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Nutrition Congress Abstracts - Oral Presentations

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Abstracts

All abstracts were published as received by the congress committee. Only minor language and grammatical changes were made to the abstracts.

1. Admission morbidity status and mortality risk in SAM children aged 6-11 months in Ghana. A retrospective collection of hospital medical records

Miss Hannah Asare, *Miss Janet Adede Carboo, Mrs Cornelia Conradie, Dr Robin Dolman, Dr Cristian Ricci, Dr Tani Lombard*

North-west University

Background: In developing countries, Severe Acute Malnutrition (SAM) remains a major public health concern contributing significantly to childhood mortality. Strong epidemiological evidence shows that, low weight-for-length/height or mid-upper arm circumference (MUAC) are highly associated with 5 – 20 times increased risk of mortality. On the other side, the association between pre-morbid status and mortality risk is not well acknowledged.

Methods: A retrospective collection of hospital medical records was conducted in two hospitals in Ghana where data on 99 children aged 6 – 11 months were collected (55 girls, 55.6%). Malnutrition status at admission was assessed using weight-for-length z-score (WLZ) according to WHO child growth standards and MUAC. The odds of mortality were performed using a multivariate logistic model adjusted by gender and age.

Results: Data regarding 99 first admissions for SAM were collected over the period may-2014 and June-2017. Among those children 15 had died (15.2%). No differences were observed between baseline WLZ and MUAC in children who died compared to those discharged. Otherwise, baseline conditions like HIV status, tuberculosis, oedema, sever pallor, convulsions and respiratory tract infections were associated with an increased mortality risk up to 6 times. In a linear model aimed to evaluate number of conditions and mortality, we observed a significant mortality risk increase of 75% when a single condition accumulates on the condition profile of the child.

Conclusions: Baseline morbidity status better determined mortality in children aged 6-11 months than malnutrition status assessed by Z-scores and MUAC.

2. Iodine status in South African adults ten years after the last national survey

Prof Jeannine Baumgartner[1], *Prof Karen Charlton*[2,3], *Dr Lisa Ware*[4,5], *Prof Aletta Schutte*[4,6], *Dr Nirmala Naidoo*[7], *Dr Paul Kowal*[7,8]

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Introduction: In an effort to eliminate iodine deficiency in South Africa, mandatory iodisation of table salt was introduced in 1995. The 2005 National Food Consumption Survey indicated adequate iodine status in South Africans. As ten years have passed since this survey and considering the introduction of the salt reduction legislation in 2016, which may reduce iodine intake, it was timeous to assess the iodine status in the South African population in 2015.

Methods: This cross-sectional survey formed part of a cohort study nested within the WHO Study on global AGEing and adult health (WHO-SAGE). In 2015, data from individuals of randomly selected households (n = 4030) were collected across South Africa. Spot and 24-hour urine samples were obtained from a random sub-sample (n = 1168) for the analysis of urinary iodine concentrations (UIC). Estimated iodine intake from 24-hour urinary iodine excretion (UIE) was calculated for comparison with the estimated average requirement of 95 µg iodine/day.

Results: The mean age of adults was 54 (range: 18-102) years. The median (IQR) UIC was 116 (57,203) µg/L (males:125 [59,199] µg/L; females:111 [57,204] µg/L), with 44% of adults having a UIC below 100µg/L. Median estimated iodine intake from 24-hour UIE was 88 (44-163) µg/day.

Conclusion: In this nationally representative sample of South African adults, median UIC indicated adequate iodine status. However, based on 24-hour UIE, iodine intakes are inadequate. Considering current efforts in reducing salt intake in the South African population, our results highlight the need for continued monitoring of iodine status, as well as salt iodisation levels.

3. The new Road to Health booklet - A tool for delivery of essential package of early childhood development (ECD)

Ms Ann Behr, Ms Zandile Kubeka

National Department of Health

Introduction: Child mortality in South Africa has declined but many children are still not reaching their full potential. Stunting remain unacceptably high. Exclusive breastfeeding rates are still suboptimal at 32% and the proportion of children receiving the minimum acceptable diets remain low (23%) (SADHS 2016). The 2014 Ministerial Committee on Morbidity and Mortality (CoMMiC) report recommended that the Road to Health Booklet should be maximized to improve health outcomes for children.

Objective: To revise the RtHB to make it user-friendly and effective as a tool for delivery of an essential package of ECD services.

Methods: The National Department of Health solicited inputs on the old RTH booklet from key stakeholders. A technical working group was established to revise the booklet and to drive the under-5 campaign linked to the RtHB. The second draft was independently tested in 3 provinces.

Results: The content in the new RtHB covers the essential package of ECD services and specifically addresses user-friendly nutrition messages for caregivers, community health workers and health care workers namely breastfeeding diagrams to aid breastfeeding mothers and illustrations on complementary feeding.

Conclusions: Given the potential of the booklet to reach over 1 million homes it could be used as a significant tool to convey effective nutrition messages to improve health and development outcomes for children.

4. Application of the Theory of Planned Behaviour (TPB) in the identification of messageable beliefs for the development of a Fruit and Vegetable Intervention

Mrs Sharmilah Booley

University of Cape Town

Application of the Theory of Planned Behaviour (TPB) in the identification of messageable beliefs for the development of a Fruit and Vegetable Intervention

Background: The theory of planned behaviour (TPB) is commonly used in health intervention planning. This research involved the comprehensive application of the TPB in formative assessment to identify messageable beliefs for a fruit and vegetable (FV) intake intervention targeted at University of Cape Town PASS staff. TPB states that intention is predicted by attitude, subjective norms and perceived behavioural control, while behavioural, normative and control beliefs predict the latter three constructs. A messageable belief would be one that can change and is correlated with other TPB constructs.

Methods: Salient beliefs in relation to fruit and vegetables were identified using 4 focus groups (total n=37, 35.1% males, 64.9% females). A TPB questionnaire was developed and administered to 195 respondents (16.6% males, 83.4% females) in an online survey to quantify beliefs and TPB constructs using a Likert scale and investigate associations between beliefs and TPB constructs. Integrative interpretation of all results was used to identify messageable beliefs.

Results: 14 behavioural, 8 normative and 17 control belief themes were identified. Behavioural and normative beliefs were positively correlated with intention; control beliefs were negatively associated with intention (the stronger the presence of perceived hinders, the weaker the intention). Identified messageable beliefs: Fruit can satisfy sweet craving; vegetables require a lot of your time to prepare; FV are expensive; Having little time makes it difficult to prepare vegetables, Being stressed prevents eating FV and Lack of motivation contributes to eating insufficient FV. Intervention messages will be developed to address these beliefs.

5. Treatment outcomes of infants and children aged 0-59 months diagnosed with complicated severe acute malnutrition in 2 hospitals in Ghana: a retrospective study

Miss Janet Carboo, *Dr Robin Dolman, Dr Martani Lombard, Dr Cristian Ricci*

North West University, Potchefstroom

Introduction: Even though there are diagnostic guidelines for in-patient management of SAM, knowledge of the relationship between admission characteristics, recovery, weight gain and the risk of mortality is limited. Therefore this study aimed at assessing the association between admission profile and treatment outcomes.

Methods: This was a retrospective study which reviewed the medical records of children aged 0-59 months, admitted, treated and discharged for SAM between January 2013 and June 2017 at the Princess Marie Louis Children's hospital and the Komfo Anokye teaching hospital in Ghana. Data was analysed using SAS version 9.4. Fisher's Pearson correlation and logistic regression were used to determine the association between admission variables, LOS, daily weight gain and mortality.

Results: 289 records were included in the study. Discharge, death and abscond rates were 77.7%, 17.7% and 3.8% respectively. Average LOS was 11 days with 5.8 g/kg/day weight gain. Oedema and WHZ < -5 were associated with longer LOS (14.1 days; 95% CI: 11.5-17.2; P = 0.02) and (14.0; 95% CI: 11.1-17.7; P = 0.02) respectively. Median time to death was 5.0 days (IQR: 2.0; 9.0), with infants <6months dying earlier (1.5 days; 95% CI: 0.7-3.2; P = 0.001) than the 6-59month group (5.9 days). Shock, oedema and HIV positive status were associated with 7.1 (95% CI: 2.7-20.5; P < 0.001), 2.5 (95% CI: 1.2-5.5; P = 0.02) and 3.1 (95% CI: 1.3-7.2; P = 0.03) increased risk of death.

Conclusion: A high death rate beyond the internationally accepted minimum requires further intervention to reduce SAM deaths in hospitals.

6. Infant and Young Child Feeding Regulations: perspectives from South African dietitians

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The study aimed to determine the knowledge, attitudes, behaviours and practices of dietitians in South Africa regarding the Regulations Relating to Foodstuffs for Infants and Young Children (R991).

A mixed method, cross sectional design was used; including quantitative data by means of an online questionnaire (n = 282) and qualitative data by means of two focus group discussions (n = 12). Study participants were dietitians registered with the Health Professions Council of South Africa.

Dietitians' average knowledge score was 64.8%. Those working in infant and young child feeding had a 5% higher knowledge score. (95% CI: 1.4% to 8.6%, p = .007). Attitudes towards the regulations were generally positive and supportive. The majority of dietitians' practices were compliant with the regulations. The most frequently selected enabler to implementation of the regulations was other breastfeeding promotion initiatives. The most frequently selected barrier was lack of awareness among health care providers. Generally, those with higher knowledge scores selected more decisive answers. More positive attitudes seemed to correlate with more compliant practices. The major themes that arose from the focus group discussions included; less knowledge among dietitians and mothers about products controlled under the regulations, non-compliance of other HCPs, the dietitians' role in support and enforcement, the discrepancy between practice in private and public sectors and a lack of enforcement.

There are gaps that still need to be addressed in the regulation of infant and young child foodstuffs, South Africa has made the first step in legalising the Code and should upscale programs to ensure consistent monitoring and enforcement.

7. Breastfeeding self-efficacy and the duration of exclusive breastfeeding in HIV-infected and uninfected mothers

Ms Abigail Courtenay[1], Ms Evette Van Niekerk[1], Ms Caida MacDougall[2]

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Introduction: The overwhelming benefits of exclusive breastfeeding are well documented, and current recommendations advocate exclusive breastfeeding for the first six months of life, regardless of HIV status. Breastfeeding self-efficacy, measured using the Breastfeeding Self-Efficacy Scale Short-Form (BSES-SF), is a modifiable risk factor for breastfeeding outcomes. The aim of this study is to determine if a relationship exists between breastfeeding self-efficacy and the duration of exclusive of breastfeeding in HIV-infected and HIV-uninfected mothers. In addition to this, the difference in exclusive breastfeeding between HIV-infected and HIV-uninfected will be assessed, together with additional factors that could affect a mother's breastfeeding self-efficacy.

Methods: A descriptive analytical cohort study was conducted, with the primary outcome being the duration of exclusive breastfeeding up to six months postpartum. The study sample comprised 329 women who were interviewed during their postpartum hospital stay using self-formulated questionnaires including the BSES-SF. Post-hospital follow-up was done telephonically.

Results: The BSES-SF scores were a positive predictor of the duration of exclusive breastfeeding in both HIV-infected and uninfected mothers. The BSES-SF scores were found to be an independent predictor of an increased duration of exclusive breastfeeding. Other independent predictors of breastfeeding included; method of feeding in hospital, prenatal intention to breastfeed and race.

Conclusion: In our study, the BSES-SF has been confirmed as a valuable instrument for identifying women at risk of early cessation of exclusive breastfeeding. Together with other demographic, medical and breastfeeding factors, this instrument could be useful in directing limited resources to those most in need of breastfeeding support.

8. Amendment of the Food Fortification Regulations

Ms Maude De Hoop, Mr Gilbert Tshitaudzi, Ms Rebone Ntsie

National Department of Health

Introduction: Regulations for the mandatory fortification of maize meal and wheat flour with an ash content of more than 0.6% with six vitamins (vitamin A, thiamine, riboflavin, nicotinamide, pyridoxine and folic acid) and iron (as electrolytic iron) and zinc, became mandatory in 2003. Consultations with the milling and baking industry were held to amend the fortification regulations to bring it in line with international recommendations, e.g. include vitamin B12, increase the zinc content and change the iron compound to a more bioavailable form and to expand the scope of fortification vehicles, i.e. including cake flour.

Methods: Sensory evaluation of the proposed formulation was conducted on super and special maize meal, white and brown bread flour and cake flour, breads baked with these wheat flours and products made with cake flour. The evaluation on both fresh and stored fortified vehicles took place during 2015 and 2016.

Results: The sensory evaluation showed no changes of the proposed fortification mix formulation on fresh maize meal, maize porridge, wheat flour and bread samples and stored wheat flour and bread samples. Minimal, but acceptable changes were detected on stored maize meal and maize porridge samples. The draft fortification regulations were published for public comment in March 2016 and the final amended regulations will be published in 2018.

Conclusion: The review and amendment of the food fortification regulations should be a continuous process and be informed by new evidence and best practices in order to contribute to the prevention and reduction of micronutrient deficiencies.

9. Formative assessment of primary school educators in independent schools in Gauteng to advise the need for and content of an intervention for the prevention of non-communicable diseases

Ms Linda Drummond, Prof Nelia Steyn

University of Cape Town

Background: Risk factors for non-communicable diseases (NCDs) have been found to be highly prevalent in educators in disadvantaged schools in the Western Cape (n = 517). These include high blood pressure (46%), overweight/obesity (31% / 47%), hypercholesterolaemia (30.4%), and high blood glucose levels (2%) (Senekal et al., 2015). Educators are known to have a key environmental influence and serve as role models for learners, hence their health status need to be assessed. This study assessed the health status and prevalence of certain NCD risk factors among educators of primary school learners in independent schools.

Methods: A cross-sectional descriptive design was used to assess the body mass index (BMI) and waist circumference (WC), blood glucose (BG), cholesterol (BC), blood pressure (BP) of 69 educators in independent schools in Gauteng, South Africa.

Results: Among the 69 educators assessed, 59 (85.5%) were white females of high socio-economic status (LSM 9 or above) with a mean age of 44 ±10.3 years. Of this group (n=59), 26% had a BMI > = 25, 68.5% had a WC > 80cm (n = 55), 10% were prehypertensive and 4% hypertensive. 37.7% had a glucose level of ≥ 5.6 mmol/l, 39.6% had a cholesterol level of ≥ 5.2 mmol/l and 73.6% had a triglyceride level of ≥ 1.7 mmol/l (n = 53).

Conclusion: The findings of this study showed that although the prevalence of overweight, obesity, high WC, and hypertension were lower in this group of educators, compared with those teaching in low-socio-economic areas in the Western Cape, their risk for NCDs were still very high.

10. Field-testing of the revised Paediatric Food-Based Dietary Guidelines amongst mothers/caregivers of children aged 0-12 months in the Western Cape Province, South Africa

Prof Lisanne Du Plessis, Mrs Lynette Daniels, Mrs Hilletje Koornhof

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Introduction: Paediatric Food-Based Dietary Guidelines (PFBDG) are short, positive, evidence-based messages on optimal infant and young child feeding (IYCF) that could be used as an educational tool in combating malnutrition while simultaneously addressing misinformation on IYCF. The aim of this study was to test the appropriateness and understanding of the revised PFBDG amongst mothers/caregivers of children aged 0-12 months, in the Breede Valley sub-district, Western Cape Province.

Methods: Data were collected from 14 focus group discussions (FGD), conducted in the participants' (n = 73) home language, namely IsiXhosa (n = 5), English (n = 4) and Afrikaans (n = 5).

Results: The majority of participants reported previous exposure to variations of the PFBDG. Health platforms and practitioners (community health centres, ante-natal classes, nurses, doctors) and social networks and platforms (family, magazines, radio) were mentioned as primary sources of information. Barriers to following the PFBDG included: limited physical and financial access to resources; poor social support structures and the demands of raising a child. Out-dated information; misconceptions, inconsistent messages (the latter mainly communicated by healthcare workers); and contrasting beliefs and cultural/family practices were evident from the findings. The vocabulary used in some of the PFBDG was not understood, indicating that a degree of rewording should be considered to facilitate the comprehension of the guidelines.

Conclusion: The study findings highlight the need for standardised IYCF messages. The National PFBDG working group should consider the findings of this study and take appropriate further action. In the meantime, healthcare workers should be made aware of the evidence-base for the proposed PFBDG.

11. Factors associated with low bone mineral density in HIV positive and HIV negative black women

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Introduction: Bone health and human immunodeficiency virus (HIV) infection remains neglected in terms of research and management in Africa. The study aimed to investigate factors associated with low bone mineral density (BMD) among HIV positive and HIV negative women.

Methods: A case-control study of black women aged 29-65 years from Potchefstroom in the North West Province, South Africa was conducted based on secondary analysis of data collected from 2012-2014 of two different studies. Socio-demographic and health information of the women were determined through an interviewer-administered structured questionnaire. Whole body BMD, left femur neck of the hip (LFN BMD) and spine BMD, percentage body fat (%BF) and fat-free mass were measured using dual-energy X-ray absorptiometry (DXA). Regression models included whole body, spine and LFN BMD, respectively, as dependent variables. Covariates included age, educational status, smoking, alcohol intake, calcium intake, as well as physical activity level.

Results: HIV negative women had significantly higher median BMD, %BF, appendicular skeletal mass (ASM), ASM index, body mass index (BMI) and waist circumference than HIV positive women. In the total group age, smoking and HIV status were associated with lower BMD, while calcium intake and BMI were positively associated with BMD. Similar variables were associated with BMD in HIV negative women, while only age and education level were consistently associated with BMD in HIV positive women.

Conclusion: Low BMD was more common among HIV positive compared to HIV negative controls. HIV positive women who are older and have low education may be particularly at risk.

12. Nutrient contribution of commercial infant products and fortified staple foods at age 6, 12 and 18 months in a cohort of children from a low socio-economic community in South Africa

Prof Mieke Faber[1], Mrs Eloise Swanepoel[2], Prof Lize Havemann-Nel[2], Dr Marinel Rothman[2], Mrs Ria Laubscher[3], Dt Tonderayi Matsungo[2], Prof Cornelius Smuts[2]

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Introduction: Commercial infant products (CIPs) and fortified staple foods (FSFs) can potentially provide key micronutrients during the complementary feeding period.

Objectives: To determine energy and nutrient contribution of CIPs and FSFs to total intake, and compare consumers (on recall-day) and non-consumers.

Methods: 24-hr dietary recall data was collected in a peri-urban cohort at age 6 (n = 715), 12 (n = 446) and 18 (n = 213) months.

Results: At 6 months, 83% children consumed CIPs, contributing 33% energy and 94% iron of consumers' intake; median iron intake was higher for consumers (6.4 mg) than non-consumers (0.8 mg) [P < 0.001; Mann-Whitney U-test]. At 12 months, 46% consumed CIPs, providing 27% energy and 56% iron of consumers' intake. From 6 to 18 months, number of consumers of FSFs (mostly maize meal) increased (23% to 96%); for consumers, energy contribution from FSFs increased (11% to 29%). At 12 months, 81% consumed FSFs; 54% consumers versus 25% non-consumers met requirements (EAR) for all eight fortification micronutrients (P < 0.001, Pearson chi-square). At 18 months, 75% consumers met the EAR for all fortification micronutrients; FSFs contributed >30% of iron, zinc, vitamin A, thiamine, niacin, vitamin B6 and folate of consumers' intake. At age 12 and 18 months, 75% had calcium intake < EAR; low breastfeeding

rates (12 months 56%; 18 months 37%) and low formula and milk intake contributed to low calcium intake.

