. Body fat percentage was determined using body composition monitor. Respondents’ fasting blood glucose were determined using standard glucometer designed by Accu check and their dietary intake assessed using 24-hour dietary recall. Respondents’ mean knowledge and compliance below 50% were categorized as poor while mean knowledge and compliance score of 50% and above were categorized as good. Data Analysis include descriptive and inferential statistics (Chi Square, t test, ANOVA, and Correlation at \( p < 0.05 \)).

**Results:** Majority of the respondents, 38 (76.0%) and 29 (58.0%) had poor overall knowledge score (<50 % score) and dietary compliance (<50% score) respectively. Respondents’ knowledge and dietary compliance had significant influence on their biochemical status and anthropometric status (\( p < 0.05 \)).

**Conclusion:** Nutrition education to diabetic mellitus patients regarding diet, as well as patient compliance needs to be intensified for better results.

**P035: CONSUMERS’ PRODUCTS BETWEEN OPPORTUNITIES AND CHALLENGES. THE EXEMPLA OF THE BISPHENOL A-CONTAINING BABY BOTTLES**

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**Background:** The plasticizer Bisphenol A (BPA) is banned in baby bottles in many industrialized countries due to safety concerns. **Method:** We provide a pilot view on the potential BPA exposure of bottle-fed children in sub-Saharan Africa through an enquiry on availability, accessibility and affordability of plastic baby bottles, usage pattern, and risk perception. An observational survey was conducted in a randomized group of vending sites (34 pharmacies; 87 shops and markets), in three cities (Yaoundé, Founbot, Bafoussam) in Cameroon (two regions), and in two cities (Lagos, Port Harcourt) in Nigeria (two states). **Results:** Interviews in vending sites and group discussions were conducted with 248 mothers. Cameroon and Nigeria showed a largely comparable situation. Plastic baby bottles are largely imported from industrialized countries, where a label indicates the presence/absence of BPA. In pharmacies most plastic baby bottles are labeled as BPA-free, whereas most bottles sold in shops are not BPA-free. BPA-containing bottles are more accessible and affordable, due to sale in common shops and lower costs. The meaning of the label BPA-free is unknown to both vendors and customers: the BPA issue is also largely unknown to policy makers and media and no regulation exists on food contact materials. **Conclusions:** The wide availability of BPA-containing baby bottles, lack of information and usage patterns (e.g. temperature and duration of heating) suggest a likely
widespread exposure of African infants. Possible usage recommendations to mitigate exposure are indicated. Risk communication to policy makers, sellers and citizens is paramount to raise awareness and to oppose possible dumping from countries where BPA-containing materials are banned. Our pilot study points out relevant global health issues such as the capacity building of African communities on informed choices and usage of baby products, and the exploitation of international knowledge by African scientists and risk managers.

**P036: KNOWLEDGE AND PREVALENCE OF PICA PRACTICES AMONG PREGNANT WOMEN IN ABEOKUTA METROPOLIS**

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**Background:** Pregnancy is associated with physiological changes that often times affect the type of food eaten. Sometimes, it leads to craving for non-food substance in some people, evaluating the prevalence of this eating habit will help in its effective management.

**Objectives:** the study sought to assess the nutritional status, knowledge and practice of pica practice among pregnant women in Abeokuta metropolis

**Methodology:** A descriptive cross sectional study was conducted among 200 pregnant women selected randomly from two purposively selected hospitals in Abeokuta metropolis. A semi structure and interviewer administered questionnaire was used to obtained data on socio-demographic characteristics, knowledge, perception and practice of pica. Data were analyzed using Statistical Package for Social Sciences version 20.0.

**Results:** Majority (53.0%) of the subject were within the age range of 31-40 years, almost all (93.5%) of the subject were married, 51.3% were secondary school certificate holder and 52.0% were traders. The entire respondent begins antenatal clinic before the end of second trimester and 38.4% experienced vomiting as the pregnancy symptom. 47.9% have had of pica before majorly from the hospital and majority (68.1%) of them doesn’t know it negative effect. Prevalence of pica was very high (56%), non-food substances they do consume are white clay (11%), ice (17%), charcoal (1.4%), red clay (0.7%) and tooth paste (37.2%).

**Conclusion:** high prevalence of pica was discovered among the respondents, nutrition education targeted at correcting this habit is recommended so has to prevent the negative impact of this on the pregnancy outcome.

**P037: PREVALENCE OF INFANT FEEDING PRACTICES AMONG HUMAN IMMUNE VIRUS EXPOSED INFANTS IN ETHIOPIA: SYSTEMATIC REVIEW AND META-ANALYSIS**

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**Background:** Infant and young child feeding in the context of human immune virus (HIV) infected mothers, has significant challenges due to the risk of transmission of the virus via breastfeeding. The aim of this review was to assess the pooled prevalence of feeding practices of HIV exposed infants in Ethiopia.

**Methods:** In this meta-analysis, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline was strictly followed. PubMed, Cochrane Library, Google Scholar and direct Google were used to search the relevant articles. Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument adapted for cross-sectional study design was used for quality assessment. STATA 14 software was used to perform the meta-analysis. The heterogeneity and publication bias was assessed using the I² statistics and Egger’s test and Begg’s respectively. Forest plots were used to present the pooled prevalence using random effect models. Trim and fill analysis were performed to see the significant variations.

**Results:** This review included 17, 13 and 13 studies, 5207, 4018 and 4020 study participants for exclusive breastfeeding, replacement feeding and mixed feedings respectively. The overall pooled prevalence of exclusive breastfeeding, replacement feeding and mixed feeding of HIV exposed infant were 62.17 % (95% CI: 46.27, 78.08), 20.38 % (95% CI: 11.34, 29.43) and 21.10% (95% CI: 7.91, 34.28) of HIV exposed infants in Ethiopia respectively.

**Conclusion and recommendations:** In Ethiopia, three in five, one in four HIV exposed infants in Ethiopia were getting exclusive breastfeeding, replacement feeding and mixed feeding during the periods of 6 months respectively.
Therefore, the Ethiopian government should strengthen the health institutions to implement the existing infant feeding strategies and guidelines in the context of HIV positive mothers to increase exclusive breastfeeding for the first 6 months and to avoid mixed feeding during the periods of six months.

Key words: Exclusive breastfeeding, Replacement feeding, mixed feeding, HIV exposed, Ethiopia

P038: PRELACTEAL FEEDING AND ASSOCIATED FACTORS IN ETHIOPIA: SYSTEMATIC REVIEW AND META-ANALYSIS

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Background: Prelacteal feeding is giving any solid or liquid foods other than breast milk during the first three days after birth. In Ethiopia, fragmented and inconsistent findings were reported. Therefore, the main objective of this meta-analysis was to estimate the pooled prevalence of the prelacteal feeding and its associated factors in Ethiopia.

Methods: The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guideline was followed. Articles were systematically searched through different searching mechanisms. Quality assessment was done using JBI-MASTARI. A total of 28 studies was extracted and analyzed using STATA 14. The random effect model was used; whereas subgroup analysis and meta-regression was performed to identify the probable source of heterogeneity. Both Egger’s and Begg’s test were used to check publication bias. Pooled odds ratio were assessed.

Results: The totals 28 studies were included in meta-analysis. The Meta analysis result showed that the pooled prevalence of prelacteal feeding practice in Ethiopia was 25.29 % (CI: 17.43, 33.15) with severe heterogeneity ($I^2$ = 99.7, p <0.001). Antenatal care [(OR=0.25, 95% CI: 0.09, 0.69), counselling on infant feeding [(OR= 0.37, 95% CI: 0.22, 0.63)], Timely initiation of breastfeeding [(OR=0.28, 95% CI: 0.21, 0.38)] and urban residence [(OR=0.47, 95% CI: 0.26 , 0.86)] were decreases the risk of prelacteal feeding practice while home delivery [(OR=3.93, 95% CI: 2.17, 7.10)] increases the risk of prelacteal feeding practice in Ethiopia.

Conclusions: In Ethiopia, one fourth child was given prelacteal foods. Mothers who gave birth at home are more prone to give prelacteal foods. Whereas, Antenatal care visit, timely initiation of breastfeeding, counseling on infant feeding and being urban residence decrease prelacteal feeding practices in Ethiopia. Therefore, the government and health institutions should focus to increase maternal health service utilization and promote infant and young child feeding practices according to the guideline.

Keywords: Prelacteal feeding, Pooled prevalence, Ethiopia, Associated factors

P039: BREAKFAST EATING HABITS AND ANTHROPOMETRIC CHARACTERISTICS OF PUBLIC PRIMARY SCHOOL CHILDREN IN ILORA, OYO STATE

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Background: Regular breakfast consumption among school-aged children contributes to decreased risk of obesity and chronic diseases, improved cognition and improved nutrient intake. However, studies showed that breakfast consumption among school-aged children is declining globally and fast food consumption is increasing with consequences on learning ability.

Objective: This study was therefore designed to assess the breakfast eating habits and anthropometric characteristics of public-school pupils in Ilora, Oyo State, Nigeria.

Design: This descriptive cross-sectional study involved three-stage sampling procedure to select six out of 12 public primary schools and 568 pupils using simple random and total sampling respectively.

Methodology: A semi-structured, interviewer-administered questionnaire was used to collect socio-demographic characteristics and breakfast consumption information. Weight and height were assessed using standard procedures and analysed using World Health Organization Anthro plus software to obtain the BMI-for-age. Data were analyzed using descriptive statistics and Students t-test at p<0.05.

Results: Mean age of pupils was 11.10±1.53 years, 51.9% were females, 97.0% were Yoruba, and 66.5% lived with both parents. Most pupils (90.8%) ate three times daily, 82.6% often ate before going to school, 74.6% ate breakfast before 8.00am and 7.2% always skipped breakfast. Majority of the pupils (72%) preferred rice as breakfast and ate it on the study day. Prevalence of underweight and overweight/obese was 29.7% and 1.1% respectively. There was no
relationship between breakfast consumption and Body Mass Index (BMI) of the pupils (p-value = 0.310). Breakfast consumption did not have an effect on the anthropometric characteristics of the respondents (t=-1.015, p>0.05).

**Conclusion:** Breakfast consumption among public primary school pupils in Ilora is high, yet underweight constitutes a public health problem among the school pupils. There is no association between breakfast consumption and anthropometric of the pupils, further studies are recommended to provide information on the nutrient adequacy of breakfast consumed.

**Keywords:** Breakfast, eating habits, anthropometric characteristics, primary school children

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**P040: STREET FOODS, NUTRITION AND HEALTH OF URBAN AND PERI-URBAN HOUSEHOLDS IN ONDO STATE, NIGERIA**

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**Background:** Accurate measurement of body composition in children and adolescents is important as the quantities of fat and fat-free mass have implications for health risk. The objectives of the present study were: to determine the reliability of Fourier Transform Infrared spectroscopy (FTIR) measurements and; compare the Fat Mass (FM), Fat Free Mass (FFM) and body fat percentage (%BF) values determined by bioelectrical impedance analysis (BIA) to those determined by deuterium dilution method (DDM) to identify correlations and agreement between the two methods.

**Methods:** Some 1250 respondents were selected through a multistage sampling technique from ten urban and peri-urban settlements purposively selected in Ondo state, western Nigeria. Data (primary and secondary) were collected from the respondents and econometric tool of Nutrition and health analysis was done. Health impact assessment was conducted for the respondents.

**Results:** All the respondents were observed to be nutritionally poor based on FAO standard. Results also showed that majority of the respondents have no awareness about the health risk of the street food they consume. The mean per capita monthly income of $4.03 was recorded for the respondents. Level of education, type of occupation, cost of food item to be consumed, receipt of transfer fund/income and age of the respondents were major determinants of the consumption of street foods. Over 80% of the respondents were nutritionally poor haven been observed to have being consuming less than 2250 kilocalorie per day. The health impact assessment showed that all the respondents had intestinal disorder from consuming street food.

**Conclusions:** It was therefore recommended that government should conduct a comprehensive health impact assessment for the nation. The agency responsible for food and drug standard should be further strengthened to perform its role.

**Keywords:** Street Food, Poor, Education, Nutrition and health

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**P041: PROCESSING AND COMMERCIALIZATION OF PSEUDO STEM AND RHIZOM OF BANANA PLANT FOR FOOD SECURITY IN ETHIOPIA.**

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**Background:** Banana is a staple food grown in the tropical regions of the world. The banana pseudostem and rhizome which are considered to be of little or no significance is often discarded as waste after the fruit is being harvested, thereby constituting a menace to the environment. This study was designed to determine the nutritional compositions and antioxidant activities (AA) of banana (Musa sp.) pseudostem (BP) and rhizome (BR) as possible sources of nutrients in formulating animal feeds, food and nutraceuticals.

**Methods:** Samples were collected from Amogera district, Gurage Zone. The determinations were done using standard methods of analyses of Association Official Analytical Chemists (AOAC), Atomic Absorption Spectrophotometric (FAAS) for the proximate and minerals respectively. Total phenolic content (TPC), and total flavonoid content (TFC) of the extracts were determined by using Folin-ciocalteau and AlCl₃ methods respectively, and the AA was determined by using 2, 2-diphenyl- 1-picrylhydrazyl (DPPH) assay. A 0.50 g an oven-dried sample was wet-digested using 3 mL of (69 - 72%) HNO₃ and 3 mL of (70%) HClO₄, for 2 h at a temperature (270 OC). The validity of the optimized procedure was evaluated by the analysis of spiked samples whose recovery was in the range of 94 - 99%.

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**Results:** From analysis the mean proximate composition ranges were recorded in BP and BR (%), respectively moisture (7.5 - 10.97), ash (8.23 - 9.03), crude protein (0.88 - 0.33), crude fat (1.8 - 2.66), crude fiber (6.12 - 10.12) carbohydrate (64.69 - 74.64). The mean mineral contents ranges (mg/kg), Ca (61.84 - 58.75), Cd (0.0183 - 0.018), Zn (59.60 - 56.92). The concentration of Ni, Cr and Pb metals in BP and BR samples were below the detection limit. The methanol extract of BR showed higher TPC and TFC (560.2 mg GAE/g and 405.12 mg QRE/g of extract respectively) and methanol extract of BR showed the highest DPPH radical scavenging activity (IC50 = 58.9 µg/mL).

**Conclusion:** Rhizome is a source of starch and has been eaten in times of famine in Africa and Asia and also Banana pseudostem is a by-product of plant and has potential for providing profitable products such as food source for human consumption. The study has shown the banana pseudo-stem to possess a commercial importance as a dietary source in the diet especially after processing.

**P042: ACRYLAMIDE CONTENT IN ALKALIZED ROASTED COCOA BEANS BASED ON K2CO3**

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**Background:** The Dutching process of cocoa liquor, ensures consistency of the brown color and flavor of cocoa masse. However, acrylamide, a known probable carcinogen which is one of known by-products of browning reactions, is linked to the strength of alkalis frequently used for the process.

**Methods:** This study used Response Surface D-optimial, 20 experimental runs to determine acrylamide content of beans after using treatment factors; temperature (110–160 °C), time (20–50 min) and K2CO3 (10–70 % w/v). Subsequently, treated cocoa bean samples were treated using QuEChERS method to obtain extracts containing acrylamide. Concentrations of the acrylamide were determined using HPLC after which the data was processed by fitting a cubic process order followed by diagnostics to remove outliers.

**Results:** The results yielded optimized process conditions of treatment required to yield low acrylamide content, validated to be 29.17% for alkalis, 110 °C as roasting temperature and time as 20 min. These validated treatment conditions produced outcomes of pH indicated as 6.5 and acrylamide content of 7.22×10^{-2} mg/g.

**Conclusions:** Though this value of acrylamide is still high for a probable carcinogen, it is however, lower than the prevailing range (17.00×10^{-2}–23.00×10^{-2} mg/g) in products on the markets. This suggest that the application of K2CO3 could hold promise of lowering exposure and risk to acrylamide in cocoa products. For their applications however, other factors such as astringency and matching K2CO3 alkalized cocoa cakes to consumer products must be studied.

**Keywords:** Alkalized cocoa, acrylamide, potassium carbonate, probable carcinogen

**P043: FARMERS’ BEHAVIOUR PLAN IN CROP PRODUCTION AND CONSUMERS PERCEPTION OF IMPROVED NUTRITIOUS CROPS**

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**Background:** Investment in Nutrition Sensitive Agriculture (NSA) in Nigeria is increasing, however, farmers uptake of nutrition-sensitive practices and consumers perception remain undefined.

**Objective:** This study was designed to evaluate agriculture stakeholders’ perception, farmers’ behaviour plan in crop production and consumers’ perception of improved nutritious crops.

**Design:** This cross-sectional study involved 23 Agricultural Extension Workers (AEWs), 25 farmers and 235 Reproductive Age Women (RAW) in Benue, Kaduna and Kogi states of Nigeria. Data on socio-demographic characteristics, work experience, training and practice of NSA was collected using semi-structured questionnaire. Knowledge of NSA among AEWs was assessed using 15-item questionnaire classified as good (≥10.0) and poor (<10.0). Farmers preparedness to adopt improved crop varieties was evaluated using 33-item Behavioural Plan in Crop Production Questionnaire. Eight focus group discussions were conducted to explore perception and utilization of improved nutritious crops among RAW. Quantitative data were analyzed using descriptive statistics at p<0.05. Qualitative data were analysed thematically.

**Results:** Age of AEWs was 52.7±5.3, 53.5±7.8 and 57.4±5.9 years; and working experience was 17.8±3.8, 16.4±4.5 and 28.4±6.7 years in Benue, Kaduna and Kogi states respectively. All AEWs (100.0%) had training on NSA; major
activities included training on home gardening and nutrition value addition. Challenges were high workload and incentive. All farmers (100.0%) indicated willingness to understand nutritional composition of improved crops, 87.5% each in Benue and Kaduna and 88.9% in Kogi practiced and promoted multiple cropping. Age of RAW (years) was 35.8±10.9, 38.6±10.2 and 40.0±13.2 and knowledge of NSA was 10.86±2.27, 9.5±0.93 and 11.5±3.82 and 85.7%, 75.0% and 75.0% had good knowledge in Benue, Kaduna and Kogi states respectively. Women displayed willingness to use improved nutritious crops in food preparation. Factors affecting use include seasonal availability, knowledge, fund, cultural practices and poor physical access.

**Conclusions:** Knowledge of Nutrition sensitive agriculture is high and practice is gaining acceptance among various agriculture stakeholders in Nigeria.

**Keywords:** Nutrition sensitive agriculture, women of reproductive age, improved nutritious crops

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**P044: EFFECT OF COWPEA FLOUR PROCESSING ON THE CHEMICAL PROPERTIES AND ACCEPTABILITY OF A NOVEL COWPEA BLENDED MAIZE PORRIDGE**

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**Introduction.** Childhood growth stunting is a pervasive problem in Malawi and is in large part due to low quality complementary foods and chronic gut inflammation. Introducing legumes such as cowpea (*Vigna unguiculata*) into the complementary diet has the potential to improve childhood growth by improving diet quality through improvements in macro- and micronutrients and also by reducing gut inflammation. The present study evaluated the effect of processing on the retention of zinc, crude fibre, and flavonoid in roasted, boiled, and dehulled cowpea flours, and assessed the acceptability of maize porridge (70%) enriched with one of the three cowpea flours (30%).

**Method.** Cowpea flour was processed using 3 different methods: roasting (120°C; 50 minutes), boiling (100°C; 40 minutes) and dehulling (soaking 22 hrs) before milling. Crude fiber was analyzed using enzymatic-gravimetric method. Zinc and flavonoid content were analyzed spectrometrically.

**Results.** Dehulled cowpea had a significantly lower zinc content than each other formulation (p<0.01), attributed to soaking, which would allow zinc to leach into the water. Crude fiber content was increased from the amount in raw cowpea by each of the three processing methods (p<0.003). Each formulation’s flavonoid value differed significantly from each other (p<0.02), with roasted cowpea flour having the highest value. Roasted, boiled, and dehulled cowpea blended maize porridges were acceptable to children with mean quantities of leftover food of less than 3g from the given 100g. Caregivers also rated the blended flours to be highly acceptable to them as well, with maize porridge blended with dehulled cowpea flour the most acceptable to both children and caregivers.

**Conclusions and Recommendations.** These results demonstrate that cowpea flour, processed by any of these three different methods, could serve as a useful addition to maize porridge for complementary feeding of children in sub-Saharan Africa.

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**P045: STUDIES ON THE NUTRITIONAL AND FUNCTIONAL CHARACTERISTICS OF OGI POWDER PRODUCED FROM Malted and Fermented MAIZE ENRICHED WITH SOYBEAN AND COCOA POWDER**

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**Introduction:** Undernutrition and hidden hunger are serious concerns in Nigeria. Most diets are prepared from cereal which lack adequate protein and other essential nutrients for healthy livelihood. This has been implicated for most deaths in Nigeria especially among the infants and children.

**Aim:** The study was designed to increase the utilisation potential of cocoa powder and nutritious soybean to enrich ogi in order to combat undernutrition in humans, particularly in young children, convalescence, elderly and nursing mothers who consume ogi and other maize products.
Method: The maize and soybean were cleaned and processed separately into flours. The maize grains were divided into three portions. One portion was malted, another fermented and the third was processed to flour. The cocoa powder used was supplied by reputable producer. The various flours were composited at different ratios. Each enriched ogi was subjected to various analyses (proximate, mineral compositions, functional, antioxidant and sensory properties, etc) using standard procedures.

Results: The results showed that malting, fermentation and enrichment with soybean and cocoa improved the protein, ash and energy levels of the ogi powder. There was significant increase in the level of the mineral element of the malted and fermented ogi. The malting process reduced the bulk density, viscosity of the ogi gruel after reconstitution. The malting and fermentation processes coupled with enrichment of the ogi with soybean and cocoa powder significantly increased the antioxidant properties of the resulting ogi. The enriched ogi was acceptable to the panellists.

Conclusion/Recommendation: The study concluded that the nutritional quality of ogi can be improved by malting and fermentation processes and enrichment with both soybean and cocoa powder boosted the antioxidant properties of the product. The enriched ogi will be invaluable to solving the problem of undernutrition among Nigerians.

**P046: BODY SIZE PERCEPTIONS AND FOOD CHOICE AMONG NORMAL AND OVERWEIGHT MOTHERS AND CHILDREN IN MALAWI**

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**Introduction**: Overweight in mothers and children in sub-Saharan Africa is rapidly increasing and may be related to body size perceptions. In many African countries, overweight is considered a sign of wealth, health, strength, and fertility. We examined mothers’ perceptions of their own and their child’s body size and their food choices.

**Methods**: We enrolled 271 mother-child dyads. Mothers were 19-48 years old and children were 6-59 months old. Twenty-nine percent (n=78) of mothers were normal while 71% (n=193) were overweight. Forty-four percent (n=120) of children were normal and 56% (n=151) were overweight. Interviewers used a set of 7 adult female and 7 child body silhouette drawings to measure mothers’ perceptions of their own and their child’s current, preferred, and healthy body sizes and how these affected food choices. The silhouettes ranged from underweight to obesity. Chi-squared tests compared body size perceptions to actual body size. Open-ended responses were categorized by weight status then grouped into themes.

**Findings and Interpretations**: About 66% of normal vs 72% overweight mothers selected their body size image correctly; 67% normal and 68% overweight preferred overweight body size; 96% normal and 94% overweight selected overweight as being healthy. Mothers of normal weight children (57%) vs of overweight children (46%) selected their children’s silhouette incorrectly; 70% vs 48% preferred overweight body sizes for their children; and 89% vs 94% said overweight silhouettes were healthy. Mothers said they and their children could eat larger quantities or more frequently, increase consumption of fatty/oily foods and drinks such as sodas, sweetened yoghurt, and milk to achieve overweight body size.

**Conclusions**: Mothers strongly preferred overweight body sizes for themselves and their children and described consumption of fried foods and sugary beverages as a way to increase body size. Body size preferences should be considered when designing overweight prevention interventions in Malawi.

**P047: BREAKFAST EATING HABITS AND ANTHROPOMETRIC CHARACTERISTICS OF PUBLIC PRIMARY SCHOOL CHILDREN IN ILORA, OYO STATE**

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**Background**: Regular breakfast consumption among school-aged children contributes to decreased risk of obesity and chronic diseases, improved cognition and improved nutrient intake. However, studies showed that breakfast consumption among school-aged children is declining globally and fast food consumption is increasing with consequences on learning ability.
Objective: This study was therefore designed to assess the breakfast eating habits and anthropometric characteristics of public-school pupils in Ilora, Oyo State, Nigeria.

Design: This descriptive cross-sectional study involved three-stage sampling procedure to select six out of 12 public primary schools and 568 pupils using simple random and total sampling respectively.

Methodology: A semi-structured, interviewer-administered questionnaire was used to collect socio-demographic characteristics and breakfast consumption information. Weight and height were assessed using standard procedures and analysed using World Health Organization Anthro plus software to obtain the BMI-for-age. Data were analyzed using descriptive statistics and Students t-test at p<0.05.

Results: Mean age of pupils was 11.10±1.53 years, 51.9% were females, 97.0% were Yoruba, and 66.5% lived with both parents. Most pupils (90.8%) ate three times daily, 82.6% often ate before going to school, 74.6% ate breakfast before 8.00am and 7.2% always skipped breakfast. Majority of the pupils (72%) preferred rice as breakfast and ate it on the study day. Prevalence of underweight and overweight/obese was 29.7% and 1.1% respectively. There was no relationship between breakfast consumption and Body Mass Index (BMI) of the pupils (p-value = 0.310). Breakfast consumption did not have an effect on the anthropometric characteristics of the respondents (t=-1.015, p>0.05).

Conclusion: Breakfast consumption among public primary school pupils in Ilora is high, yet underweight constitutes a public health problem among the school pupils. There is no association between breakfast consumption and anthropometric of the pupils, further studies are recommended to provide information on the nutrient adequacy of breakfast consumed.

Keywords: Breakfast, eating habits, anthropometric characteristics, primary school children

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P048: ORAL HYGIENE STATUS AND CARIES EXPERIENCE AMONG CHILDREN AT A NUTRITIONAL REHABILITATION CENTER IN ACCRA, GHANA

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Background: Significant association exists between nutritional status and oral health status in children. Children’s high growth rate requires timely and adequate nutrient for development of the oral cavity. Malnutrition therefore can affect the oral health status of children. Princess Marie Lewis Hospital (PMLH) in Accra has a rehabilitation center for malnourished children.

Aim: The Study aims at assessing the oral hygiene status and dental caries experience of children at the nutrition rehabilitation center.

Method: All children at the rehabilitation center were orally examined after consent from mothers. Anthropometric measurements were taken for nutritional status assessment. Oral Hygiene Index(OHI) was taken to estimate the oral hygiene status while the dmft score for their caries experience. Gum bleeding was also recorded. BMI-age-sex percentile and MUAC were used to classify malnutrition status. Associations were determined using Chi-square test.

Results: Mean age was 3.3 ± 1.7years. Overall malnutrition was 77(62%). Severely malnourished 19(15.2%), Moderately malnourished 48(38.4%), Normal weight 48 (38.4%), Overweight 4(3.2%) and Obese 6(4.8%). Oral hygiene status were good, 18(14.4%), fair 66(52.8%) and poor 41(32.8%). Caries prevalence was 42(33.6%) with mean DMFT score of 1.78±3.5 ranging from 0 to 16. Fair to poor oral hygiene status were more common in the severely malnourished children 18(94.7%) than normal weight children 39(81.3%) but not significant, p=0.163. Caries prevalence was similar in the normal children 14(29.2%) and malnourished children 28(36.4), p=0.407.

Conclusion: Poor oral hygiene status and higher caries experience were observed in the severely malnourished children though nonsignificant.

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P049: NUTRIENT COMPOSITION OF SMOKED, OVEN, SHADE AND SUN-DRIED SNAIL MEAT FLOUR

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Background: Snail meat is affordable and easy to farm rich source of protein and minerals for the poor resource communities but the consumption is low in Nigeria due to fallacies and or poor keeping quality of the meat once harvested. The use of this mini-livestock can serve as alternative to expensive sources of animal protein or complement cheap plant protein.

Objective: This study examined the nutrient composition of snail meat flour processed using different drying (smoking, oven, shade and sun-drying) methods
Methods: *Archachatina marginata* (African giant land snail) breed purchased from a local market in River state, Nigeria was used for the study. The snail shells were broken, the meat eviscerated, washed severally with lime, rinsed with water and cut in tiny pieces. The cut snail meat was placed in different pans, dried using different methods and ground into flour. The energy, proximate, mineral and vitamin contents of the samples were determined using standard methods. Data were analyzed using descriptive statistics (means and standard deviation). Analysis of variance (ANOVA) was used to separate the means while Duncans multiple tests used to compare the means.

Result: The energy (374Kcal) and protein (85.7%) values of the sun-dried sample were significantly (p < 0.05) higher than in the other samples. The smoked sample had the highest carbohydrate (13.1%) and fat (4.4%) contents. The shade dried sample had the highest amounts of vitamin A (118.73µg/100g), vitamin C (20.64mg/100g), and vitamin B<sub>12</sub> (86.34µg/100g) while vitamin B<sub>6</sub> (0.36mg/100g), iron (14.47mg/100g) and magnesium (565.31mg/100g) were highest in the sun-dried sample. Calcium and iodine (466.11mg/100) and (0.63mg/100g, respectively) were highest in the oven-dried sample.

Conclusion: Sun-drying method was relatively the most favorable drying method, retaining most of the nutrients.

P050: HAEMATOLOGICAL INDICES, SERUM BILIRUBIN AND LIVER ENZYMES OF WISTAR RATS ADMINISTERED SUSPENSION OF EDIBLE CLAY (NZU).

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Introduction: The practice of clay consumption is on the increase across ages and socio-economic status. Some individuals nibble at some type of clay while others consume substantial quantities on a regular basis. Like any other edible item, the consumption of clay should elicit some metabolic and biochemical reactions in the organism when consumed.

Objective: This research investigated the influence of different concentrations of suspension of *nzu* on haematological, liver enzymes and serum bilirubin indices of Wistar rats.

Method: Ninety five rats were used for the experiment. They were grouped into nineteen with five rats in each group. The rats were weighed at the beginning of the 28-day experimental period and then weekly till the end of the experiment. Group 1 was the base line group, groups 2-4 were the control while groups 5-19 were the test groups which received varied doses of 125mg, 250mg, 500mg, 1000mg and 2000mg per kg/wt of *nzu* suspension respectively. The doses were administered daily for 28days. Five rats were sacrificed from the control group and

Conclusion: There were variations in most of the values of the parameters measured. There is need to extend the investigation to sex hormones.

P051: EFFECT OF EDIBLE CLAY (NZU) ON THE BODY WEIGHT, SERUM PROTEIN, LIPIDS AND ELECTROLYTES OF WISTAR RATS

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Introduction: Consumption of geologic materials is as old as man. Several benefits are claimed to be attached to the consumption of some of these materials. However, these claims are surrounded by controversies.

Objective: This research work investigated the effect of different concentrations of suspension of *nzu* on the body weight, serum protein and electrolytes of Wistar rats.

Methods: Ninety five rats were used for the experiment. They were grouped into nineteen with five rats in each group. The rats were weighed at the beginning of the 28-day experimental period and then weekly till the end of the experiment. Group 1 was the base line group, groups 2-4 were the control while groups 5-19 were the test groups which received varied doses of 125mg, 250mg, 500mg, 1000mg and 2000mg per kg/wt of *nzu* suspension respectively. The doses were administered daily for 28days.
each dose group on week 1, 2 and 4. The base line group was sacrificed at the beginning of the experiment. The blood of the animals was collected for analysis.

**Results:** The mean body weight increase (−2.80 ± 0.5g) was lowest in the treatment group that received the highest dosage 2000mg/kg of the suspension. The serum sodium, potassium and chloride concentration decreased with increase in concentration of the suspension with the highest concentration having the least values 97.0±7.27mEq/l, 3.50±1.16mEq/l, 63.60±5.08mEq/l respectively. The values for total protein and Albumin for all the group over the experimental period varied but the difference was not significant (P< 0.05). The levels of triglycerides, cholesterol and HDL cholesterol increased with concentration of suspension.

**Conclusion:** The values for the parameters measured for the control and test groups compared favourably. However, there may be need to use human subjects for the research.

**P052: KEY BARRIERS AND ENABLERS OF ADEQUATE MATERNAL DIETARY DIVERSITY BY REFUGEE AND HOST POPULATION FARMERS IN THE RHINO CAMP SETTLEMENT AREA, ARUA DISTRICT, UGANDA**

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**Introduction:** Welthungerhilfe is implementing the Strengthening Resilience through Infrastructure, Agriculture and Skills Development (RIAS) project with refugees and the host population (‘hosts’) in Arua and Yumbe Districts. Two earlier project surveys showed low percentages of households/ women consuming a diverse diet.

**Purpose:** To investigate, ahead of developing materials for community nutrition sessions, key barriers and enablers of consuming a diet diversity by women of reproductive age of RIAS project.

**Method:** In September 2017, Welthungerhilfe conducted two barrier analysis surveys, among refugees and hosts, in the Rhino Camp settlement where RIAS operates. Data were collected of women of the project’s farmer field schools who did/did not consume a diverse diet. Among refugees, 49 ‘doers’ and 49 ‘non-doers’ and, among hosts, 48 ‘doers’ and 56 ‘non-doers’ were interviewed. A \( p<0.05 \) of the odds ratio and/or absolute percentage point difference of ≥15% between doers and non-doers were used to identify key barriers/enablers.

**Results:** Responses of doers and non-doers differed significantly in seven of 12 determinants investigated: perceived self-efficacy, social norms, positive consequences, access, risk, severity and action efficacy. Enablers included confidence in being able to consume a diverse diet. Among the hosts, 50.0% doers and 14.6% non-doers felt this was easier with nearby markets or when husbands bought the food items. Barriers included access: many respondents, but fewer doers, felt access to the necessary foods/materials to consume a diverse diet was very/somewhat difficult. Among refugees, 65.3% non-doers and 32.7% doers perceived it very difficult.

**Conclusions/recommendations:** Understanding specific barriers and enablers can support with the fine-tuning and focus of social and behaviour change activities. Income earning/saving opportunities, farming and related inputs were perceived as key for an enabling environment to consume diverse diets. Refugee response and development projects should support such activities with the clear objective to improve the quality of diets.

**P053: KEY BARRIERS AND ENABLERS OF EXCLUSIVE BREASTFEEDING OF CHILDREN BELOW SIX MONTHS OF AGE IN FOUR DISTRICTS OF SOUTHERN KARAMOJA, UGANDA**

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**Introduction:** Concern Worldwide implemented a social and behaviour change component for improving health and nutrition behaviours among participants of the ‘Resiliency through Wealth, Agriculture, and Nutrition in Karamoja’ (RWANU) project, a large-scale project implemented in four districts of Karamoja, Uganda, from 2012-2017. Exclusive breastfeeding (EBF) is key to optimal nutrition and health during the first six months.

**Purpose:** To investigate key barriers and enablers of improving (EBF) of infants <6 months in four districts in Karamoja.

**Method:** In April 2016, Concern Worldwide conducted a barrier analysis survey using the established ‘Designing for behavior change’ approach in four districts (two communities each) where the RWANU project operated. Data were collected of 55 ‘Doers’ and 52 ‘Non-Doers’: mothers of infants aged 6-8mo who did/did not practice the desirable behavior when their child was <6mo. A \( p<0.05 \) of the odds ratio and/or absolute percentage point difference of ≥15% between doers and non-doers were used to identify key barriers/enablers.
Results: Responses of Doers and Non-Doers differed in seven of 12 determinants investigated. Enablers included confidence in breastfeeding their baby exclusively for six months; beliefs that breastmilk has no disadvantages, is the most adequate food for a baby and that EBF prevents child malnutrition and diarrhea. Barriers included perceived breastmilk shortage due to insufficient maternal food intake or sickness, and time challenges. Many Non-Doers felt ‘on their own’ with little approval from their social group and they felt ‘bad’ about not practicing EBF.

Conclusions/ recommendations: Social and behavior change programs should continue to promote EBF, its importance and tips for overcoming (perceived) breastmilk shortage. Interventions should involve the wider community to foster an enabling social network for better support, available time and to reduce maternal mental stress. Maternal nutrition during lactation needs strengthening.

**P054: CHEMICAL COMPOSITION OF AERIAL YAM (DISCOREA BULBEFRA) FLOUR PRODUCED FROM GERMINATION AND FERMENTATION PROCESS.**

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Introduction: Aerial yam is one of the high yielding food crops with great potential to contribute to food security through improved processing technique that improve nutrient quality and diversity.

Objective: the study evaluated the Chemical composition of aerial yam (*Discorea bulbifera*) flour produced from germination and fermentation process.

Method: The aerial yam harvested from a farm in Ovoko, Igbo-Eze South Local Government Area in Enugu State, Nigeria. The Aerial yam were divided into potions: unprocessed; two portions were germinated; germinated and fermented for 48hrs, then peel, washed, drained, sundried and milled into flours. Unprocessed aerial yam flour (UAYF); germinated aerial yam flour (GAYF); germinated and fermented aerial yam flour (GFAYF). The flour samples were subjected to chemical analysis using standard methods. The data were analyzed using Statistical Product for service solution (IBM SPSS) version 22. Statistical analysis was carried out using Analysis of Variance (ANOVA) and the means were compare using Duncan’s multiple tests.

Result: The proximate composition of the flour samples in dry matter base. Germinated and fermented aerial yam flour (GFAYF) had increased Protein content (21.30%); Fat (3.32%) and decreased in carbohydrate (65.78%), ash content (3.95%) in (GFAYF). Fiber content increased to 3.95% each in UAYF and GFAYF respectively. GFAYF had increased zinc content (0.13mg), iron (3.55mg), calcium (3.34mg) and phosphorous (84.39mg). GFAYF had reduced in Phytate 4.73mg; Tannins (1.24); Hydrogen Cyanide (4.16); Oxalate (2.38); but increased in Saponin (0.12) respectively.

Conclusion: this study shows that germination and fermentation process increase the nutrient content and reduces the carbohydrate and anti nutrient contents of the aerial yam flour.

Keyword: Aerial yam flour, Germination, Fermentation, chemical composition

**SUB-THEME: NUTRITION AND HEALTH IMPLICATION OF THE CURRENT FOOD SYSTEM IN AFRICA**

**P01: POSITIVE LINKS BETWEEN HOME GARDENING AND IRON STATUS OF SCHOOL AGE CHILDREN**

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Introduction: Many households in Nigeria are food insecure. Though, production of certain crops has increased, it has not translated into improved food and nutrition security for the vulnerable groups such as children. Home gardening has been linked with improved food and nutrition security in many populations.

Purpose: This study therefore, examined the link between home gardening and iron status of school aged children.

Methods: This was a cross-sectional study conducted among school age children in Ubakala community in Umuahia South Local Government Area of Abia State, Nigeria. Two hundred and fifty-four (254) children were recruited from their primary schools using a multistage sampling procedure. Information on socio-demographics and agricultural
practices were collected from their mothers using validated questionnaires. Iron status of the children was assessed by measuring haemoglobin levels in the blood following standard procedures.

**Results:** More than half (58.3%) of the children were males. Majority of the households (70.1%) owned a home garden. More children from households without home gardens (66.7%) had low iron levels (haemoglobin <10 g/dL) compared to children from households with home gardens (31.4%). A significant (p<0.05) and positive association was found between ownership of home garden and iron status of children

**Conclusion and recommendation:** This study provides additional evidence that home gardening contributes to attainment of optimum iron status in this population. Therefore, strategies to encourage home gardening should be employed in the combat of food and nutrition insecurity.

**Keywords:** Home gardening, nutrition security, haemoglobin, school age children

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**P02: MALNUTRITION: CAUSES AND PREVENTIONS– A CASE STUDY OF BAUCHI (A REVIEW)**

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**Introduction:** The intake of nutrients such as carbohydrate, protein, lipids, vitamins, minerals and water must be adequate in quality and quantity to ensure maintenance of good health in addition with personal hygiene, environmental health and good medical care. Deficiency of nutrients results in breakdown of normal good health giving rise to malnutrition. Malnutrition is a silent killer, more than half of all children’s death worldwide is attributed to it.

**Purpose of the study/program:** To enlighten the developing nation as to causes of malnutrition and reducing it

**Methods/approach used:** Literature review and personal interview

**Summary of results:** Nutritional disorder identified in Bauchi State includes kwashiorkor (13.5%), and Marasmioc-kwashioker (32.1%). Some of the factors that contribute to these disorders include: - cultural food habits, ignorance, family size, food distribution, poverty, disease, improper food handling, and preparation. The suggested community nutrition programme should include:- creating of awareness on the part of extension services of the ward, local and state Agriculture Development authority, Family Support Programme(FSP), Maternity and Child Health Centres, Home Economics Units etc. Finally all the governmental and non-governmental agencies (NGO) could be used to train the local women in processing and formulation of infants and young children diet. Preserving the locally available foods and as well in planning their menus should be of focus. The mothers should be trained to observe hygienic ways of preparing foods, eat enough foods if possible three (3) times a day, children are regularly immunized against the six killer diseases and establishing a system for monitoring each community on a regular basis.

**Major conclusions/recommendations:** Nigeria has so many traditional foods that is rich in nutrients. There is nothing wrong with the traditional food but with the society and their attitude to traditional foodstuffs. The key to better nutrition lies in pursuing an effective nutrition education programme

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**P03: MILK CONSUMPTION PATTERNS AMONG CHILDREN (24-59 MONTHS) IN SMALLHOLDER DAIRY AND NON-DAIRY HOUSEHOLDS IN NAKURU COUNTY, KENYA**

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**Background:** Despite milk being a rich source of proteins containing all the essential amino acids and other nutrients, its consumption by children below five years has been on the decline especially in developing countries. This study aimed to establish milk consumption patterns by children (24-59 months) from dairy (DHs) and non-dairy smallholder households (NDHs) from a peri-urban (Bahati) and rural (Olenguruone) setting in Nakuru County, Kenya.

**Methods:** A cross-sectional study was conducted targeting 216 randomly selected smallholder DHs and NDHs. Semi-structured questionnaires were used to collect data whereby the qualitative 24 hour recalls gathered information regarding milk consumption. Chi-square and T-tests were used to test for differences between DHs and NDHs in peri-urban and rural areas while a multi-linear regression test performed to test the relationship between socio-economic characteristics, child dietary diversity and milk consumption patterns of children at a (α=0.05) level of significance.
Results: The percentage of children who consumed milk was higher among DHs (80.3%) and NDHs (72.2%) in rural area compared to their counterparts from DHs (57.4%) and NDHs (40.3%) in peri-urban area. However actual mean±SD intakes of milk was 338.3±245.7 mls and 207.7±109.7 mls in DHs and NDHs in rural area while 195.1±97.0 mls and 235.0 ± 69.7 mls in DHs and NDHs in peri-urban area respectively. The mean±SD intakes of milk by children were significantly different among DHs and NDHs in rural areas (P=0.002) but not significantly different (P=0.076) in peri-urban. The linear regression model was significant (r²=18.4%, P=0.001) in predicting the daily milk intakes by children.

Conclusion/recommendations: Milk consumption of children was below the WHO minimum recommended intake of 500 mls per day. Interventions seeking to improve the quality of diets consumed by young children should include strategies to increase the actual amounts of milk consumed by children.

Keywords: Milk consumption, smallholder, dairy households, non-dairy households

P04: NUTRITIOUS INDIGENOUS FOOD INGREDIENTS FOR COMPLEMENTARY FOOD FORMULATIONS AS A PATHWAY TO FIGHT AGAINST INFANT MALNUTRITION IN BENIN: A REVIEW

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Background: Infant and young child malnutrition is a major public health concern in developing countries. In the West African subregion, the use of local food resources for infant and young children’s food formulations is strongly encouraged.

Objective: This paper reviews indigenous Beninese food resources as potential ingredients for complementary infant foods with the aim to develop affordable formulations for low-income households in each agro-ecological zone of the country.

Design: Potential ingredients were selected on their documented nutritional value. The selected foods encompass 297 plant products from home gardens or collected from natural vegetation and 50 animals, either domesticated or from the wild.

Results: The compiled data reveal that the distribution of the available nutritious food resources was unbalanced between agro-ecological zones. Best documented plant protein providers were Glycine max, Balanites aegyptiaca leaves, Amaranthus hybridus leaves, Adansonia digitata kernels, and Ceratotheca sesamoides leaves, which all contain more than 200–320g kg−1 DW protein. Among the major minerals, calcium is essential for bone structure and function, with a daily requirement of 5 gkg−1 DW for infants. For food complementation, preference should be given to Citrus limon peel, Moringa oleifera, Amaranthus viridis, Adansonia digitata leaves, and Grewia mollis fruits, which all contain more than 3g kg−1 DW Ca. Iron is an essential mineral for humans and its recommended intake for infants is 0.116gkg−1 DW Fe given for 5% of dietary iron bioavailability. Best haem iron providers were grasshoppers, termites, snails and fish; best non-heme iron providers were seeds of Parkia biglobosa, and Adansonia digitata pulp and leaves.

Conclusions: Based on this review, local foods for the development of complementary food formulas for Beninese infants and children may be selected for each agro-ecological zone. The approach used is exemplary for other sub-Saharan African countries in need of complementary infant foods.

Keywords: local food resource; infant food; standards; nutritional value; Benin

P05: PROTEIN QUALITY OF COMMONLY CONSUMED EDIBLE INSECTS IN A RESOURCE-LIMITED COUNTRY: A CASE FOR ZIMBABWE

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**Background:** Consumption of edible insects as an alternative animal protein-source is a potential solution to curb protein-deficiency. Entomaphagy has been expressed in both developed and developing countries, and previous studies have proved edible insects are high in protein. The protein quality of edible insects, suggested as good alternative animal-protein source in resource-limited settings has not been fully investigated.

**Objective:** To evaluate crude protein content, protein-efficiency-ratio (PER) and protein-digestibility (PD) of three commonly consumed edible insects in Zimbabwe.

**Design:** In a 20-day mice-feeding trial four groups of Balb C 21 days-old mice were fed with protein-formulated diets consisting 1) *Imbrasia belina*, 2) *Locusta migratoria*, 3) *Encosternum delegorguei* and 4) casein (control group). Kjeldhal method was used to evaluate crude protein of the edible insects. Crude protein content, PER and PD was determined. Analysis was by ANOVA.

**Results:** Crude protein was high in *Locusta migratoria* (71.2%), *Imbrasia belina* (57.7%) and *Encosternum delegorguei* (31.3%). PER was lower in insect samples *L. migratoria* (2.3), *I Belina* (1.96), *E. delegorguei* (2.0) compared to casein (2.5) and the difference was significant. PD was comparable to casein (96%), *I. belina*-92%, *L.migratoria*-90% and *E. delegorguei*-92%. was high and comparable to that of casein (96%).

**Conclusion:** High protein quality of edible insects commonly consumed in Zimbabwe is comparable to casein. High digestibility of the three edible-insects indicated ease of absorption of insect-protein and potential in efficient utilisation by body tissues. *I. Belina* and *E. delegorguei* conceivable are limiting in amino acids that support building and growth of body tissues. Edible insects are a good source of quality protein that could meet protein requirements for communities to curb protein deficiency.

**Key words:** Protein Efficiency Ratio, Digestibility, Protein quality, Edible Insects

**P06: INFLUENCE OF FOOD PACKAGING ON FOOD CHOICES OF UNDERGRADUATE IN OBAFEMI AWOLOWO UNIVERSITY, OSUN STATE**

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**Background:** Packaging, the “silent salesman” attracts consumer’s attention and arouse individual desires in making purchase of food items. The new and emerging health claims by manufacturers is influencing consumer’s buying behaviour decision. The study examine the influence of food packaging on food choices of undergraduates at Obafemi Awolowo University, Ile-Ife, Nigeria.

**Methods:** Multistage sampling procedure was employed in selecting a total of 286 undergraduates from the student hall of residence. Pretested questionnaire was used to assess information on the influence of packaging on food choices. Data was analyzed using descriptive tools and t-test analysis was used to examine difference in purchase.

**Results:** Results reveals that half (59.4%) were male, and 40.6% females with mean age of 20.75±2.50. Students from level 100 were 23.8%, 200 (23.7%) and 300 (24.5%) respectively. Almost half (45.8%) had monthly allowance between ₦5000-₦10,000. Majority (82.5%) bought package food, and items bought were soft drink (81.8%), bread (75.2%), spaghetti (74.5%), biscuit (74.1%), noodles (67.8%), beverage (67.1%), and sausage roll (62.6%). The motivating factors for purchasing were convenience (46.2%), reduced cooking time (29.7%), safety (7%), and affordability (7%), while nutritional information (52.1%), convenient packaging (50%) brand name (44.7%), food picture (28.7%), packaging design (38.8%), and attractive package (38%) were cues that influences product choice. More than half of the respondent (62.5%) were satisfied with the quality of food in the packaging. The t-test analysis revealed a significant difference in the purchase of packaged food among male and female undergraduates (t = 48.32) at the 95% significant level.

**Conclusion:** The motivating factor for purchasing package foods were convenience, safety and affordability. The product choices were influenced by nutritional information, convenient packaging, brand name, food picture, packaging designs, and attractive packaging. It is recommended that intervention on improved nutritional knowledge be dispense to consumers of packaged food for appropriate food choices.