Conclusion: CIPs and FSFs contributed significantly to intakes of several key micronutrients. Meeting calcium requirements (age 12 and 18 months) is however challenging.

13. Nutrient profile and energy cost of food sold by informal food vendors to learners in primary and secondary schools in the Eastern Cape, South Africa

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Introduction: Promoting healthy eating in different settings, including schools, is one of the key actions of the "Strategy for the prevention and control of obesity in South Africa". The school-food environment is an important component in promoting healthy eating in children.

Objective: To assess type, nutrient profile and cost of food items sold by informal vendors inside or immediately outside the school premises.

Methods: Quintile 1–3 schools (n=36) were randomly selected from six education districts in the Eastern Cape. Food vendors (n=92) were interviewed; food items were weighed; and type, weight and cost of each food item were recorded.

Results: The median number of vendors per school was 2 (IQR 1–5); the number of food items sold per vendor was 6 (IQR 4–7). Food items sold at most schools were corn-based processed snacks (94%), sweets (89%) and lollipops (72%), and biscuits (62%). Fruit were sold at few (28%) schools. Based on the South African Nutrient Profiling model, most food items were not eligible for "healthy" classification. The nutrient profiling score was inversely related to cost per 100 kcal of the food item (r= −0.562, P=0.010; Spearman correlation). Energy cost was highest for animal source foods (ZAR 2.95±1.16/100kcal), and lowest for bread and vetkoek, snacks and confectionary (< ZAR 0.80/100kcal).

Conclusion: Vendors sold mostly unhealthy options; healthier food items were more expensive (cost per 100 kcal). Strategies are needed to assist food vendors to select cheaper healthy food options to sell.

14. Patient-centered factors for consideration in the development of weight loss intervention for overweight/obese patients attending secondary health care facilities in Ibadan, Nigeria: insights from a mixed methods study

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Background: Overweight/obesity is a problem in Nigeria, and the rollout of treatment programmes at secondary health care level is a priority.

Objective: This research aimed to compile a profile of behaviours and moderating factors for the development of a weight loss intervention.

Methods: Two groups of patients were recruited from outpatient clinics at secondary healthcare facilities. Group 1 (n = 328) completed a questionnaire on socio-demographics, medical history, body image, food choices and physical activity. Group 2 (n =18) completed an in-depth interview on weight loss concepts/body image. Height and weight of both groups were measured. Quantitative data (QtD) were analysed with SPSS and in-depth interviews (qualitative = QlD) with NVivo.

Results: 40% of survey respondents were overweight and 60% obese; 44.4% of in-depth interview respondents were overweight and 55.6% obese. Physical inactivity (55.8% inactive), low fruit/vegetable intake (consumed ≤ 2 times/day), high-fat meat intake (consumed > 1 time/day) and large carbohydrate staple portions (consumed 2 times/day) were identified as key target behaviours (QtD). Moderating factors include underestimation of weight (QtD, QlD), satisfaction with current size although overweight/obese (QlD), co-morbidities and not obesity per se identified as problematic (QlD), lack of insight in the role of physical inactivity (QlD), poor knowledge of healthy eating (QtD), too comfortable and relaxed, resulting in over-eating (QtD) and no control over body size (genes, God's will) (QlD).

Conclusions: considerations for intervention development are poor food choices, physical inactivity, satisfaction with large body size and not recognising obesity as such and lack of understanding of causes of obesity.

15. Building capacity in early childhood development practitioners could be an effective way of improving access to health and nutrition services, information and practices in children under 5 years of age

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Introduction: Thabo Mofutsanyane (TM) and Capricorn District (CD) in 2016 were identified as districts with high Severe Acute Malnutrition case fatality rates, 11% and 9% respectively. During focus group discussions, community members raised concern about the lack of platforms for receiving information on child health and nutrition within the community.

Methodology: Health and nutrition knowledge and skills assessments through observation and questionnaires on 32 early childhood development (ECD) practitioners from TM (n = 16) and CD (n = 16) as part of a cross sectional baseline study in the Sireletsa Bana project.

Results: The average score on a knowledge and skills assessment was 52% in TM and 54% in CD. 94 to 100% of practitioners made

copies of the Road to Health Booklet, however, only 57% and 63% from TM and CD, respectively, checked it regularly, and reminded caregivers of upcoming clinic visits. In TM, 50% of practitioners had weight scales and recorded children's weight, none measured mid upper arm circumference (MUAC) or height. In CD 13% measured the children's weight and MUAC, no practitioners measured the children's height.

Conclusions: ECD practitioners who have daily contact with children under 5 years of age can play a significant role in monitoring child growth and RtHB completion, referring caregivers to the clinic, establishing good health and nutrition practices and educating caregivers. However, ECD practitioners' knowledge and skills in relation to child health and nutrition are inconsistent. Therefore, providing capacity building would be highly beneficial in early detection of acute malnutrition.

16. The need for adolescent friendly breastfeeding support in Nelson Mandela Bay Health District: a qualitative study

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Background: Sub-Saharan Africa had the highest prevalence of global teenage pregnancy in 2013[1] with Nelson Mandela Bay (NMB) having some of the highest rates in South Africa. However, limited information was available regarding the breastfeeding experiences and available support among adolescent mothers in South Africa.

Aim: The aim of the study was to explore and describe the experiences of adolescent mothers regarding breastfeeding in Nelson Mandela Bay health district (NMBHD) in the Eastern Cape.

Methodology: A qualitative research design utilising one-to-one interviews was conducted at primary healthcare (PHC) facilities in NMB. Fourteen adolescent mothers were invited to voluntarily participate and provide informed consent. Interviews were audio recorded and transcribed verbatim before content analysis was done using ATLAS.ti by the researcher and an independent coder.

Results: Three dominant themes were identified. Firstly, participants described the intricacies of breastfeeding; secondly, they related challenges experienced during breastfeeding and thirdly suggestions were provided by participants to help improve the support given to adolescent mothers by health care providers in PHC facilities. Participants' inferred that health care providers need to be compassionate, caring and not judgemental.

Conclusions and recommendations: This study's findings revealed that adolescent mothers may need extra age-appropriate education and support to assist them in breastfeeding. This includes routine home visits, establishing breastfeeding support groups and parenting programmes. Proper enforcement of the youth friendly policy in PHC facilities through training and attitude modification of staff providing care to adolescent mothers is also needed.

17. Routine iron supplementation in iron-sufficient urban pregnant women in South Africa is associated with increased morbidity and higher blood pressure: the NuPED study

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Introduction: Anaemia and iron deficiency contribute to the global burden of disease and should be prevented during pregnancy. In South Africa (SA), ~60 mg of elemental iron is provided daily to all pregnant women. However, emerging research shows that iron supplementation may increase hypertension and morbidity, particularly when iron sufficient or with a high inflammatory status.

Objective: To assess the relationship between iron status at gestation < 18 weeks with hypertension and morbidity symptoms during pregnancy.

Methods: While attending antenatal care at the Rahima Moosa Mother and Child Hospital in Johannesburg, participants' iron and n-3 polyunsaturated fatty acid (PUFA) status were assessed at < 18 weeks of gestation (n = 102) and blood pressure at < 18, 22 and 36 weeks. Participants also recorded morbidity symptoms until birth.

Results: Iron sufficiency was associated with higher diastolic blood pressure at 36 weeks gestation ($p = 0.045$). Iron-sufficient women experienced higher incidence of fever, extreme tiredness, coughing and diarrhoea ($p < 0.001$, $p = 0.043$, $p < 0.001$ and $p = 0.014$, respectively). Women who were compliant to iron supplementation had a higher incidence of fever, extreme tiredness, runny nose and vomiting ($p < 0.001$, $p = 0.013$, $p = 0.025$, $p = 0.008$, respectively) irrespective of iron or anaemia status. Throughout pregnancy, women with a higher n-3 PUFA status experienced a lower incidence of fever, extreme tiredness, headache, runny nose, coughing, diarrhoea, vomiting, constipation and heartburn (all $p < 0.05$).

Conclusion: Iron sufficiency is associated with increased morbidity during pregnancy and it may be necessary to re-evaluate the iron supplementation strategy during pregnancy in SA.

18. Effect of omega-3 fatty acids on clinical outcomes of mechanically ventilated, critically ill patients: a systematic review

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Introduction: Previous studies indicated that omega-3 fatty acids (n-3 FA) could reduce length of mechanical ventilation in critically ill patients. Some indications for MV and complications thereof have strong inflammatory components which might be ameliorated by anti-inflammatory properties of n-3 FA, possibly decreasing inflammation, improving oxygenation and aid earlier weaning from MV. This systematic review aimed to review

published data to determine the effect of n-3 FA on length of MV and clinical outcomes.

Methods: Electronic searches of MedLine, Scopus, EBSCOhost and ScienceDirect were conducted from 2000 to 2017. Randomised clinical trials (RCTs) included compared fish oil supplementation in critically ill, MV patients via the enteral or parenteral route. Data was analysed according to the route of feeding. Heterogeneity was assessed by the Chi2 test and quantified by the I2 test.

Results: Eight enteral RCTs (n = 1032) and four parenteral RCTs (n = 411) were included. No significant differences were found in LOV in patients receiving parenteral n-3 FA at day 4 (p = 0.51, I2 = 0%) or day 7 (p = 0.54, I2 = 0%). No significant differences in LOV via the enteral route n-3 FA (p = 0.68, I2 = 61%) was found. PF ratio, ICU LOS and mortality did not differ significantly. Risk of bias across studies was high and the quality thereof very low.

Conclusion: Supplementation with parenteral or enteral n-3-containing products had no effect on LOV or other clinical outcomes in mechanically ventilated critically ill patients. More high quality, large-scale RCTs are required to provide reliable evidence.

19. The sodium content of processed foods in South Africa during the introduction of mandatory sodium limits

Mrs Terry Harris

Discovery Vitality, The George Institute

In June 2016, South Africa introduced legislation for mandatory limits for the upper sodium content permitted in a wide range of processed foods. We assessed the sodium levels of packaged foods in South Africa during the one-year period leading up to the mandatory implementation date of the legislation. Data on the nutritional composition of packaged foods was obtained from nutrition information panels on food labels through both in-store surveys and crowdsourcing by users of the HealthyFood Switch mobile phone app between June 2015 - August 2016. Summary sodium levels were calculated for 15 food categories, including the 13 categories covered by the sodium legislation. The percentage of foods that met the government's 2016 sodium limits was also calculated. 11,065 processed food items were included in the analyses; 1851 of these were subject to the sodium legislation. Overall, 67% of targeted foods had a sodium level at or below the legislated limit. Categories with the lowest percentage of foods that met legislated limits were bread (27%), potato crisps (41%), salt and vinegar flavoured snacks (42%), and raw processed sausages (45%). About half (49%) of targeted foods not meeting the legislated limits were less than 25% above the maximum sodium level. Sodium levels in two-thirds of foods covered by the legislation were at or below the permitted upper levels at the mandatory implementation date of the legislation and many more were close to the limit. The South African food industry has an excellent opportunity to rapidly meet the legislated requirements.

20. The development of an evidenced based street-food vending model for vulnerable groups within Cape Town, South Africa

Dr Jillian Hill[1], *Prof Zandile Mchiza[2], Prof Thandi Puaone[2], Prof Nelia Steyn[3]*

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Street foods (SF) contribute significantly to the nutritional intake of adults and children in developing countries. They are inexpensive and a major source of income for a vast multitude. A major concern is that SF are high in saturated fats, trans-fats, sugar and salt. South Africa's stable unemployment rate, estimated at +26%, has influenced business growth in the informal sector, particularly SF vending.

The aim of this study was the development of a street food vending model (SFVM) that considers nutrition, hygiene/safety, business and operational aspects of SF vending.

SF vendors (N = 831) and consumers (N = 1047) were interviewed about preferences, selling/purchasing habits followed by observations of practices (phase 1). Interviews and focus groups were conducted with government officials and literature was reviewed to determine available regulations/policies for SF vending (phase 2). Participatory methods involving SF vendors were used to validate the findings and inform the development of the SFVM (Phase 3). The data from previous phases were integrated within a sociological framework to develop the proposed SFVM. The components of the proposed SFVM consists out of a business component, a food and nutrition component, a hygiene component and a vending cart.

The four components consider various elements of the socio-ecological framework, namely intrapersonal/individual, interpersonal, the physical environment/community and the policy environment. The development of this model could potentially improve the nutritional status of SF consumers by making SF healthy and safe (public risk of food poisoning) for consumers and allowing vendors to trade under optimal conditions giving due consideration to regulations/policy.

21. Dietary intake and the association with breast cancer risk in black South African women

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Introduction: Incidence rates of breast cancer (BC) are increasing in South Africa. A third of cancers including BC can be prevented by a nutritious diet and maintaining a healthy body weight. The aim of this study was to investigate the association between dietary intake and BC risk in black South African women.

Methods: Subjects were 396 BC cases and 396 matched controls, participating in the South African Breast Cancer (SABC) study. Dietary intake was measured in BC cases before treatment started and possible changes in dietary intakes occurred. Diet was assessed by using a validated quantified food frequency questionnaire (QFFQ) from which 12 food groups were formed

and analysed. Odds ratios were used to determine associations of dietary intake with BC risk.

Results: After adjusting for possible confounding factors, fresh fruit and red meat (mostly organ meat) consumption were inversely associated with BC risk (OR = 0.6, 95% CI 0.4,0.9 and OR=0.5, 95% CI 0.3; 0.8). Savoury foods were positively associated with BC risk (OR = 1.9, 95% CI 1.2, 3.1). Four-fifths of cases (80.0%) and controls (82.4%) were either overweight or obese.

Conclusion: Similar and monotonous diets associated with a westernised dietary pattern together with worrisome obesity rates were noted in both cases and controls. Therefore, the black female population of South Africa is advised to follow a diet with more fruit and vegetables (approximately 400g/day) and nutrient dense, low fat organ meat (less than 90 g/day) together with less energy dense, micro-nutrient poor foods like savoury foods as possible preventative diet against BC risk.

22. Anaemia prevalence and dietary diversity among women in the rural Free State, South Africa

Mrs Marizeth Jordaan, *Prof Corinna Walsh, Prof Louise van den Berg, Mr Cornel van Rooyen*

University of the Free State

Introduction: Anaemia, a global public health problem that particularly affects women, holds major consequences for human health. The aim was to determine dietary diversity, prevalence of anaemia and contraception use in rural women, 25-49 years in the Free State, South Africa.

Methods: A cross-sectional descriptive study design was used. A 24-hour recall was completed to determine dietary diversity. Biochemical markers of anaemia, iron deficiency and inflammation were measured. Information regarding contraceptive use was obtained.

Results: Median age of the women was 41 years. Half (51.5%) had medium dietary diversity and 44.7% had low dietary diversity. Overall, 76.9% consumed flesh meats and fish and only a quarter (25.4%) ate dark green leafy vegetables. Anaemia was present in 4.6%, with 0.7% suffering from iron deficiency anaemia and 1.5% from iron deficiency. Overall, 7.5% presented with elevated homocysteine levels, however, only 3.8% had low levels of red cell folate. Almost half (45.0%) had elevated C-reactive protein (CRP) levels. Half (54.1%) reported that they regularly menstruate and 71.6% used injectable contraceptives. Significant associations were found between median MCV and MCH levels and dietary diversity score.

Conclusion: Although a diet with moderate variety was consumed, and the prevalence of anaemia was low, the women's diets should receive attention, as foods rich in haemopoietic nutrients were not consumed by all. Prevalence of iron deficiency could be underestimated due to the large percentage with elevated CRP. The older median age of the women and half of them not menstruating regularly could further have influenced the low prevalence.

23. Medical Nutrition Therapy for the Treatment of Polycystic Ovarian Syndrome (PCOS)

Ms Claire Julsing Strydom

Nutritional Solution

Polycystic ovary syndrome (PCOS) is a complex syndrome characterized by reproductive and metabolic implications such as insulin resistance, obesity, dyslipidaemia, hypertension and obstructive sleep apnoea, just to name a few. 95% of woman attending fertility clinics present with PCOS. Lifestyle changes, such as diet and exercise, are considered first-line therapy for women affected by PCOS. Dietitians have a critical role to play in educating and treating woman with PCOS and optimising their nutritional status to prevent the compound long term effects of these metabolic disturbances. This presentation will aim to increase the knowledge and practical skills of dietitians treating patients with PCOS by focusing on the key nutrient specific interventions that are needed to improve the clinical outcomes in these patients. The overview of PCOS, associated health risks, nutrient specific nutrition interventions, including but not limited to macronutrient composition of the diet, vitamin D, NAC, magnesium, inositols, omega 3 fatty acids, pro-inflammatory SFA and advanced glycation end products will be presented based on an overview of current literature. Understanding of biochemical markers necessary in the treatment of PCOS together with the use of pharmacotherapy and supplementation will be included. Finally, case studies will be presented to translate the clinical literature into practical strategies that dietitians can use to better treat woman with PCOS both, in public and private settings.

24. Update of the South African Food Quantities Manual

Mrs Malory Jumat, *Mrs Joelaine Chetty, Dr Averalda van Graa*

South African Medical Research Council, Biostatistics Unit, SAFOODS Division

Introduction: The South African Food Quantities Manual (FQM) assists researchers in converting food consumption data reported in household measures into grams of food for accurate estimation of nutrient intake. The constant change in food items on the market and the recent update of the South African Food Composition Tables (SAFCT), warranted the need to update the FQM. Albeit cumbersome, the update was essential to ensure the FQM is current, in line with the SAFCT and provide data for the new FoodFinder web-application. The updated FQM aim to assist with ensuring that dietary intake analyses are as accurate as possible.

Methodology: The last published edition of the FQM was reorganised to mirror the fifth edition of the SAFCT. Food items from identified priority groups were obtained from local manufacturers and supermarkets. Food quantities were measured in triplicate using an analytical scale and standardised household measuring utensils. Food items not available in stores were matched with similar foods for which quantity data were determined. Breast milk substitute manufacturers provided scoop sizes and reconstitution instructions.

Results: The updated FQM comprise 1296 food items with household measures and 9111 individual measures, an average increase of > 70% from the previous publication. The Infant and Pediatric Feeds and Foods encompassed the highest increase (> 700%), followed by Beverages (100%) and Meat and Meat Products (> 80%) compared to the last publication.

Conclusion: Aligned with the latest SAFCT and incorporated into the new FoodFinder, the updated FQM will enable more accurate estimation of nutrient intake from foods currently consumed.

25. N-3 fatty acid and iron depletion, alone and in combination, during early development provoke anxiety, hedonic and social dysfunction in rats

Ms Erna Kemp[1], Dr Marisa Möller[2], Prof Brian Harvey[2], Prof Cornelius Smuts[1], Prof Jeannine Baumgartner[1]

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To investigate the effects of pre- and postnatal n-3 fatty acid (FA) and iron deficiency (ID), alone and in combination, on cognitive and social behaviour in rats, and to determine whether effects are sex-specific.