**Keywords:** Food packaging, Food choices, Nutritional information, Consumer, Undergraduate.
**P07: Effect of Micronutrient Powder Supplementation on Serum Retinol and Overall Nutritional Status of Children under Five Years in Lugari Sub County, Kenya: A Randomized Controlled Trial**

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**Introduction:** Under Five Years children are faced by many nutritional problems including deficiencies of major micronutrients such as Vitamin A, Iron and Zinc. Vitamin A Deficiency is a public health problem in Kenya and efforts for its control have focused on preschool children and lactating mothers but the endeavor has not yet bore fruits. Supplementation is one way of improving the micronutrient status of children. Multiple-micronutrient supplementation is envisaged as one of the most cost-effective approaches to addressing the micronutrient problems in children. However, research in this area has been scanty though the efforts employed.

**Overall Objective:** To assess the effect of Micronutrient Powder (MNP) Supplementation on serum retinol and the general nutritional status of under five years children.

**Study design:** Under Five Children selected from Lugari Sub County were randomly allocated to two groups MNP supplementation and control in a Randomized Controlled Trial study design. Serum retinol, weight and height were the parameters monitored in four school terms (16 months). Treatment groups were tested for significance at p < 0.05.

**Results:** Height for age and weight for age increased in all the groups. Body Mass Index for age increased only in the group that received MNP but decreased in the control. These changes in nutritional status were, however, not significant. The level of stunting in MNP group remained at 9.5% while that in control reduced from 9.8% to 0%. Underweight increased by 50% in the treatment arm 9.5% to 4.8% but increased by 33% in the control. Wasting on the other hand decreased from 4.8% to 2.4% in the treatment arm but increased in the control group. There were significant increases in mean serum retinol in both MNP groups after supplementation but not in the control. Vitamin A Deficiency reduced from 25% to 20.5% in MNP group A, but increased in the control from 27.8% to 30.6%. The Vitamin A status was not associated with any of the anthropometric indices: stunting, underweight and wasting.

**Conclusion and recommendations:** Supplementation significantly reduced the prevalence of underweight but not stunting among the children. Serum retinol levels of the children were significantly increased in the supplemented group and not in the control. The supplementation, irrespective of the regimen, produced significant reductions in the prevalence of Vitamin A Deficiency. Vitamin A status was not associated with weight-, height- or BMI for age in the school children. Supplementation with multiple micronutrients including vitamin A, Iron and Zinc was found to have beneficial effects in this cohort of U5 children. More studies are needed to better understand the contribution of U5 supplementation with micronutrients in areas where deficiencies of these nutrients are common, before a recommendation to supplement U5 with multiple micronutrients can be considered.

**Key words:** Micronutrient nutrient powder, deficiency, supplementation, stunting and vitamin A.

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**P08: Factors Influencing Dietary Diversity Among Children under 5 Years Old in Lugari and Likuyani Sub Counties of Kakamega County, Kenya**

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**Background:** Dietary diversity (DD) is useful indicator of dietary quality and nutrient adequacy. In developing countries limited evidence is available regarding predictors of DD during the critical complementary feeding period. The purpose of the study is to understand factors influencing dietary diversity among children under 5 years old in Lugari and Likuyani Sub Counties of Kakamega County, Kenya.
Method: A cross-sectional study was conducted among 1200 children aged 6–59 months in Lugari and Likuyani Sub Counties. The children were selected using a stratified two-stage cluster sampling technique. DD in the preceding day of the survey was assessed using the standard 7-food group score without imposing a minimum intake restriction. Factors associated with DD were identified by modeling dietary diversity score (DDS) using linear regression analysis.

Results: It was noted that 23.6% (95% CI: 7.6–13.6) of the children had the minimum recommended DD (≥4 food groups). In children born to literate mothers, the DD was increased by 0.4 as compared to their counterparts (p = 0.04). Children from households that practiced mixed farming, the DDS was significantly increased by 0.5 (p = 0.05). Caregivers and mothers who received One Acre Fund Nutrition and behavior change communication trainings during their antenatal and post-natal care, the DDS was increased by 0.32 (p = 0.037). Other factors that showed positive association with DD: mothers’ education, age of child, ownership of land, mother’s participation in One Acre Fund core program, exposure to nutrition information and husband involvement and participation in child nutrition.

Conclusion: Nutrition and behavior change communication training, husbands’ involvement in child nutrition, integration and implementation of agri-nutrition can significantly promote DD of children. It is recommended to invest in strategies that will promote maternal education through behavior change communication trainings, diversification of crops and livestock rearing and the scaling up of nutrition trainings based on a multi-sectoral approach.

Keywords: Dietary diversity, nutrition and behavior change communication training, child nutrition, agri-nutrition, nutrition status.

P009: FOOD TREE AND CROP PORTFOLIOS: ADDRESSING HARVEST AND NUTRIENT “GAPS” IN LOCAL FOOD SYSTEMS

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Background: Food trees provide a variety of nutrient dense foods including fruits, vegetables, nuts, seeds and oils, which have the potential to complement and diversify staple based diets.

Objective: To better incorporate these local tree products into food systems and thereby addressing challenges of seasonal food availability, World Agroforestry developed a methodology for selecting ecologically-suitable and nutritionally-valuable food tree and crop species for production on farms.

Design: Harvest months of location specific food tree and crop species are mapped against food insecurity periods. In addition to filling harvest ‘gaps’ the portfolio addresses certain nutrient ‘gaps’ by matching the identified tree foods with nutritional data. Food composition data play a key role in linking agriculture to nutrition, particularly the nutrient composition of indigenous and underutilised species, for which such information is often lacking. To address this data and knowledge gap, ICRAF have compiled, standardized and aggregated food composition data following international standards. To simplify the nutrient content information, the foods are scored for whether they are a high source (+++), source (++ or present, but moderate or low (~) for the nutrients iron, folate, vitamin A (retinol equivalent) and Vitamin C. Additional food composition information on macronutrients, minerals and vitamins for over 80 food trees and crop species is covered in an open access database.

Results: Altogether sixteen portfolios with on average thirty species, have been established for site specific locations in Kenya, Uganda and Ethiopia. Moreover, the project identified several community entry points for distributing and disseminating information and planting material for the portfolios, thereby leveraging agriculture for nutrition.

Conclusion: The portfolios present a sustainable food-based approach to address micronutrient deficiencies by increasing the quality of local diets. In addition, the food composition data compiled for these species provides a repository for prioritizing domestication programs to mainstream available nutritious foods.

Key words: agroforestry, underutilised crops, food composition, nutrition, food-based approach sustainable diets

P010: COMPARISON OF FRUIT AND VEGETABLE CONSUMPTION PATTERN AND NUTRITIONAL KNOWLEDGE AMONG MALE AND FEMALE UNDERGRADUATE STUDENTS OF ALEX EKWUHEME FEDERAL UNIVERSITY NDUFU-ALIKE, IKWO (FUNAI)

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**Introduction:** Eating the recommended amount of fruits and vegetables each day can reduce the risk of chronic diseases.

Purpose of the study: The study aimed at comparison of Fruit and Vegetable consumption and nutritional knowledge among male and female students of Alex Ekwueme Federal University Ndufu-Alike ikwo (FUNAI)

**Methods:** This was a descriptive cross-sectional study used to select 234 male and 236 female students aged (17-27 years) of the University. A semi-structured pre-tested interviewer-administered questionnaire was used to collect data on socio-demographic profile, weight and height measurements, nutritional knowledge and fruit and vegetable consumption pattern. The data were analysed using descriptive statistics and Chi-square. Statistical significance determined at 5% level (P <0.05).

**Results:** Mean age of the males and females were 21.72 ± 2.80 years and 20.64 ±2.12 years respectively while the mean BMI were 22.15 ±2.42 kg/m² and 23.2±3.5 kg/m² respectively. There was no significant difference between the nutritional knowledge of fruits and vegetable consumption pattern by the males and females (p>0.05). More than 90% and 99 % of males and females had no idea of daily minimum recommendation of fruits and vegetables, respectively (p>0.05). More females (10.2%) than males (6.4%) consumed fruits always (p>0.05). Also more females (59.5%) than males (51.7%) sometimes consumed vegetables (p>0.05). Nevertheless, 90% of the students showed good knowledge of the nutritional and health benefits of fruits and vegetables. Differences exist in preferences for types of fruits or vegetables among males and females but only the consumption of Orange was significant (p<0.05). Variables such as availability and price significantly hindered the students' fruit and vegetable intake (p<0.05).

**Conclusions/ recommendations:** Results of this study showed no significant differences among male and female students in their overall fruit and vegetable consumption. Making fruits and vegetable available and reducing their prices is recommended.

**KEY WORDS:** Fruits, Vegetables, Consumption, Knowledge, Male and Female Undergraduates.

**P011: DRIVERS OF DEMAND FOR ANIMAL-SOURCE FOODS IN LOW-INCOME INFORMAL SETTLEMENTS IN NAIROBI, KENYA**

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**Background:** Undernutrition is a persistent problem in Nairobi’s informal settlements (with 42% of stunting and 74% of anaemia in young children). Nutrient-rich animal-source foods (ASF) can prevent stunting and micronutrient deficiencies, but prices are generally higher than other foods. Multiple other internal/external barriers may also explain low ASF consumption.

**Objective:** The purpose of this study is to explore these drivers in Nairobi low-income settlements, estimating the effect of the demand and supply side factors.

**Design:** We conducted mixed methods research, including a household survey and a retailer survey complemented by pre- and post-survey focus group discussions (FGDs) and key informant interviews (KIIs), in informal settlements of Dagoretti, Nairobi. We investigate the ASF environment: supply side (data from 900 retailers on product price -for price elasticity analysis-, availability and product quality) and demand side (data from 300 low-income households with a child under-5 on the choice, preferences and perceptions on ASF consumption). We specifically designed indicators of women’s bargaining power in the couple to explore the spousal decision-making on ASF consumption, and to quantify the allocation of purchased ASF among household members. We explored association of these drivers with nutrition outcomes (i.e. intake, anthropometry and haemoglobin levels). The qualitative research explored deeper and more nuanced aspects of ASF consumption drivers.

**Results and conclusions:** Pre-survey FGDs showed that peer-pressure exists to include ASF at least in the kid’s diet. In low-income households, the possibility to purchase smaller portions of meat and (unpackaged) milk makes a difference in ASF affordability and consumption. These small formats often come from the informal sector and may be at the cost of food safety. A degree of risk is often assumed by poor consumers, in exchange for their perceived high nutritional value. Quantitative data resulting from the retailer and household surveys on how the different drivers influence nutrition will be presented.
Keywords: animal-source foods, drivers of food choice, gender, bargaining power, intra-household allocation, stunting, anemia, Kenya

**P012: THE EFFECT COOKING TIME ON THE ESSENTIAL NUTRIENTS CHEMICAL COMPOSITION OF GREEN LEAFY VEGETABLES**

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**Background:** Vegetables have important nutritional benefits. Cooking of vegetables causes loss of many essential nutrients.

**Purpose of the study:** There is a need to establish best cooking time of vegetables to enhance retention of nutrients.

**Methods:** Proximate composition were determined by standard methods of the Association of Official and Analytical Chemists (AOAC). Carbohydrate content was estimated by a different method (Carbohydrate % =100 – Protein + Crude fibre + Crude fat + Ash + Moisture). Total carotenoids was determined by spectrophotometric assays and beta carotene by High Performance Liquid Chromatography (HPLC) method. Iron, zinc, calcium were determined by Atomic Absorption Spectrophotometric method (AAS). Vitamin C was determined by a titration method using, where extracted samples were titrated against N-bromosuccinimide until attainment of a permanent bluish-purple color. Data obtained were analyzed with SPSS. Means of continuous variables were compared by the student t-test and analysis of variance (ANOVA) for any significant differences. Vegetables were exposed to sunlight for eight hours for 2 consecutive days and were boiled for 5, 10 and 20 minutes and their Vitamin A content were analysed using HPLC.

**Results:** Five minutes boiled vegetables retained much of the nutrients than those boiled above five minutes (p<0.05). There was significant reduction in Vitamin A content of vegetables that were exposed to sunlight and its content of both were maintained at all boiling times.

**Conclusion:** Nutrients content were negatively affected by boiling beyond 5 minutes except for Vitamin A. Vitamin A content decreased significantly in those exposed to sunlight. This suggests that sunlight may not affect Vitamin A content of vegetables in their natural setting on the farm.

**Keywords:** Vegetable, cooking time, effects of heat of nutrients, green leafy

**P013: FARM ANIMALS AS SENTINEL FOR ENVIRONMENTAL HEALTH AND FOOD SAFETY IN NIGER DELTA, NIGERIA.**

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**Introduction:** The Niger Delta area of Nigeria is known for crude oil exploration with attendant environmental pollution. Biomonitoring of farm or free-ranging animals is critical in building risk management measures to protect human health.

**Purpose of the study:** Human health risks associated with exposure to heavy metals and metalloids in meat samples from farm animals in Niger Delta, Nigeria were investigated.

**Methods:** Fresh unprocessed cow, goat and chicken meat samples (liver, muscle and gizzard (for chicken only)) were collected from different abattoirs in the Niger Delta. Processed goat meat, chicken and beef suya, kilishi and pepper soup goat meat were also collected. The concentrations of Pb, V, Zn, As, Cu, Hg and Cd in the samples were determined using atomic absorption spectrophotometer. Human health risk assessment models by USEPA employed estimated daily intakes (EDI), target hazard quotient (THQ), hazard index (HI) and carcinogenic risk (CR).
**Results:** The concentrations of metals and metalloids in the samples were 0.211 - 14.728 mg/kg for Pb, 0.001 – 48.310 mg/kg for V, 0.856 – 81.369 mg/kg for Zn, 0.000 – 6.81 mg/kg for As, 0.273 – 20.881 mg/kg for Cu, 0.000 – 0.120 mg/kg and 0.000-0.852 mg/kg for Cd. Notably, 80% of the samples violated regulatory standards by WHO, USEPA, NAFDAC, DPR and EU. EDI was 3.314E-07 – 7.362E-02 mg/kg/day while THQ was 5.524E-05 – 9.468E+00. HI values were (01.461 – 48.519, 0.996 – 12.310, 4.175 – 138.626 and 0.996 -12.310) for adults, adolescents, children and seniors respectively with 95% of the values > 1. Carcinogenic risks were 1.729E 09 – 5.337E 03 for adolescents, 3.598E08 - 4.837E02 for children and 6.927E09 – 5.333E03 for seniors.

**Conclusions:** There was high carcinogenic and non-carcinogenic health risk from consumption of meat contaminated with heavy metals and metalloids. Evaluating contaminant concentration in farm animals can serve as an early indicator of pollution.

**P014: DIETARY PATTERN, NUTRIENT ADEQUACY AND PERCEPTION OF HEALTHY DIET AMONG WOMEN FARMERS IN THREE NIGERIAN STATES**

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**Background:** Women farmers are food producers and caregivers, yet vulnerable following poor income and access to production inputs. Few studies have explored nutrition situation among women farmers.

**Objective:** To assess the dietary pattern, nutrient adequacy and perception on healthy diet among women farmers in three Nigerian states.

**Design:** This cross-sectional study with a mixed-method approach involved 222 women farmers selected using cluster sampling of Benue (67), Kaduna (78) and Kogi (87) states, Nigeria. Information on socio-demographic characteristics and dietary practices was collected using a semi-structured questionnaire. Dietary pattern was assessed using a food frequency questionnaire. Dietary intake was assessed using 24-hour diet recall and analyzed using Total Diet Assessment software. Weight and height were assessed and BMI categorised as underweight (<18.5Kg/m²), normal-weight (18.5-24.9Kg/m²) and overweight/obese (≥25.0Kg/m²). Data were analyzed using descriptive statistics and Chi-square test at p<0.05. Eight focus group discussions were held to explore understanding, prospects and challenges of healthy diet. Data were transcribed verbatim and analyzed thematically.

**Results:** Age (years) was 35.8±10.9, 38.6±10.2, 40.0±13.2 and 64.1%, 71.9%, 25.3% spent >50.0% of household income on food in Benue, Kaduna and Kogi states respectively. Rice, maize, wheat, cassava, yam, and groundnut constituted staple foods. Small portion sizes of legumes (147±90.8g; 159.6±118.7g; 150.4±78.4g), soups (110.7±66.7g; 124.3±80.0g; 137.2±74.2g), animal foods (54.7±15.7g; 56.5±22.0g; 31.2±15.4g) and inadequate intakes of energy (66.0%, 29.0%, 69.2%), protein (58.0%, 22.0%, 78.8%), folic acid (94.0%, 36.0%, 92.0%), calcium (86.0%, 57.0%, 100.0%), zinc (88.0%, 23.0%, 88.5%) and iron (58.0%, 19.0%, 67.3%) were prominent in Benue, Kaduna and Kogi states respectively. Underweight was highest in Benue (19.4%) and lowest in Kaduna states (3.9%). Women exhibited good understanding of healthy diet; limitation to healthy dietary intake included inadequate money, food restrictions and poor physical access.

**Conclusions:** Inadequate nutrient intake occasioned by small portion sizes and poverty, and consequently underweight are high among women farmers.

**Keywords:** portion sizes, underweight, dietary practices, rural women

**P015: PHYSICOCHEMICAL COMPOSITION OF CASSAVA-PEANUT COMPOSITES, SENSORY ATTRIBUTES AND NUTRIENT DENSITY OF COOKIES MADE FROM THEM**

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**Background:** Unhealthy snacking behavior on high energy-dense cookies among adolescents due to high intake of dietary fat promotes the development and increasing prevalence of obesity among young adults and children worldwide. Cassava and peanuts are staple foods that have wide application in food production with high potential for product development and dietary...
diversification for healthy food choices. The study evaluated the physicochemical composition of cassava-peanut composites, sensory attributes and nutrient density of cookies made from them.

**Methods:** Cassava (Manihot sp.) flour and peanut (Arachis hypogea) paste were produced and blended in the ratios (90:10, 80:20, 70:30, 60:40 and 50:50) to obtain composite flours coded as CPA, CPB, CPC, CPD and CPE respectively. Wheat flour (WFF) (golden penny) (100%) served as control. Proximate composition and functional properties of the composite flours were determined. Using standard recipe for crackers biscuits, these composite flour blends were used to produce cookies CBA, CBB, CBC, CBD and CBE and WBF. Proximate composition and functional properties, sensory attributes, macro and micro nutrient densities of these cookies were determined and analyzed statistically using ANOVA and means were separated using Turkey test. Significant level was considered at p<0.05.

**Results:** Per 100gm, blend CPA had the lowest protein (2.94%) and fat (1.99%) but highest carbohydrate (77.58%); while blend CPB had the highest water absorption capacity (6.37%), oil absorption capacity (194%) and viscosity (200.5%). Product CBA had the highest carbohydrate (70.06%) and crude fiber (6.04%) but least fat (4.95%), protein (4.19%) and energy (341kcal) per 100g. Product CBC had the highest calcium (27.72Mg), zinc (8.84mg) and iron (5.77mg) per 100g. For general acceptability, CBA had better score (4.80). The cookies had high carbohydrate and protein (>70%) but low fat and micronutrient densities (<50%). Product CBA had the best profile (low fat, high carbohydrate and fibre content) with higher acceptability compared to other test samples. The low fat acceptable cookies should further be enriched with mineral rich foods.

**Key words:** Unhealthy snacking behavior, obesity, composite flour, cookies, sensory evaluation, nutrient density

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**P016:**

**P017: PATHWAYS LEADING TO MORE DIVERSE DIETS - A RETROSPECTIVE ANALYSIS OF A PARTICIPATORY NUTRITION-SENSITIVE AGRICULTURAL PROJECT IN KENYA**

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**Background:** A previous impact study that assessed the effectiveness of participatory farm diversification and nutrition education on dietary diversity in Western Kenya showed an increased dietary diversity of young children. In this present study we would like to identify the pathways, and the behaviours explaining those pathways, that led to the increased dietary diversity. While existing frameworks summarise pathways from agriculture to nutrition outcomes, they do not explain the behaviour along the pathways. This is unfortunate as such insights could guide future nutrition-sensitive agricultural interventions.

**Methods:** Data collection and analysis will thus be inspired by a widely-used framework related to nutrition-sensitive agriculture, the Pathways from Agriculture to Nutrition and a model for behaviour change, the COM-B model. The study design consists of a qualitative cross-sectional study applying 10 focus group discussions and 5 key informant interviews. The focus group discussions are conducted with community members who have actively participated in the participatory farm diversification and nutrition education while the key informant interviews involve local authorities who have been accompanying the communities in this. For data analysis we chose to apply a process that is inspired by the constant comparison analysis. Based on the collected information own frameworks of agriculture-nutrition linkages will be developed and the behaviour and motivations along these frameworks will be identified. The triangulation will aim to maximise the understanding of the pathways leading to more diverse diets. Gender disaggregation during data collection and analysis will enable the interpretation regarding gender equality and women empowerment aspects.

**Results:** The study is on-going and results will be presented.

**Keywords:** Agricultural-nutrition pathways, community-based participatory approach, dietary diversity, nutrition-sensitive agriculture

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**P018: ASSESSMENT OF HEALTH WORKERS’ COMPLIANCE WITH THE NATIONAL POLICY ON INFANT AND YOUNG CHILD FEEDING**

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Introduction: Health workers are supposed to support mothers and caregivers especially within healthcare facilities to feed their infants optimally by providing them with correct information on various feeding options. Unfortunately, inappropriate feeding practices have been reported within health facilities.

Objective: The purpose of the study was to ascertain the level of health workers’ compliance with the National Policy on Infant and Young Child Feeding at the facility level.

Methods: The study was conducted among health workers in healthcare facilities within Enugu Metropolis using a cross-sectional descriptive survey. The Multi-stage technique of sampling was used to select one hundred and sixty (160) respondents and data was collected using self-administered questionnaire.

Results: The level of health workers’ compliance with the Policy was poor (46%). Out of 111 that counseled mothers on infant and young child feeding in the context of HIV/AIDS, only 52.3% had correctly recommended breastfeeding and exclusive breastfeeding for twelve and six months respectively. And, a significant few (7.1%) had advised HIV-positive mothers against practicing exclusive breastfeeding in spite of encouraging them to breastfeed. While 5(3.6%) out of 138 counseled mothers to breastfeed up to two years of age and beyond.

Conclusion: Majority of the health workers are non-compliant with the Policy guidelines especially with regards to the feeding of infants in the context of HIV/AIDS and continued breastfeeding.

Recommendations: Copies of the Policy should made available and accessible to health workers and avenues such as training/re-trainings, seminars and conferences should be engaged to improve their knowledge of infant and young child feeding and compliance with the Policy.

Keywords: Assessment, health workers, compliance, National Policy on Infant and Young Child Feeding

P019: EMERGING EVIDENCE ON THE DOUBLE BURDEN OF MALNUTRITION IN TANZANIA

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Introduction: In Tanzania, rates of child stunting (chronic malnutrition) are high but gradually falling in some areas. At the same time, overweight and obesity are less prevalent but rising rapidly. This nutrition transition is closely related to the food system transformation that the country is undergoing. The objective of the study is to critically examine how the food environment influences household and individual consumption decisions and nutritional outcomes.

Methods: We use data from the 2008/09 and 2014/15 National Panel Surveys to assess the level, trends, and drivers of the double burden of malnutrition in Tanzania. We do so at household level and at individual level. At household level, we examine households with no members suffering either from stunting or overweight/obesity; households with members suffering only from stunting; those with members suffering only from overweight/obesity; and those with members showing both problems, whether in the same individual or across individuals (double burden households). At individual level, we examine individuals who are both stunted and overweight/obese. We also use an innovative new measure of “urbanicity” instead of administrative rural/urban definitions to explore these relationships over space.

Results: At household level, we find declines in the double burden in urban Tanzania, both in Dar es Salaam city and other cities, but steady (but lower) rates in the rural hinterland, semi-rural, and peri-urban areas. Overall in 2014/15, about 12% of households suffered from the double burden. Patterns over the two survey rounds are driven by declines in stunting and rises in overweight/obesity, both of which show strong but opposite relationships over space: stunting falls steadily from the most rural to the most urban areas, while overweight/obesity rises steadily, jumping sharply in the most urban areas. At the individual level, we find lower rates of double burden and a sharp fall from 2008/09 in all spaces, from the most rural to the most urban.

Key Word: Stunting, Overweight, Obesity, Food Environment

SUB-THEME: EXPLORING THE POTENTIALS OF AFRICAN FOODS IN NUTRITION AND DISEASE:

P01: QUALITY ASSESSMENT OF CASSAVA GRITS FORTIFIED WITH AFRICAN YAM BEAN (SPHENOSTYLIS STENOCLAPA)

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Background: Most families, especially the rural communities and low income earners depend on staples from Cassava. An energy giving food but highly deficit in protein and other essential nutrients while African yam bean (AYB) is high in these nutrients but underutilized.

Objective: To study the potentials of African yam bean substitution into cassava grits and to determine its effect on quality attributes of cassava grits.