Using a 2-factorial design, 56 female Wistar rats at post-natal day (PND) 21 were randomly allocated to one of four diet groups: Control, n-3FA deficiency (n-3FAD), iron deficiency (ID), or n-3FAD+ID. Rats were maintained on allocated diet throughout mating, pregnancy and lactation. Offspring continued on the same diet (n = 24/group ; male:female = 1:1) until adolescence (PND42–45). Offspring were subjected to a sucrose preference test (SPT), novel object recognition test (NORT), elevated plus maze (EPM) and social interaction test (SIT).

ID offspring consumed less sucrose ($p = 0.020$) in the SPT, spent more time in closed arms ($p = 0.008$) and less time in open arms ($p = 0.019$) of the EPM. In the SIT, ID offspring spent less time together ($p < 0.001$) and approaching ($p = 0.013$). In females (sex-diet interaction), n-3FAD and ID offspring spent significantly less time approaching and together, with an additive effect of ID and n-3FAD on time spent approaching and together in the n-3FAD+ID group. ID offspring spent more time grooming ($p = 0.019$), although this was attenuated by n-3FAD (n-3FADxID $p = 0.036$). N-3FAD offspring spent more time rearing ($p = 0.010$) and anogenital sniffing ($p=0.038$). However, the effect of n-3FAD on anogenital sniffing was attenuated by ID (n-3FADxID $p=0.041$).

The results indicate that n-3 FAD and ID during early development may provoke anxiety, hedonic and social dysfunction, with potential additive and attenuating effects when deficiencies are combined.

26. In-hospital growth of preterm infants receiving fortified human milk

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[1]University of Pretoria, [2]Chris Hani Baragwanath Academic Hospital, [3]University of the Witwatersrand

Introduction: Fortification of human milk for very low birth weight (VLBW) preterm infants is practised routinely, yet little is known about their in-hospital growth in developing countries.

Objective: To describe in-hospital growth of VLBW preterm infants receiving fortified human milk in a tertiary South African hospital.

Methods: For six months daily protein and energy intake of VLBW infants was calculated using published composition of preterm and mature milk (Cormack, 2016) and fortifier (0.2 g protein; 3.5 kcal/g powder). Weight, length and head circumference (HC) were measured at start and end of fortification. Change in Z-scores (Fenton, 2013) for weight (WFAZ), length (LFAZ) and HC (HCFAZ) was calculated as primary outcome. Additionally, weight gain velocity (g/kg/d) (Patel, 2005) and gain in length and HC (cm/wk) were calculated.

Results: 58 Infants (52% F; gestational age: 30 ±2 wk; birth weight: 1215 ±187 g) received mothers own milk. Weight at start and end of fortification was 1263±182g and 1570±123g respectively. Protein and energy intake were 3.4 ±0.2 g/kg/d (95% CI: 3.3;3.4) and 145 ±7 kcal/kg/d (95% CI: 143;147) respectively. Protein-to-energy ratio was 2.3 ±0.1 g/100 kcal (95% CI: 2.3;2.4). Change in WFAZ was -0.5±0.5 (95% CI: -0.6;-0.3); Weight gain was 14.5 ±4.3 g/kg/d (95% CI: 13.4;15.6). Change in LFAZ was -0.3 ±0.5 (95% CI -0.5;-0.2); Length gain was 1.1 ±0.5cm/wk (95% CI: 0.9;1.2). Change in HCFAZ was 0.1±0.5 (95% CI: -0.9;0.2); Gain in HC was 1.0 ±0.4 cm/wk (95% CI: 0.9;1.1).

Conclusion: Energy intake met recommendations, but protein intake and protein-to-energy ratio did not. Growth was inadequate based on change in Z-scores, but may be satisfactory according to secondary indicators.

27. Sodium content of processed foods frequently consumed by children in early childhood development centres in the North-West Province

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Introduction: Childhood obesity is a major public health concern for South Africa. Children who are obese often suffer from cardiovascular diseases such as high blood pressure, which can continue throughout life. Evidence is emerging regarding the crucial role of sodium regulating the blood pressure of children. While many factors contribute to childhood obesity and its related diseases, processed foods which are high in fat, sugar and/or sodium have been identified as a key contributing factor.

Objectives: To determine the true sodium content of processed foods frequently consumed by children aged two to five years, living in the Tlokwe municipality. Furthermore, to determine whether the current sodium regulation (R.214) includes high-sodium foods frequently consumed by children.

Methods: Sodium analysis was done by means of atomic absorption spectrometry sequential to microwave digestion to determine the true sodium content of frequently consumed processed foods.

Results: In total, 15 processed food categories were identified and three food products per food category were selected. The majority (86.67%) of the identified food products were included in the sodium regulation (R.214); only 13.33% were not included.

The sodium measured in the different food categories varied from what was reported on the label and were 4.1% to 40.7% different.

Conclusion: Our findings showed that the majority of the food products consumed is included in the regulation. The findings however provide valuable information to support future studies on larger varieties of processed foods frequently consumed by children.

28. Maintenance of metabolically healthy overweight/obesity over 10 years in black South Africans

Prof Salome Kruger, *Dr Shani Botha, Prof Hanlie Moss, Prof Edelweiss Wentzel-Viljoen, Prof Lanthe Kruger, Prof Alta Schutte*

North-West University

Introduction: Metabolically healthy overweight/obesity (MHO) is defined as the absence of the metabolic syndrome in adults with body mass index (BMI) ≥25kg/m^2.

Objectives: The objectives of this study were to determine what proportion of a cohort of MHO black South African adults maintained MHO over 10 years, and to compare factors associated with maintenance of MHO versus transition to overweight/obese with metabolic syndrome (ObMetS).

Methods: A cohort (1195 women, 742 men) was recruited in 2005 and followed up in 2015 (649 women, 274 men). Anthropometric measurements, blood pressure, fasting glucose and serum lipids were collected in both years. There were no significant differences between the baseline data of those followed up in 2015 and the drop-outs. Participants were categorised as healthy normal weight (MHNW), MHO or overweight/obese with metabolic syndrome (ObMetS) in 2005 and 2015 and the groups were compared.

Results: In 2005, more than half of women (54.5%) and 13.5% of men were overweight/obese, but most (83.5% women, 86% men) were MHO. Most MHO participants, (69% women, 57.5% men) maintained MHO over 10 years. There were no significant differences between the baseline age, BMI, physical activity or dietary intakes of the MHO and ObMetS groups. Baseline waist circumference (WC) and rural residence were associated with transition from MHO to the ObMetS state. MHNW participants had the most optimal metabolic health after 10 years.

Conclusions: Most MHO black adults maintained MHO over 10 years, but rural residents and those with greater baseline WC were more likely to transition to ObMetS.

29. Mother Baby Friendly Initiative (MBFI) designation policy change in South Africa

Ms Zandile Kubeka, *Ms Ann Behr*

National Department of Health

Introduction: South Africa has implemented the Mother Baby Friendly Initiative (MBFI) since 1994. The initiative is aimed at changing maternity practices and recognising the achievements of health facilities that promote, protect and support breastfeeding. By 2016/17 financial year, 74% (408) public health facilities with maternity beds were accredited. Implementation of the MBFI have contributed significantly to improved early initiation of breastfeeding. Key challenges included vertical implementation, cost effectiveness, lack of sustainability, and poor exclusive breastfeeding rates. The focus of MBFI is often misconstrued as only an accreditation process.

Objective: To revise the MBFI to focus on strengthening the implementation of the 10 steps to successful breastfeeding

Methods: A consultation process with key stakeholders and a desk review of global and local evidence was conducted.

Results: A policy decision was taken in South Africa that all facilities rendering maternity services should implement the 10 steps to successful breastfeeding as a standard of care.

Conclusions: In South Africa, the designation of facilities for MBFI status is phased out. All facilities rendering maternity care services are required to implement the WHO ten steps to successful breastfeeding as a standard of care with routine monitoring. Integration of the ten steps into existing strategies, policies and quality assurance initiatives was recommended.

30. Micronutrient intakes and risk of deficiency of men in Vhembe, Limpopo province, before and after the mandatory fortification of maize meal and wheat flour

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Introduction: Fortification of maize meal and bread with selected micronutrients was implemented in South Africa post 2003 to alleviate targeted micronutrient deficiencies.

Objective: To quantify the changes in fortified micronutrient intakes, and the proportion of men in the Vhembe region, Limpopo Province at risk of deficiencies between 2003/4 and 2016/17.

Methods: The samples comprised men (18-35 years) (2003/4: N = 470; 2016/7: N = 157); enrolled in an ongoing observational cross-sectional environmental health study in the Vhembe region. The validated quantitative food frequency questionnaire (QFFQ) used in 2004 was re-validated in 2016. Trained local interviewers conducted the interviews using food portion photographs and household utensils to estimate portion sizes. Nutrient intakes were analysed by FoodFinder3 (2004) and the SAFOODS (2016/17) programs of the Medical Research Council. Median micronutrient intakes were compared by the Mann-Whitney test and proportions of intakes below the Estimated Average Requirements (EARs) by the Chi-squared test ($p < 0.05$).

Results: Median intakes for all fortified micronutrients were significantly higher in 2016/17 ($p < 0.0001$). Median percentage increases were: iron, 130%, zinc, 139%, vitamin A, 423%, thiamin, 100%, riboflavin, 127%, niacin, 214%, folate, 634% and pyridoxine, 421%. Proportions of intakes below the EAR decreased by 78% (vitamin A, riboflavin) to 96% (folate) and 97% (pyridoxine)

($p < 0.0001$). Fortification provided from 34% (riboflavin) to 78% (folate) of the fortified micronutrient intakes.

Conclusion: Fortification has significantly increased micronutrient intakes and reduced the proportion of the target population at risk of deficiency. The extent of the benefits of fortification to improve nutrient intake, however, varies across micronutrients.

31. Comparative validity and reproducibility of a quantitative food frequency questionnaire for use among men in the Vhembe Region, Limpopo Province

Professor Una Mac Intyre[1], *Dr Mojisola Kupolati[1], Professor Christiaan de Jager[2]*

[1]Department of Human Nutrition, University of Pretoria, [2]University of Pretoria Institute for Sustainable Malaria Control and MRC Collaborating Centre for Malaria Research, School of Health Systems and Public Health, University of Pretoria

Introduction: Valid and reproducible dietary data are essential for drawing accurate conclusions about the intakes of a study population.

Objective: To determine the comparative validity and reproducibility of a culturally sensitive quantitative food frequency questionnaire (QFFQ) for men in the Vhembe region.

Methods: The sample comprised men (18 – 35 years) enrolled in an environmental health study. Comparative validity was tested against four 24-hour recalls (24HR) administered at two-day intervals. Reproducibility was determined by repeating the QFFQ after one week. Trained local interviewers conducted interviews. Nutrient content was analysed by the Medical Research Council's SAFOODS database. After normality testing, statistical analyses for energy and selected nutrients were: Wilcoxon rank sum test, Spearman rank (r) and intraclass correlation (ICC) coefficients, weighted kappa statistic (Kw) and Bland-Altman (BA) plots.

Results: For validity ($n = 73$), all median intakes were higher for the QFFQ ($p < 0.05$), r ranged from 0.22 ($p = 0.57$) to 0.5 ($p < 0.0001$) and, excluding vitamin A and riboflavin, ICCs were significant (0.3 to 0.6; $p < 0.05$). Kw indicated fair agreement ($p < 0.05$) for seven nutrients. For reproducibility ($n = 65$), median intakes were lower for the repeat QFFQ, r and ICCs were acceptable to good (0.4 to 0.6; $p < 0.05$). Kw was fair (0.3 to 0.5; $p < 0.05$). validity and reproducibility BA plots showed wide limits of agreement and magnitude bias to varying extents.

Conclusion: Both validity and reproducibility showed acceptable to good correlation and fair agreement. Despite the differences between intakes of the QFFQ and 24HR and administrations, the QFFQ was considered acceptable for use in the target population.

32. Effect of two small-quantity lipid-based nutrient supplements on morbidity of 6-month-old South African infants: a randomised controlled trial

Dr Linda Malan[1], *Ms Karen Joosten[1], Dr Carl Lombard[2], Dr Mieke Faber[2], Dr Marinel Rothman[1], Dr Tonderayi Matsungo[1], Prof Cornelius Mattheus Smuts[1]*

[1]North-West University, [2]South African Medical Research Council

Introduction: Supplementation of complimentary foods from age 6 mo may alleviate nutritional deficits and influence morbidity. Aim: To determine the effect of two small-quantity lipid-nutrient supplements (SQ-LNS) on morbidity in 6-mo-old South African infants.

Method: Infants ($n = 750$) were randomly assigned to receive SQ-LNS A, SQ-LNS B or no supplement. Both SQ-LNS had similar macronutrient, micronutrient and essential fatty acid compositions. SQ-LNS B contained additionally n-6 and n-3 long-chain polyunsaturated fatty acids and various other nutrients. Morbidity symptoms were recorded daily on a calendar and weekly with a questionnaire.

Results: Both SQ-LNS A and B reduced fever, by 18% ($P < 0.001$) and 10% ($P = 0.006$); as well as wheezing, by 78% and 53%, respectively (both $P < 0.001$). Coughing was reduced marginally in both groups (9% by SQ-LNS A and 6% by SQ-LNS B, both $P < 0.001$). Both SQ-LNS A and B increased diarrhea, by 30% and 68%, respectively (both $P < 0.001$). The SQ-LNS A group had almost five times and the SQ-LNS B group 2.4 times more sick days with vomiting than the control (both $P<0.001$). Both products increased rash/sores; SQ-LNS A by 13% ($P = 0.012$) and doubled by SQ-LNS B ($P<0.001$). The intensities of symptoms were mild for ≥ 98% of cases and ≤ % were classified as serious adverse events.

Conclusion: Both SQ-LNS products reduced fever, wheezing and coughing but introducing SQ-LNS in the diet of infants may increase gastric symptoms and rash, which requires further attention.

33. Allergy is associated with altered red blood cell fatty acid composition in pregnant women in urban South Africa: the NuPED study

Mrs Idonette van Zyl[1], *Prof Cornelius Mattheus Smuts[1], Mrs Elize Symington[1,2], Prof Jeannine Baumgartner[1], Dr Lizelle Zandberg[1], Dr Olusola Sotunde[2,3], Dr Marinel Rothman[1], Dr Linda Malan[1]*

[1]North-West University, [2]University of South Africa, [3]McGill University

Introduction: Allergy has been associated with fatty acid status. An important link between polyunsaturated fatty acids (PUFA) and immunological processes related to allergy is that of the eicosanoid family of immune mediators or lipid mediators. The n-6 and n-3 status reflect fatty acid intake and metabolism. Because diet is modifiable, the establishment of the relationship between maternal nutrient intake and nutritional status on allergic outcome in herself and in the infant, would be of significant value. Objective: In this cross-sectional study of 102 urban pregnant South African women, the association between allergy and fatty acid status was investigated.

Methods: Allergy symptoms were assessed with the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire. Total phospholipid fatty acid composition was measured in red blood cells using gas chromatography tandem mass spectrometry (GCMSMS).

Results: An allergy prevalence of 19.6% was found. The n-6 PUFA, gamma linolenic acid (GLA; $P = 0.021$) and arachidonic acid (AA; $P = 0.044$) were lower in the allergic group. The dihomo-gamma-linolenic acid (DGLA) to GLA ratio, indicative of the elongase enzyme activity, was higher ($P = 0.042$) in the allergic group.

Conclusion: Our findings suggest that there is an up-regulation of the fatty acid desaturase and elongase pathway due to possible increased production of inflammatory lipid mediators, as reflected by lower RBC AA and GLA composition and a higher DGLA:GLA ratio in the allergic group. However, this should be confirmed by lipid mediator analysis. Key words: allergy / allergic disease; pregnancy; fatty acid composition.

34. Food Services as an integral component in the provision of quality health care

Mr Madome Manyuha, *Ms Maletsema Mahonko*

National Department of Health

Introduction: The policy for Food Service Management in public health establishments has been in existence since 2010. The aim of the policy and guidelines is to standardized operations in the food service environment. Orientation sessions were conducted in all provinces. The level of implementation of the prescripts in the Policy and the guidelines was not known as there was no a standardized tool to measure this.

Methodology: Standards and criteria where developed to determine the level of implementation, identify thematic areas which needs to be improve, to assist in learning best practices and broadly assess quality within the Food Service sub-system. Food Service Units (FSU) were assessed using the Food Service Management Quality Assessment (FSMQA) Tool.

Results: Best practices were observed where Food Service is pitched at the highest level. These were amongst others appropriately skilled staff, and broadly appropriately managed resource. FSUs with sub-optimal compliant scores were supported and showed improvement in the subsequent quality assessments.

Conclusion: The delivery of quality food service depends on active involvement of other sub-systems such as Dietetic Services, Supply Chain Management, Quality Assurance, Infection Control, Environmental Health Services as well as management support at all levels. All FSUs should do self-appraisal using the FSMQA Tool at least once a year.

35. Protecting breastfeeding: facing new challenges

Mr Madome Manyuha, *Ms Ann Behr*

National Department of Health

Introduction: Optimal nutrition during infancy and childhood is critical to child health and development. The 2005 Innocenti Declaration on IYCF recognised that inappropriate feeding practices pose significant threat to child health and survival. The 2011 Tshwane Declaration fast-tracked the publishing of The Regulations Relating to Foodstuffs for Infants and Young Children, R. 991 in the Government Gazette on 6 December 2012. The Regulations gave effect to the principles and aims of the WHO International Code of Marketing of Breastmilk Substitutes dealing with labelling, marketing, educational information and responsibilities of health authorities. While there was a decline of pure promotions of designated products, a new trend of violations emerged as companies, retailers and individuals violate disregard the provisions of the Regulations.

Methodology: A task team to facilitate handling of enquiries and resolutions of violations was setup at the National Department of Health.

Results: The following challenges were identified in as far as adherence to R991 is concerned: Promotion on Social Media, Online Shopping and Indirect Sales is becoming prominent. Sponsorship offers by Multi-National Companies to researchers, Health Care providers and facilities still pose threats to undermine the provisions of the regulations, including use and distribution of educational material with medical claims.

Conclusion: To setup a web-based monitoring and reporting system of violations and inquiries and to continue engaging with Multi-National Companies, academics, health care providers and members of the civil society on the provisions of the regulations.

36. The perceptions of employees on healthy eating in the workplace.

Maletsema Mahonko, **Rebone Ntsie**

Introduction: The Department of Health developed a *National guide for healthy meal provisioning in the workplace* in an effort to promote healthy eating in workplaces. This is an initiative anchored on goal two of the *National Strategy for the prevention and control of obesity in South Africa 2015-2020*, which calls for action to create enabling environment that support availability and access to healthy food and beverage choices in various settings.

Method: A total of 288 questionnaires were distributed to participants attending the nine provincial orientation workshops on the national guide. The aim was to assess the participants' perceptions with regard to the healthiness of the food and beverages served during workplace events such as meetings and workshops, the factors associated with healthy eating as well as availability of opportunities for physical activity at workplace.