Design/ methodology: Fresh yellow cassava tubers were peeled, washed, cut into smaller sizes and soaked for 3 days. The cassava mash was dewatered, drained, roasted and sieved to obtain fine grits. AYB were cleaned, roasted at 190 °C for 10 minutes, dehulled and processed into flour. Composite blends of 100:0; 90:10; 80:20; 70:30; 60:40 and 0:100 from Cassava grits and AYB flour, respectively using Design Expert Software. The samples were analysed for proximate, antinutrients, functional properties, amino acid profile and Beta-carotene. The sensory attributes were evaluated using nine point hedonic scale and all Data subjected to Analysis of Variance while means were separated using fisher’s least significant difference test at 5% probability.

Results: Moisture, fat, ash, protein, crude fibre and carbohydrate were in the range of 4.66 -7.92%, 6.11-6.82%, 0.16-4.06%, 2.72-27.43% and 56.25 -81.56%, respectively. There was increase in protein (10.60%) and the ash contents (1.46%) with inclusion of AYB. The amino acid profile revealed Total Amino Acid in the range of 63.33-80.50, Total Essential Amino Acid in the range 20.59-31.88 and Essential Amino acid in the range of 32.51-40.16. Beta Carotene of the samples was in the range of 190.93-661.60 IU. The bulk density, Water Absorption Capacity, Swelling capacity and swelling index ranged from 0.70 -0.81 g/ml; 151.05–503.29 g/ml; 1.67-5.68 and 2.86 -13.32%, respectively. Inclusion of AYB flour increased the bulk density and the swelling index. The pasting properties revealed a decrease in the peak viscosity, trough viscosity, breakdown viscosity and final viscosity with AYB flour at the four levels of fortification. All the antinutrients studied were within the safe limits in all the samples.

Conclusions: This study revealed the potentials of African yam bean in increasing the nutritional value of the cassava grits with acceptable sensory attributes thereby contributing to food security and national development.

Keywords: cassava, African yam bean, cassava grit, nutritional, underutilized, meal, gruel.

P02: ACCEPTABILITY AND NUTRIENT ANALYSIS OF YOGURT MADE FROM COW MILK AND OTHER PLANT SOURCES
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Background: The nutritive value of cow milk yogurt enriched with tigernut and soybean milk has not been sufficiently investigated.

Objective: To determine the mineral and vitamin content of yogurt prepared from extracts of tigernut and soybean milk.

Design: The milk samples were analyzed for minerals (Mg, Ca, Fe, K) and vitamins (A, B12, C, E) in addition, sensory evaluation was conducted. The various milk extracts used in making yogurt were investigated in a completely randomized design model using Cow milk (A1) as control, 50% Cow milk + 50% Tiger nut milk (A2), 50% Cow milk + 50% Soybean milk (A3), 50% Tiger nut + 50% Soymilk (A4), and 50% Cow milk + 50% Soybean milk+ 50% Tiger nut milk (A5). Sensory evaluation of the yogurt was conducted using a five point hedonic scale. It involved the participation of 50 panelists who comprised of staff of NAERLS, Ahamdu Bello University; Zaria. Each individual evaluated seven sensory characteristics (appearance, taste, color, flavor, consistency, sweetness and thickness)

Results: The result of the nutrients and vitamin analysis showed that sample (A4) had the highest amount of Mg and vitamin A, while sample (A5) was richest in Ca, Fe and vitamin E. The overall sensory score was 5.0 for all types of yogurt. However, yogurt made from sample (A1) and (A5) had similar sensory qualities compared to yogurt from other samples. Yogurt prepared from sample (A4) and (A5) had the overall acceptability score as well as could be successfully used in production of yoghurt characterized by high health and nutritional properties.

Conclusion: This study observed that the enriched yogurt with tigernut and soybean milk produced is sweeter and nutritionally superior in most quality attributes than the conventional yogurt. Thus this enriched yogurt can be used to produce yogurt which would be acceptable in the market.

Key words: yogurt, soymilk, tigernut milk, vitamins, minerals, cow milk.
P03: NUTRITIONAL AND PHYTOCHEMICAL COMPOSITION OF NONI PLANT
(Morinda citrifolia) LEAF, SEED, FRUIT AND BARK
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Introduction: Morinda citrifolia commonly known as noni is an evergreen plant with up to 80 species grown in tropical and subtropical regions. The plant is recognized by their large leaves, straight stem and grenade-like yellow fruit. The fruit has a pungent odour when ripening.

Purpose of the study: Nutritional and phytochemical composition of noni plant (Morinda citrifolia) leaf, seed, fruit and bark were carried out.

Methods: The noni plant (Morinda citrifolia) leaf, seed, fruit and bark were respectively processed into powder form. Proximate, mineral, vitamin and phytochemical composition were determined.

Results: Moisture content ranged from 8.27 – 16.45%, Protein 0.04 – 14.33%, Fat 2.0 – 3.98%, Ash 1.06 – 10.46%, Crude fiber 0.03 – 28.70% and Carbohydrate 2.36 – 53.43%. Potassium varies between 0.01 – 1.65mg/100g, Manganese 0.25 – 53.75mg/100g, Calcium 0.01 – 1.44 mg/100g, Sodium 0.0 – 0.47 mg/100g, Iron 3.71 – 92.25 mg/100g, Zinc 0.50 – 30.93 mg/100g and Magnesium 0.02 – 0.29 mg/100g. Phytochemical composition such as Tannin varies from 0.22 – 1.87 mg/100g, Saponin 1.92 -7.91 mg/100g, Alkaloids 4.27 – 17.89 mg/100g, Phytic Acid 4.48 – 5.89 mg/100g, Flavonoid 2.97 – 13.7 mg/100g and Oxalate 3.85 – 5.10 mg/100g. Vitamin A varies between 0.04 – 0.53 mg/100g, vitamin B1 0.22 – 2.21 mg/100g and vitamin C 2.11 – 4.11 mg/100g.

Conclusion: A great deal of variation occur in proximate, mineral, phytochemical and Vitamins composition between the various parts of Morinda citrifolia (L.) (Noni) seed, leaf, pulp and bark with significant different (p<0.05). This study offers opportunity to develop value added products from Noni plant since it could help to reduce micronutrient deficiency.

Key words: Morinda citrifolia leaf, seed, fruit and bark.

P04: NUTRIENT AND PHYTOCHEMICAL COMPOSITION OF GARDEN EGG PLANT (Solanum species) CULTIVARS GROWN IN SOUTH-SOUTH NIGERIA
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Introduction: The nutrient composition of fruits and vegetables vary widely depending on cultivar, variety and other factors.

Objective: The aim of this study is to determine the effect of cultivar difference on the nutrient and phytochemical composition of wild or domesticated fruits of Solanum species extensively consumed as vegetable in South-south Nigeria.

Methodology: Garden egg cultivars (Solanum aethiopicum var sosomaeum, Solanum melongena var depressum, Solanum aethiopicum var distichum, Solanum melongena var esculentum, Solanum ovigerum var album, Solanum macrocarpon and Solanum anguivi) were harvested from different locations of South-south Nigeria and subjected to nutritional and phytochemical analysis. Proximate, mineral and ascorbic acid composition of the cultivars were determined using standard methods while the phytochemicals were investigated qualitatively and quantitatively.

Results: ANOVA results showed variation (p<0.05) in the amounts of the nutrients and phytochemicals within the cultivars. Moisture content ranged between 51.63-77.89g, ash 0.68-4.60g, crude fibre 9.63-23.23.31g, crude protein 2.10-5.01g, crude fat 2.80-6.54g and carbohydrates 7.22-15.83g per 100g. Solanum macrocarpon recorded the highest ash and crude fibre contents. Micronutrient analysis revealed the cultivars to contain appreciable quantities of potassium (55.26-118.54mg/100g) and low sodium content (0.74-2.95mg/100g) with Solanum ovigerum var album having the highest concentration of potassium and sodium. Phytochemical screening revealed the presence of bioactive constituents with higher concentrations of saponins, alkaloids and flavonoids in most cultivars. The highest concentration of alkaloids was found in Solanum anguivi and saponins in Solanum melongena var esculentum.

Conclusion: Results obtained in this study revealed the tremendous variation in Solanum species suggesting it is heterozygous. The presence of bioactive constituents, high crude fibre and appreciable quantities of potassium underscores the nutritional and medicinal importance of the species in the human diet.

Keywords: garden egg, micronutrient, nutrient composition, phytochemicals, Solanum species
P05: NUTRIENT ADEQUACY OF COMMONLY CONSUMED TRADITIONAL SOUPS (AGBARA SOUP AND UKPOR SOUP) IN A RURAL COMMUNITY IN EASTERN NIGERIA

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Background: The major nutritional problem in developing countries like Nigeria is insufficient intake of food nutrients, attributed largely to food insecurity and ignorance of dietary constituents of foods.

Method: This study evaluated the nutrient adequacy of commonly consumed traditional soups namely agbara (Mucuna flagellipes) and ukpor (Abelmoschus esculentus) soups consumed in a rural community in eastern Nigeria. Different recipes of the soups were collected through focus group discussions (FGD), standardized, prepared, and chemically analyzed using standard methods. Portion sizes for different age groups (children, adult, pregnant women and elderly) were obtained, the nutrient content calculated and adequacy determined by comparing with the Recommended Nutrient Intake (RNI). Data obtained was statistically analysed using Statistical Product and Service Solution, version 22.

Results: The results showed that ukpor soup had higher (71.53%) moisture content than agbara soup (68.17%). The fibre contents of the soups were significantly different (p < 0.05) with agbara soup having a higher (3.34%) value than the ukpor (1.73%). The protein contents of the soup samples were negligible (0.53% in ukpor and 0.35% in agbara). Ukpor soup had higher ash (4.39%), folate (6.27mg), iron (18.29mg) and calcium (15.69mg) contents than the agbara soup while carbohydrate was lower (11.75%) in ukpor soup than the agbara soup (17.86%). The two soups had comparable vitamin A content (11.82 and 11.32µg Retinol). The portion sizes of the soups met only vitamin A and fat requirement of the age groups studied.

Conclusion: The traditional soups did not meet the RNI of the people. Hence, there should be modification in the ingredient combination and method of preparation of the soups to ensure nutrient adequacy.

Keywords: Nutrient adequacy, indigenous, soup, eastern Nigeria.

P06: NUTRITIONAL EVALUATION OF FORMULATED BLENDS PREPARED FROM FERMENTED PEARL MILLET (PENNISETUM GLAUCUM) GROUNDNUT (ARACHIS HYPOGEAL) AND MORINGA OLEIFERA

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Introduction: Food-based strategies are key to addressing hunger and malnutrition and the desired characteristics of such foods include high nutrient density, low bulk property, utilization of low cost and locally-available crops.

Purpose of Study: This study aimed at evaluating protein quality and sensory quality of diets formulated from local food materials.

Methodology: Complementary foods were formulated from fermented millet, groundnut and moringa seed powder in the following ratios: 55:25:20; 55:20:25; 55:15:30; 50:35:15; 50:30:20; 60:20:20 and 70:10:20 respectively. The proximate compositions, amino acid profile and sensory evaluations of the composite blends were done and compared with a standard formula.

Summary of Results: Study show that crude fat value ranged between 10.13±0.52 and 19.07± 0.03 g/100g, energy value from 401.20 to 447.73 Kcal/100g while protein content of the formulated diets ranged between 16.73± 0.01 and 18.77± 0.07 g/100g. Generally, the protein contents of the formulated blends were higher than that of ogi and Cerealac, hence there are significant differences (p<0.05) at all levels of determinations. The percentage ratio of the essential to non-essential amino acids was in the range of 33.50 – 37.95%. Lysine deficient in most cereals, was found to be relatively high (2.20 ± 0.02 and 3.02± 0.01g/100g). The formulated blends were rated high for all the sensory parameters investigated. This study revealed that formulated blends from fermented pearl millet, groundnut and moringa seeds were rated high in terms of protein quality compared to Ogi and Cerealac and therefore can fulfill the protein requirements of a malnourished child.

Keywords: Millet, moringa seed, fermentation, amino acid profile, sensory
P07: PHYSICOCHEMICAL, PHYTOCHEMICAL AND SENSORY EVALUATION OF ACHAl-CARROT FLOURS BLEND BISCUIT
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Introduction: The inability of Nigeria to meet the industrial demand of wheat, has caused incessant rise in the prices of baked products like bread and biscuit which in sequence has resulted into a call for the research into alternative local sources of flour for baking. Acha (Digitaria exilis), though potentially rich in nutrients (methionine and cysteine), has been classified among the lost crops with its cultivation and processing at village technology level.

Purpose of the study/program: The study is aimed at improving the nutrient content of acha (an underutilized grain) based biscuit

Methods/approach used: Flour blends were produced by substituting carrot flour into acha flour at 5, 10, 15, 20, and 25%. Pasting properties and functional properties of the flour blends were determined. Biscuits were produced from the flour blends and the physicochemical, phytochemical composition and sensory qualities of the biscuits were analyzed using standard methods.

Summary of results: The protein and carbohydrate content decreased from 8.35 – 7.90 and 70.67 – 68.74%, respectively. The moisture content, crude fibre, fat and ash content increased from 5.33 to 6.39, 0.85 to 1.50, 13.80 to 14.24 and 1.85 to 2.73% respectively, with increase in the added carrot flour (5-25%). The carotenoids, saponins, flavonoids, and anthocyanins increased from 4.68 – 7.87µg/g, 0.05 – 0.12, 0.01 – 0.03, and 0.05 – 0.07mg/100 g, respectively.

Major conclusions/recommendations: The 85:15% achacarrot biscuit sample was the most preferred with a corresponding increment of 2.5, 9.4, 25.4, 21.6 and 20% of protein, crude fibre, ash content, carotenoids, and anthocyanins, respectively. Addition of carrot to acha could be said to have greatly improve the quality of acha and consequently the nutrient intake of the consumer.

P08: POTENCY OF EHURU, UDA AND UZIZA IN BEANS PUDDING (MOI-MOI)
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Background: The potency of local food spices (ehuru, uda and uziza) in the production of puddings and its effect on bacteria growth and organoleptic evaluation/acceptability.

Objective: To investigate the effect of selected local food spices (‘Ehuru’, ‘Uda’ and ‘Uziza’) on the acceptability and keeping quality in the production of beans pudding which was evaluated against microbiological analysis and sensory acceptability.

Design: Dry seeds of cowpea seeds (beans) and other the selected local spices (‘Ehuru’, ‘Uziza’, and ‘Uda’), water, fresh peppers, onion, crayfish, groundnut oil, salt, were bought. The samples of the spices (‘Ehuru’, ‘Uda’ and ‘Uziza’) were sun dried and cleaned of chaffs and dirt’s by winnowing. These spices were milled, sieved and stored in air-tight containers until ready for use. All other samples were thoroughly cleaned and washed with clean water for the preparation of the test samples of the bean’s pudding. The beans pudding product was subjected to microbiological evaluation using standard procedures. Sensory evaluation was carried out for the products at Ignatius Ajuru University of Education using a nine-point hedonic scale where 1 represented dislike extremely and 9 – like extremely.

Results: Statistical analysis showed a significant difference (P<0.05) between ehuru, uziza and uda in the pudding in all parameters even at high concentrations. Organoleptic parameters evaluated were appearance, texture, aroma, taste, and overall acceptability. Statistical analysis showed a significant difference (P<0.05) between ehuru, uda and uziza in the pudding in all parameters even at high concentrations. The microbiological analysis revealed that control sample had higher counts of mesophilic bacteria. It was also observed that the higher the concentration of the spice, the higher the potency of the spice in the inhibition of mesophilic bacteria.

Conclusion: The result of the study is suggestive of the spices as potential micronutrient supplements as well as potential preservatives because of the inhibitory role exhibited.

The beans pudding is prepared using standardized recipes and the local spices were added at different concentrations (2g, 5g, 10g and 25g).
Keywords: Spices, Beans, Pudding, microbiological analysis, sensory evaluation, Nigeria.

**P09: CHEMICAL COMPOSITION OF COWPEA (VIGNA UNGUICULATA) FLOUR PRODUCED FROM GERMINATION AND FERMENTATION PROCESS.**

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Introduction: Cowpea is a well-known high yielding legume, a good source of protein which can contribute to food security. The improved nutrient potential and diversity of the cowpea through germination and fermentation to produce flours were scarce in Nigeria.

Objective: The study evaluated the Chemical composition of cowpea (Vigna unguiculata) flour produced from germination and fermentation process.

Method: The cowpea harvested from a farm in Ovoko, Igbo-Eze South Local Government Area in Enugu State, Nigeria. The cowpea were divided into portions: unprocessed; two portions were germinated; germinated and fermented for 48hrs, then de-hulled, washed, drained, sundried and milled into flours. Unprocessed cowpea flour (UCF); germinated cowpea flour (GCF); germinated and fermented cowpea flour (GFCF). The flour samples were subjected to chemical analysis using standard methods. The data were analyzed using Statistical Product for service solution (IBM SPSS) version 22. Statistical analysis was carried out using Analysis of Variance (ANOVA) and the means were compare using Duncan’s multiple tests.

Result: The proximate composition of the flour samples in dry matter base. Germinated and fermented cowpea (GFCF) flour had increased Protein content (20.99%); Fat (2.88%) and decreased in carbohydrate (68.43%), ash content (2.98%) in (UCF). Fiber content increased to 3.29% in GFCF. GFCF had increased zinc content (0.12mg), iron (3.93mg), calcium (3.52mg) and phosphorous (68.90mg). GFCF had reduced in Phytate 4.33mg; Tannins (1.43); Hydrogen Cyanide (4.31); Oxalate (3.55); but increased in Saponin (0.13) respectively.

Conclusion: this study shows that germination and fermentation process increase the nutrient content and reduces the carbohydrate and anti nutrient contents of the cowpea flour.

Keyword: Cowpea flour, Germination, Fermentation, chemical composition

**P10: BEETROT JUICE INHIBITS ARGINASE AND LIPASE ENZYMES INVITRO LINKED TO CARDIOVASCULAR DISEASES**

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Introduction: Plants foods that are effective in the prevention and management of diseases are referred to as functional or Bioactive foods. This is because they are good source of bioactive compounds like polyphenols, flavonoids and anthocyanins with high antioxidant properties. Modulation of enzyme activity is important in the management of hypertension, artherosclerosis and other cardiovascular diseases.

Purpose of the study: To determine the invitro ability of Beetroot juice (Beta vulgaris) to inhibit key enzymes (lipase and arginase) linked to cardiovascular diseases using spectrophotometric methods.

Methods/approach: 0.5gm of the freeze-dried crude extract of the beetroot (Beta vulgaris) was dissolved in 25ml of distilled water, homogenised and centrifuged. The filtrate was used for analyses of the percentage inhibition and its half maximal inhibitory concentration (IC50) of lipase and arginase using appropriate buffer and substrate solutions.

Results: Beetroot extracts were confirmed to have a dose dependent invitro enzyme inhibitory activity. The IC50 = 473µg/ml for arginase and IC50=158.8ug/ml for lipase.

Conclusions and recommendations: Nigerian beetroot juice extracts possess invitro inhibitory lipase and arginase activity and can be used as an adjuvant in the management of cardiovascular diseases. There is a need to study the assessment of the in vivo inhibitory activity of these enzymes. This will be further emphasise its beneficial use to ameliorate the progression of cardiovascular diseases.
P011: AQUEOUS DACRYODES EDULIS SEED EXTRACT INTAKE ON RAT BODY WEIGHT AND SOME BLOOD FACTORS

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Introduction: The fruits of Dacryodes edulis [African Black Pear (ABP)] are used as snacks in food servings while the seeds are discarded after consuming the fruit pulp.

Purpose: Research objectives were to examine the effect of aqueous seed extract of body weight and some blood indices using Sprague Dawley rats as experimental models. Methods: The aqueous extract was administrated in graded concentrations of 10, 100 and 1000 mg/kg daily for 28 days via oral gavage to three groups of rats, categorized as A, B and C respectively while a control set was administered water, and body weight was monitored weekly throughout the duration of the experiment. At the end, blood was collected by tail puncture and some biochemical parameters using standard methods and statistical procedures.

Results: Administered extracts were found to significantly (p>0.05) affected body weight gain of animals among the test groups A, B and C, with a recorded increases of 8.92, 8.24, and 8.79% respectively as against 77.6% for control. Blood glucose, cholesterol and urea were reduced (p>0.05) compared to control, while there were observed increases (p>0.05) in total proteins and uric acid levels of test animals compared to control. Significant (p>0.05) increases in ALT, ALP and AST were also observed for test groups compared to control. Conclusion: findings suggest that the extract of D. edulis seeds has the potential to minimize weight gain and induce other nutritional challenges in rats, when administered in raw form.

Key words: Dacryodes edulis; Bush butter; Pear.

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P012: CHEMICAL, ANTI-OXIDANT AND PHYTOCHEMICAL POTENTIAL OF AFRICAN NIGHTSHADE (Solanum nigrum complex) EDIBLE BERRIES

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Introduction: Solanum complex is a green, indigenous leafy vegetable (ALV) that grows in many parts of the world and a popular vegetable in Africa. It has great nutritional and healing potential due to its chemical and phytochemical composition. Among the indigenous vegetables, “managu”, as it is popularly known in Kenya Solanum nigrum is grossly underutilized, mainly because many assume it is an invasive weed. Even for those who consume it, only the leafy part is considered as food. This negates the other parts of the plant, especially the edible berries. To a great extent, the berries have been classified as toxic, leading to massive under-harnessing of the nutritional and medical value that can be derived from the berries.

Purpose: This study sought to address the problem of underutilization of Solanum nigrum berries by looking at the benefits that can be derived from them.

Research Approach: Four varieties of the plant were cultivated at the University of Eldoret research field using the Completely Randomized design (CRD). Harvesting of berries began once the first fruits started ripening and harvesting was done periodically till all the fruits were picked. Chemical analyses of the berries were done to determine the content and changes in macro and micro-nutrients and the phytochemical content of the berries as they ripened. Analysis of Variance (ANOVA) was used to determine the significant difference between nutrient and phytochemical composition of the different S. nigrum varieties at different ripening stages. Tukey’s means separation procedure was used to test for the significant differences.

Summary of Results: Findings from the study indicated that, though there are varietal differences, berries of the African Nightshade have macro, micro-nutrient, phytochemicals and anti-oxidant content at levels comparable or superior to other berries and fruits. They have anti-nutrient factors at the earlier maturity stages but these reduce at the ripe stage which is the point at which the fruits are eaten.

Conclusions: Given their nutritional and medicinal value, the berries should be incorporated in the diet as an avenue of diet diversification and optimal utilization of a popular indigenous plant.

Keywords: Fruits, S. nigrum, Indigenous vegetables, Ripening, Utilization
P013: DEVELOPMENT OF CHIPS FROM CASSAVA (MANNIHOT ESCULENTA) AND SENSORY ACCEPTANCE COMPARISON WITH POTATO CHIPS

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Introduction and Background: Cassava (Manihot esculenta) was introduced in Ethiopia around 1960’s. Currently the plant is being distributed throughout the country as a tool to tackle food insecurity. However, the distribution is not supported by proved food preparation techniques for optimal processing to increase nutrient density and eliminate the toxin.

Purpose of the Study: The aim of this Research is to develop the cassava chips and compare sensory acceptance with potato chips and improve nutritional quality of cassava-based foods. Sweet variety cassava was used in this experiment.

Methods: Processing methods such as washing, peeling, slicing, frying and draining were used to increase nutritional value and diversity of cassava-based foods

Results: In this study the chips produced from potato was found to be the best in sensory acceptance criterion while chips produced from Cassava was best in the crispness quality

Conclusion: In general, both cassava and potato can be used to produce/make chips

Key Words: Chips, Cassava, Crispness, Sensory Analysis, frying, frying pan

P014: FOOD-TO-FOOD FORTIFICATION WITH MORINGA LEAF POWDER AND BAOBAB FRUIT PULP IS EFFECTIVE IN TREATING MILD OR MODERATE ACUTE MALNUTRITION

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Introduction. Diet quality is a major determinant of nutritional status. Underutilized food resources could be valued to improve children’s diet and prevent malnutrition but also cure acute malnutrition. Purpose. This study examined the effectiveness of food-to-food fortification with moringa leaf powder and baobab fruit pulp in the management of mild or moderate acute malnutrition.

Methods. Sixty-three 6 to 59 months old children affected by mild or moderate acute malnutrition were randomly selected in the district of Tangueta in Northern Benin and assigned to a case or a control group. During two weeks, children in the case group were gathered every morning in a nutritional rehabilitation home and fed each 400g of fermented sorghum porridge enriched with 10g of moringa leaf powder and 5g of baobab fruit pulp. Children in the control group had their usual food only. Participants’ nutritional status was monitored using anthropometry. Recovery rate and average weight gain were compared between the two groups.

Results. Daily consumption of the fortified food during two weeks has not significantly increased children’s weight in the case group compared to the control group. However, average weight gain in the case group was 9.85 g/kg/day and the recovery rate was 62.50% among children who consumed the fortified food till the end of the intervention.