Results: About 81% of respondents indicated that meals are the most common type of refreshments served during workplace events. Forty-seven percent perceived them as unhealthy whilst 34.7% think the food is healthy. Lack of policy/guidance on the procurement of healthy options was cited as the major barrier for provisioning of healthy meals. Access and availability of a variety of healthy foods and beverages that are reasonably priced or more affordable is believed to be critical to ensure healthy eating in the workplace. Most of the respondents (78.8%) believed that there is an opportunity to be physically active at workplace.

Conclusion: The findings provide useful information that could be used in developing and putting into practice workplace policies that support employees to make healthy choices and promote their health and wellbeing.

37. Role of bioactive peptides in the cardiometabolic health effects of fermented dairy products

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A growing body of evidence suggests that yogurt consumption is associated with reduced risk of type 2 diabetes (T2D). However, the effect of yogurt intake on cardiometabolic clinical outcomes remains unknown, and the mechanisms that underlie the potential beneficial effects of yogurt consumption on cardiometabolic diseases (CMD) remain elusive. This study tested the hypothesis that bioactive peptides generated during fermentation of dairy proteins may underlie some of the beneficial effect of yogurt on metabolic health using mouse models of CMD. We used C57BL6 and atherosclerotic-prone LDLr KO mice fed a high-fat high sucrose (HFHS) diets in which half the dietary proteins were substituted for proteins from milk (MP), fermented milk peptides (FMP), fermented yogurt peptides (FYP) or not (HFHS). We found that body weight and adiposity were not different among dietary groups. However, glucose tolerance tests revealed that glucose-induced insulin response improved in FYP-fed mice vs that of HFHS or MP-fed mice. Interestingly, while MP-fed LDLrKO mice had reduced plasma triglyceride (TG) levels vs untreated HFHS fed mice, they showed elevated TG levels in the liver. Conversely, hepatic TG levels were reduced in mice fed FYP vs MP-fed animals. These metabolic effects of FYP and FMP were associated with lower circulating levels of systemic inflammation and adhesion markers, and up-regulation of anti-microbial peptides in the intestine. Overall, these results show that fermented dairy peptides, especially those generated following yogurt fermentation, reduce inflammation, insulin resistance and hepatic steatosis, thus possibly contributing to the preventive effects of yogurt consumption on CMD.

38. The risk profile for non-communicable diseases of nurses at a district hospital in Mpumalanga, using the WHO STEPwise approach

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[1]Department of Human Nutrition, University of Pretoria

Introduction: Non-communicable diseases (NCDs) are leading cause of death worldwide. Healthcare professionals including nurses may be at risk of developing NCDs. This study aimed to determine the risk profile for NCDs of nurses at a district hospital in Mpumalanga, using the adapted World Health Organsation (WHO) STEPwise approach of NCD risk (STEPS).

Methods: An observational, cross-sectional descriptive study was undertaken amongst 126 (92% female; mean age 39.5±10.7 years) conveniently selected nurses. The STEPS instrument comprised of questionnaire-based assessment (step 1: demographic, smoking, dietary, physical activity data), physical measurements (step2: weight, height, waist circumference, blood pressure) and biochemical measurements (step 3: finger prick fasting glucose and total cholesterol). Data were collected by trained healthcare professionals. EpiInfo (version 7.1.5.2) was used for descriptive statistical analyses. NCD risk was determined according to the WHO criteria.

Results: Current tobacco smoking was reported by 4% and ever consuming alcohol by 29% participants. 85% and 81% participants reported eating one or two servings of vegetables and fruits respectively per day. Vigorous or moderate intensity spare time activities were performed by 33% of participants. Of the participants, 23% were overweight and 60% were obese. Mean systolic and diastolic blood pressures were 119.75 ±16.32 mmHg and 72.5±12.2 mmHg. Mean fasting blood glucose and total cholesterol were 5.23±2.16 mmol/l and 4.7 ±1.32 mmol/l. Hypertension was present in 23%, diabetes in 7% and raised total cholesterol in 4% of participants.

Conclusion: Nurses appeared to be at increased risk of developing NCDs. Due to the convenience sampling, these results may have limited generalisability.

39. Household food Security and coping strategies of households from rural communities in Limpopo Province

Prof Xikombiso Mbhenyane[1], Ms Sefora Makuse[2], Dr Lindelani Mushaphi[3], Dr Nomusa Dlamini[4], Prof Gubela Mji[1]

[1]Stellenbosch University, [2]Univeristy of Limpopo, [3]University of Venda, [4]CSIR

Introduction: The main aim of the study is to develop models for improving food security and nutritional status of households using indigenous foods among rural communities in the selected areas of Eastern Cape and Limpopo provinces. This paper reports on household food security and coping strategies to food deprivation by households in Limpopo Province.

Methodology: The approach 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 Health and Research Ethics Committee of 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. The copying 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%). Only 15% of the households with an occurrence of once week gathered wild food, hunt or harvest immature crops.

Conclusion: High levels of food insecurity was reported in these two communities and household employ various approaches to cope with food deprivation with none utilisation of indigenous or wild foods.

40. Eating Patterns, Household Food Security, Physical Activity and Health Risk in Adults from Limpopo Province

Mr Solomon Mabapa[2], Ms Vanessa Mbhatsane[2], Ms Tshifhiwa Mandiwana[2], Ms Lindelani Mushaphi[2], Mr Motadi Selekane[2], Ms Tirhani Masia[2], Ms Merriam Mohlala[2], Prof Xikombiso Mbhenyane[1]

[1]Stellenbosch University, [2]University of Venda

Introduction: The purpose of the study was to determine eating patterns, household food security, physical activity and health risk of adult population in Limpopo province.

Methods: Cross sectional exploratory and correlational survey. A validated questionnaire was used to obtain data on demography,

eating patterns and physical activity patterns. A hunger scale, 24 Hr recall and an FFQ were administered and weight and height measured to estimate the BMI.

Results: 699 randomly selected participants of which 79.9% were females, mean age 36.23±17.56 years.

67.1% were responsible for preparing food at home, 27.2% ate fast food once to daily per week, with 52.4% indicating KFC, 5.7% Pizza, 4.7% Burger, and 2.6% Nandos as their preferred fast foods. 32.6% were food secure, 35.6% at risk of hunger and 31.7% food insecure. 85.1% were involved in physical activity with household chores (19.5%) and walking (18.2%) being the most cited. The mean systolic BP was 120.85±20.54 mmHg; 23.7% were hypertensive with 2% above 180/120 mmHg. The mean weight was 63.16±16.65 kg; mean height 1.58±0.133 m with 22.5% overweight, and 17.4% obese. 63.4% suffered from a combination of diabetes, heart disease and/or hypertension.

Correlations of BMI showed significance with type of activity ($p = 0.0000$) while not significant for type of fast food ($p = 0.947$), involvement in activity ($p = 0.722$) and household hunger ($p = 0.104$). Regression for BP and BMI showed significance at $p = 0000$.

Conclusion: Some participants were at risk of chronic diseases of lifestyle with low involvement in physical activities.

41. Field Testing of the Revised Paediatric Food-Based Dietary Guidelines among Siswati Speaking Mothers/Caregivers of Children Aged 0–36 Months in Kabokweni, Mpumalanga, South Africa

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Introduction: The Paediatric Food-Based Dietary Guidelines (PFBDGs) are short, evidence-based, nutrition messages aimed at improving the nutritional status of children. The PFBDGs have been revised, but still require testing in different communities to determine the applicability and feasibility thereof. This study aimed to determine the comprehension and feasibility of the revised PFBDGs among SiSwati speaking mothers/caregivers of children aged 0–36 months living in Kabokweni, Mpumalanga, South Africa (SA).

Methods: A qualitative research study was conducted. The study was set in Kabokweni and the study population included mothers/caregivers living in this community. Purposive and snowball sampling were used to recruit a total of 75 participants, who formed 12 groups. Data was collected using focus group discussions.

Results: Participants were generally aware of the nutrition messages presented by the guidelines and had a fair comprehension thereof. Comprehension was influenced by the wording of the guidelines and was linked to the feasibility of the guidelines and to the socio-economic status of the participants. Enablers included the importance of the messages and health benefits to children. Barriers included misinterpretation of the guidelines, specific disease conditions and lack of resources.

Conclusion: Nutrition is one of the many aspects that affects the development of young children. The PFBDGs can be used to educate parents, caregivers, healthcare providers and educators on the correct nutritional practices for children aged 0–36 months, thereby ensuring the healthy growth and development of young children in SA.

42. Strategic understanding of salt reduction in stock cubes on cooking behaviour: a consumer study

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Unilever

Introduction: Previous studies have shown that a portion of South African consumers add salt to end dishes to compensate for salt reduction in cooking products like stock cubes thereby diminishing the potential benefit of salt reduction legislation. This study was commissioned to understand the implications of the second phase of salt reduction in stock cubes on:

- Consumers' cooking behaviour and total sodium intake when preparing chicken stews with stock cubes

Methodology: In-home quantitative research with n = 292 stock cube users (Black, Female, LSM B, Market Representative Age & Regional Split). Stock cubes with 2016 and 2019 stock cubes, with maximum salt levels of 18000 mg/100 g and 13 000 mg/100 g respectively, were placed with consumers for period of 2 weeks, sequentially in a fully randomised order. At the end of the 2-week period consumers were observed cooking with the cubes (observational data captured) and a sample of the dish collected for sodium analysis.

Results:

- Salt awareness education and regulations are working. The number of consumer's who cook chicken stew with stock cubes plus salt has reduced from 70% in 2012 to 54% in 2016.
- South African consumers cook habitually, irrespective of health awareness and behaviour change intentions.
- Consumers who benefit the most from salt reduction in stock cubes, in terms of net sodium content of chicken stews, are those who change their behaviour by omitting additional salt when cooking. These consumers had chicken stews that contained 11% less salt compared to those who did not change their salt cooking behaviour.

43. Nutrition Clinical Practice Guidelines: from evidence to practice

Mrs Nolene Naicker

National Department of Health

Introduction: Currently nutrition practice guidelines in the South African Context are few and far between. Yes, there may be guidelines available but, are these indeed clinical practice guidelines? What exactly are clinical practice guidelines? What purpose do they serve? What role do we as health professionals play in ensuring that we practice evidence based medicine?

Methods: The National Department of Health: Nutrition Directorate embarked on the development of norms and

standards for nutrition services. However, in doing so this process revealed the need for tools to support the implementation of these norms and standards. Without, these essential tools in place, appropriate implementation would not be possible. This then started the development of a number of nutrition clinical practice guidelines. This very involved and time consuming process included the establishment of a number of clinical task teams with various technical experts to support the development of these clinical practice guidelines. It entailed extensive consultation with all relevant stakeholders in both the public and private sectors to ensure implementation.

Results: A total of 4 national nutrition clinical practice guideline documents have been developed and approved since 2012 and include: adult enteral nutrition, adult parenteral nutrition, paediatric parenteral nutrition and adult renal nutrition practice guidelines. The adult diabetes practice guideline is currently undergoing the approval process at this time.

Conclusion: These nutrition clinical nutrition practice guidelines aim to provide quality, evidence based and standardised nutrition care in South Africa.

44. Mobile health messaging and the sources of nutrition and gestational weight information amongst postpartum women attending public health facilities in the Western Cape –pilot study

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Introduction: Frequent weight measurement during pregnancy without nutritional and gestational weight guidance renders limited clinical benefits. Objectives: To identify the sources of nutrition and gestational weight information during pregnancy and the preferences for mobile health messaging (MHM) among postpartum women.

Methods: A retrospective cross-sectional study was conducted with postpartum women attending public health facilities in the Western Cape. Conveniently sampled participants completed an interviewer administered questionnaire. Questions included demographics, anthropometry (weight & height), sources of nutrition and gestational weight information during the pregnancy and MHM preferences (format, frequency, content).

Results: Participants were coloured (87%), between 21-35 years old (87%) and 93% were either married or single. Ninety-seven percent of participants had some secondary education, 63% lived in formal housing and 73% were unemployed. Fifty – three percent of participants did not receive gestational weight information whilst attending the clinic during their pregnancy. Participants, who received nutritional information (47%), obtained it mainly from pamphlets (53%). Long detailed, daily MHM, was the preferred format and frequency amongst 57% of the participants. Forty seven percent of participants preferred content for MHM included nutrition information relating to; either gestational diabetes, high blood pressure, management of common pregnancy related symptoms, 33% requested nutrition information related to infancy and 20% requested dietary recommendations and nutritional requirements for the pregnant women.

Conclusions: Further research is required regarding MHM, nutrition and gestational weight information for pregnant women attending public health facilities in the Western Cape.

45. Testing of the development of Food Based Dietary Guidelines for the elderly in South Africa

Prof Carin Napier[1,2]

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This presentation will describe the process of the testing of the Elderly Food Based Dietary Guidelines (EFBDGs) for South Africa. Following a literature review, stakeholder discussions and revision, preliminary English EFBDGs were proposed and circulated to an expert panel for input. The developed EFBDGs are based on the existing FBDGs which were revised in 2012 and adapted for older people following the FAO/WHO guidelines. Minor corrections were received and incorporated, after which the guidelines were tested for comprehension, appropriateness and applicability in consumer groups. The focus group topic guide developed by Love for the testing of the 2003 FBDGs was adapted and used as a basis for the focus group discussions in this study and included some socio-demographic questions, including questions on age, gender, ethnic group, education level, employment status, income and cooking fuel. Firstly, the English EFBDGs were tested with IsiZulu, Afrikaans, IsiXhosa, English and Sesotho speaking elderly aged 60 years and older in KwaZulu Natal, Gauteng, Eastern Cape and Free State provinces respectively in small focus groups of between eight to ten people. Thereafter they were adapted and translated into IsiZulu, Afrikaans, IsiXhosa and Sesotho. Secondly, the adapted and translated EFBDGs were tested in the mentioned ethnic groups. In general, as expected, the results of the tests showed that the English speaking elderly responded better to the English guidelines than the other ethnic groups. The feedback in respect of the tested translated guidelines was more positive indicating a better understanding of the EFBDGs by the various ethnic groups.

46. Automated growth monitoring: Conceptual and artificial intelligence considerations for computerised interpretation of the Road to Health weight-for-age chart in assessing risk for the development of severe acute malnutrition (SAM)

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[1]University of Pretoria, [2]Department of Health, [3]University of Johannesburg

Background: Severe acute malnutrition (SAM) affects 6 per 1000 South African children, with case fatality rates exceeding 15% in some districts. Due to implementation problems, routine growth

monitoring often fails to identify incipient SAM. Digitisation of growth monitoring can potentially address this.

Interpretation of growth is complex. Normal growth follows a consistent z-score, with some intra-individual deviation. Dietitians/clinicians judge childhood growth by subjectively assessing the shape of the growth curve, using clinical experience. Objective differentiation between normal variation and pathological downward deviation is challenging.

Aim: To conceptualise a method for automated interpretation of growth curves.

Methodology: Development of an automated growth monitoring method by extensive consultation with child growth and computer programming experts.

Results: A neural network was selected for the digital interpretation of growth. Rather than being programmed with set criteria, the neural network "learns" to recognise normality and deviance by example. A dataset of ~2000 growth curves, combined with allocated SAM risk of each case, are used to train the neural network. It creates a mathematical model from this data, enabling the computer programme to judge the SAM risk level when presented with any growth curve.

To optimise data quality, growth curves representing common clinical scenarios were rated for SAM risk by child growth experts, yielding a set of 100 growth curves with multiple responses per curve. Validation of the developed programme against actual cases of SAM will determine its predictive ability.

Conclusion: Automated interpretation of growth curves could transform routine growth monitoring and reduce SAM incidence.

47. CRP genotypes predict increased risk to co-present with low Vitamin D and elevated CRP in a group of healthy black South African women

Mr Pieter H Myburgh[1], Prof G Wayne Towers[2], Prof Iolanthé M Kruger[2], **Prof Cornelie Nienaber-Rousseau[1]**

[1]NWU; Centre Of Excellence For Nutrition (CEN), [2]NWU; Africa Unit for Transdisciplinary Health Research (AUTHeR)

Introduction and aims: Low 25-hydroxyvitamin D (25(OH)D) and elevated C-reactive protein (CRP) concentrations are independently associated with adverse health outcomes, including cardiovascular disease (CVD). Although an inverse association between these factors has been described, the underlying mechanisms remain unknown. We postulate that environment–gene interactions, through which 25(OH)D interacts with SNPs within the CRP gene, modulate CRP; that certain CRP genotypes predispose individuals to a co-phenotype of low 25(OH)D and elevated CRP concentrations; and that this co-phenotype is associated with higher CVD risk.

Methods: Twelve CRP SNPs were genotyped, and both 25(OH)D and CRP were quantified, in 505 black South African women.

Results: Alarmingly, 66% and 60% of the women presented with deficient/insufficient 25(OH)D and elevated CRP concentrations, respectively. CRP were higher in individuals with lower 25(OH)D concentrations ($p = 0.001$). No 25(OH)D–CRP genotype interactions were evident ($p > 0.05$). The minor alleles of five SNPs were associated with a reduced risk of presenting with inadequate 25(OH)D combined with elevated CRP compared to the presenting with either sufficient 25(OH)D or normal (< 3 mg/L) CRP concentrations. Of these, rs3093068, rs3093062, and rs3093058 presented with increased odds (1.54, 1.64, and 1.67, respectively), whereas reduced odds were observed in rs2794520 and rs7553007 (0.65 and 0.67, respectively) for minor allele carriers. Women presenting with this co-phenotype had higher blood pressure and increased anthropometric measures.

Conclusion: We recommend increasing vitamin D fortification and supplementation efforts to reduce inflammation among black women with vitamin D deficiency, thereby possibly curbing diseases contingent on the co-phenotype described here.

48. Does peripheral adiposity influence high blood pressure in the elderly?

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[1]Federal Polytechnic, [2]Vaal university of Technology, [3]Texas Tech University

Introduction: The correlation between obesity and high blood pressure has been established. The aim of this study was to investigate the association between Mid Upper Arm Circumference (MUAC), Triceps Skin Fold Thickness (TSFT) and blood pressure.

Methods: One hundred and fifteen (115) elderly (97 females and 18 males) participated in this cross-sectional study. Blood pressure, Waist Circumference (WC), Triceps Skin Fold Thickness (TSFT), Body Mass Index (BMI) and heart rate were measured using standard procedures. Correlation and regression analysis were done using SPSS version 20 at $P < 0.05$ level of significance

Result: Sixty-seven (58.3%) out of 115 elderly were hypertensive (54.6% females and 77.8% males), Isolated systolic hypertension (ISH): 55.7%; Isolated diastolic hypertension (IDH): 40.9%; Combined systolic and diastolic hypertension: 38.2%. WC correlated slightly with diastolic blood pressure ($p = 0.021$) but not with systolic blood pressure ($p > 0.05$). The correlation between BMI and systolic blood pressure ($p = 0.054$) and WC and diastolic blood pressure ($p = 0.052$) was marginal. MUAC and TSFT had no correlation with neither diastolic nor systolic blood pressure. There was no significant difference ($p > 0.05$) in the MUAC and TSFT values of non-hypertensive and hypertensive elderly.

Conclusion: The study found no association between peripheral adiposity (MUAC and TSFT) and high blood pressure in the elderly.

49. Beneficial impacts of blueberry polyphenolic fractions against metabolic disorders in a mouse model of diet induced-obesity

Dr Geneviève Pilon[1,2], *Mrs Camille Kropp[1,2], Mrs Arianne Morissette[1,2], Dr Vanessa Houde[1,2], Dr Thibault Varin[1], Dr Stéphanie Dudonné[1], Dr Yves Desjardins[1], Dr Denis Roy[1], Dr Émile Levy[1,3], Dr André Marette[1,2]*

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Given the obesity epidemic, it is essential to identify strategies that could contribute to prevent this situation. Blueberry consumption can prevent obesity-linked metabolic diseases and it has been proposed that its polyphenol content may contribute to these effects. Indeed, polyphenols have been shown to favourably impact gut microbial populations and metabolic health, but the role of specific polyphenol classes remains elusive. The objective here was to evaluate the properties of a whole, anthocyanin or proanthocyanidin enriched blueberry treatment in a diet induced obesity model. Two control groups received a chow diet or a high-fat high-sucrose (HFHS) diet. Other HFHS-fed mice were assigned to a diet supplemented with whole blueberry powder, or fractions enriched with either blueberry anthocyanin (ANT-HFHS) or proanthocyanidin (PAC-HFHS) for 12 weeks. Metabolic cages were performed to follow motor activity and energy expenditure and insulin and oral glucose tolerance tests were performed at week 10 and 12, respectively. Despite no differences in energy intake, we observed a significantly lower body weight gain in animals fed with the PAC-HFHS diet compared to the control mice. Interestingly, we also observed an increased motor activity in these mice. Moreover, mice consuming diet with ANT- and PAC-enriched blueberry fractions demonstrated improved glucose metabolism. Our data suggest that proanthocyanidins and anthocyanins could explain some of the beneficial effects of blueberry consumption on metabolic health. Whether these beneficial effects can be linked to changes in gut microbiota diversity and composition is currently under investigation. This work was funded by the U.S. Highbush Blueberry Council

50. Food pattern assessment using the principal component analysis applied to food questionnaires. Pitfalls, tips and tricks

Dr Cristian Ricci

North-West University

Background: Principal component analysis (PCA) is a statistical technique aimed to investigate food patterns derived from food questionnaires. PCA is commonly used in nutritional epidemiology and statistical packages made its use simple. Nevertheless, the PCA is not free from pitfalls.

Methods: We reported here about the Blom's transformation, a statistical method aimed to normalize and standardize food intakes before PCA. Afterwards, a simulation study was performed to evaluate the eigenvalue distribution of a correlation, matrix in the presence of three food patterns under conditions commonly found in food questionnaire analysis. The scree plot visual inspection and the Guttman-Kaiser criterion (GK) were compared to evaluate their efficacy in food pattern identification.

Results: The scree plot results as a monotone continuous series when no food patterns are present. In this situation about 50% of the eigenvalues assume a value higher than one, showing a first fallacy of the GK. When three food patterns are simulated a clear discontinuity appears after the third eigenvalue, showing that the scree-plot visual inspection is a suitable method to identify food patterns. In the presence of three simulated food patterns, it appears that the GK generates a number of false positive food patterns.

Conclusion: The Blom's transformation is a suitable method to normalize and standardize data before the PCA. In conditions of poor factoriability of the correlation matrix the scree plot is more reliable than the GK to identify food patterns.

51. Field testing of the revised South African Pediatric Food-Based Dietary Guidelines among mothers/caregivers of children between the ages of 3-5 years in the Western Cape Province

Ms Stephanie Röhrs, *Prof Lisanne du Plessis*

Stellenbosch University

Introduction: Stellenbosch University has taken initiative to consumer-test the revised Paediatric Food-Based Dietary Guidelines (PFBDG). The aim of this study was to test the appropriateness and understanding of the PFBDG among mothers/caregivers with children aged 3-5 years, residing in the Atlantis, Witsand, Du Noon and Blouberg areas, Western Cape Province. The study also identified barriers and enablers to implementation of the PFBDG.

Methods: A qualitative, descriptive, cross-sectional study design was applied. Focus group discussions were conducted in English, Afrikaans and isiXhosa through the inclusion of eligible participants (n = 55). Responses were audio recorded, transcribed and analysed to explore understanding of the guidelines across the different population groups and languages.

Results: Understanding of the terms 'regular meals' and 'snacks' was identified as possibly problematic. The word 'lean' was not always clearly understood by the informal groups. Among the formal areas, the guideline concerning 'dried beans, split peas, lentils and soya' was considered specific to certain cultures. To the informal area groups, minimising use of sugar and fat were equally important, whereas in the formal areas there was more concern to limit sugar, and evident that sources of fat are considered more important than quantity.

Conclusion: Overall, the guidelines were well understood in all languages, formal and informal areas. Barriers to application of the guidelines were partialities toward familiar tastes and cultural norms, time for shopping and preparation, availability and affordability. There is an unmistakable need to disseminate the guidelines on a larger scale, in accessible formats, to help minimise mixed messages.

52. Infant formula companies sponsoring paediatric and nutrition conferences: a conflict of interest?

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Under-five mortality in South Africa remains unacceptably high. The 2015 Lancet series identified breastfeeding as the single

most effective intervention to reduce mortality in infants <6 months, yet breastfeeding rates in South Africa remain low with only 23.7% of infants still exclusively breastfed in months 4-5. Improvement in breastfeeding rates is critical for child survival and development since 46% of children 0-6 live below the food poverty line (per capita income of below R415/ month) and 33% lack water on site.

Aggressive marketing of breastmilk substitutes (BMS) undermines breastfeeding. Global sales are projected to nearly double between 2014 and 2019 with 2019 projected sales of $346 million in South Africa. Regulation 991 of the Foodstuffs, Cosmetics and Disinfectants Act seeks to enforce International Code of Marketing of Breastmilk Substitutes, remove commercial pressures in infant feeding and prevent inappropriate and unethical marketing of BMS. This includes the regulation of educational material directed at health care providers and conference sponsorship. Yet monitoring and enforcement remain weak.

This case study will describe ongoing efforts by the Advocacy Committee of the Department of Paediatrics and Child Health, University of Cape Town to document and raise awareness of inappropriate and unethical marketing of BMS at the annual UCT Paediatric Refresher Course from 2015 – 2018. It highlights key challenges facing the nutrition and paediatric community in enforcing R991, avoiding conflicts of interest and protecting infant feeding, and has implications for the funding of academic activities and events such as conferences.

53. Exploring the role of sorghum as an indigenous African cereal in the staple food complex in South Africa

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Indigenous cereals such as sorghum have been supplanted by maize in Southern Africa. Climate change and cycles of severe drought are fuelling renewed interest in agro-biodiversity as opposed to genetic uniformity. Indigenous African cereals are known for their drought resistance but are produced and consumed less in modern diets, characterised by the nutrition transition. The paper explores the affordability, nutritional value, consumption, availability and acceptability of sorghum within the South African staple food complex.

Retail food price analysis on a single serving unit (SSU) basis indicates that prior to the recent severe 2015/2015 drought in South Africa, sorghum meal was on average 25% more expensive than super maize meal. During the drought impact period (April to December 2016) the SSU cost of maize- and sorghum meal was similar (due to significant drought-induced maize meal price increases. As maize meal is exempt from 14% value added tax (VAT) and sorghum is not, the removal of VAT on sorghum could have resulted in sorghum meal being 12% less expensive than maize meal in the drought impact period. In the post-draught recovery period (January to October 2017) sorghum meal was on average 22% more expensive than maize meal. Removal of VAT on sorghum meat could benefit consumers from a nutritional perspective (contributing to food security), as well as benefit agrobiodiversity and create opportunities for small scale farmers. The paper also explores the potential of sorghum in the light of consumers' preferences for small-scale farmers' produce, as well as the desired staples food characteristics.

54. Associations of plasma phospholipid fatty acid patterns with feeding practices and psychomotor development in six-month-old South African infants

Miss Linda P Siziba[1], Prof Jeannine Baumgartner[1], Dr Cristian Ricci[1], Mr Adriaan Jacobs[1], Dr Marinel Rothman[1], Dr Tonderayi M Matsungo[1], Dr Namukolo Covic[2], Prof Mieke Faber[1,3], Prof Cornelius M Smuts[1]

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Introduction: The objective of this study was to assess the plasma FA patterns of six-month-old South African infants and to determine their association with feeding practices, growth and psychomotor development.

Methods: Plasma FA composition (% of total FAs) of six-month-old infants (n = 353) from a peri-urban township was analysed, and principal component and factor analysis were performed to identify plasma FA patterns. Feeding practices, anthropometric measurements and psychomotor development scores were determined.

Results: Four major plasma FA patterns were identified: A 'high EFAs with low DHA and AA', 'high n-6 LCPUFA', 'high monounsaturated FA (MUFA) and nervonic acid', and a 'trans-FA' pattern. Infants who were formula-fed were more likely to have a 'high EFAs with low DHA and AA' pattern. Infants who were not breastfed, did not receive semi-solid foods or were formula-fed were less likely to have a 'high n-6 LCPUFA' pattern. Infants who were breastfed were less likely, while infants receiving formula or cow's milk were more likely to have a high MUFA and nervonic acid' pattern. Infants who were not breastfed or not receiving semi-solid foods were less likely to have a 'trans-FA' pattern. The 'high MUFA and nervonic acid' and 'trans-FA' patterns were positively associated with psychomotor development.

Conclusion: In six-month-old South African infants, distinct plasma FA patterns that presumably represent the FA quality of their diet were identified. Our results suggest that breast milk is an important source of n-6 LCPUFAs and that formula-fed infants may be at risk of inadequate LCPUFA intake.

55. Efficacy of novel small-quantity lipid-based nutrient supplements in improving long-chain polyunsaturated fatty acid status of South African infants: a randomised, controlled trial

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Introduction: Long-chain polyunsaturated fatty acid (LCPUFA) intakes from breast milk and complementary foods in six to 36-months-old South African infants were recently estimated to be below recommendations. Thus, fortifying complementary foods with essential fatty acids (EFAs) and LCPUFAs may be necessary to ensure adequate supply for optimal growth and development.

Objectives: To investigate the efficacy of small-quantity lipid-based nutrient supplements (SQ-LNS) containing EFAs with or without LCPUFAs in improving LCPUFA status in complementary fed South African infants.

Methods: In a randomized controlled trial, six-month-old infants (n = 750) were randomized to receive: 1) daily SQ-LNS containing the EFAs linoleic acid (LA) and alpha-linolenic acid (ALA), 2) daily SQ-LNS with EFAs and the LCPUFAs arachidonic acid (AA) and docosahexaenoic acid (DHA), or 3) no supplement (control group). Plasma total phospholipid FA composition (% of total FAs) was measured at baseline (n=353) and at 12 months (n = 293) (overlap n = 148).

Results: At baseline breastfed infants presented with significantly higher plasma DHA and AA than non-breastfed infants. Infants receiving the SQ-LNS with EFAs and LCPUFAs had significantly higher plasma DHA (4.52 [4.3-4.9]) at 12 months than the controls (3.8 [3.6-4.0]), with no effect on AA. Consequently, infants receiving the SQ-LNS with EFAs and LCPUFAs had a significantly lower plasma n-6 to n-3 PUFA ratio at 12 months than control infants.

Conclusion: Our study suggests that the provision of SQ-LNS containing EFAs and LCPUFAs is efficacious in improving plasma DHA status. Particularly infants who are no longer breastfed may benefit most from LCPUFA-enriched SQ-LNS.

56. Knowledge, attitude and practices of patients receiving maintenance hemodialysis in Bloemfontein, South Africa

Mrs HC Spies, *Assoc Prof VL van der Berg, Ms M Nel*

UFS

Introduction: This is the first Sub-Saharan study to focus on knowledge, attitudes and practices (KAP) regarding the renal diet required for patients on maintenance hemodialysis (MHD).

Methods: In a descriptive, cross-sectional study, KAP-questionnaires were administered during structured interviews in 2017 to 75 participants in five MHD-units in Bloemfontein.

Results: Participants were mostly (70.7%) male (median 50.5 years). Overall, 49.4% scored <50% on knowledge regarding restricted foods, mineral content of food, and phosphate binder medication; 60% felt negative about the diet; and 61.4% reported poor adherence practices. Whilst the median education level was Grade 12, participants with tertiary education (28%), had statistically significantly better knowledge scores than those with only primary school education (6.7%) (95% CI: 3.9% ; 73.5%), and those who had only partially completed secondary school (17.3%) (95% CI: 6.3% ; 64.0%). Only 21% had received written and 30.7% verbal nutrition education (NE) in their home language (which was mostly Sesotho [46.7%] and Afrikaans [4%]). Overall, 24% had not received NE in their home and/or second language (which was mostly English [61.4%] and Sesotho [18.7%]). Having received NE in a home language and/or second language was associated with statistically significantly higher knowledge scores (95% CI: 3.7% ; 49.5%). Most (77.3%) reported ≤ 1 consultation with a dietitian per MHD year (NKF-K/DOQI recommendation: > 3).

Conclusion: This population presented with poor KAP regarding the renal diet, and inadequate involvement of dieticians in their treatment. Higher education level and provision of NE in a first or second language was associated with better KAP.

57. Pre- and postnatal iron deficiency negatively affects bone development in rats with irreversible effects in combination with n-3 fatty acid deficiency

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Introduction: To investigate the effects of pre- and postnatal iron and n-3 fatty acid deficiency, alone and in combination, on bone development in rats, and to determine whether effects are reversible and sex-specific.

Methods: Fifty-six female Wistar rats were randomly allocated to one of four diet groups: Control, iron deficiency (ID), n-3 fatty acid deficiency (n-3FAD), or ID+n-3FAD, and maintained on the allocated diets throughout mating, pregnancy and lactation. After weaning, offspring either maintained their respective experimental diet or were switched to a control diet until early adolescence. Bone mineral density (BMD) was measured ex vivo in spine and femur (dual X-ray absorptiometry), and biomechanical bone strength was determined in femur (three-point bending tests).

Results: In offspring maintained on respective experimental diet post-weaning, ID resulted in significantly lower BMD in spine and femur, and indices of bone strength (stiffness, ultimate load, transition load, ultimate stress and transition stress), even after adjusting for sex and body weight. Additive effects of ID with n-3FAD on BMD in the femur were observed in the ID+n-3FAD group. The effects of ID remained significant in offspring switched to a control diet post-weaning. However, the effects of ID alone did not remain in rats switched to a control diet post-weaning. No diet-sex interactions were observed.

Conclusion: These results indicate that ID during early life may negatively affect bone development, with potential additive effects with n-3FAD. While the effects of ID alone seem reversible, a combined ID and n-3FAD may result in irreversible deficits in bone development.

58. Field testing of the revised Paediatric Food-Based Dietary Guidelines among mothers/caregivers of children aged 12–36 months in the Stellenbosch Municipality in the Western Cape province, South Africa

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Stellenbosch University

Introduction: The development and revision of the South African Paediatric Food Based Dietary Guidelines (PFBDGs) are important strategies aimed at promoting appropriate infant and young child feeding (IYCF) practices in South Africa. The aim of this study was to determine the appropriateness and understanding of the revised PFBDGs among Afrikaans, English and isiXhosa speaking mothers/caregivers of children aged 12–36 months.

Methods: A descriptive cross-sectional qualitative study was conducted. Data was collected from nine focus-group discussions (FGDs) to assess the overall understanding and interpretation of the PFBDGs and to gain insight into previous exposure and the perceived barriers to and enablers of the implementation of the PFBDGs. FGDs ranged from 4–11 participants each. A total of 65 mothers/caregivers participated in the study.

Results: This study revealed that participants expressed a general understanding of the core messages contained in the PFBDGs. Misinterpretation of certain PFBDGs were related to unfamiliar terminology, ambiguity, and examples not being provided. The findings suggested that participants were familiar with and recognised the majority of the concepts conveyed by the PFBDGs. Strong themes emerging from discussions around the perceived barriers to the implementation of the PFBDGs included cost, time constraints, accessibility, and marketing, while perceived enablers included education, visual effects, improved marketing techniques, and improved availability of food.

Conclusion: In order for the PFBDGs to be implemented successfully, certain aspects need attention. Only through addressing common barriers and making the necessary adaptations, will the PFBDGs be implemented effectively, and have the intended outcome on IYCF practices.

59. Food insecurity of students registered at University of the Western Cape

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Introduction: Food insecurity at Higher Education Institutions nationally and internationally has received renewed attention in recent years. The findings from South African universities vary. The purpose of this study was to assess the prevalence of food insecurity among the UWC student population as well as to explore the nature of the problem as experienced by students and to investigate their suggestions for interventions to alleviate the problem.

Methods: The study used mixed methods. All registered students (21 964) were invited to participate in an electronic survey. A further 200 randomly selected students agreed to participate in key informant interviews conducted by trained fieldworkers. The study was approved by the Biomedical Research Ethics committee of the UWC.

Results: A total of 278 students (3% of student body) participated in the online survey. Their profile is representative of the student demographics except for a higher proportion of female respondents. Twenty-eight percent of students reported being food insecure with 22% regularly going to bed hungry and 11% reported severe food insecurity regularly going without food for more than 24hrs. Many students (60%) indicated existing engagement with needy students by sharing (mostly) lunch boxes. Respondents demonstrated a definite preference to assist those that they know rather than anonymous beneficiaries. Almost all students (87%) indicated willingness to assist in intervention projects. The avoidance of stigmatisation in planned intervention was emphasised. Suggestions included "walk-in" food banks, meal-for-all, and learning food production on university land.

Conclusion: Continued engagement with student body can help to address the problem.

60. Iron and anaemia status throughout pregnancy of women residing in Johannesburg: the NuPED study

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Introduction: Pregnant women are at risk of developing iron deficiency anaemia (IDA) with potential adverse consequences for both mother and infant. Limited data are available on IDA in South African pregnant women. The aim of this study was to describe the iron and anaemia status throughout pregnancy of women residing in Johannesburg.

Methods: In this cohort study, healthy pregnant women were recruited from primary healthcare clinics in Johannesburg (n = 175). Venous blood was drawn at < 18 (phase 1, P1), ±22 (phase 2, P2) and ±36 (phase 3, P3) weeks' gestation. Haemoglobin (Hb) was determined on site in whole blood. Iron status indices, ferritin and transferrin receptor (sTfR), were measured in serum. Ferritin values were adjusted for inflammation using C-reactive protein and alpha1-acid glycoprotein.

Results: All results below are reported for P1, P2 and P3, respectively. Mean (95%CI) Hb was 11.5 (11.3-11.7), 11.0 (10.8-11.2) and 11.0 (10.8-11.3) g/dL, respectively, with anaemia (Hb<11g/dL) prevalent in 29%, 42% and 47% of women. Median (25th;75th) ferritin was 53.5 (24.0;108.4), 34.1 (20.2;63.1) and 22.7 (14.3;43.0) µg/L, respectively, with ID (ferritin <15 µg/L) prevalent in 11%, 12% and 29% of women. IDA (Hb < 11g/dL plus ferritin < 15µg/L) was prevalent in 6%, 7% and 21% of women. Median sTfR was 4.3 (3.5;5.7), 6.9 (4.3;8.4) and 7.8 (5.1;10.2) mg/L, respectively, with elevated sTfR (> 8.3mg/L) prevalent in 7%, 27% and 43% of women.