Conclusions. Moringa leaf powder and baobab fruit pulp may be promoted at scale as local and affordable fortifying foods to improve children’s diet at home as well as in nutritional rehabilitation centres. Assessment of their effect on micronutrient deficiencies, such as iron deficiency, is also recommended. Mapping of potential food vehicles is needed in different regions of Benin and other countries where moringa and baobab trees are available. To enhance the effectiveness of the fortified foods, potential adverse factors, like parasitic infection, should be taken into account.

P015: EVALUATION OF NUTRIENTS AND PHYTOCHEMICAL COMPOSITION OF LESSER-KNOWN VEGETABLE (PHYLLANTUS NURIRI) IN NIGERIA

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**Background:** Green leafy vegetables constitute an indispensable part of human diet, especially in local delicacies. Apart from the well-known and easily cultivated green leafy vegetables serving as sources of micronutrients, several wild and ornamental plants are traditionally important supplement sources of food nutrients. The issue of micronutrient deficiencies and other consequences on health, learning capacity and productivity of affected people constitute a major public health problem in Nigeria. The current rate of micronutrient deficiency among mothers and pregnant women in Nigeria is a major worry. There have been several attempts by nutritionists the world over to proffer adequate solutions to the problem and part of the efforts is to document the nutrient and phytochemical composition of some green leafy vegetables which is still grown as wild crops or semi-wild crop or unpopular vegetables in many areas in Nigerian Eco-system which could contribute to the nutrients, micronutrients and phytochemical intake of the populace.

**Objective:** The study examined the nutrients and phytochemical composition of a lesser known vegetable (*Phyllantus Nuriri*).

**Methods:** The vegetable was plucked and sorted by removing extraneous material with deionised water. The vegetable was pulverized using an electric blender until the desired particle size was obtained. Standard methods of AOAC (2016) were used to determine the proximate, mineral and vitamin composition as well as the phytochemical constituents of the extract.

**Results:** *Phyllantus Nuriri* contained 15.47% carbohydrate, 3.87% protein and 3.20% crude fibre. The vegetable had significant quantities of calcium (34.71mg) and iron (11.27) per 100g sample. The vegetable contained significant quantity of vitamin C (20.13mg/100g). There is modest concentration of Phytochemicals, alkaloids, tannins, saponins and flavonide.

**Conclusion:** The result of this study showed that the vegetable is rich in micronutrients and phytochemicals and if incorporated into family menu, will be promising in fighting malnutrition.

**Keywords:** Nutrient, Mineral and Vitamin, Phytochemical.

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**P016: EFFECT OF VARYING FERMENTATION PERIODS ON THE PROXIMATE AND VITAMIN COMPOSITION OF MAHOGANY BEAN (AFZELIA AFRICANA) SEED FLOUR.**

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**Introduction:** Mohogany bean seed (*Afzelia africana*) locally known as “akparata” among the Igbos is a food thickening agent with nutritional values.

**Purpose of the Study:** This study was carried out to investigate the effect of varying fermentation periods on the proximate and vitamin composition of Mahogany Bean (*Afzelia africana*) seed flour.

**Methods:** *Afzelia africana* seeds were purchased from a local market in Nsukka, Enugu State, Nigeria. The seeds were identified and processed by roasting for 20-25 minutes with continuous stirring as it is done traditionally using a gas cooker at 145°C until it turned light brown. The roasted seeds were dehulled and divided into four portions, three portions were fermented separately for 24, 48 and 72 hours respectively and oven dried at 60°C for 24 hours. The individual portions were milled into flour and analyzed using standard procedures. Statistical analysis was carried out using IBM SPSS statistics software version 21. Results were presented as means and standard deviations and analysis of variance was used to separate the means at p<0.05.

**Results:** The results of the chemical analysis showed that the sample fermented for 24hours, 48hours and 72hours had moisture content (4.44%, 4.45% and 4.46% respectively), ash (4.63%, 4.85% and 6.05% respectively), crude fiber (1.94%, 2.21% and 2.24% respectively), fat (20.61%, 15.84% and 10.21% respectively), protein (21.90%, 20.14% and 14.88% respectively), carbohydrate (46.48%, 52.51% and 62.11% respectively), pro-vitamin A (22.36%, 20.96% and 14.83% respectively), vitamin C (35.88%, 20.34% and 7.76% respectively), vitamin E (10.66%, 10.22% and 6.57% respectively).

**Conclusion:** The moisture, crude fibre, ash and carbohydrate content of fermented *Afzelia africana* increased as fermentation period increased. The fat, protein and vitamin C contents decreased as fermentation period increased.

**Keywords:** *Afzelia Africana*, fermentation, vitamin, proximate.

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**P017: THE EFFECT OF VARYING FERMENTATION PERIODS OF MAHOGANY BEAN (AFZELIA AFRICANA) SEEDS ON THE LIPID PROFILE OF ALLOXAN-INDUCED DIABETIC ADULT MALE WISTAR RATS.**

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**Introduction:** Mohagany bean seed (*Afzelia africana*) locally known as “akparata” among the Igbos is a food thickening agent with nutritional values.

**Purpose of the Study:** This study was carried out to investigate the effect of varying fermentation periods on the proximate and vitamin composition of Mahogany Bean (*Afzelia africana*) seed flour.

**Methods:** *Afzelia africana* seeds were purchased from a local market in Nsukka, Enugu State, Nigeria. The seeds were identified and processed by roasting for 20-25 minutes with continuous stirring as it is done traditionally using a gas cooker at 145°C until it turned light brown. The roasted seeds were dehulled and divided into four portions, three portions were fermented separately for 24, 48 and 72 hours respectively and oven dried at 60°C for 24 hours. The individual portions were milled into flour and analyzed using standard procedures. Statistical analysis was carried out using IBM SPSS statistics software version 21. Results were presented as means and standard deviations and analysis of variance was used to separate the means at p<0.05.

**Results:** The results of the chemical analysis showed that the sample fermented for 24hours, 48hours and 72hours had moisture content (4.44%, 4.45% and 4.46% respectively), ash (4.63%, 4.85% and 6.05% respectively), crude fiber (1.94%, 2.21% and 2.24% respectively), fat (20.61%, 15.84% and 10.21% respectively), protein (21.90%, 20.14% and 14.88% respectively), carbohydrate (46.48%, 52.51% and 62.11% respectively), pro-vitamin A (22.36%, 20.96% and 14.83% respectively), vitamin C (35.88%, 20.34% and 7.76% respectively), vitamin E (10.66%, 10.22% and 6.57% respectively).

**Conclusion:** The moisture, crude fibre, ash and carbohydrate content of fermented *Afzelia africana* increased as fermentation period increased. The fat, protein and vitamin C contents decreased as fermentation period increased.

**Keywords:** *Afzelia Africana*, fermentation, vitamin, proximate.
Introduction: Fermentation is a process of improving the nutritional value of food crops. This process has been shown to offer a lot of health benefits. 

Purpose of the Study: The study evaluated the effect of varying fermentation periods of mahogany bean (Afzelia africana) seeds on the lipid profile of alloxan-induced diabetic adult male wistar rats.

Methods: Afzelia africana seeds were purchased from a local market in Enugu State, Nigeria. The seeds were sorted, roasted, dehulled, fermented for varying periods (0hours, 24hours, 48hours and 72hours, oven-dried and milled into flour samples. Fifty (50) adult rats were randomly selected into five groups for the experimental study. The control group were non-diabetic rats and were fed with rat chow and distilled water. The remaining four groups were induced with diabetes using alloxan and were fed with rat chow, distilled water and Afzelia africana flour samples of different fermentation periods respectively. The feeding trial lasted for 21 days. Blood samples were collected from the rats on the first and last day of the experiment and were subjected to biochemical analysis using standard procedures. Statistical analysis was done using the statistical product for service solution (SPSS) version 21.0.

Results: The result of the biochemical analysis revealed that treatment with the flour fermented for 48hours (F48a48hours) gave the highest percentage (20.99%) decrease in total cholesterol, highest percentage (27.78%) increase in high density lipoprotein (HDL) level, the highest percentage (54.04%) decrease in low density lipoprotein (LDL) levels and the highest percentage (27.43%) decrease in triglyceride levels.

Conclusion: Fermented Afzelia africana flour samples improved the lipid profile of alloxan-induced diabetic adult male wistar rats with the 48 hours fermentation having the highest improvement.

Keywords: Afzelia africana, fermentation, diabetic rat, lipid profile

P018: TO WHAT EXTENT IS BAOBAB USED FOR EMERGENCY FOOD STRATEGIES; A CASE STUDY OF BAOBAB OCCURRING AREAS OF KILIFI AND KITUI COUNTIES OF KENYA

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Introduction: Baobab (Adansonia digitata L.) is an indigenous fruit tree (IFT) that occurs in several dry parts of Kenya such as Kitui and Kilifi Counties, where it plays a key role in dietary diversification, thus contributing to food and nutrition security. This tree is adaptable to adverse climatic conditions such as droughts and floods which are common in these counties.

Purpose of the study: There is limited research on its role in emergency food strategies in Kenya. This study was done with the objective of determining the contribution of baobab to household food security especially during food emergencies situations among specific populations living in Kitui and Kilifi Counties of Kenya.

Methodology: The study employed a cross-sectional design where 216 household heads were interviewed through structured interviews. Data was analysed using SPSS version 24.

Results: Respondents mainly consumed baobab fresh fruits (94%). About 33.3% used baobab pulp to make porridge while 16.7% made a hard gruel (ugali) when nothing else was available to eat. Drinks and candies ‘mabuyu sweets’ accounted for 41.20% and 28.70% respectively. In Kilifi, baobab pulp was mixed with coconut milk to be used as an accompaniment to ugali (34.3 %). About two thirds (60.7%) of the respondents collected and stored baobab fruits for use during lean seasons. Baobab was sold by 34.7% of the respondents and the income was used to buy food (45.3 %), education (22.7%) and for healthcare (13.3%).

Conclusion: This study showed that baobab fruit and pulp is an important food emergency alternative in this area. It was available and accessible during lean seasons. Households sold baobab fruits to augment their income. Education and promotion of baobab products could bring better incomes and improve nutrition status of communities in baobab growing areas and it helps to overcome food insecurity in emergency situations.

Key Words: lean seasons, baobab products, income, food insecurity, coping.
P019: EVALUATING THE NUTRITIONAL RELEVANCE OF COMPOSITE COCOYAM RECIPES, SENSORY ATTRIBUTES AND THEIR HEALTH IMPLICATIONS ON THE CURRENT FOOD SYSTEM IN AFRICA

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Introduction During the last decade, there have been a number of concerted effort to set specific goals for eliminating various kinds of foods and nutrition insecurity on the current food system in Nigeria in particular and Africa at large by 2030. The United Nations development programme (2014) listed its major goals as:
To end hunger and achieve food security
To improve nutrition and promote sustainable agriculture
To improve household food and nutrition security among others
Based on these goals, the researchers are poised in developing new recipes such as cakes and other confectionaries from composite cocoyam flour to improve household food and nutrition security across Africa.

Purpose Of Study: The study evaluated the nutritional relevance of developing new recipes from composite cocoyam and its acceptability through sensory attributes. Specifically, the study sought to determine:
the general acceptability of cakes developed from composite cocoyam at varying proportions in terms of food attributes such as colour, taste, texture, and general acceptability and
the proximate nutrient composition of cakes produced from composite cocoyam flours when compared to the conventional cakes made from 100% wheat flour

Method Of Study: The study adopted the research and development (R&D) method

Summary Of Results:
Interactions effects of the general acceptability of cakes developed from composite cocoyam at varying portions in terms of food attributes such as colour, taste, texture, and general acceptability.
Main effects of the proximate chemical composition of composite cocoyam

Major Conclusions/Recommendations: The study concluded that the use of composite cocoyam flours in cake making was cost effective and nutritionally healthier than the conventional use of wheat flour. In pursuant to some of the objectives of these goals, the researchers developed a new cake recipe from composite cocoyam flours to improve household food and nutrition security in Nigeria which could be replicated across Africa. The major recommendations from the findings carried out on proximate analysis include:
Consumption of composite cocoyam cake is suitable for promoting healthy lifestyles among type II diabetic patients due to its low carbohydrate content.
Policies that will care for the socio-economically deprived and nutritionally vulnerable individual whose current food system is faulty.

P020: HAEMATOLOGICAL PROFILE AND NEPHROTECTIVE EFFECT OF ETHYLACETATE EXTRACT OF PERSEA AMERICANA(AVAGADO PEAR) SEED IN ACETAMINOPHEN INDUCED WISTAR RATS.

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Introduction: Nephrotoxicity constitute a whole gamut of disorders reflecting damage to different nephron segments as a consequence of individual drug mechanisms. Significant acetaminophen (paracetamol)-induced hepatotoxicity usually triggers nephrotoxicity. The assessment of haematological parameters provide information on inflammation, necrosis, various infection of visceral organs. Different parts of plants are traditionally used in different countries for mitigation of drug or toxin induced hepatic and renal disorders.

Purpose of the Study: The study aimed to evaluate the haematological profile and the nephroprotective activity of aqueous extract of Persea americana seeds in acetaminophen induced Wistar rats.

Methods: The fruits were processed and extracted using ethylacetate before administering to the rats. Twenty-five (25) rats (125 – 176 g) were randomly grouped into five. Rats in group 1 served as control, groups 2 and 3 served as negative and positive control respectively, while groups 4 and 5 were treated with the extract.

Results: Results of haematological analysis for groups 3, 4, and 5 revealed significant (p<0.05) elevation in the concentration of white blood cells and platelets and a decrease in the levels of PCV, Hb, RBC, Neutrophil, Monocytes and Eosinophil as compared to groups 1 and 2. Results on renal function parameters, showed that acetaminophen...
treatment caused nephrotoxicity as evidenced by marked elevation in serum urea and creatinine. Co-administration of *Persea americana* seed extract decreased the rise in these parameters in a dose dependent manner. Serum electrolyte indices also indicated increase in K⁺ and Mg²⁺ concentrations, and a decrease in Ca²⁺ concentration for groups 3, 4, and 5.

**Conclusion:** These results revealed that the use of the extract in phytotherapy may produce adverse side effects such as anaemia while ameliorating nephrotoxicity.

**Recommendation:** Further research could be considered using aqueous or ethanol as solvent for extraction.

**Keywords:** *Persea americana* , haematological profile, nephroprotective , ethylacetate acaminophen

**P021:** EFFICACY OF EDIBLE AND NON-EDIBLE PARTS OF TWO VARIETIES OF GRAPEFRUITS (*CITRUS PARADISI*) ON BIOMARKERS OF METABOLIC SYNDROME IN WISTAR RATS

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**Introduction:** Metabolic syndrome (MetS) is a public health challenge and predictor of type-2 diabetes and cardiovascular diseases. Evidence suggest that polyphenols from citrus fruits reduce risks of MetS and few studies focused on influence of commonly-consumed fruits on metabolic diseases in Nigeria.

**Objective:** This study was designed to assess the efficacy of edible and non-edible parts of two varieties of grapefruits on MetS in Wistar rats. **Methods:** Edible (pulps) and non-edible (peels, seeds) parts of freshly harvested white and pink grapefruits were manually separated, freeze-dried and pulverised into fine powder. Eighty matured male wistar rats were randomly grouped into ten (n=8). Group 1 (Negative control [NC]) was given corn starch-rich diet, group 2 (positive control [PC]) and experimental groups (3 to 10) were fed with MetS-induced diet for 12 weeks to induce MetS.

Diets of groups 3 to 10 were supplemented with non-edible pink (NEP), edible pink (EP), non-edible white (NEW) and edible white (EW) grapefruit powder in estimated doses corresponding to 1g and 2g polyphenol daily for 8 weeks. Blood samples were analysed for lipid profile, fasting plasma glucose(FPG), fasting plasma insulin(FPI), insulin resistance(IR), adiponectin, Tumor necrosis factor-α(TNF-α), Interleukin-6(IL-6), C-reactive protein(CRP) and Malondialdehyde (MDA) using standard procedures. Data were analysed using ANOVA at p<0.05. **Results:** Blood pressure, lipid profile (except high-density lipoprotein), FPG, FPI, IR, TNF-α, IL-6, CRP and MDA were significantly reduced in all grapefruit treated groups close to NC status (p<0.05) in this order: NC<NEP<EP<NEW<EW<PC. However, high-density lipoprotein and adiponectin were increased significantly in all treated groups (p<0.05) following this sequence NC<NEP<EP<NEW<EW<PC. **Conclusion:** Edible and non-edible parts of white and pink varieties of grapefruit attenuated biomarkers of metabolic syndrome in the experimental animals. Non-edible part of pink variety was most efficacious. Grapefruit could serve as potential functional food in prevention and management of metabolic syndrome.

**Keywords:** biomarkers, metabolic syndrome, grapefruit, polyphenols, wistar rats

**P022:** CHEMICAL COMPOSITION OF BISCUITS MADE FROM FINGER MILLET (ELEUSINE CARACANA) SOYABEAN (GLYSINE MAX), AND CARROT (DAUSUS CAROTA) FLOUR BLENDS.

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**Introduction:** The use of biscuit for tea break and as snack is becoming a common sight in many homes in Nigeria. However in recent time the economic downturn has affected the quantity of biscuit produced per pack. Wheat a major ingredient in biscuit production is low in protein and micronutrients; in addition it is implicated in celiac disease. The need to substitute wheat with other indigenous food items for biscuit production has become imperative.

**Purpose of study:** The purpose of the study was to produce biscuit using finger millet, soybean and carrot flour blends.

**Material and methods:** Finger millet, soybean and carrot blends were made into flour using standard methods. Blends were formulated in the following ratios 70:20:10, 50:30:20 and 45:45:10 respectively for finger millet:soybean:carrot and100% wheat was used as control. Proximate composition was determined using standard AOAC assays techniques; elemental components were determined using standard methods after wet-digestion. Pro-vitamin A, riboflavin,
thiamin and niacin were determined spectrophotometrically, while vitamin C was determined by the titration method. Gravimetric method was used for alkaloids; phenol was by folin-ciocaltean spectrophotometric method, while flavonoid and saponins were by gravimetric oven drying method.

**Results:** Moisture, CHO, (7.05%; 68.63%) were significantly higher in 100% wheat biscuit while protein (9.08 – 9.12%), fiber (3.41 – 3.93%), lipid (16.05 – 15 -28%), β-carotene (312.62-346.45mcg), flavonoids (1.91 -1.98mg) and vitamins B₁ (4.71 – 4.82mg), B₂ (8.05 – 8.21mg) and B₃ (2.83 – 2.97mg) respectively were significantly higher in composite biscuits. Macrominerals, tannins and phytate were generally low.

**Conclusion/Recommendation:** Biscuits produced from composite flours had higher amounts of protein, fiber, lipid and vitamins values compared to biscuits produced from 100% wheat flour. Composite flour made from 70:20:10 flour blends is however recommended for biscuit production as it was richer in most nutrients compared to wheat and the other composite blends.

Keywords: Biscuit, composite flour, finger millet, soybean, carrot

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**P023: THE CONSUMPTION OF EDIBLE INSECTS AS ALTERNATIVE SOURCES OF PROTEIN IN SOUTHERN PART OF NIGERIA**

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**Introduction/background:** Proteins are essential nutrients for the human body and one of the building blocks of body tissue. It provides much energy density as carbohydrates. The most important aspect of protein is its amino acid composition. The need for adequate protein consumption in the daily menu of African has been widely discussed and hence, assessing other sources of scaling up our nutrition is very important.

**Methods:** A survey on the consumption of edible insects as alternative source of protein was carried out in 2017 in Akwa Ibom State, Nigeria. Three communities were randomly selected from three senatorial districts of the State, Mbiakong Uruan in Uyo, Ekeya-Okobo in Eket and Edim Idim Ibesit in Ikot Ekpene, respectively. Multistage sampling method was used to distribute 200 structured questionnaire with a sampling intensity of 10 %. Proximate analysis was conducted in the laboratory to determine the nutrient composition of the various edible insects in the state. Data collected were analysed using analysis of variance and significant means were separated using least significant difference (LSD) at 5 % level of probability.

**Results:** The result showed that termite (Isoptera), cricket (Orthoptera), palm weevil (Coleoptera), caterpillar (Lepidoptera) are the most consumed insects in the region. Similarly, proximate analyses showed the edible insects contain higher amount of protein (65 g/100 g) and calcium (9.34 mg/100 g) compared with fish with (protein 22 g/100 g, calcium 5 mg/100 g) and beef (protein 23 g/100 g, calcium 4.5 mg/100 g) which are majorly consumed in the area.

**Conclusion:** In conclusion, these edible insects which are predominant in the southern part of Nigeria could serve as cheap sources of protein and calcium to the teeming population.

**Key words:** consumption, nutritional composition, edible insects, protein, calcium, South/South

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**P024: CHEMICAL COMPOSITION OF BISCUITS MADE FROM FINGER MILLET (ELEUSINE CARACANA) SOYABEAN (GLYSINE MAX), AND CARROT (DAUSUS CAROTA) FLOUR BLENDS.**

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**Introduction:** The use of biscuit for tea break and as snack is becoming a common sight in many homes in Nigeria. However in recent time the economic downturn has affected the quantity of biscuit produced per pack. Wheat a major ingredient in biscuit production is low in protein and micronutrients; in addition it is implicated in celiac disease. The need to substitute wheat with other indigenous food items for biscuit production has become imperative.

**Purpose of study:** The purpose of the study was to produce biscuit using finger millet, soybean and carrot flour blends.
Material and methods: Finger millet, soybean and carrot blends were made into flour using standard methods. Blends were formulated in the following ratios 70:20:10, 50:30:20 and 45:45:10 respectively for finger millet:soybean:carrot and 100% wheat was used as control. Proximate composition was determined using standard AOAC assays techniques; elemental components were determined using standard methods after wet-digestion. Pro-vitamin A, riboflavin, thiamin and niacin were determined spectrophotometrically, while vitamin C was determined by the titration method. Gravimetric method was used for alkaloids; phenol was by folin-ciocatean spectrophotometric method, while flavonoid and saponins were by gravimetric oven drying method.

Results: Moisture, CHO, (7.05%; 68.63%) were significantly higher in 100% wheat biscuit while protein (9.08 – 9.12%), fiber (3.41 – 3.93%), lipid (16.05 – 15 -28%), β-carotene (312.62-346.45mcg), flavonoids (1.91 -1.98mg) and vitamins B₁ (4.71 – 4.82mg), B₂ (8.05 – 8.21mg) and B₃ (2.83 – 2.97mg) respectively were significantly higher in composite biscuits. Macrominerals, tannins and phytate were generally low.

Conclusion/Recommendation: Biscuits produced from composite flours had higher amounts of protein, fiber, lipid and vitamins values compared to biscuits produced from 100% wheat flour. Composite flour made from 70:20:10 flour blends is however recommended for biscuit production as it was richer in most nutrients compared to wheat and the other composite blends.

Keywords: Biscuit, composite flour, finger millet, soybean, carrot
**Objective:** This present study explores the potential of underutilized African nuts/seeds (Black walnuts and Almond) which are naturally believed to have inherent culinary, medicinal and therapeutic benefits when utilized as a cheap sources of nutrients.

**Design:** The study adopted survey research design to generate data from 127 consumers of the two nuts (drawn from family members) on their reasons for consuming, knowledge of the availability, culinary, medicinal and therapeutic benefits of these important but grossly underutilized African nuts. 25 herbal practitioners were also interviewed to seek their opinion on the herbal remedy of these nuts

**Results/Conclusion:** Data generated showed that 67% of the consumers of these nuts know little or nothing about the cultivation, culinary, medicinal and therapeutic benefits of the nuts let alone utilize them in their diets. The report of some of the herbal practitioners interviewed corroborated the fact that Almonds is high in antioxidants that can protect body cells from oxidative damage, a major contribution to ageing and disease and that Black walnuts is useful in the treatment of tuberculosis, diarrhea and promotes healing of sores in the mouth. Based on these, the researchers conclude that Almonds and walnuts must form active parts of family’s diet. Some of the recommendations made were that further research is needed on the proximate composition of these nuts in relation to nutrition and diseases. The agronomists were also challenged on the genetic manipulations of these nuts to increase yields and make them readily available and to educate the masses on best utilize these nuts for nutrition and healing.

**Keywords:** Underutilized African nuts (Almond and Black walnuts), Culinary importance, medicinal benefits, Therapeutic advantages, Nutritional and dietary Diseases.

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**P027: COMPARATIVE EVALUATION OF SOME COMMONLY CONSUMED EDIBLE FLOURS: A PRELIMINARY STUDY.**

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**Background:** Recently, there has been an increase in the incidence rate of non-communicable diseases (NCDs) and appropriate dietary adjustments play a major role in the prevention and management of these NCDs.

**Aim:** To compare the proximate, micro nutrient and anti-nutrient content of four flours namely – wheat, plantain, oat and fonio flours.

**Methodology:** Samples of already processed oat, wheat, and plantain flours were purchased from the market while fonio grains were bought, cleaned and ground into fine flour using a miller. Proximate analysis was carried out using AOAC (2000) methods; Atomic Absorption spectrophotometry and Flame Photometry were used for mineral and vitamin determinations. The anti-nutrient contents were evaluated using a number of standard laboratory methods like spectrophotometry; laboratory results were recorded. Inferential statistics was used to analyse the data, and significance accepted at *P*<0.05.

**Results:** The proximate content varied significantly (*P*<0.05) among the flours. The carbohydrate content varied from 76.20g/100g for oat flour to 87.60g/100g for plantain flour. Protein was significantly (*P*<0.05) higher in wheat flour and was lowest in plantain flour. Wheat flour also had significantly (*P*<0.05) higher content of fibre (1.90g/100g) followed by oat flour. For the vitamins, oat flour had much significantly (*P*<0.05) higher content of carotene than the others. The flours had significant quantities of iron and zinc with fonio flour having significantly (*P*<0.05) higher content of iron (3.79mg/100g). The anti-nutrient contents were within safe levels probably due to processing; oat flour had the lowest content of all the anti-nutrients.

**Conclusion:** Oat flour had lower carbohydrate, higher protein content and minimal anti-nutrient content. Due to its higher carbohydrate and lower protein content, plantain flours may not be an excellent alternative for people seeking to lose weight.

**Recommendation:** Consumption of oatmeal (made with oat flour) should be encouraged especially for people predisposed to NCDs like obesity and diabetes.

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**P028: FOOD SECURITY AMONG FIRST-YEAR INTERNATIONAL STUDENTS STUDYING AT THE UNIVERSITY OF CHESTER (UOC) AND THE RELEVANCE OF DIETARY ACCULTURATION AS A DETERMINING FACTOR.**

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**Introduction:** Food security is an important nutrition issue among vulnerable population groups such as international university students; especially during the early period of their stay when faced with new food cultures. **Aim:** This study aimed to investigate the extent of food security among first-year international students at the University of Chester (UoC) and to assess factors affecting their ability to obtain their preferred traditional foods. **Method:** A cross-sectional survey of 124 first-year international students at the UoC, using self-reported validated questionnaires. Most participants were from Asia (46.8%) and Africa (33.9%). Food security was measured using the Australian National Nutrition Survey (single item measure) and US Adult Food Security Survey Module from the United States Department of Agriculture Community Food Security Assessment Tool Kit (10-item measure). Socio-economic and demographic variables, and food access and availability questions were also included. **Results:** The result showed that the prevalence of food insecurity using the multi-item measures were: 79.8% (4 out of 5 students) of which 54.8% were severely food insecure and 25% experienced some degree of food insecurity respectively. Students’ food insecurity was associated with local food availability and accessibility, purchasing power; especially among low income international students without scholarships and employment. **Conclusion:** The study showed that international students’ familiar foods were limited in terms of accessibility, availability and affordability, which had an impact on their food security. Establishing on-campus intercontinental food stores, reduced cost of available preferred foods and better proximity to stores will influence their food security status.

**P029: CHEMICAL COMPOSITION AND SENSORY EVALUATION OF INSTANT POUNDED YAM FLOUR AND UNRIPE PLANTAIN FLOUR BLENDS**

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**Introduction:** Yam (*Dioscorea*) and plantain are a vital component of the agricultural sector of West Africa, in terms of food, social and cultural values. They are staple foods commonly consumed in the tropical regions of the world. These two crops have been fairly well utilised over time, especially yam. **Aim:** The aim of this study is to produce and determine the chemical composition and sensory evaluation of instant pounded yam flour (IPYF) and unripe plantain flour (PF) blends. **Methodology:** The unripe plantain was sundried, milled and mixed with instant pounded yam flour in the following samples (A: 100% IPYF) (B: 95% IPYF + 5% PF), (C: 90% IPYF + 10% PF), (D: 85% IPYF + 15% PF), (E: 80% IPYF + 20% PF), (F: 100% PF). Proximate & sensory evaluation was carried out on the six resultant samples. **Result:** The proximate composition of the blends show that sample C has the highest protein and carbohydrate contents of 1.71g/100g and 83.24 g/100g respectively in comparison with other flour blends. Mineral composition of the blends shows that sample E (80% IPYF) contains a 41.83mg/100g of Iron which makes it a good source of Iron. Sensory evaluation showed that sample A had the highest acceptability in terms of colour, aroma & texture while sample F was least preferred. **Conclusion & Recommendation:** The study showed that inclusion of at least 10% unripe plantain flour to instant pounded yam flour will improve the nutritive values of the flour blends which were acceptable by the consumers. However, in order to attain some level of food and nutrient security, and to enhance better research quality, work still needs to be done in evaluating the other diverse ways in which they can be maximally utilized.

**P030: PROXIMATE AND MINERAL COMPOSITIONS OF NOODLES MADE FROM TRITICUM DURUM, DIGITARIA EXILIS, VIGNA UNGUICULATA FLOUR AND MORINGA OLEIFERA POWDER**

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**Background:** The nutritive value of noodles made from *Triticum durum* is high in carbohydrates but low in fibre, protein and some micronutrients which is inadequate to meet the nutritional needs of consumers. **Objective:** To determine the proximate, mineral composition, and sensory properties of noodles made from *Triticum durum* flour substituted with *Digitaria exilis*, *Vigna unguiculata* flour and *Moringa oleifera* leaf powder. **Design:** Four ingredients (*Digitaria exilis* flour, *Vigna unguiculata* flour, *Triticum durum* flour and *Moringa oleifera* leaf powder) were mixed in four by four factorial, in complete randomized design (CRD) to formulate the composite blends at four different levels (25, 50, 75 and 100) that gave 16 samples. The samples were subjected to sensory analysis and five samples selected based on significantly highest means in the different parameters used. Proximate
composition and chemical analysis of the noodles was also determined. All determinations were done in triplicates and reagents were of analytical grade.

**Results:** Proximate composition of sample with 75% *Triticum durum*; 25% *Vigna unguiculata* had the highest moisture of 13.81%, while protein and carbohydrate had 10.06 to 14.44% and 33.79 to 59.88% with sample 100% *Triticum durum* having the least and highest, respectively. Mineral ranged from 1.58 to 11.56 for sodium, 19.28 to 40.40 for potassium. *Digitaria exilis*, *Vigna unguiculata* and *Moringa oleifera* showed increase in the proximate and mineral analysis of noodles. Sensory evaluation results showed no significant (p<0.05) difference among treatments used in taste, appearance, flavour and general acceptability.

**Conclusion:** The combination of *Digitaria exilis*, *Vigna unguiculata* and *Moringa oleifera* to produce noodle increased the proximate and mineral composition which implies a boost in the nutritional content of noodles and is recommended.

**Key words:** Proximate, mineral composition, flour, noodles, food.

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**P031: NUTRITIONAL AND PHARMACOLOGICAL POTENTIAL OF ETHANOL LEAVES EXTRACT OF TARAXACUM OFFICINALE**

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**Background and objective:** *Taraxacum officinale* (dandelion) leaves are used as common vegetable and eaten as salad or cooked in soups and sauces by Nigerians. Several studies revealed that wild or semi-wild plants are nutritionally important because of their high vitamins, minerals, proteins, essential fatty acids and fibre contents. Apart from being nutritious, dandelion leaves are believed to have some medicinal properties like being diuretic, antioxidant, anti-inflammatory, antidiabetic, antimicrobial, anticancer etc.

The objective of the study was to determine the nutritional and pharmacological potential of ethanolic leaves extract of *taraxacum officinale* so as to amass data to support and encourage its usage in human nutrition and in disease treatment.

**Materials and methods:** Fresh leaves of *taraxacum officinale* were obtained. The fresh leaves were washed, dried and ground to powdered form and then an extract was formed using ethanol. The extract was used for the various analysis i.e phytochemical, proximate, elemental analysis as well as antioxidant and antibacterial activity

**Results:** The proximate analysis of *taraxacum officinale* showed high percentage of crude fiber followed by ash and carbohydrate contents with crude protein having the least percentage. The phytochemical screening revealed the presence of tannins, terpenes and phenolic compounds in the leaves. The mineral elements analysed using Atomic Absorption spectrophotometer of the leaves enumerate elements like Mg, Na, K, Ca, Mn, Fe, Zn, Cu, Pb and Cr. The leaves extract possess some degree of antimicrobial activities on *E. coli* and *S. aureus*, while *P. aeruginosa* and *salmonella typhi* showed no activity. Antioxidant activity was evaluated using the DPPH assay, where the plant leaves extract shows promising antioxidant potentiality.

**Conclusion:** The results indicated that, the leaves are potential sources of useful nutrients and could be used to fulfil the growing demands of plant-based food.

**Keywords:** Taraxacum officinale, nutritional, pharmacological, phytochemical, antioxidant.

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**P032: NUTRIENT ANALYSIS OF DRIED SEEDS OF WATERMELON FRUIT (CITRULLUS LANATUS) CULTIVATED IN RIVERS STATE, NIGERIA**

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**Background:** Watermelon (*Citrullus lanatus*) fruits are eaten in most households in Nigeria but the seeds are often discarded as waste. The nutrients in watermelon seeds that are often discarded can contribute immensely to recommended daily allowance and maintenance of a good nutritional status hence, good health for both man and animals.

**Objective:** To analyse the proximate, vitamin and mineral content of watermelondried seeds planted in Rivers State, Nigeria.
**Design:** It is an experimental study. Moisture and ash content of the samples were determined using the method described by AOAC. Crude protein was determined using micro-kjeldah method. The fat content was analyzed using soxhlet method. Crude fiber was determined using weaned method. Carbohydrate was calculated by difference. Vitamins were determined using the method of Association of Vitamin Chemist (AOVC). Vitamin A and B were determined using spectrophotometer method. Vitamin C was determined by the 24 dinitrophenol hydrazine method. Vitamin E determination was done with microbiological standard assay. Minerals of each sample of the dried and ashed watermelon’s seeds were determined by digesting the ash with 3M Hydrochloric acid (HCl), while the atomic absorption spectrophotometer (AAS) was used to determined calcium, magnesium, manganese, and iron. Potassium and sodium were determined by Flame photometer.

**Results:** The results obtained from proximate analysis were: moisture content (9.60%), ash content (4.15%), crude protein (20.41%), crude lipid (48.20%), crude fiber (20.41%), carbohydrate (8.88%). The seed also contained appreciable amount of Vitamin A (19.12mg/100g), Vitamin B1 and E (5.74mg/100) respectively and vitamin C (5.60 mg/100g). The mineral analysis showed that zinc has the highest value (248.4mg/100g), followed by sodium and potassium (9.74mg/100g) respectively, iron (4.23mg/100g), calcium (0.05mg/100g) and only traces of magnesium was found. Results were reported as mean ± standard deviation (SD).

**Conclusion:** This research has upheld the consumption and various nutritional benefits of this seed on the basis of its proximate, vitamins and mineral analysis. Therefore, people could resort to watermelon seeds for supplementation of their diet. which could help maintain good nutritional status.

**Keywords:** Watermelon *Citrullus lanatus*, Seeds, Proximate, Vitamin, Mineral.

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**P033: FORMULATION OF A WEANING PORRIDGE COMPOSITE FLOUR FROM LOCALLY AVAILABLE FOOD**

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**Background:** Micronutrient malnutrition is persistent among infants and young children in many developing countries. This is mainly due to poor quality of weaning foods since most children are fed on starch-based weaning gruels.

**Objective:** To develop acceptable, nutritious composite flour for porridge suitable for weaning food using locally available food maize, grain amaranth, and soy-bean at the ratio of 75:15:10.

**Design:** Concept 4 creative software (creative Formulation Concepts, LLC, Annapolis, Maryland 21401, USA) was used to generate formulations by determining the optimum levels of incorporation of grain amaranth, maize and soy bean flours into composite to significantly contribute to the protein, energy, iron and zinc requirements for weaning foods of children aged 6-24 months. The physico-chemical properties of the formulated composite flour were determined using standard methods while acceptability was assessed using a 9-point hedonic scale.

**Results:** Compare to the nutrient rich composite flour porridge there were no significant difference (p> 0.05) between the color, taste, and after taste of this product based on 9-point hedonic scale rate. And also panel showed that porridge prepared from the nutrient rich composite flour was liked moderately (6.94). The thickness of soy-millet porridge composite flour was significantly higher (p< 0.05) than that of developed nutrient rich composite flour. Additionally, porridge made from this composite flour was significantly (p< 0.05) more acceptable to consumers as compared to marketed soy-maize and soy-millet.

**Conclusion:** Incorporation of soybean and grain amaranth to cereal based porridge produced a highly acceptable product, it should be out scaled to communities to feed children as many foods fed to them have poor sensory properties. Therefore, the nutrient rich composite flour developed has a potential for use in weaning and/or supplementary foods in developing countries for pre-school age children.

**Key words:** malnutrition, complementary food, processing, composite flour porridge.

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**P034: NUTRIENT COMPOSITIONS AND SENSORY PROPERTIES OF LOCAL SNACKS FORTIFIED WITH SOYA BEANS FLOUR AS CONSUMED IN AKWA IBOM STATE, NIGERIA.**

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Background: Local snacks occupy important positions in dietary intakes as they sometimes serve the function of full meals. However, major staples used in preparation of these snacks may not present a final product with high dietary quality.

Objective: This study was designed to evaluate the nutrient contents and sensory properties of Moi moi, Ekoki, Ikpan and Akara Iwa prepared with cowpea, maize, melon seed and cassava respectively.

Methods: Each staple was substituted with 0% (control), 5%, 10%, 15% and 20% soya beans flour. Snacks were produced based on recipes established during preliminary studies. All chemical analyses were conducted based on standard procedures and sensory evaluation was done using a 9 point Hedonic scale. Data obtained were expressed as mean ± standard deviation. Analysis of variance was used to determine significant differences in means.

Results: Nutrient compositions of the samples increased with increasing level of soya beans substitution. Ash, fibre, protein, fat, energy, sodium, potassium, copper and zinc were significantly higher in products with 20% soya bean substitution compared to controls. Results on sensory properties indicated no significant difference for all samples. However, snacks prepared with 20% soya bean substitution were least preferred.

Conclusion and Recommendation: Moi moi, Ekoki, Ikpan and Akara Iwa prepared with soya bean substitution results in products of higher nutritional value. In order to obtain high nutritional quality products with good sensory properties, it is recommended that, these snacks be prepared with soya bean substitution between 15% to 20% level.

Keywords: Moi moi; Ekoki; Ikpan; Akara Iwa; Soya beans.

P035: EFFECT OF PROCESSING ON THE NUTRITIONAL COMPOSITION OF MORINGA OLIFERA LEAVES AND SEEDS.

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Background/Objective: Processing improve the nutrient quality of food and may/not lead to nutrient losses. Processing is done to eliminate microorganism and extend the shelf life of food. Moringa Oleifera plant is an important tree in some part of Nigeria having been successfully used as food, medicinal and for industrial purpose. This study was design to determine the effect of processing on the nutritional profile of moringa olifera leaves and seeds.

Methodology: The leaves and seeds were harvested from the forest. The leaves were washed, drained and divided into three portions. The first portion was the control, the sun and shade dried samples were the second and third portion. The seeds were cracked and divided into six portions. The first portion served as the control and the other five portions were fermented for 24, 48, 72, 96 and 120h respectively. The sample were analyzed for proximate, vitamin, mineral, and antinutrients using standard method. Data generated were statistically analyzed for mean and standard deviation using SPSS version 16.

Results: The proximate composition of the seeds ranged from moisture 16.63-17.75 %, protein 13.92-38.45%, fat 14.93-19.00 %, fibre 3.94-7.10 %, ash 1.96-6.22 % and carbohydrate 19.50-45.20 %. The ranges for mineral values of the seeds were iron 2.10-33.35mg, zinc 1.19-1.35 mg, and iodine 12.33-126.61 mg. The vitamin contents of the seed were ascorbic acid 3.57-24.55 mg. The antinutrient contents of the seeds were 0.03 – 1.35/100g saponin, 0.21 – 6.25mg/100g of oxalate, 0.11 – 0.28mg tannins and 5.69 – 16.81mg/100g of phytate. The proximate composition of the vegetables ranged from moisture 8.99 – 75.33%, protein 6.01 – 17.78%, fat 0.64 – 3.89%, fibre 3.14 – 11.96 %, ash 2.46 – 15.22 % and carbohydrate 12.01 – 48.52%. The ranges for mineral values of the vegetables were iron 0.04 – 0.23 mg, zinc 0.03 – 0.10mg and iodine 13.66 – 46.61mg. The vitamin levels of the vegetables were ascorbic acid 56.43 – 167.66mg. The antinutrient levels in the vegetables were 0.04 – 1.26mg/100g saponin, 0.31 – 8.44mg/100g oxalate, 0.05 – 0.20mg/100g tannins while phytate varied from 3.31 – 13.20/100g.

Conclusion: Processing of both leaves and seeds of moringa olifera increases nutrient density and decrease the concentration of antinutrients. Consumption of moringa olifera should be popularized to diversify diet and extend the food use

Keywords: Processing, Moringa Oleifera; Nutrient; seeds and vegetables.

P036 BIOCHEMICAL EFFECT AND PROTEIN QUALITY OF MORINGA OLIFERA LEAVES AND SEEDS FED TO RATS AS DIETARY SUPPLEMENT.

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Background/Objective: Protein malnutrition is detrimental at any point in life. Protein malnutrition prenatally has also been shown to have significant lifelong effects. During pregnancy, one should aim for a diet that consists of at least 20% protein for the health of the fetus. The objective of this study was to evaluate the biochemical effects and protein quality of Moringa olifera leaves and seeds fed to rats as dietary supplement.

Methodology: The leaves and seeds were harvested from the forest. The leaves were washed, drained and divided into three portions. The first portion was the control, the sun and shade dried samples were the second and third portion. The seeds were cracked and divided into six portions. The first portion served as the control and the other five portions were fermented for 24, 48, 72, 96 and 120h respectively. The blends of the sun (SDL) and shade (SHDL) dried leaves as well as 24h fermented seed (FMS) provided 10% protein for three groups of rats. The diet were fed 20 adult albino rats in a 12-days N and mineral balance study. Casein was used as control. The result generated were statistically analyzed using SPSS version 22.

Result: Over 70% of the nitrogen consumed by all the 3 groups of rats fed the test diet were absorbed and retained. Among the test diet group, the FMS diet had the highest absorbed nitrogen (0.99g), retained nitrogen (0.91g), Biological value (83%) and Net Protein Utilization (80%) which was significantly different from other groups. The SHDML had the most digested nitrogen (90%), highest maintenance food intake (21.62%) and weight gain (0.81%) that was comparable with other groups (p>0.05). The FMS group had the highest liver, small intestine and lung weight, however there was no significant different among the group though the values varied. The heamatological parameters and random blood sugar of all the rats fed test diets were positive and they all compared favorably with the casein diet.

Conclusion: Both the leaves and the seeds of Moringa olifera have good nutrient profile which could promote growth, so it is imperative that they should be consumed to diversify diet and reduced micronutrient deficiency.

Key words: Biochemical, Moringa olifera, protein and quality.

P037: NUTRIENT COMPOSITION AND SENSORY EVALUATION OF TWO LEGUME-BASED PRODUCTS: AFRICAN YAM BEAN (AYB) AND BAMBARA NUT (BN) PUDDINGS CONSUMED IN ENUGU STATE, NIGERIA.

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Background: Legume based products are invaluable sources of nutrients for Nigerians. There is dearth of information on the nutrient composition and organoleptic characteristics of products.

Objective: This study evaluated the nutrient composition and organoleptic characteristics of two legume based products Bambara nut (BN) (Okpa) and African yam bean (AYB) (Azam) puddings consumed in Enugu State, Nigeria.

Method: The two legumes were purchased from local markets in Enugu state, Nigeria. They were cleaned to remove foreign objects, washed, dehulled, and milled into flour and used to prepare two Bambara nut (BN1 and BN2) and AYB puddings. The samples were subjected to chemical analysis and sensory evaluation using standard methods. Statistical analysis was done using (SPSS) version 22. Descriptive statistics such as percentages, means and standard deviations were used to present data. Independent sample t-test and Analysis of variance was used to compare the means of the nutrient and sensory properties of the samples respectively.

Results: The moisture content of the AYB and BN puddings were 36.00% and 43.99% respectively. The protein content of AYB (14.03) was significantly (p< 0.05) higher than that of BN (9.01%). Carbohydrate content of AYB and BN were 39.04% and 37.60% respectively. Fat content was higher in AYB pudding (9.53%) than in BN pudding (7.06%). Crude fiber content of AYB pudding (0.39%) was comparable to that of BN2 pudding (0.38%). Calcium (Ca), Zinc (Zn) and Iron(Fe) were higher in AYB than in BN while Magnesium (Mg) was higher in BN. Vitamin A content of AYB was higher (309.76 mcg/100g) than that of Bambara nut (122.28 mcg/100g). Bambara nut pudding (BN1& BN2) had the highest acceptability in terms of sensory characteristics.

Conclusion: The results show that the studied AYB and BN puddings are rich in Macro and Micro nutrients. Bambara nut pudding had the highest acceptability in terms of sensory characteristics.

Keyword: Sensory evaluation, African Yam Beam, Pudding, Bambara nut, Nutrient composition

P048: CONSUMPTION OF DAIRY PRODUCTS AMONG CHILDREN AND ASSESSMENT OF MICROBIOLOGICAL QUALITY OF ARTISANAL YOGURT (KOSSAM) SOLD IN MAROUA, CAMEROON.

Introduction Far North region of Cameroon possess the largest cattle herd of the country with an annual production of cow's milk which accounts for about 37% of the national production. However, children in this region are among the most malnourished (27%) and suffer from foodborne diseases (EDS-MICS, 2011). The objective of this study is to estimate the level of consumption of dairy products among the children from this region and to assess the microbiological quality of artisanal yogurt (Kossam, obtained by fermentation of cow's milk) marketed in Maroua, Cameroon.

Methods The study was conducted in the month of September 2016, using a semi-structured questionnaire and a checklist to estimate the level of consumption of dairy products among children and evaluate the food safety knowledge and practices of the processors and vendors of those food products. An analysis of the microbiological quality of some samples of Kossam taken on site was also carried out to determine the level of contamination of these products. 125 children from 6 to 15 years and 30 kossam processors and vendors were involved in the survey. The data collected were analyzed using the software SPSS 20.0 for Windows.

Result The obtained results show that the most consumed dairy products among children in Maroua are Kossam (32%) and milk powder (42%). 65% of those children said they ate those foods to maintain their health. From the 07 dairy products listed in that city, only raw fresh milk, cheeses and Kossam are locally produced by farmers who are often organized in common initiative groups. They are sold either in shops (75%) or by street vendors (25%). The vast majority of kossam vendors (98%) have not received any food safety training. There was no significant difference between male and female vendor’s base on their knowledge and practices in food safety. On the other hand, there is a significant difference between these traders in terms of their knowledge and practices in food safety on the basis of their level of education. 77% of vending sites were exposed to ambient air without ant protection from the sun, wind and dust. The results of the microbiological analysis revealed the presence of total coliforms (46.2%), total mesophilic anaerobic microbial flora (69.2%), total fungi (38.5%) and staphylococcus (76.5%).

Conclusion The results of the microbiological analysis corroborate those of the survey which revealed that kossam consumed by children was produced and packaged under poor hygienic conditions, which would explain the high rate of infections in this population.

Key words: kossam, children, food security, microbiological analysis, Maroua

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Objective: The purpose of this present study was conducted to determine the proximate composition, and minerals of black bean seeds (Phaseolus vulgaris L.) used to manage Sickle Cell Disease (SCD) in West Cameroon Region.

Methods: The Proximate composition was estimated by the standard procedures of the AOAC. Mineral contents were determined by X-ray fluorescence spectrometry.

Results: The results revealed that black bean seeds contained moisture (8.268%), ash (3.063%), crude fat (1.718%), total protein (29.169%), carbohydrate (58.107%), crude fiber (9.397%), total dietary fiber (21.833%) and energy value (276.994 Kcal/100 g). The minerals analysis showed that potassium has the highest value (51.648 mg/100 g), followed by Phosphorus (6.022 mg/100 g), Magnesium (3.867 mg/100 g), Chloride (0.425 mg/100 g) and iron (0.357 mg/100g), while Zinc was the least (0.099 mg/100 g). Calcium was not detected.

Conclusion: The results of the study revealed that black bean seeds used to manage Sickle Cell Disease in West Cameroon Region are a good source of important nutrients such as carbohydrate, protein, fat, fiber and minerals. This study concluded that black bean seed contained immense nutritional therapeutic importance in the management of Sickle Cell Disease.

Keywords: Proximate analysis; minerals; black bean seed; sickle cell disease.
**P040: ANTIOXIDANT PROPERTIES OF FREE AND BOUND PHENOLIC ACIDS FROM BRAN, SPENT GRAIN AND SORGHUM SEEDS**

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Introduction: Phenolic antioxidants have become an indispensable group of food additives because of their abilities to control the rate and extent of lipid oxidation in foods as well as their capacity to increase the shelf-life of food products. Based on their origin, they are classified as synthetic and natural antioxidants. However, synthetic phenolic antioxidants are known to exhibit several adverse effects including toxicity, carcinogenicity and liver damages. Therefore, the use of natural phenolic antioxidants in the food industry has increased and research on natural antioxidant additives has become essential as they pose no health risk to the consumers.