Conclusion: In this sample of urban women, we found a low prevalence of IDA in early pregnancy. However, despite routine iron supplementation, the prevalence of IDA markedly increased from early to late pregnancy.

61. Clinically significant predictors of malnutrition in juvenile male and female on-remand detainees in Pollsmoor correctional facility in Cape Town to advise intervention planning

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Introduction: Literature across the globe indicates that inmates are at an increased risk of health problems and malnutrition, with juveniles being at an even higher risk than adults.

Methods: A cross-sectional comparative survey of 67 male and 52 female juvenile on-remand detainees was conducted on admission to Pollsmoor correctional facility. Measures included weight, height, BMI, triceps skinfold, mid-upper arm circumference, corrected arm muscle area (cAMA), maximum hand grip strength (MHGS), socio-demographics, hunger, meal pattern, food choices, understanding of healthy eating, physical activity, risk taking behaviours, body shape perception and symptoms of anxiety/depression. Gender profiles were compared using t-tests/Mann-Whitney U test and backward multiple regression analysis were conducted to identify significant predictors of malnutrition, of which clinical significance was inspected.

Results: 17.9% males and 15.4% females were underweight, no males were overweight/obese, while 17.3% females were overweight and 5.8% were obese. 34.3% males and 3.9% females were classified as having a wasted muscle mass. Clinically significant predictors (CSPs) of BMI in females were frequency of high-fat snack intake(+), vegetable intake(+), dairy intake(-), physical activity(-) and illicit substance use(-); CSPs for cAMA and MHGS were symptoms of anxiety/depression(-) and Afrikaans home language(AHL)(-). CSP of BMI in males was AHL(-); CSP for cAMA was snacking between meals(+) and AHL(-); CSP for MHGS were higher hunger score(-) and AHL(-).

Conclusions: Malnutrition is prevalent among juveniles on admission to Pollsmoor with socio-demographic, dietary, risk taking behaviour and psychological factors contributing to this phenomenon. Nutrition screening at admission and subsequent intervention is recommended.

62. Yoghurt, appetite control and body weight stability

Prof Angelo Tremblay

Université Laval

The increase in obesity prevalence that has been observed in the last decades has promoted a global re-examination of our lifestyle. In this regard, scientific literature has revealed significant relationships between the proneness to overweight and some traditionally unsuspected environmental factors. These include an association between calcium intake and excess body weight which is today a matter of solid proof of concept based on epidemiological surveys, laboratory-based studies, and clinical trials. This emphasis on a role of calcium in the regulation of energy balance has also promoted a study of the link between dairy consumption and body weight/fat stability. Data obtained in both children and adults showed that insufficient calcium/dairy intake is related to a greater level of body adiposity. Accordingly, calcium or dairy supplementation was found to accentuate body fat loss in obese individuals subjected to caloric restriction. Up to now, this weight-reducing effect has been attributed to a calcium-induced increase in fecal fat loss and fat oxidation as well as to a facilitation of appetite control. Some studies also demonstrated the satiating effects of dairy proteins. Furthermore, recent investigations emphasising an impact of the fermented status of food on gut microbiota might highlight an additional mechanism underlying the impact of some dairy foods, e.g. yoghurt, on energy balance. These observations provide a good justification to interventions aiming at obesity prevention via an increased consumption of dairy foods such as yoghurt.

63. Multi-mycotoxin exposure and its effect on infants (0-11 months) growth parameters in rural areas of Eastern Cape - PhilaSana Project

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Introduction: Infant undernutrition is highly prevalent amongst infants 0-11 months. In rural Eastern Cape (EC), maize is the primary complimentary and weaning food. Maize in this area is contaminated with mycotoxins including fumonisins (FB), deoxynivalenol (DON) and zearalenone (ZEA). Research indicate that these mycotoxins might influence growth. Early consumption of maize put infants at risk. Objective: To determine multi-mycotoxin exposures (FB, DON and ZEA) levels and explore its effect on growth.

Methods: 138 infants 0-11 months were recruited. Daily maize intake was determined with a cultural specific food frequency questionnaire and converted to raw maize intake. Exposure to mycotoxins was estimated using a deterministic approach. WHO Z-scores WAZ, LAZ and WLZ were utilised to determine growth.

Results: n = 44 infants were exposed, 53.1% (n = 25) to FB (≥ 2 µg/kg/day) and 24.5% (n = 12) to ZEA (≥ 0.5 µg/kg/day). All infants were exposed to low levels of DON (< 1 µg/kg/day). There was a significant positive association between exposure to FB, DON, and ZEA and length P = 0.001, P = 0.01 and P = 0.0001 respectively. No association between FB, DON and ZEA and Z-scores were found. 38.9% of the moderately stunted exposed infants were exposed to all three mycotoxins (FB, DON and ZEA) (P = 0.877).

Conclusion: Some infants were exposed to high levels of one or more mycotoxins. The positive association between length and mycotoxin exposure might be due to increased maize and thus energy intake. Exposures did not influence LAZ and is not related to stunting. However, change in linear growth is slow and continuous exposure might lead to stunting.

64. Biofortification – A food-based approach in addressing hidden hunger?

Mr Gilbert Tshitaudzi

National Department of Health

Introduction: Biofortification is known as a process by which more vitamins and other micronutrients are delivered through agronomic practices, conventional plant breeding, or modern biotechnology. Biofortification is considered as one of the cost-effective, sustainable, and long-term means of addressing micronutrient deficiencies. However, to date there is no agreed

upon definition for biofortification and also how to distinguish biofortified from non-biofortified foods.

Methods: CCNFSDU requested South Africa and Zimbabwe to lead a working group of Codex members and Observer organizations to develop a proposed definition for biofortification. The terms of reference included the development of a criteria for the development of the definition, where the definition would be best placed within the Codex texts, how the definition could be used, and the distinction between biofortified and non-biofortified foods.

Results: There was general agreement amongst members that the proposed definition for biofortification should include the following critical aspects: all potential source organisms; macro- and micronutrients; bioavailability of nutrients; and the intended nutritional purpose should cover all the principles for the addition of essential nutrients to foods as stipulated in Codex Alimentarius. However, there are various opinions on what methods of production should be included due to safety concerns on the use of modern biotechnology.

Conclusion: A draft biofortification definition is currently under discussion by Codex members. Discussions are ongoing on how biofortified foods would be distinguished from non-biofortified foods, and how the term "biofortification" could be used in countries where it could be subject to misinterpretation.

65. The framework for the establishment and operation of Human Milk Bank Networks in South Africa

Mr Gilbert Tshitaudzi[1], *Ms Maude de Hoop*

[1]*National Department of Health*

Introduction: The benefits of using donor human milk is critically important among preterm and low-birthweight infants for prevention of infections. Therefore, the establishment of human milk banks in South Africa should be promoted and supported as an effective approach, especially in post-natal wards and neonatal intensive care units, to reduce early neonatal and postnatal morbidity and mortality for babies who cannot breastfeed.

Methods: Existing guidelines and internationally recognised best practices have been used to develop the South African implementation framework, regulations and guidelines on human milk banks.

Results: The regulations and guidelines on human milk banks in South Africa provide a national approach in the establishment and operations of the human milk banks, and guidance in setting a benchmark of quality against which delivery of human milk banking services can be monitored. Scaling up of human milk banking will require a different approach, taking into consideration the existing systems and management structures. A Four-tier Model is proposed and stipulated in the regulations relating to human milk banks in South Africa.

Conclusion: Human milk banks should be promoted and supported as an effective approach to reduce early neonatal and postnatal morbidity and mortality for babies who cannot breastfeed. Breast milk is unique in being a food that is secreted from the human body. This means that for human milk banks there are considerations relating to: the human source of the substance (with parallels to blood and tissue related banks); food safety; and ethical considerations around donation.

66. Codex Alimentarius proposed guidelines for ready-to-use Therapeutic foods (RUTF) for children with uncomplicated severe acute malnutrition

Mr Gilbert Tshitaudzi[1], *Mrs Nolene Naicker*

[1]*National Department of Health*

Introduction: Children affected by severe acute malnutrition (SAM) need adequate treatment and care, and safe, palatable foods with adequate amounts of vitamins, minerals and other nutrients. Children with SAM need timely treatment and RUTF is a critical part of the care. The proposed guidelines provide requirements for the production and labelling of RUTF. The guidelines are also intended to facilitate the harmonisation of requirements for RUTF at the international level.

Methods: Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU) requested South Africa, with co-chairing from Senegal and Uganda to lead a working group of Codex members to develop proposed guidelines on RUTF. The purpose of the guidelines is to provide guidance on technical and nutritional aspects of the production of RUTF, including Nutritional Composition; Raw Materials and Ingredients; Good Manufacturing Practices; Microbiological and Chemical Contaminant Criteria; Methods of Analysis and Sampling, and Provisions for Packaging and Labelling.

Results: CCNFSDU has agreed on the proposed structure and outline of the proposed guidelines and further requested the Chairs to develop the contents of the guidelines. Key outstanding issues on the guidelines is on handling of food additives and contaminants, determination of the protein quality, and the list for nutrients compounds recommended for SAM children that do not alter the acid-base metabolism.

Conclusion: The guidelines are intended for use as an instrument designed to avoid or remove difficulties which may be created by diverging legal, administrative and technical approaches to RUTF and by varying definitions and nutrient compositions of RUTF.

67. Assessment of energy expenditure using Pedometer Mobile App versus energy intake among government workers in Maseru District Lesotho

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Introduction: The incidence of imbalance in energy intake and energy expenditure largely contributes to overweight and obesity which is one of the leading causes of death in the world today.

Aim: To assess the energy expenditure using pedometer mobile app versus energy intake of government workers.

Methods: Cross-sectional quantitative study was carried out in 60 government workers from various ministries in Maseru. Participants who had smartphones and were willing to participate in the study were randomly selected and followed for a month. A semi-structured questionnaire comprising of socio demographic information, nutritional status and energy expenditure. Data collected was analysed using SPSS version 20 and Microsoft Excel.

Results: 68% (N = 41) females and 32 % (N = 19) males aged 25years and above. With 52 % (N = 31) of them married. Educational level showed 53 % (N = 32) had 1st degree holders, compared to diploma 38% (23) and postgraduates 8 % (5). Mobile pedometer app recorded the mean energy intake as 13,458kcal and 16,838 kcal, for males and females respectively. While mean energy expended was 721 kcal and 1032 kcal for both female and male respectively in one week. Mean BMI for females and males was 29.07 kg/m2 and 27.07 kg/m2 respectively.

Conclusion: There was a positive energy balance meaning more energy intake less energy expenditure. Less energy expenditure could contribute to overweight and obesity which are predisposing factors to non-communicable diseases. Mobile pedometer app could be used to monitor ones energy expenditure and energy intake.

68. The association between calf circumference and appendicular skeletal muscle mass index of black urban women in Tlokwe City

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Introduction: Sarcopenia is a public health problem in developing countries especially among the elderly. Objective: To investigate the relationship between calf circumferences (CC) and appendicular skeletal muscle mass index (ASMI) and determine if CC can be used to diagnose sarcopenia in older black South African women.

Methods: A cross-sectional study was carried out among 247 women living in Tlokwe municipality, South Africa. Appendicular skeletal muscle mass (ASM) was measured using dual-energy X-ray absorptiometry, and the ASMI calculated as ASM divided by square of the height (kg/m2). Data were analysed using correlation analysis, receiver operator characteristics (ROC) curves, and maximum Youden index to identify a CC cut-off point for sarcopenia. Three different sarcopenia related outcomes were considered; low gait speed (< 0.8 m/s), low handgrip strength (< 16 kg) and low ASMI using a South African cut-off point for sarcopenia (ASMI < 4.94 kg/m2).

Results: A strong and significant positive correlation was found between CC and ASMI ($r = 0.84$, $p < 0.001$). The ROC curve analysis showed the CC to predict low handgrip strength was 34.3 cm (sensitivity 66.7%; specificity 64.4%), compared to 37.8 cm (sensitivity 93.8% and specificity 41.2%) for low gait speed. A CC cut-off point of 29.9 cm was indicative of sarcopenia using the South African cut-off point as standard. The area under the curve (AUC) for all three outcomes was > 0.60.

Conclusion: A CC of 29.9 cm can be used as a simple and inexpensive way to predict low muscle mass and diagnose sarcopenia in black South African women in public health settings.

69. Assessing the use of intergovernmental forums in the Gauteng Province as a means to leverage infant and young child nutrition agendas

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University Of Stellenbosch

Introduction: Infant and Young Child Nutrition (IYCN) requires an enabling environment with strong leadership and a conducive political situation to promote nutrition specific - and nutrition sensitive interventions.

The aim of the study was to assess the use of the Inter-governmental Relations Framework Act (IGRFA) and corresponding Gauteng forums as a means to leverage IYCN as an agenda item in the province.

Methods: Key-informant in-depth interviews were used to determine Inter-governmental forum (IGF) members' experience of the forums, and their understanding of nutrition as a topic that involves multiple sectors.

Results: Adherence to the IGRFA was good but did not ensure the spirit of the Act is carried out in coherent planning and cooperative governance. Challenges experienced include operational functioning of forums, and political tension, which affect agenda determination and cooperation between spheres. Benefits include the opportunity for coordination, guidance and accountability. Most members felt the topics on the agenda and representation at the meetings were adequate. Participants recognized IYCN as a multi-sectoral topic and its relevance for an IGF, but it is rarely on the agenda and ignorance on IYCN remains problematic.

Conclusion: The results indicate the importance of knowledge on IYCN for government leaders, and capacity to deal with political influence. The IGFs in Gauteng demonstrated the ability to leverage IYCN by being a platform for coherent planning and governance, but not for initial introduction of the topic. Significant advocacy on IYCN needs to target high-level government officials as well as the public to develop stronger societal influence.

70. The association between fracture risk and bone mineral density in black postmenopausal HIV-positive women on HAART

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North West University

Introduction: South African urban postmenopausal women have an increased risk for the development of low bone mineral density (BMD) and consequently osteoporosis. Osteoporosis and fractures are also a concern in the HIV-infected population.

Objectives: The objectives of this study were to determine the number of fracture risk factors of black postmenopausal HIV-positive women on HAART and the association between number of risk factors and BMD of the whole body, spine and left femoral neck, respectively.

Methods: This study is a cross-sectional analysis using baseline results of 120 women from a prospective cohort study. The association between fracture risk score and total BMD, total spine BMD and left femur neck of the hip BMD were assessed in multivariable linear regression models, with age, alcohol intake, smoking and physical activity (PA) as covariates.

Results: The number of fracture risk factors of the women ranged between 2 and 5 out of a maximum of 11. Age was negatively associated, while PA was positively associated with total BMD and explained 13.3% of the variance in total BMD. Age and fracture risk score were negatively associated with spine BMD and explained only 3.9% of the variance in spine BMD. The same variables were negatively associated, while PA was positively associated with hip BMD. These three factors explained 12.7% of the variance in hip BMD.

Conclusions: Among black postmenopausal HIV-positive women age and fracture risk score were negatively associated with BMD of the spine, as well as BMD of the left femur neck of the hip.

71. Scientific literature key in establishing a first edition of a country specific food composition database: a multi-country collaboration

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Introduction: A country-specific Food Composition Database (FCDB) lays the foundation for nutrition related training, research and practice; establishing a database however, is an intensive process. A multi-country collaboration, between SAMRC, LUANAR and TUFTS University, resulted in the establishment of a FCDB for Malawi.

Methods: An initial scoping mission assessed the nutrition landscape for possible FC compilation and related activities. A repository of relevant Malawian scientific literature (MSL), publications and data were collated, whilst scientific articles, research manuscripts and dissertations were sourced through online databases and academic institution visits. An adapted, data quality assessment tool (DQAT), evaluating sampling and analytical methods, was applied for quality assurance.

Results: Data gathered led to the evaluation of >80 scientific articles, dissertations and theses. Approximately 48% (n = 39) of SL assessed, adhered to DQAT set requirements. A total of 315 food items, guided by a priority food list, across eight food groups were compiled through standard compilation methods (Pre-published FCDB, 2018). Malawian SL contribute one-hundred-and-twenty-five foods (40%), while recipe calculations comprise 23% (73), totaling 198 (63%) foods. One-hundred-and-seventeen (37%) foods are borrowed from International FCDBs; SA and West African FCDBs comprise 30% (96) and 4% (13) respectively, while USA and Mozambique FCDBs contribute 2 and 1%, respectively. Legumes (94%) and staples (90%) comprise the largest contribution from MSL to respective food groups, and infant foods (1.2%) the smallest.

Conclusion: Scientific literature remains an important source of food composition data, which through rigorous, stringent evaluation and data quality assessment could be used to compile a country-specific FCDB.

72. Branding and cartoon character usage in food marketing to children: the South African picture

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Introduction: Marketing of foods to children may contribute to the increase in childhood obesity and ultimately the childhood obesity epidemic. Limited information about child-directed food marketing practices in South Africa is available. The aim of this study was therefore to describe the frequency of advertising and the use of cartoon characters and branding as a marketing strategy of food and non-alcoholic beverages to children in South Africa.

Methods: For this observational study, the use of cartoon characters and branding was defined as child-directed food marketing techniques. The four South African free-to-air TV channels were recorded on a Monday to a Thursday and one Saturday from 06:00 to 22:00 during April, June, September and November 2014. All recordings were screened for advertisements. Information on breakfast cereal packaging in the largest supermarkets in Potchefstroom were also recorded.

Results: Of the 4916 TV advertisements, 1030 were food advertisements (17.9% containing cartoon characters). Majority of the advertisements aimed at children advertised sweets, confectionery and snack foods, sugar sweetened beverages, pre-sugared breakfast cereals, sweetened milk and dairy products. A total of 131 breakfast cereal products were marketed to children. Persuasive techniques on breakfast cereal packaging included cartoon characters (52%), children featuring on the packaging (44%), games (15%), collectable items (9%), and competitions (6%). Breakfast cereals aimed at children were placed on the lower shelves and cartoon characters looked downwards.

Conclusion: Food marketing is one possible contributing factor to childhood obesity. Addressing responsible marketing to children may be one step towards curbing the childhood obesity crisis.

73. The relationship between cardiovascular measures and circulating homocysteine concentrations together with genetic and diet determinants in black South Africans

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North-West University, Potchefstroom Campus

Introduction: Homocysteine (Hcy) is a risk factor for cardiovascular disease (CVD) and hypertension. Our aim was to determine the relationship of Hcy and its dietary and genetic predictors with cardiovascular measures and to explore modulation by Hcy single nucleotide polymorphisms in black South Africans.

Methods: Full factorial ANCOVA on ±2010 men and women allowed detection of Hcy categories and gene-diet interactions in relation to cardiovascular measures.