Purpose of Study: This study aims to investigate the phenolic contents and the antioxidant activities of free and bound phenolic extracts from sorghum bran, spent grain and seeds.

Methods: Free and bound phenolic acids were isolated from sorghum bran, spent grain and seeds. Their phenolic acid (PA) profiles were assessed by HPLC and their antioxidant properties using FRAP, ABTS and DPPH assays.

Results: These studies shown that syringic (0.06-2.65 mg/100g of flour), vanilic (0.47-2.63 mg/100g) and p-hydroxybenzoic (0.38-1.75 mg/100g) acids were the major free PAs. Ferulic acid (1.20-6.37 mg/100g) was the major bound PA along with small amounts of protocatechuic, p-hydroxybenzoic and syringic acids. Free PA mixture from bran had the highest total phenolics and antioxidant activities (8.41 µmol Fe²⁺ Equivalent/g, 23.48 µmol TE/g flour, IC₅₀: 0.08 mg/ml for FRAP, ABTS and DPPH assays. respectively). PA content and composition in the mixture contribute significantly to their antioxidant activity. Positive correlations were found between total phenolics, p-hydroxybenzoic, syringic acids and antioxidant activities.

Conclusion: Free and bound PAs from bran and spent grain especially the free PA from bran, have significant antioxidant and free radical scavenging activities. These could be potentially used as rich sources of natural antioxidants in the preparation of functional foods.

Keywords: sorghum, bran; spent grain; antioxidant activity; free phenolic acids; bound phenolic acids; ferulic acid.

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**P041: COMPARATIVE STUDY OF NUTRIENT CONTENT AND ACCEPTABILITY OF NOODLES PREPARED WITH AND WITHOUT INCORPORATION OF TRADITIONAL GREEN LEAFY VEGETABLES FOUND IN NIGERIA.**

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Introduction: Value addition of traditional foods with micronutrient dense components such as green leafy vegetables is a feasible food based approach to combating micronutrient deficiency in Africa. A crucial component of leafy vegetable promotion strategy for children is to reintroduce the consumption of leafy vegetable into the daily food habits of children.

Purpose: The study was descriptive in design and aimed at incorporating traditional green leafy vegetables into a commonly consumed meal of children; determine and compare the nutrient content of the improved meal and control; ascertain the acceptability of improved meal.

Methods: Commonly consumed foods of children were identified using pre-tested food frequency questionnaires administered to children and their mothers. Noodles was selected as the most commonly consumed food by children. Cooking experiments were conducted to develop a standardized recipe for incorporating three types of commonly consumed green leafy vegetables namely: *Telfaria occidentalis, Amaranthus Hybridus, and Celosia Argentea* grown during a gardening intervention study. Proximate and mineral analysis were done on the improved noodles and plain boiled noodles served as control. Sensory evaluation was conducted among 60 panelists (children) using a 5 point hedonic scale, to determine the acceptability of the improved noodles recipe and traditional recipe (plain).
**Results:** Mineral composition of the improved noodles with green leafy vegetable had higher concentration of magnesium, zinc and calcium. Plain cooked noodles had 20.95 mg/100g (± 0.01) of magnesium while the noodles incorporated with *telfaria, amaranthus and celosia* had 21.83mg/ 100g (±0.01), 21.88 mg/100g (± 0.01) and 21.83 mg/100g of magnesium, respectively. Fiber content of improved noodles increased from 0 to 1.71 (±0.10) and (1.68 ± 0.07 ) from the plain recipe to the improved noodles.

Mean overall acceptability for sensory evaluation of the improved noodles was 4.48 and plain boiled noodles was 4.28, there was no statistical significance in the difference.

**Conclusion and recommendation:** A higher micronutrient composition and general acceptability of the improved noodles among the children was observed. More research in the development of improved recipes with green leafy vegetables in traditional meals for children is recommended.

**Keywords:** indigenous vegetables, sensory evaluation, nutritional value.

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**P042: ANTIDIABETIC ACTIVITY OF THE FRESH POD EXTRACT JUICE OF RIPE JACK FRUIT IN ALLOXAN-INDUCED DIABETIC WISTAR ALBINO RATS. AN EXPERIMENTAL LABORATORY BASED STUDY**

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**Introduction:** Currently Diabetes mellitus (DM) type 2 is increasingly becoming a global burden especially among individuals above 40 years of age and also in developing countries like Uganda; in both the urban and rural areas of the country. However, in local communities, DM type 2 is managed traditionally through dietary modification, exercise and use of traditional medicine especially from medicinal plants like Jackfruit (*Artocarpusheterophyllus*), though its effectiveness in reducing blood sugar levels has not been scientifically evaluated.

The study evaluated the hypoglycemic activity of fresh ripe Jackfruit pods extracts on the alloxan-induced type 2 DM in Wistar albino rats.

**Methodology:** This was an experimental laboratory based study involving eight groups of animals (group 1-no treatment given, group 2-2mls normal saline, group 3-5mg/kg bwt gilbenclamide (Standard drug), group 4-2mls of fresh juice, group 5-8 125,250, 500 and 1000mg/kg bwt of aqueous extract) each consisting of 4 animals. Veno puncture was done on the tail vein of each animal and blood glucose levels were measured using a calibrated glucometer at different time intervals following dosing the animals. Data was entered into excel spread sheet and exported to Epi Info package for data analysis. ANOVA was used to compare means within group and between groups.

**Results:** The experimental group treated with the jackfruit aqueous extract showed a higher hypoglycemic activity than that in gilbenclamide (standard drug) though it was long acting as the activity was seen at 120 and 180 minutes.

**Conclusion:** Fresh Jackfruit pod juice and extracts have hypoglycemic activity after 1 hour of administration in alloxan induced diabetic wistar albino rats and thus its use by local communities in the management of diabetes mellitus.

**Key words:** Jack fruit juice, wistar albino rats, diabetic and hypoglycaemic

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**P043: HEAVY METAL COMPOSITION OF FOUR VARIETIES OF BANA (Green mutant, Red Dacca, Gros Michel, Lady’s finger) CONSUMED IN ENUGU STATE**

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**Background:** There is a common practice of using carbide to ripen banana in Nigeria, the addition of heavy metals to these banana varieties and the potential health risk is not known.

**Aim:** The study determined the heavy metal composition of four banana varieties consumed in Enugu State.

**Methods:** Banana varieties were purchased from different retailers in local markets inNsukka Local Government Area, Enugu State. The banana samples were sorted, peeled and weights taken before blending for homogenization. Heavy metal content of the banana varieties was determined using standard method. Statistical analysis was done using IBM SPSS statistical software version 22. Descriptive statistics. Mean and standard deviation was used to
describe the data obtained. One-way Analysis of Variance was used to compare the means of the heavy metal scores of the different banana species. Post-hoc analysis was done with turkey HSD. A p < 0.05 was considered statistically significant.

**Result:** Green mutant banana species had the lowest lead content (1.21µg/100g) while Red Dacca had the highest value (3.01µg/100g). Mercury was absent in all the banana species. Arsenic was absent in Gros Michel and Green mutant species but Red Dacca showed the highest level of arsenic (0.05µg/100g). Lady’s finger had the lowest value for cadmium (0.04µg/100g) while Red Dacca presented the highest value (0.26µg/100g).

**Conclusion:** The study gave invaluable information on the heavy metal composition of banana varieties commonly consumed in Enugu state. The findings revealed that Red Dacca species contains a significant amount of heavy metals which can contribute significantly to its build up in body cells over time.

**Keywords:** Banana, heavy metal, Red Dacca, Gros Michel, Lady’s finger

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**P044: PROXIMATE AND ENERGY COMPOSITION IN A PORTION SIZE OF COMMONLY CONSUMED MANGO VARIETIES IN ENUGU STATE**

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**Background:** Although studies have reported proximate composition of mango but there is scarcity of data on the proximate and energy composition of varieties of mango based on their portion size. This study determined the proximate and energy composition with corresponding content in a portion size of four mango varieties (Sweet, Normal, German and Alphonso) consumed in Enugu state.

**Methods:** Samples of four mango varieties were collected from different markets in Nsukka, Enugu state, Nigeria. Seven fully ripe mango fruits from each of the four varieties were randomly selected, thoroughly washed in warm water, allowed to dry and weighed. The edible portion of the fruits were separated from the seed and homogenized. The samples were subjected to chemical analysis using standard methods. The data were analyzed using Analysis of variance (ANOVA) to compare the mean and a Post-hoc was done to separate the mean using turkey HSD test.

**Results:** The average weight of the four mango varieties for this study ranged from 91.14g for Sweet mango to 192g for Normal mango. The proximate and energy composition of a portion size of the mangoes showed that the ash content of alphonso was significantly (p<0.05) highest (1.42 g/average portion size). German mango had the highest fat content of 0.91 g/average portion size. The crude fiber content differs significantly (p<0.05) amidst the samples with German mango having the least value 3.15 g/average portion size. The protein content of the samples was comparable (p>0.05). Sweet mango had the least carbohydrate (7.95g/average portion size). The energy composition per portion ranged from 108.21kcal/average portion size in German mango to 140.09kcal/average portion size in normal mango.

**Conclusion:** This study shows the actual amount of nutrient and energy contribution from different varieties of mango/portion size and it will be appropriate in dietary counseling and portion size control.

**Keywords:** Proximate, Mango, Portion Size, Standardization

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**P045: NUTRITIONAL AND ANTINUTRITIONAL PROPERTIES OF CASSAVA (MANIHOT ESCULENTA (VAR 325) AS AFFECTED BY ARBUSCULAR MYCORRHIZAL FUNGI (AMF) IN FIELD CONDITION.**

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**Introduction/background:** Problem of food security remains the challenge worldwide. Despite decisions making to overcome this constraint, it remains. Cassava is of great contribution to food security as roots and leafs are used for nutrition purpose. It belongs to a family of plant producing substances dangerous for human health. AMF, a symbiote of the majority of terrestrial plant, impact plant nutrition and metabolisms. We hypothesize that AMF is useful for quality food production.

**Aim of the study:** study the impact of AMF inoculation on some nutrient and antinutrient amount of cassava roots and leaf in field condition.
Methods: cassava was produce within the year 2018 in field condition at the experimental site of the Faculty of Science, University of Yaoundé I, with AMF and control as treatments. When harvested at maturity, root and leaf were transported to the lab, clean and dry with an oven, crushed and store in plastic bag for analysis of sugar, lipid, protein, minerals, cyanide, saponins, phytate and oxalate. Data was analyzed using SPSS. 20. 0 software for window.

Results: Root colonization of cassava plant was 40% for AMF treatment and 10% for control. We record a 50% yield increase for the AMF treatment compare to control. Amount of sugar, protein, calcium, potassium, phosphorus, iron and magnesium were significantly high in root and leaf of cassava following AMF inoculation. The respective percentages of increase were 8,1; 49,42; 24, 78; 30,01; 19, 35 and 15,37% in roots, 3,5; 19; 11,76; 52, 93; 22,22; 25,20 in leafs. In contrast, amount of phytate, saponnin, cyanide and oxalate were significantly low following AMF inoculation in our samples. The respective percentage of decrease were 32,5; 76,94; 85% in roots and  15,21 in leafs. Those results point out new argument to support the use of AMF in the production of healthy cassava for food purpose with improving nutritional quality.

Key words: cassava, arbuscular mycorrhizal fungi, sugar, cyanides.

P046: NUTRIENT COMPOSITION OF SPICE PRODUCT FROM FRESH AND DRIED RAW TURMERIC (CURCUMA LONGA) ROOT
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Introduction: The nutrient content and phytochemical property of dried and fresh Tumeric (curcuma longa) has not been extensively explored, despite its use as spices, herbs and in the treatment of diseases.

Objective: This study evaluated the nutrient composition of spice product from fresh and dried raw turmeric (curcuma longa) root.

Methods: The turmeric root (Curuma longa) used for the study were purchased from a local market (Ogigemarket) in Nsukka in Enugu State, Nigeria. The raw turmeric roots were cleaned by hand picking, scripted and wash with water. The turmeric samples were divided into two; the fresh turmeric while the other part was dried at 55°C. Both the dried and fresh samples were milled in a laboratory hammer mill. The two samples were subjected to food analysis (proximate, minerals, vitamins and phytochemical evaluation) using standard procedures. Data generated from all analysis were analyzed using Statistical product for service solution (SPSS) version 22.

Result: The proximate composition of fresh turmeric and dried turmeric are; Moisture (63.50% and 12.44%), protein content (1.37% and 7.83%), Ash (5.66% and 11.50%), Fibre (4.63% and 7.80%), Fat (4.63% and 7.80%) and Carbohydrate (24.05% and 53.93%) respectively. The micronutrient composition of fresh turmeric and dried turmeric, Iron (4.84mg and 9.79mg), Phosphorus (285.51mg and 161.98mg), Magnesium (96.90mg and 569.23mg), Calcium (174.40mg and 285.09mg), Sodium (29.18mg and 59.30mg), Zinc (0.41mg and 3.08mg) and Copper (0.04µg and 0.90 µg), the thiamin (1.11mg and 1.73mg), Riboflavin (1.11mg and 1.73mg) and Ascobic acid (2.97mg and 3.94 mg) respectively. The cyanide content of fresh turmeric and dried turmeric (2.95mg and 0.87mg);Tannin (0.05mg and 0.08mg) and Phytate (0.21mg and 0.18mg) respectively, Saponin (0.69mg and 1.18mg), Alkaloid (1.31mg and 3.00mg) and Flavonoid (9.66mg and 4.01mg) respectively.

Conclusion: Tumeric is a good source of fibre, fat, carbohydrate, minerals, vitamins and flavonoid.

Keyword: Fresh Tumeric, Dried Tumeric, Spice, Nutrient composition

P047: CONTRIBUTION OF TOXICOLOGICAL ASSESSMENT OF AFLATOXINS IN SOME OLEAGINOUS MEANFT FOR HUMAN CONSUMPTION IN YAOUNDE, CAMEROON.

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**Background:** Aflatoxins are one of the most important mycotoxins produced by a fungus called *Aspergillus* in oleaginous. Besides their highly carcinogenic effects, they are associated with many public health and food security issues.

**Purpose of study:** This study contributes to toxicological assessment of total aflatoxins (B$_1$, B$_2$, G$_1$ and G$_2$) in some oleaginous seeds (i.e. peanuts, pistachio and Soybeans) marketed in Yaoundé’s town, the political capital of Cameroon.

**Methods:** A preliminary survey on the population allowed us to highlight the daily quantities of oleaginous seeds consumed, as well as the state of knowledge on mycotoxins (aflatoxins). A total of 45 oleaginous samples based on food preference were collected according to the standard procedure from different markets in the town of Yaoundé and analysed with their aflatoxin content using validated Enzyme Linked ImmunoSorbent Assay. Toxicological parameters such as Probably Daily Intake (PDI), Margin of Exposure (MOE) and Risk of Primary Liver Cancer (RPLC) were estimated.

**Results:** Analysis showed that 26%, 33% and 40% of peanuts, pistachios and soybeans samples, respectively, were contaminated with total aflatoxins (AFt), with average respectively of 7.27 μg / kg, 7.76 μg / kg and 1.19 μg / kg. Taking into account the average body weight (60Kg), the Probable Daily Intake (PDI) for AFt through the consumption of peanuts, pistachios and soybeans in an adults were: 18.05 ng / kg body weight/ day, 12.55 ng / kg body weight/ day and 0.32ng / kg body weight/ day, respectively. The Margin of Exposure (MOE) to aflatoxins contamination was 9.42 for peanuts, 13.6 for pistachios and 531.2 for soybeans. The Risk of Primary Liver Cancer (RPLC) was also estimated to be 0.81; 0.56 and 0.01 cancer /year/100.000 persons respectively for the three matrices.

**Conclusion:** These results suggest the need for the establishment of regular control measures for these toxins in oilseeds marketed in Cameroon.

**Key words:** Aflatoxins, Peanuts, Pistachios, Soybeans, Exposure, Yaoundé’s population, Cameroon.

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**P048: ISOLATION AND IDENTIFICATION OF ESCHERICHIA COLI AND SHIGELLA SPP FROM AMARANTHUS VIRIDIS**

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**Purpose of the study:** This study was aimed at isolating and characterising Shigella species and *Escherichia coli* from green vegetables, *Amaranthus viridis*, cultivated and sold in Ife Central Local Government Area, Ile – Ife, Osun State, Nigeria.

**Methodology:** A total of 30 samples of fresh, green and firm vegetables (*Amaranthus viridis*) were collected at different sites of retail sales and cultivation across Ife Central Local Government Area of Ile–Ife and transported in ziploc bags to the laboratory. The samples were cultured using streak plate technique. After rinsing the samples with distilled water, 2ml of the rinse water was aspirated and transferred into 10ml Selenite and Nutrient broths which were incubated for growth at 37°C for 24hrs before being subcultured to Salmonella-Shigella agar (SSA) plates for isolation of *Shigella* spp and Eosin Methylene Blue (EMB) agar for isolation of *Escherichia coli*. The rinse water was also streaked directly on some of the agar plates and they were incubated at 37°C and duration of 24hrs necessary for growth and survival of the species of interest in duplicates.

**Results:** After 24 hours of incubation, of the 30 samples processed, 9(30%) samples produced no growth while 21(70%) produced growth of which only 7(33.33%) showed characteristics of *Shigella* which appear colourless without black centre on SSA, and 5(23.81%) showed characteristics of *Escherichia coli* which appear as green metallic sheen on EMB agar. The positive samples were then subcultured for further examination. Identification of *Shigella* spp. and *Escherichia coli* was done based on Microscopy, Cultural characteristics on Nutrient Agar (NA) and Biochemical tests, in conjunction with Bergey’s Manual of Determinative Bacteriology. The presence of either *Shigella* spp. or *Escherichia coli* indicates possibility of faecal contamination of food, which renders food unsafe for consumption and may cause illnesses, hence the need for proper processing of vegetables from these outlets to prevent food poisoning when consumed.

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**P049: INCORPORATION OF GREEN LEAFY VEGETABLES INTO A COMMONLY CONSUMED MEAL OF CHILDREN**

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**Introduction:** Value addition of traditional food products with micronutrient dense components such as green leafy vegetables is a feasible food-based approach to combat micronutrient deficiency in Africa. A crucial component of leafy vegetable promotion strategy for children is to re-introduce the consumption of leafy vegetable into the daily food habits of children.

**Purpose:** The study was designed with the aim of incorporating traditional green leafy vegetables into a commonly consumed meal of children; determine the nutrient content and ascertain the acceptability of improved meal.

**Methods:** Commonly consumed foods of children were identified using pre-tested food frequency questionnaires administered to children and their mothers. Noodles was selected as the most commonly consumed food by children. Cooking experiments were conducted to develop standardized recipe for incorporating three commonly consumed green leafy vegetables: *Telfaria occidentalis*, *Amaranthus Hybridus*, and *Celosia Argentea* grown through gardening intervention study. Proximate and mineral analysis were done on enriched noodles and control (plain boiled noodles). Sensory evaluation was conducted for acceptability of the vegetable-enriched noodles recipe compared with the control using 5-point hedonic scale, and p value set at 0.05.

**Results:** The enriched noodles had higher concentration of magnesium, zinc and calcium. Plain cooked noodles contained 20.95±0.01mg magnesium while the noodles enriched with *Telferia occidentalis*, *Amaranthus Hybridus* and *Celosia Argentea* had 21.83±0.01mg, 21.88±0.01mg and 21.83±mg /100g magnesium, respectively. Fibre content of enriched noodles increased from 0 to 1.71±0.10g, and 1.68±0.07g from plain recipe to enriched noodles. Mean overall acceptability of enriched noodles was 4.48 while that of plain boiled noodles was 4.28, with no significant difference.

**Conclusion and recommendation:** A higher micronutrient content was observed in the enriched noodles which was generally more acceptable among the children. There is need for more research in developing improved recipes from traditional meals with green leafy vegetables for children.

**Keywords:** Green Leafy Vegetables, Children, Enriched noodles.

**P050: ASSESSMENT OF CHEMICAL COMPOSITION AND NUTRIENT BIOAVAILABILITY OF CIRINA FORDA LARVA**

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**Introduction:** Protein and micronutrient malnutrition are still persisting globally. *Cirina forda*, consumed as snack or cooked in soups has been reported to have the potential to provide substantial amount of protein, essential minerals and vitamins. Little information exists on the bioavailability of these nutrients when consumed.

**Purpose of the study:** This study was carried out to assess the chemical composition and essential nutrient bioavailability of *Cirina forda* (CF) larva using Wistar strain rats.

**Materials and methods:** Dried processed CF larva was purchased from Saki (Nigeria) and Ghana (from Bodija market, Ibadan). The samples were analysed for proximate, minerals, vitamins and anti-nutrients composition using standard methods of AOAC while nutrient bioavailability was determined using Weanling Wister strain rats. One-way ANOVA was used to interpret the data at p<0.05.

**Results:** *Cirina forda* samples were very low in moisture (6.05g & 4.92g), high in protein (50.71g & 52.88g), fat (16.51g & 16.95g) and carbohydrate (23.63g & 22.09g) for Saki and Ghana respectively. Significant difference was observed in the proximate, mineral and vitamin composition of the samples (p<0.05). However, no significant difference was observed in the anti-nutritional composition of both samples (p>0.05) except for trypsin inhibitor (p<0.05). Mean weight gain in experimental diet group S (+16.00g) and G (+26.66g) was significantly higher than that of control diet group (+11.34g) while the basal diet group recorded a weight loss (-9.5g). Basal diet group had the least value of all serum nutrient level while the control diet group had the highest.

**Conclusion:** *Cirina forda* larva was rich in protein, calcium, iron, zinc and vitamin A. The contribution of *C. forda* larva to rat serum level of these micronutrients indicate their bioavailability in rats, and is believed will be bioavailable in humans; hence, its consumption should be encouraged as means of reducing micronutrient deficiency.

**Keywords:** Chemical composition, Nutrient bioavailability, *Cirina forda* larva.
P051: ELEMENTS OF KITCHEN TOXICOLOGY TO EXPLOIT THE VALUE OF TRADITIONAL (AFRICAN) RECIPES: THE CASE OF EGUSI OKRA MEAL IN THE DIET OF HIV+/AIDS SUBJECTS

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Introduction: The Egusi Okra soup is a traditional African meal that is considered of high nutritional value and protective against weight loss. The Egusi Okra soup is discussed in the context of a diet that is asked to mitigate complications (weight loss, opportunistic infections) and support antiretroviral therapy in African countries with high HIV/AIDS prevalence.

Purpose: We introduce the concept of "kitchen toxicology" to analyse the recipe of the Egusi Okra soup and highlight possible mitigation measures for toxic and/or antinutritional effects in the wide spectrum of health and nutritional needs of HIV+/AIDS subjects.

Method: We focus on toxicants (environmental contaminants, process contaminants, substances leaching from food contact materials) dysregulating the immune status, as well as on interactions between nutrients, contaminants, and/or antinutrients which may lead to secondary/conditioned nutritional deficiencies or imbalances; in their turn, these can modulate the ability to cope with toxicants, and increase nutritional requirements.

Results: Recommendations are given for practices preserving the Egusi Okra soup from such risk factors, identifying points of particular attention during meal preparation, from purchase of raw ingredients through to food handling, cooking, storage, and consumption.

Conclusion: Based on acknowledged toxicological profiles of substances, nutritional interventions would benefit of the integration of kitchen toxicology practices in everyday life. Toxicological risk assessment is crucial to understand the history and status of the person exposed to or affected by infectious diseases.

P052: NUTRITIONAL AND SENSORY EVALUATION OF TOMATO-PINEAPPLE JUICE BLEND

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Background: Juices of fruit blends in varying compositions have been explored for the purpose of enhancing their nutritional, sensory, antioxidant properties and therapeutic benefits. The purpose of this study was to examine the nutritional and sensory properties of a blend of juice processed with tomato and pineapple in varying proportions.

Methods: Juice blends of tomato and pineapple were prepared at 10%, 20%, 30%, 50%, 70% and 100% (T10, T20, T30, T50, T70 and T100) of tomato juice. Preliminary nutritional analysis was carried out by standard methods. Sensory evaluation rating by color, taste, flavor, aroma and general acceptability was done among thirty (30) participants of either sex and responses were computed. Results obtained were analyzed by SPSS statistics 20 at p˂ 0.05.