Results: In those with hyperhomocysteinaemia (HHcy), diastolic blood pressure (DBP) increased as carbohydrate intake increased whereas an inverse association was observed for individuals with normal Hcy concentrations (nHcy) ($p = 0.004$). The increase in pulse pressure (PP) with elevated omega-6 intake was more pronounced in HHcy than the nHcy subdivision ($p = 0.02$). PP increased more so as fruit and vegetable intake increased in HHcy than in nHcy groups ($p = 0.04$). Carotid pulse wave velocity (crPWV) correlated stronger with alcohol intake in nHcy than with HHcy participants ($p = 0.02$). crPWV decreased as biotin intake increased in HHcy whereas no correlation was observed for nHcy participants ($p = 0.04$). DBP decreased as plant protein intake increased for those harbouring the MTHFR1298A. DBP increased more prominently in the MTHFR1298C carriers as omega-3 intake increased. PP rose precipitously with accumulating numbers of MTHFR677T, as the intake of pulses, nuts and seeds increased. crPWV declined in MTHFR677TT, but increased in CT and CC carriers as alcohol intake increased.

Conclusion: Due to the existence of Hcy/gene-diet interactions in relation to cardiovascular measures, manipulation of these factors according to genotype could possibly improve cardiovascular outcomes.

74. Repeated high-dose Vitamin A supplementation causes hepatic retinol accumulation in South African preschool children eating liver

Dr Lize Van Stuijvenberg[1], *Prof Ali Dhansay[1], Ms Jana Nel[2], Prof SA Tanumihardjo[3]*

[1]South African Medical Research Council, [2]Northern Cape Department of Health, [3]University Wisconsin-Madison

Vitamin A is fat-soluble and accumulates in the liver when ingested in amounts higher than daily needs. There are growing concerns about the risk of hypervitaminosis A in areas where the same child is exposed to multiple vitamin A interventions. The aim of this study was to assess liver vitamin A stores in 3-5-year-old children who eat liver (an excellent source of preformed vitamin A), and in addition receive vitamin A via the national food fortification and vitamin A supplementation programmes. Liver vitamin A stores was measured by isotope dilution, before ($n = 88$) and after 4 weeks of receiving a high-dose vitamin A supplement ($n = 74$). In addition, liver intake was assessed by means of a liver frequency questionnaire, and history of vitamin A supplementation obtained from the child's Road-to-Health booklet. Hypervitaminosis A (total liver reserves ≥1 µmol/g liver) was present in 63.6% of children at baseline, and increased to 71.6% after supplementation; mean total liver reserves of vitamin A increased from 1.13 ± 0.43 to 1.28 ± 0.46 ($p < 0.001$). Liver vitamin A reserves at baseline correlated significantly with habitual liver intake ($p = 005$), as well as with the number of vitamin A supplements received during the last 12 months ($p < 0.001$), and the total number of supplements received since birth ($p = 0.004$). We showed accumulation of vitamin A in the liver with the increasing number of supplements in a population where liver is frequently eaten, and suggest limiting vitamin A supplementation in such areas to children ≤3 years, and possibly also reducing the dose.

75. Development of an impedance based equation for fat free mass of black pre-adolescent South African children

Ms Amanda Van Zyl, *Dr Zelda White, Prof Friede Wenhold, Dr Johan Ferreira*

University of Pretoria

Background: Bioelectrical impedance analysis (BIA) is a practical alternative to dual-energy X-ray absorptiometry (DXA) for determing body composition in children, yet no population specific prediction equations are available for South Africa. This study aimed to determine agreement between fat-free mass (FFM), measured by DXA and calculated from published multifrequency bioelectrical impedance prediction equations and, if needed, to develop a new equation for estimating FFM for pre-adolescent black South African children.

Methods: Data were collected in a cross-sectional study on 83 conveniently sampled children (44 girls; mean±SD age 8.5 ±1.4 y). Body composition was measured with whole-body DXA scans (Hologic Discovery W densitometer) and impedance values were obtained from the Seca mBCA 514 to calculate FFM using 17 equations. Differences were tested for significance using paired sample t-tests. Agreement was explored using the Bland-Altman method and intra-class correlation. A new equation was developed with multiple linear and stepwise regression analyses.

Results: Nonsignificant differences ($p < 0.05$) between measured and calculated FFM and acceptable limits of agreement (LOA) were identified in 2 of the 17 equations. For these, the mean difference in the Bland-Altman analysis was 0.15 (LOA:-2.68;2.37) and 0.01 (LOA:-2.68;2.66). A new prediction equation was developed which yielded an adjusted $R2 = 0.9544$. No statistical shrinkage was noted during cross-validation.

Conclusion: The new impedance based equation explained 95% of the variation in FFM. This new equation may be used in healthy black pre-adolescent South African children where body composition is required for assessment and monitoring.

76. Efficacy and safety of Saccharomyces boulardii in the treatment of acute gastroenteritis in the pediatric population: systematic review

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Rationale: Gastroenteritis is the second leading cause of death in the world's most vulnerable populations. This systematic review assessed the efficacy and safety of the probiotic Saccharomyces boulardii in the treatment of acute gastroenteritis in the pediatric population. Cost-effectiveness in terms of length of hospital stay, optimal dosing and administration routes were also investigated.

Methods: Data sources included Medline, CINAHL, Scopus and The Cochrane Library. Randomized controlled trials in a hospital setting and involving subjects < 16 years were included. Two reviewers independently evaluated studies for eligibility, quality and extracted data. Data were analyzed using Review Manager 5 software. A random effects model was used due to presence of heterogeneity of treatment effects between studies.

Results: Ten of 190 articles were selected for final inclusion. A meta-analysis of five of the included studies showed that Saccharomyces boulardii compared with the control significantly shortened the duration of diarrhoea (in days) (MD –0.57, 95% CI –0.83 to –0.30, p < 0.0001), but there was no difference between groups regarding time to achieving formed stools. No adverse effects were reported. The GRADE tool assessed overall methodological quality as moderate.

Conclusion: The results demonstrate a potential benefit using Saccharomyces boulardii to treat acute gastroenteritis in the pediatric patient. Offering this probiotic at a dose of 250mg once to twice per day for up to 5 days showed benefit and appears to be safe. Larger and more rigorous controlled trials are needed in order to offer specific treatment guidelines.

77. High prevalence of dyslipidaemia in HIV-infected children receiving Anti-retroviral therapy

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Introduction: Prior research indicates a high prevalence of dyslipidaemia in human immunodeficiency virus (HIV)-infected children on anti-retroviral therapy (ART). This study aimed to identify dyslipidaemia in HIV-infected children receiving ART, in order to start treatment.

Methods: Children attending the HIV clinic at Dr George Mukhari Academic Hospital (Pretoria) were enrolled into a cross-sectional study. These children had received ART for at least 6 months and were virologically supressed.

Results: In all, 140 children were enrolled, mean age at enrolment was 71.4 months (SD 17.8) and 51% were female. Mean period of ART use was 41.39 months (SD 25.08) and they had commenced ART at 27.14 ± 28.5 months of age.

Lipid profile results were available in 108 of the 140 children. American paediatric thresholds for dyslipidaemia were used. Total cholesterol was borderline in 33% and elevated in 11%. LDL cholesterol was borderline in 24% and elevated in 7%. HDL cholesterol was borderline in 20% and low in 30%. Triglyceride levels were borderline in 29% and elevated in 39%.

Children were considered as having dyslipidaemia if one or more of the four lipid profile levels were abnormal, or if at least two were borderline. By these criteria, 75% were dyslipidaemic. There was no correlation between dyslipidaemia and age or weight-for-age Z-score (WAZ) at enrolment, age at ART commencement, or WAZ at commencing ART. However, there was a significant correlation between dyslipidaemia and current height-for-age Z-score (p < 0.01).

Conclusion: HIV-infected children who were stunted were more likely to have dyslipidaemia.

78. Omega-3 supplementation attenuates pro-inflammatory response and enhances the anti-inflammatory response with no effect on exercise performance in athletes

Miss Johnine Viljoen, Dr Cristian Ricci, Prof Lize Havemann-Nel

North-west University

Background: Large volumes of unaccustomed, intense exercise in athletes cause increased muscle damage, inflammation and suppression of the immune system resulting in delayed exercise recovery, overtraining syndrome, and compromised exercise performance. Omega-3 (n-3) may alter the inflammatory response and have immunomodulatory effects. Therefore, the aim of this systematic review and meta-analysis is to review current evidence regarding the effects of n-3 PUFA supplementation on inflammation, muscle damage and exercise performance in athletes.

Methods: Seven electronic databases were searched, and 16 randomised controlled trials were included for analysis. Meta-analytical synthesis was performed using a random effect analysis to calculate the effect size of n-3 PUFAs on markers of inflammation (Tumor Necrosis Factor [TNF-α], Interleukin 2 [IL-2], 6 [IL-6], 4 [IL-4] and 10 [IL-10]), muscle damage (creatine kinase ad C-reactive protein [CRP]) and time trial performance.

Results: n-3 PUFA supplementation increased anti-inflammatory cytokine IL-10 concentrations (4.35; 95% CI: 3.01, 5.68, [p < 0.001]). There was a decrease in pro-inflammatory cytokine concentrations for IL-2 (-0.60; 95% CI: -1.133, -0.067, [p < 0.027]) and TNF-α (2.095; 95% CI: -4.112, -0.079, [p < 0.042]). IL-6 demonstrated a trend towards decrease (-1.369; 95% CI: -2.781, 0.044, [p < 0.058]). Moreover, supplementation failed to show a beneficial effect for creatine kinase, CRP, IL-4 or time trial performance.

Conclusion: Although n-3 PUFA supplementation demonstrated no effect on sport performance and muscle damage markers the

increase in anti-inflammatory and pro-inflammatory cytokines suggest that supplementation enhances aspects of the immune system.

79. Food security and anthropometry of preschool learners: impact of a school feeding programme

Prof Corinna Walsh[1], Dr Ronette Lategan-Potgieter[1], Dr Elmine du Toit[1], Prof Louise van den Berg[1], Dr Lucia Meko[1], Mrs Marizeth Jordaan[1], Mrs Liska Robb[1], Ms Riette Nel[2]

[1]Department of Nutrition and Dietetics, University of The Free State, [2]Department of Biostatistics, University of the Free State

Background and aim: The adverse effect of hunger on health and school performance is well-established. We investigated household food security and anthropometry of preschool learners before and nine months after introduction of a school feeding programme.

Methods: A pre-test post-test design was applied (n = 190). Learners at Masaleng Primary School received the National School Nutrition Programme (NSNP) as well as the Tiger Brands Foundation breakfast programme (experimental school), while Caledon Park received the NSNP, but not the breakfast programme (control school). Questionnaires were completed in a structured interview with primary caregivers. To determine food security, the Community Childhood Hunger Identification Project (CCHIP) index was completed. Anthropometry was measured using standardised procedures.

Results: Learners had a median age of 5.5 years. At baseline 57.6% of households were food insecure and 29.2% at risk of food insecurity. Underweight was identified in 4.7% of learners, while 7.4% were stunted. After nine months of intervention, the percentage of food insecure children decreased significantly in both schools (by 18.7% in Masaleng and by 15.7% in Caledon Park). Prevalence of underweight and stunting did not change.

Conclusions: High prevalence of household food insecurity was identified. Despite this, a relatively small percentage of children were underweight and stunted. The NSNP and breakfast programme succeeded in reducing food insecurity in a large percentage of children, but anthropometric indicators remained unchanged. Future research could assess other benefits of school feeding, such as effects on school attendance and performance.

80. Research Orientation of South African Registered Dietitians

Dominique Kruger, Reabetjoe Manyaka, Leigh-Anne Moote, Kegomoditswe Tibedi, Dr Zelda White

University of Pretoria

Introduction: Research is referred to as the backbone of the dietetics profession and plays a role in developing guidelines for evidence-based practice (EBP) and public policy setting related to nutrition. This study aimed to determine the research orientation (RO) of registered dietitians (RDs) in South Africa (SA) by investigating the four components of RO: value of research, being at the leading edge of the profession, involvement in research, and EBP.

Methods: A cross-sectional, quantitative online survey was conducted among RDs in SA using non-random convenience sampling. Research Orientation was determined using the Edmonton Research Orientation Survey (EROS) questionnaire on the Qualtrics Online Survey Software. Descriptive statistics were used to summarise findings.

Results: Value of research (80%) and being at the leading edge of the profession (81%) scored the highest out of the four components among RDs (n=107). The majority (54%) of RDs are not actively involved in clinical research, with those working in the academic field reporting the highest involvement (55%). Participants with higher qualifications tend to be more involved in research activities. The main barrier presented in the survey was lack of peer support to conduct research activities.

Conclusion: The RDs in this study had an overall positive view towards research. Although the minority of RDs are involved in research, they are positive about conducting research in the future. More research including a representative sample of South African RD's is needed to identify strategies to promote research involvement and/ collaboration among RD's in SA.

81. A framework to regulate the marketing of foods and non-alcoholic beverages to children in South Africa

Dr Mariaan Wicks

Introduction: A framework to regulate the marketing of foods and non-alcoholic beverages to children in South Africa

The World Health Organization has called for governments to improve children's food environment by implementing restrictions on the marketing of foods high in fat, sugar and/ or salt (HFSS) to children. Nutrient profiling models are 'tools' developed for the purpose of classifying foods and are used to support food regulations. This study aimed to develop a framework for regulating the marketing of HFSS foods to children in South Africa with the support of an appropriate nutrient profiling model.

Methods: First, suitability of the South African nutrient profiling model (SANPM) for child-directed food marketing regulations was assessed by comparing the SANPM to four models specifically developed for such regulations. Then, construct validity of all the included models in this context was assessed by comparing the models to the views South African dietitians. Finally, scientific evidence supporting absolute exclusion criteria used by some models were evaluated.

Results: An almost perfect pairwise agreement (kappa = 0.948) existed between the SANPM and a model extensively tested and validated for such regulations. The SANPM was the only model displaying a strong correlation with dietitians' views (Spearman's correlation = 0.71, p = 0.001). An absolute exclusion criterion for non-nutritive sweeteners was found to be scientifically sound for inclusion into the suggested framework.

Conclusion: The appropriateness and validity of the SANPM for regulating the marketing of foods to children in South Africa was established and a suggested framework was developed. We recommend that this framework is legislated to regulate the marketing of foods to children in South Africa.

82. Maternal dietary patterns are associated with maternal and neonatal adiposity in urban black South Africans

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[1]Developmental Pathways for Health Research Unit, University Of The Witwatersrand, [2]Medical Research Council Epidemiology Unit, University of Cambridge, [3]Wits Reproductive Health and HIV Institute, University of the Witwatersrand

Aim: This study identifies habitual dietary patterns in urban black South African women and explores their associations with maternal body mass index (BMI), gestational weight gain (GWG) and neonatal adiposity.

Methods: Habitual dietary intake of 538 pregnant women was assessed using a quantitative food frequency questionnaire and dietary patterns were depicted via principle component analysis. Linear and logistic regression was used to analyse associations between dietary patterns and BMI-specific GWG, as well as newborn: (1) weight-to-length ratio (WLR, kg/m) in 393 mother-neonate pairs; (2) Peapod estimated fat mass index (FMI, kg/m^3) in a 171-pair subsample.

Results: Three dietary patterns were identified: Western, Traditional and Mixed. Western and Mixed patterns were associated with 35g/week (p = 0.021) and 24 g/week (p = 0.041) higher GWG in normal weight and obese women respectively. A 1 SD increase in Traditional diet pattern score was associated with reduced odds of excessive weight gain in the total sample (OR: 0.81; p = 0.006) and in normal weight women (OR: 0.68; p = 0.003). Additionally, traditional diet pattern adherence was associated with lower newborn WLR (-0.04 kg/m per +1 SD; P = 0.033), as well as 0.13 kg/m3 (P = 0.027) and 0.32 kg/m3 (P = 0.005) lower FMI in the total sample and in newborns of normal weight women, respectively.

Conclusion: Increased intake of a traditional diet pattern—high in whole grains, legumes, vegetables and traditional meats—and decreased intake of refined, high sugar and fat driven diets may reduce both maternal and newborn adiposity in urban black South Africans.

Late submission

83. Threats and challenges impacting adherence to exclusive breastfeeding in Nelson Mandela Bay: a qualitative study

Dr Alison Feeley[2], Dr Liana Steenkamp[3], Prof Maggie Williams[3]

[1]University of the Witwatersrand, [2]UNICEF, [3]Nelson Mandela University

Background: Although the Department of Health embraced the WHO's Infant and Young Child Feeding guidelines, limited progress has been made to improve breastfeeding rates in the last decade. With a scarcity of primary health care dietitians to support breastfeeding counselling during antenatal care, an urgent need was identified to explore threats and challenges that may impact implementation and adherence to guidelines by caregivers of infants in Nelson Mandela Bay health district (NMBHD).

Aim and objectives: The aim of the study was to explore and describe the theats and challenges to adherence to exclusive breastfeeding in NMBHD.

Methodology: A qualitative research design utilised 11 focus groups and additionally community dialogues were conducted with 14 adolescent mothers at primary healthcare facilities. Participants voluntarily participated and provided informed consent. Interviews were audio recorded and transcribed verbatim before content analysis was done using a combination of the eight steps of the Tesch analysis technique and ATLAS.ti by the researcher and an independent coder.

Results: Three dominant themes were identified. 1) Participants described the benefits of breastfeeding, including bonding with the infant, affordability, and health benefits; 2) Participants described practical challenges experienced during breastfeeding, including lack of knowledge about breastmilk expression and poor support from family, particularly grandparents 3) Participants described beliefs and myths threatening breastfeeding, including dirty or salty breastmilk and perceived breastmilk insufficiency.

Conclusions and recommendations: The findings revealed that challenges and beliefs are a real threat to breastfeeding adherence, irrespective of breastfeeding information the mothers may have been exposed to.

84. Exploratory multisectoral approach to improving nutritional status of children in Early Childhood Development centres and strengthening child health services in Nelson Mandela Bay health district (NMBHD)

Dr Alison Feeley[2], Dr Liana Steenkamp[3], Prof Maggie Williams[3], Ms Joyce Nyarko[4]

[1]Unicef, [2]University of the Witwatersrand, [3]Nelson Mandela University, [4]Nelson Mandela Bay Health District

Background: Integration of nutrition and early childhood development (ECD) provide opportunities to influence child health and nutritional status.

Aim and objectives: The aim was to test a multisectoral participatory approach to improve nutrition competency among ECD practitioners in an underprivileged community to identify early signs of malnutrition, related health problems and refer cases to clinics, thereby strengthening the health system.

Methodology: A mixed methods approach was used including quantitative and qualitative methods. Phase 1, the planning phase included a stakeholder situation analysis; Phase 2, a

purposive cross-sectional nutritional survey of children (n = 455) attending ECD centres in Ibhayi NMB; Phase 3, development and testing of a standardised nutrition training manual, and ECD practitioner mentoring programme; Phase 4 a nutrition screening and referral system followed by process evaluation and reflection to identify successes and challenges.