Results: The juice yield from 4kg of tomato fruits was approximately 2.3 L while 1.7 L of pineapple juice was obtained from four (4) fruits whose average weight was 250g. Nutritional analysis at p< 0.05 showed that Vitamin C levels all blend were not significantly different having values ranging from 0.27±0.02 mg/g to 0.3±0.02 mg/g. Flavonoid, tannin, total phenolic, lycopene, beta carotene and total carotene contents were found to increase steadily from T10 (0.03±0.01 mg/g, 0.18±0.004 mg/g, 0.13±0.003 mg/g, 1.20±0.02 mg/100g, 0.92±0.04 mg/100 g, 2.48±0.08 mg/100 g) to T100 (0.12±0.03 mg/g, 0.23±0.003 mg/g, 0.15±0.004 mg/g, 2.21±0.02 mg/100g, 1.60±0.002 mg/100 g, 2.66±0.01 mg/100 g) while brix was highest in T10 at 10.25 and lowest in T100 at 5.0. Sensory evaluation showed that 67% preferred T20 while T100 was least preferred. 100% indicated their willingness to purchase both T10 and T20. Conclusions: Findings from this study showed that tomato-pineapple juice blends have advantageous nutritional attributes. Hence, they can be recommended as natural sources of nutrient supplements.

Keywords: Juice blend; beta carotene; vitamin C; lycopene

P053: INFLUENCE OF BLANCHING AND FERMENTATION ON THE BIOACCESSIBILITY OF ZINC AND IRON FROM AFRICAN LEAFY VEGETABLES (ALVS)

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Introduction: African leafy vegetables (ALVs) are considered as an important source of iron and zinc. However, their iron and zinc concentration may not necessarily indicate bioaccessibility as they also contain antinutrients which inhibit their absorption. The study was carried out to determine the influence of blanching and fermentation on the bioaccessibility iron and zinc from ALVs.

METHODS: Gynandropsis gynandra (spider plant), Amaranthus thunbergi (pigweed), Corchorus spp. (wild jute), Vigna unguiculata (cowpea leaves) and Brasica Carinata (African kale) were purchased from locally farmers in Botswana. The ALVs are commonly consumed in sub-Saharan Africa, they were processed by cooking, blanching and fermentation. The iron and zinc content and antinutrients of ALVs were analysed. The bioaccessibility of iron and zinc from processed ALVs was evaluated using *in vitro* dialysability model.

RESULTS: In overall blanching and fermentation had a positive effect in reduction of phytates, oxalate and tannin contents. The percentage iron bioaccessibility from ALVs ranged from 1.4 to 16.4% and the average percentage dialysability of iron in cooked, blanched and fermented ALVs were 6.8%, 3.4% and 5.3% respectively. Percentage zinc dialysability ranged from 6.6 to 43.2%, 16.6 to 35.7% and 14.5 to 28.7% for cooked, blanched and fermented ALVs respectively. There was a double increase in the dialysable zinc in both fermented (207%) and blanched amaranth (214%). The results of this study found that there was no significant effect between the bioaccessibility of iron and zinc in fermented and cooked ALVs while a reduction was observed in blanched.

Conclusion: From this study, high iron and zinc concentration from ALVs did not translate directly to high bioaccessibility of these minerals.

P054: FOOD PURCHASING DECISIONS IN OVERWEIGHT MOTHER-CHILD DYADS IN MALAWI

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Introduction: As obesity increases in sub-Saharan Africa, information is needed about factors influencing food choices in households with overweight members. This study assessed women’s food purchasing decisions in overweight mother-child dyads in Malawi.

Methods: We enrolled 50 mother-child (age 6-59 months) dyads in which either the mother, the child, or both were overweight in Lilongwe and Kasungu districts. Research assistants accompanied each woman on a food shopping trip and filled out a structured observation form on the types of food purchased and locations of purchases. At home, an in-depth interview was conducted on the factors that influenced the woman’s purchases, including asking them to sort 12 factors into piles that always, sometimes, or never influence their food purchasing choices.

Results: Women most often purchased from outdoor markets small quantities of foods needed to prepare dishes. These foods include tomatoes (76%), green leafy vegetables (66%), cooking oil (56%), onions (44%), and fish (41%). Pile sorts and open-ended responses revealed that taste, cost, and food quality were the strongest factors influencing food purchases. Women explained that if a food is too expensive, they buy a smaller quantity or buy something else (e.g., fish instead of meat). Preparing food that their family enjoys eating influenced the foods women bought. Adding tomatoes, onions, and oil to relish was commonly described as making the food tastier. To make the child happy, >50% of the women reported buying them sweets, packaged snacks, fruit, or fried food (e.g., doughnuts), specifically.

Conclusions and Recommendations: Cost, taste, and food quality were the most important drivers of women’s food purchasing choices. Despite their overall emphasis on food cost and quality, women used some of their minimal funds to buy unhealthy foods for their children. These findings can be used by programs to reinforce healthy and decrease unhealthy food purchases.

P055: COMPARATIVE ANALYSIS OF THE NUTRITIONAL COMPOSITIONS OF BREAST MILK, INFANT FORMULAR AND COW MILK

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**Introduction** Milk is a very important food for all mammals. It is an opaque white liquid that provides optimum nutrition for growth and development. The role of milk in nature is to nourish and provide immunological protection for the mammalian young.

**Aim** The aim of this study is to determine the nutritional compositions of breast milk, cow milk and infant formulas. Thus, ascertain if infants fed with baby formulas and cow milk get the same nutritional benefits derived from breast milk.

**Materials and Methods** NAN® infant formula was bought from Eke-Awka market in Anambra state. Five cow milk samples were collected from five different healthy cows at Ugwuoba cattle market, Enugu state. Breast milk samples were collected from five healthy breast-feeding mothers at General Hospital Enugu-Ukwu, Anambra state, all volunteers.

The total fat content of the milk samples were determined using Rose Gottlieb method. Similarly, the levels of Vitamin K, Calcium and Sodium were analyzed in two different infant formulas (NAN® and Cowbell®) and in cow milk as well as human breast milk.

**Results** The results show a mean total fat value of 3.92 ± 1.47, 3.4 ± 0.008 and 4.63 ± 0.043 for breast milk, NAN® formula and cow milk respectively. In addition, results show that NAN® formula contains 7.3mg/USP Vitamin K, 0.52mmol/l Ca²⁺ and 9.34mmol/l Na⁺. Cow milk contains 5.0mg/USP Vitamin K, 0.38mmol/l Ca²⁺ and 7.40mmol/l Na⁺. And human breast milk contains 7.2mg/USP Vitamin K, 0.061mmol/l Ca²⁺ and 21.00mmol/l Na⁺.

**Conclusion** The results of this experiment suggest that, though cow milk may contain some nutrients at appreciable amount, but because of its high fat content, it is not a perfect replacement for breast milk for infant feeding.

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**P056: MULTI-MYCOTOXIN EXPOSURE OF CHILDREN (0 - 24 MONTHS) IN RURAL MAIZE-SUBSISTENCE FARMING AREAS OF EASTERN CAPE, SOUTH AFRICA**


**Background:** Child malnutrition is highly prevalent in South Africa, especially among children below 24 months living in rural areas in the Eastern Cape (EC) Province, where maize is mostly used as weaning and complementary food from an early age. Previous studies also indicated high levels of fumonisin B (FB), deoxynivalenol (DON) and zearalenone (ZEA).

**Aim:** A cross-sectional study of children below 24 months was conducted in rural maize-subistence farming areas (EC) to determine exposure levels.

**Methods:** Home-grown maize samples (n=171) were collected from households and analysed by LC-MS/MS for FB, DON and ZEA concentrations. Food intakes of 129 children were quantified using a validated food frequency questionnaire (FFQ). Individual raw maize consumption was calculated using recipes from the FFQ. Probable daily intakes (PDIs) for each mycotoxin were determined using a deterministic approach and were compared to the respective mycotoxins' provisional maximum tolerable daily intake (PMTDI). Mean FB, DON and ZEA levels were 1035, 24.5 and 31.0 µg/kg respectively. Mean PDIs for FB, DON and ZEA were 8.4, 0.2 and 0.3 µg/kg body weight (bw)/day, respectively. Exposures stratified by age indicated persistent high mean PDIs for FB, (above the PMTDI of 2 µg/kg bw/day), ranging between 5.0-11.6 µg/kg bw/day. Mean exposure to DON and ZEA were below their relevant PMTDIs (1 and 0.5 µg/kg bw/day, respectively). Individually, 81% and 13% of children had exposures above the PMTDI for FB and ZEA.

**Conclusion:** Results confirm the magnitude of FB exposure among vulnerable groups from rural maize subsistence farming areas in EC. This increase the health risk of these vulnerable infants and young children especially regarding loss of appetite, poor gut permeability and nutrient absorption resulting in malnutrition.

Presenter will be Dr Martani Lombard (tani.lombard@nwu.ac.za) and it is anticipated that this will fall under the malnutrition symposia.

**P057: ASSESSMENT OF POST-HARVEST LOSSES OF PERISHABLE FRUITS SOLD IN YAOUNDÉ, CAMEROON**

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Introduction/Background: Cameroon and most Sub-Saharan African countries are currently facing one of the serious food crises of their existences. Unavailability and inaccessibility of foods are incriminated. One of the solutions to solve these problems is the reduction of food losses through the Food Supply Chain. The first thing to do is to determine the causes and estimates the quantity of these losses.

Purpose of Study: This study estimated the quantity and determined the causes of post-harvest losses of perishable fruits marketed in Yaoundé, Cameroon.

Methods: The study was conducted in May 2017 using a semi-structured questionnaire and a checklist. Fifty perishable fruit retailers were selected following the “snowball” strategy. The information gathered were socio-economic characteristics, fruit marketing practices and food losses. The data collected were analyzed using the software SPSS 20.0 for Windows.

Results: The results show that women (92%) dominate the fruit market. None of the respondents were trained in fruit losses management and only 22% attended above secondary school education. Among the 15 species of fruits listed on the market, mangoes, pineapples, bananas, papayas, oranges, lemons, avocados and watermelons were the most represented. The average shelf life of fruits was only 1-2 days in the hands of retailers and about 40 to 50% of fruits were lost before reaching the consumer’s table. Most of the respondents considered that the main causes of fruit losses were: difficulty in selling, transporting from the purchase point to the shops, storage conditions. However, survey results reveal that knowledge and know-how such as hygiene, good conservation practices and fruit processing techniques are the most incriminated.

Conclusion: Training of the retailers of fruits on the management of fruit losses could help to reduce these losses and to improve fruits shelf life and the situation of food insecurity in Yaoundé, Cameroon.

Key words: Fruit losses, retailers, Yaoundé, storage conditions, fruit processing techniques

**P058: HEALTH AS NATURAL TRANSGENERATIONAL CAPITAL (SUSTAINABLE FOOD SAFETY): THE ECOLOGY OF EATING IN SENEGAL, WITH A FOCUS ON SAVANNA AREAS, PASTORAL SYSTEMS, AND ONE HEALTH**

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Background: Sustainable, i.e. transgenerational, health flow implies proper conceptus programming and health challenges of healthy adulthood. In Senegal traditional daily diet is not deficient in calories and proteins; however, especially in rural areas and in the poorest areas of cities, is also less varied, and possibly less rich in essential nutrients than it would seem at first glance.

Purpose: Information on Senegalese diet, food culture and food systems has been collected in urban, semi-urban and rural settings in the regions of Dakar, Théïs and Diourbel.

Methods: Information collected on the field has been integrated by Senegalese cooking recipes detailed by a organization of Senegalese women immigrated in Italy. Besides foods and current dietary behaviour, aspects related to the general local culture, maternal diet and newborn health and communication tools rooted in the social network were studied.

Results: The access to nutritional variety may have been limited where agricultural shapes have been deleted by monocultures and productions of goods for export. On the other hand, the current malnutrition and the need for training on basic nutritional and safety rules appear anomalous in the general criterion of selection. Communication related to the market replacement foods and breastmilk substitutes should be severely surveyed. Health behaviors associated with poverty could result in exposure to environmental endocrine disrupting compounds. In Senegal, child mortality...
is not yet low and female education remains low, but family-size is decreasing quite rapidly. A national family planning programme is promoted by the Senegalese midwives association.

**Conclusion:** In general, the population survival strategy, the fascination by western models, the commodification of land and labor in the pastoral sector, and the rapid transition to an urban economy and lifestyle make it particularly urgent the establishment of primary prevention workframes as information and communication on preventable health risk factors associated with maternal pre-, peri-, post gestation diet and behaviours.

**Keywords:** Sub-Sahara; Fulani; HACCP; food security; food sovereignty; fertility, Senegal

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**P059:** THE HEALTHINESS OF PROCESSED FOODS FREQUENTLY CONSUMED BY CHILDREN AGED TWO TO FIVE YEARS ATTENDING EARLY CHILDHOOD DEVELOPMENT CENTRES IN TLOKWE, SOUTH AFRICA

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**Introduction:** Childhood obesity is of great public health concern. In South African, childhood obesity (two to five years) has increased from 10.6% to 18.1% in the last decade. The frequent consumption of processed foods is of concern due to the increased availability and affordability of processed foods often classified as less healthy due to the fat, sugar and/or salt content.

**Purpose of the study:** To determine the healthiness of processed foods frequently consumed by children aged two to five years attending early childhood development (ECD) centres in the Tlokwe, South Africa.

**Methods:** Frequently consumed processed foods were classified as foods consumed three to five times per week or more by 5% of the study population. Processed foods were identified by using a newly developed unquantified food frequency questionnaire (FFQ). The food item and specific manufacturer brand was identified. The healthiness of the processed foods was classified by applying the South African nutrient profiling model.

**Results:** A total of 66 processed foods were identified of which 16 (top 75th percentile) were identified as frequently consumed. The healthiness of the top three reported brands for each of the 16 food items identified as frequently consumed were assessed. In total, all of the included brands of four foods items (25%) were identified as healthy and for nine (56.25%) foods items as less healthy. A variance in healthiness classification was present between the reported brands of three foods items (18.75%). In total 68.75% of the included food items were classified as less healthy.

**Conclusion:** These findings support the need for actions to improve children’s food environment and highlights the necessity for future research studies on a larger variety of foods.

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**P060:** EFFECT OF NUTRITION EDUCATION ON THE CONSUMPTION OF FRUITS AND VEGETABLES AMONG IN-SCHOOL ADOLESCENTS IN IBADAN NORTH LOCAL GOVERNMENT AREA OF OYO STATE

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**Background:** Fruits and vegetables are rich sources of micronutrients that perform important functions in the body. Despite the increased micronutrient needs during adolescence, adolescents have been found to consume below the recommended daily requirements of fruits (2servings/160gm) and vegetables (3servings/240gm).

**Objective:** To assess nutritional knowledge, attitude and practice of in-school adolescents as well as to evaluate the effects of nutrition education on fruits and vegetables consumption in Ibadan North local government.

**Design:** This quasi-experimental study recruited 264 in-school adolescents from two private schools in the Local Government Area. Control and intervention groups were determine via tossing of a coin. Nutrition club, where nutrition education classes and nutrition games were done during a 60 minutes club meeting over a six week period was formed in the intervention group. Nutrition knowledge, attitude and practice was assessed using a self-administered, semi-structured questionnaire at baseline and endline. Knowledge was classified into poor (0-5), moderate (6-10), good (11-15), attitude was categorized into poor (1-3), and good (4-6). ANOVA was used to compare the mean score and chi square was used to test for relationship at p<0.05.

**Results:** The mean age of the respondents was 12.46 ± 1.86 years and 55.7% were males, frequently consumed fruits and vegetable were mango, watermelon, African cherry, onions, and garlic. At baseline, mean knowledge, attitude and practice were 5.32±2.22, 6.34±2.00, 5.94±2.54 and 6.03±2.76, 7.52±1.79, 6.03±2.45 for both control and intervention groups respectively. At endline, mean knowledge, attitude and practice of the respondents were
Conclusion: This suggests that creation of nutrition clubs in secondary schools or inclusion of nutrition education in adolescents’ school curriculum may help to improve their fruits and vegetable consumption.

Keywords: Adolescents, nutrition education, fruits, vegetables, micronutrients.

P061: GUM DISEASES IN MOTHERS AND THEIR ASSOCIATION WITH LOW BIRTHWEIGHT AND PRETERM CHILDREN AT THE KBTH, ACCRA: A CASE-CONTROL STUDY.

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Background: Gum diseases common in pregnancy are reported to be associated with low birth weight (LBW) and preterm birth. LBW and preterm babies are affected by maternal and fetal factors. This study sought to investigate the possible association between LBW and preterm with gum disease in pregnancy.

Aim: To assess the association between gum disease during pregnancy with low birth weight (LBW) and preterm in children born at the KBTH.

Method: Mothers were orally examined and gum disease prevalence estimated and compared between 57 mothers with LBW and preterm children as Cases and 58 of those with normal birthweight (NBW) children as Controls. LBW was defined as weight <2500g and NBW as ≥2500g. Preterm babies had gestational age <37 weeks and term birth had ≥37 weeks.

Results: The Cases were 57(50.4%) and Controls 58(49.6%). Prevalence of tooth loss in all the mothers was 32(27.8%). Eleven (34.4%) lost the teeth through gum disease. Gingival recession was 44(38.3%), tooth mobility was 14(12.2%). Preterm (<37 weeks gestation) children was 63(54.8%). Gum inflammations were; None 31(27%), Mild 40(34.8%), Moderate 40(34.8%) and Severe 4(3.5%). Gingival recession among LBW mothers was 17(38.6%) and NBW mothers was 27(61.4%), p=0.038, OR= 1.48 (95% CI= 1.03 -2.13). Among the preterm mothers, Gingival recessions was 19(43.2%), for normal gestation 25(56.8%), p=0.04 and OR, 1.53 95%CI, 1.03 – 2.28. Current gum conditions was, 38(45.2%) in LBW mothers and 46(54.8%) in NBW mothers. Among the preterm mothers, 42(50%) had gum condition and 42(50%) had normal gum, P=0.09 and OR was 1.55 95%CI, 0.89 -2.70.

Conclusions: Mothers with normal weight children rather had significantly higher gingival recession than the LBW mothers. Current gum disease was not significantly associated with LBW.

Key words: low birthweight, preterm children, gum disease, gingival recession, gum inflammation

P062: MBEYA REGION: VILLAGE HEALTH AND NUTRITION DAYS.

Godfrey Anna, Nkotagu Neema & Fungo Charles

Introduction: Village Health and Nutrition Day (VHND) is an innovative community-based platform that provides community members – children U5, Pregnant women, men and women, with easier access to integrated nutrition and health services. VHND is being semi-annually implemented by the CRS and CONSENFUTH consortium through UNICEF funded program: Accelerating Stunting Reduction Program (ASRP) in six districts of Mbeya region since 2017.

Activities: The VHND involves mostly Community based Growth Monitoring and Promotion activities such as anthropometric measurement to assess the nutritional status of children U5 to identify those who are either stunted or underweight; provision of deworming medication and Vitamin A supplementation as per the national regulation; assessment of pregnant women’s nutritional status using MUAC, checking weight-gain and Hb; provision of counselling sessions to caregivers and pregnant women (not using FeFO); and referral of severe malnourished children to treatment of severe acute malnutrition.

Other activities include: Practical cooking demonstration of enhanced complementary foods using locally available foods and stimulation activities of children through plays.

Results: Since VHNDs establishment, 245 communities have been reached and out of them, 50 communities organized the events using own resources.

Nutrition status of children: ASPR assessed nutritional status of a total of 24,176 under 5 years old (U5) children in six districts of Mbeya. Among them, 35% of the U5 boys (15% been U2) were stunted; while 30% of the U5 girls (12% been U2) were also stunted (short for their age). Also, 19% of the children U5 were underweight (thin for their age).

Maternal and health care: 1,332 pregnant women (PW) were assessed. Among them 19% were not using FeFO while 55% of PW using FeFO started during their second trimester.
**Vitamin A supplementation and deworming medication:** 42% of the children received deworming medication and vitamin A supplementation. **Nutrition assessment for adults:** 11,052 adults were assessed using Body Mass Index (BMI).

**VHNDs successes:** VHNDs successes resulted from engaging multiple stakeholders i.e. communities, HFCPs, local government authorities (LGAs), private individuals and other implementing partners (IPs) as key partners in mitigating stunting problem – from planning, implementation and follow-ups. Prior event, VHNDs involved awareness creation with LGAs on its importance for nutrition mitigation solutions; and engaging individuals, community in resource mobilization. The project also linked with HFCPs for personnel and nutritional resources; and IPs for referrals.

**Lessons learned**
- (a). VHND is opportunity for co-location of services. Multiple services e.g. nutrition assessment, counselling activities, cooking demonstration; linkage of beneficiaries with other psychosocial and economic services; children stimulation activities through play; social protection activities e.g. birth registration can be mobilized and accessed in one area. (b). VHNDs increased awareness and commitment among communities (families and leadership) to support activities for stunting reduction; (c). Increased male engagement in child-care – improved readiness to allocate time resources for child nutrition and stimulation; increased monitoring of nutrition trends among communities through growth monitoring charts; used as entry point for community resource mobilization and joint- actions; and increased collaborative efforts towards reduction of stunting in Mbeya region.

**P063: NUTRITIONAL AND PHYTOCHEMICAL COMPOSITION OF NONI PLANT**

*(Morinda citrifolia)* LEAF, SEED, FRUIT AND BARK

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**Introduction:** *Morinda citrifolia* commonly known as noni is an evergreen plant with up to 80 species grown in tropical and subtropical regions. The plant is recognized by their large leaves, straight stem and grenade-like yellow fruit. The fruit has a pungent odour when ripening.

Purpose of the study: Nutritional and phytochemical composition of noni plant (*Morinda citrifolia*) leaf, seed, fruit and bark were carried out.

**Methods:** The noni plant (*Morinda citrifolia*) leaf, seed, fruit and bark were respectively processed into powder form. Proximate, mineral, vitamin and phytochemical composition were determined.

**Results:** Moisture content ranged from 8.27 – 16.45%, Protein 0.04 – 14.33%, Fat 2.0 – 3.98%, Ash 1.6 – 10.46%, Crude fiber 0.03 – 28.70% and Carbohydrate 2.36 – 53.43%. Potassium varies between 0.01 – 1.65 mg/100g, Manganese 0.25 – 53.75 mg/100g, Calcium 0.01 – 1.44 mg/100g, Sodium 0.0 – 0.47 mg/100g, Iron 3.71 – 92.25 mg/100g, Zinc 0.50 – 30.93 mg/100g and Magnesium 0.02 – 0.29 mg/100g. Phytochemical composition such as Tannin varies from 0.22 – 1.87 mg/100g, Saponin 1.92 – 7.91 mg/100g, Alkaloids 4.27 – 17.89 mg/100g, Phytic Acid 4.48 – 5.89 mg/100g, Flavonoid 2.97 – 13.7 mg/100g and Oxalate 3.85 – 5.10 mg/100g. Vitamin A varies between 0.04 – 0.53 mg/100g, vitamin B₂ 0.22 – 2.21 mg/100g and vitamin C 2.11 – 4.11 mg/100g.

**Conclusion:** A great deal of variation occur in proximate, mineral, phytochemical and Vitamins composition between the various parts of *Morinda citrifolia* (L.) (Noni) seed, pulp and bark with significant different (p<0.05). This study offers opportunity to develop value added products from Noni plant since it could help to reduce micronutrient deficiency.

**Key words:** *Morinda citrifolia* leaf, seed, fruit and bark.

**P064: EFFECT OF TRADITIONAL DRYING METHODS ON PROXIMATE COMPOSITION AND CONSUMER ACCEPTABILITY OF FRESH MAIZE PORRIDGE BLENDS**

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**INTRODUCTION:** Fresh maize plays an important role as a snack and a relief food during hunger periods; it is considered indispensable in lean months (Harriman, 2014). It is enjoyed boiled, roasted and baked. However, it has a short harvesting period, a shorter shelf life and losses its sensory quality when stored (Szymanek, 2009; Ketthaisong, 2010). Processing and preservation of fresh maize remains limited and confined to small scale processors. Although,
widely accepted in rural Malawi, traditionally preserved fresh maize called *viselera* is underutilized, not well understood and merely reconstituted.

**PURPOSE:** This study investigated the effects blanching and traditional drying techniques on the proximate composition and consumer acceptability of maize harvested at different stages of maturity.

**METHODS:** Test flours of blanched and dried fresh maize were analysed using the Association of the Official Analytical Chemists (AOAC), 2010 methods to determine their proximate composition. To measure degree of liking of dried fresh maize soy porridge, acceptability tests using 87 mothers and 113 nursery school children were done. A trained descriptive panel of 8 people described the prepared porridge blends.

**SUMMARY OF RESULTS:** Analysis of nutritional data showed that the flours from the blanched and dried fresh maize contained lower moisture contents (4.51-6.14%), had proteins (10.5-13.7%), fats (4-8%) and carbohydrates (64.9-74.4%). Sensory evaluation results showed that all the test porridges were generally accepted by the mothers and children.

**CONCLUSION/RECOMMENDATION:** In conclusion, fresh maize-soy flour blends can potentially be used in complementary feeding of children at home and school as an alternative to traditional maize flours currently being used.