Results: The nutrition survey showed that 1.3% had acute malnutrition, 11% were stunted and 22% overweight. ECD practitioners (n = 31) attended a 3-day nutrition course followed by an 8-month nutrition mentoring programme. Although 81% of the ECD practitioners kept track of identified children, only 30% monitored weight, height and MUAC regularly. Of the initial referrals to clinics (n = 162), 25% were tracked with 19% counselled by a nutritionist.

Conclusions and recommendations: More than half the ECD practitioners trained were able to provide additional nutrition and health support to children in their care. However, authors strongly recommend that mentorship and support to ECD centres and primary health care staff is a priority for future integrated nutrition and ECD programmes.

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Nutrition Congress Abstracts - Poster Presentations

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Abstracts

All abstracts were published as received by the congress committee. Only minor language and grammatical changes were made to the abstracts.

1. Natural food fortification: a potential sustainable plant food-based strategy to improve essential mineral bioavailability in african cereal-based diets

Ms Oluyimika Adetola[1], Dr Johanita Kruger[1], Dr Zelda White[2], Prof John RN Taylor[1]

[1]Department of Consumer and Food Sciences, University of Pretoria, [2]Department of Human Nutrition, University of Pretoria

Introduction: Many poor communities at risk of mineral deficiencies in Africa are often not reached by conventional food fortification strategies and natural plant-food-sources of minerals. Objectives: To determine the effects of adding African plant-foodstuffs high in minerals (moringa leaf powder - MLP) and mineral bioavailability enhancers (baobab fruit powder - BFP) to staple pearl millet porridge (PMP) on iron and zinc bioaccessibilities.

Methods: MLP and BFP were added at 15g/100g PMP and compared to PMP fortified with synthetic ascorbic acid (AA) and citric acid (CA) (known mineral bioavailability enhancers). The levels of AA and CA used were similar to present quantities in BFP. Bioaccessibility was analysed by in vitro dialysability assay. AA and CA, mineral (Fe, Zn, Ca) and total phenolic contents of food samples were analysed.

Results: Percentage iron bioaccessibility was improved ($p<0.05$) only in PMP+BFP and PMP+CA, by 30% and 50%, respectively. Furthermore, BFP and synthetic CA appeared to have similar effect ($p < 0.05$) in improving iron bioaccessibility from PMP. None of the treatments improved the percentage zinc bioaccessibility, however, there was a 21% reduction ($p < 0.05$) in PMP + MLP. The inhibitory effects of MLP could results from its high calcium and phenolic contents, which reduce mineral bioavailability. The enhancing effect of BFP on iron bioaccessibility was probably due to its high CA content.

Conclusions: Natural fortification of cereal foods e.g. pearl millet with baobab fruit could be a sustainable food-based strategy to improve iron bioavailability in the diets of people in Africa.

2. Growth monitoring practices: as an indicator for evaluating nutritional adequacy of under two infants

Mrs Olufunmilola Adewumi[1], Dr Temitope Adu[2], Dr Ayodapo Soyinka[3]

[1]Department of Nutrition, Amuwo-Odofin Maternal and Child Centre, [2]Department of Paediatric, Amuwo-Odofin Maternal and Child Centre, [3]Department of Obstetrics and Gynaecology, Amuwo-Odofin Maternal and Child Centre

Introduction: Nutritional adequacy compares the nutrients intakes of individuals at every stage of life, while growth monitoring practices follow the growth rate of a child, as compared to standard periodic anthropometric measurements.

Objective: To evaluate the nutritional adequacy of 250 under two infants using growth monitoring practices as an indicator.

Method(s): The retrospective cross-sectional surveys of anthropometric (weight/age) data conducted on 250 infants attending immunization at Amuwo-Odofin Maternal and Child Centre in relation to their feeding practices was investigated.

Results: The comparison and association were analyzed using EPINFO 3.51 for multivariate analyses. Those exclusively breastfed significantly dropped from 153 (62.1%) to 125 (50%) ($p = 0.0004$), those fed with breast milk and water from 21 (8.4%) to 8 (3.2%) ($p = 0.0004$) while infants not exclusively breastfed increased from 76 (30.4%) to 117 (46.8%) ($p = 0.0004$) by the end of 6th month. Significant difference between infant growth and the nutrition status was also recorded, p value of 0.0002.

Conclusions: Findings from this study indicated a decline in the rate of exclusive breastfed by the 14th week. This may be due to the fact that the majority of the mothers usually introduced breast milk substitute because of their various commitment and fear of their excessive weight gain. This study further reinforced the need for nutrition advocacy, extension of maternity leave up to 6 months and provision for a working conducive environment proximal to their residence to enhance their ability to exclusively breastfed their infants without interruption to their jobs.

3. Nutritional status and health practices among adolescents in secondary schools in Barberton, Mpumalanga, South Africa

Ms Brenda Baloyi, Nxumalo Nombuso Portia

University of Venda

Introduction: The African region now experience a high prevalence of obesity and chronic diseases as a result of nutrition transition (Ukegbu et al., 2017; Omobuwa et al., 2014; Rossouw et al., 2012). The SANHANES report of 2012 indicates that the perceived BMI higher than actual BMI among adolescents of 37.3% for males and 20.8% for females.

Aim: The aim of the study was to determine the nutritional status and health practices of adolescents.

Methodology: A cross sectional study was conducted among 110 participants among adolescent in Barberton, Ehlanzeni district. The assessments that was taken include anthropometric, blood glucose (BGL) and blood pressure (BP). The statistical package for social sciences (SPSS) version 25 was used to analyse descriptive statistics inferential statistics.

Results: About 16. 4% were obese and 47, 3% were overweight. About 42.7% of participants had high waist circumference. Males were found to be having high SBP (17.3%) and high DBP (10, 0%) than females. BGL was high in females with 7.4% and low in males with 2, 9%. Adolescents were found to be having poor health practices with 69.1% of the them not having breakfast daily, 20, 9% consume three meals per day, 26% engaged in 60 minutes of exercise at least 3-4 times a week, 80% of the participants spent over 3 hours watching TV daily, 81.8% consumed alcohol, 41.8% smoked tobacco and 27.3% used drugs.

Conclusion: Females were having high BMI and high BGL than males whereas males were having high WC, SBP, and DBP than females.

4. Effect of researchers' tailored nutrition education programme on nutrition knowledge and quality of dietary intake of adults living with HIV in Abeokuta Nigeria

Dr Tk Bello, Gerda J Gericke, Prof Una MacIntyre, Prof Piet Becker

University of Pretoria

Objective: To examine the effects of a tailored nutrition education programme (NEP) on nutrition knowledge and quality of dietary intake of adults living with HIV (ALH) in Abeokuta, Nigeria.

Methods: This study premised from a need assessment study for a nutrition education programme (NEP) for ALH in Abeokuta, Nigeria. The results were used to develop trainer's manual, brochure, flipcharts and participants work book. Participants (N = 200) were conveniently recruited, stratified for gender and duration on ART. Two hospitals were randomly assigned to intervention and control sites using a quasi-experimental design. Previously validated questionnaire was used to obtain nutrition knowledge of the participants at the baseline, week 12 and week 24. Dietary quality was assessed using individual dietary diversity scores (IDDS). GLS regression analyses were used for group comparisons and constructs of nutrition knowledge. The IDDS was calculated by counting the number of food groups that an individual consumed over the previous 24 hours out of 9 foods groups.

Results: There was no significant difference between the intervention and control groups in the mean percentage scores on knowledge of meal planning (p = 0.19), food preparation (p = 0.14) and food purchase (p = 0.18) at baseline. Consumption of meat was higher among the intervention participants than the control group participants at baseline (intervention: 83%; control: 77%), week 12 (intervention: 83%; control: 76%) and week 24 (intervention: 87%; control: 73%).

Conclusion: This study showed that NE plays a significant role in improving the nutrition knowledge and IDDS of ALH.

5. Using Program Impact Pathway to evaluate the potential of Early Childhood Development Education to contribute to nutrition in Nigeria

Ms Oluchi Ezekannagha[1,2], Prof Xikombiso Mbhenyane[1], Prof Scott Drimie[1], Dr Dieter von Fintel[3], Dr Busie Maziya-Dixon[2]

[1]Division of Human Nutrition, Stellenbosch University, [2]International Institute of Tropical Agriculture, [3]Department of Economics, Stellenbosch University

Background: One of the important contribution of early childhood education asides early brain stimulation and care, it has the potential to contribute to adequate nutrition for growing children.

Objective: To conduct a process evaluation of the early childhood development education programme in chosen states (Kebbi and Anambra states) in Nigeria to assess the implementation of the programme and identify ways of strengthening the program to ensure that it contributes to adequate nutritional status.

Methods: A programme theory was hypothesised, developed and used for the evaluation. Key Informant interviews with programme implementers (n = 10), programme beneficiaries (n = 4), observation of programme delivery (n = 2) were conducted to assess the delivery and subsequent utilisation of the programme impact pathway hypothesised.

Results: Four pathways were hypothesised through which early childhood development education impacts on nutrition. While the programme itself was implemented as planned numerous components that were necessary for maximum impact were impact. These include a gap in human and infrastructural resource, poor delivery of in-service training and poor pupil recruitment.

Conclusion: Strengthening delivery, increasing coverage and improving use are key processes that can be improved to ensure that this nutrition-sensitive program delivers adequate nutrition to under-fives in the study states.

6. Caregivers from Thabo Mofutsanyane and Capricorn District need to be more aware of the importance of continuing clinic visits for children up until five years of age

Rosalyn Ford[1], Sue Jones[1], Tang Khobotlo[1], Pumla Dlamini[1], Celia Hsiao[2], Suzanne Wessels[1], Gugu Xaba[1], Adelaide Mkhomasi[1], Moloko Moremi[1]

[1]Save The Children, [2]University of Witwatersrand

Introduction: Around 87% of malnutrition cases in South Africa go undetected. Regular growth monitoring through clinic visits would more effectively detect the early signs of acute malnutrition, leading to treatment and prevention of more severe forms of malnutrition. Clinic visits for those under 5 years of age also ensure immunisations; growth monitoring and vitamin A supplementation are completed.

Methods: As part of the cross-sectional designed baseline study in the Sireletsa Bana Project, the Road to Health Booklet (RtHB) of 257 children aged 0-70 months from Thabo Mofutsanyane (TM) and 238 children from Capricorn District (CD) were assessed through 32 early childhood development (ECD) centres.

Results: Complete immunisation coverage marked in TM's RtHB dropped steadily from 100% at 0-6 months to 72% for children 60-70 months. CD's coverage, ranged from 100% at 0-6 months, 80% at 6-12 months, fluctuating from there onwards to 92% completion at 60-70 months. In TM, 47% of children 0-50 months had complete neonatal information, vitamin A supplementation and deworming treatment recorded. All three were recorded in 43% of RtHB in CD. 94 to 100% of ECD practitioners made copies of the RtHB, only 57% and 63% from TM and CD, respectively, checked the RtHB regularly, and reminded caregivers of the next clinic visit.

Conclusion: Regular clinic visits specified in the RtHB is fundamental to child survival, health, development and early detection of growth faltering. Greater awareness needs to be raised with caregivers and ECD practitioners on the importance of timely clinic visits according to the RtHB.

7. Improving growth monitoring skills and knowledge of primary health care nurses in Thabo Mofutsanyane and Capricorn District could contribute to decreasing severe acute malnutrition

Rosalyn Ford[1], Sue Jones[1], Tang Khobotlo[1], Pumla Dlamini[1], Celia Hsiao[1,2], Suzanne Wessels[1], Gugu Xaba[1]

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Introduction: Thabo Mofutsanyane (TM) and Capricorn District (CD) in 2016 were highlighted as having significant child case fatality rates due to Severe Acute Malnutrition (SAM), 11% and 9%, respectively. Community members from the districts stated during focus group discussions that health and nutrition information was mainly accessed through primary health care (PHC) nurses.

Methodology: Health and nutrition knowledge and skills assessments through observation and questionnaires were performed on 39 PHC nurses from TM (n = 20) and CD (n = 19) as part of a cross sectional baseline study in the Sireletsa Bana project.

Results: 60% and 74% of nurses in TM and CD respectively, had reportedly received training on breastfeeding support and 65% and 47% respectively on complementary feeding. Nurses in TM scored an average of 73% on a health and nutrition knowledge skills test while CD nurses' average score was 76%. In TM, 85% of nurses reported to have received training on growth monitoring. After observation, it was determined that 60% of TM nurses required further training on taking mid upper arm circumference (MUAC) measurements, 20% for taking height measurements and 15% for taking weight. In CD, 74% of nurses had reportedly been trained on growth monitoring, 32% required further training on taking height and MUAC measurements and 21% on weight.

Conclusion: Whilst knowledge of infant and young child feeding was relatively good amongst PHC nurses in TM and CD, further training in aspects of growth monitoring and promotion is necessary. This would contribute towards preventing and decreasing SAM in the districts.

8. Are fathers involved in infant and young child feeding? Perceptions of parents and caregivers in Mzimba-north district, Malawi

Ms Wezzie Kumwenda, Ms Gerda Gericke, Dr Jane Muchiri

University of Pretoria

Background: Inappropriate infant and young child feeding (IYCF) persists in Malawi. Involving both parents in IYCF is important in improving the feeding practices.

Aim: To explore and describe the involvement of both parents in IYCF in Mzimba-north district, Malawi.

Study design: Cross-sectional, explorative and descriptive (quantitative and qualitative).

Setting: Five agriculture-extension planning areas (Mzimba-north district, Malawi).

Participants: Quantitative: Mothers (n = 154), fathers (n = 127), caregivers (n = 4) with children aged zero to 24 months randomly stratified into three groups [below six, six to 11; 12 to 24 months]. Qualitative: Purposive sample: mothers (n = 53) and fathers (n = 41).

Methods: Semi-structured questionnaires obtained quantitative data. Fisher's exact test compared males' and females' responses. Focus group discussions (FGDs) [five with males; six with females] using semi-structured questions obtained qualitative data. Creswell's data analysis method identified themes and sub-themes. [Ethical approval: UP NAS ethics committee (no EC151204-26)].

Results: Significantly more females (71.2%) than males (42.9%) (P = 0.007) with children below six months reported mothers as the main decision makers on exclusive breastfeeding. Majority of participants (50%) with children six to 24 months perceived child feeding as the mother's responsibility and purchasing food for children as the father's responsibility. In the FGDs, more direct roles like breastfeeding, food preparation and feeding children were assigned to mothers while fathers had roles of proving physical, financial and emotional support.

Conclusion: Low participation of fathers in IYCF was found. Mothers had direct roles in IYCF while fathers had supporting roles. There is need to enhance fathers' involvement in IYCF to improve IYCF practices.

9. Effect of school-based nutrition education on nutrition self-efficacy and knowledge of grade 2 and 3 learners in resource limited settings of Pretoria

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[1]University of Pretoria, [2]Ministry of Health and Child Care

Background: Self-efficacy and knowledge as potential dietary behaviour mediators are important targets for change in school-based nutrition education programmes (NEPs).

Aim: To determine whether nutrition education (NE) based on South African food based dietary guidelines would improve the nutrition self-efficacy (NSE) and knowledge (NK) of Grade 2 and 3 learners in resource limited settings (Pretoria).

Method: A quasi experimental study was conducted with a convenience sample of learners (n = 178) at two primary schools. Participants received nine NEP lessons for six weeks. The NEP had been planned based on a needs assessment and comprised classroom curriculum, education materials and homework activities. A modified Pathways knowledge, attitudes and behaviours questionnaire assessed the NSE and NK at baseline, six weeks (post-test) and 12 months (follow-up). Paired t-tests and independent sample t-tests evaluated the effect of the NEP at six weeks and repeated measures ANOVA at 12 months ($p < 0.05$ significance level).

Results: From baseline to follow-up, mean NSE scores decreased (0.80 vs. 0.74; p = 0.000) while those for NK increased (0.52 vs. 0.73, p = 0.000). Mean NSE scores for less fatty foods increased (0.766 vs. 0.797; p = 0.078), while those for less sugary foods decreased (0.80 vs. 0.797; p = 0.43). Girls (n = 64) had higher

scores for both NSE ($p > 0.05$) and NK (0.59 vs. 0.51; $p = 0.047$ at post-test; 0.74 vs. 0.63, $p = 0.02$ at follow-up) as compared to boys (n = 57).

Conclusion: The tailored NE improved nutrition knowledge and not self-efficacy of the participants with more positive effects on girls. NE for young children should probably follow gender specific approaches.

10. Parental nutrition attitudes and practices on infant and young child feeding: a mixed methods enquiry in Mzimba-north district, Malawi.

Ms Wezzie Kumwenda, Ms Gerda Gericke, *Dr Jane Muchiri*

University Of Pretoria

Background: Inappropriate infant and young child feeding (IYCF) persists in Malawi. Understanding parents' nutrition attitudes and practices on IYCF is important to formulate effective strategies for improving IYCF.

Aim: To explore, describe and compare parental/caregivers' nutrition attitudes and practices on IYCF in Mzimba-north district, Malawi.

Setting: Five agriculture extension planning areas (Mzimba-north district, Malawi)

Study design: Cross-sectional explorative and descriptive (quantitative and qualitative)

Participants: Qualitative: Mothers (n = 154) and fathers (n = 127) with children aged zero to 24 months and caregivers (n = 4) stratified into three groups [below six, six to 11, 12 to 24 months]. Qualitative: Purposive sample: mothers (n=53) and fathers (n = 41).

Methods: Quantitative: Data were collected using semi-structured questionnaires. Fisher's exact test compared males' and females' responses. Qualitative: Five FGDs with males and six FGDs with females were conducted using semi-structured interview guides. Creswell's data analysis method was applied to identify themes and sub-themes. [Ethical approval: UP NAS Ethics Committee (No. EC151204-26)].

Results: More than 80% of participants showed positive attitudes on the appropriate IYCF practices. However, poor IYCF practices were reported. Only half of the children below six months were exclusively breastfed. Poor food diversity with low consumption of animal foods and low feeding frequencies were reported for children six to 24 months. Similarly, in FGDs, participants reported positive attitudes on breastfeeding and complementary feeding and poor IYCF practices.

Conclusion: Irrespective of the method of enquiry, participants reported having good nutrition attitudes in IYCF. However, poor IYCF practices were reported. The findings from the mixed methods were in agreement.

11. An assessment of the nutritional status of four rural communities in KwaZulu-Natal, South Africa

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Introduction: Malnutrition is a significant challenge in developing countries, including South Africa (SA). While several studies have assessed the nutritional status of South Africans, the status of defined communities, within provinces of SA are lacking. The aim of the current study was to assess the nutritional status of defined population groups in rural areas of KwaZulu-Natal (KZN).

Methods: Systematic sampling generated a sample of 50 households each in Swayimane, Umbumbulu and Tugela Ferry and 21 households at Fountain Hill Estate. Anthropometric (height, weight, mid-upper arm circumference and waist circumference) and dietary intake data (24-hour repeat recall and food frequency) were collected. Data was analysed using the statistical package for social sciences (SPSS) and Food Finder. The Estimated Average Requirement (EAR) cut-point method was used to assess the prevalence of nutrient inadequacy.

Results: The prevalence of stunting in children under 5 years was 31%. Further, 23.6% (n = 76) of adults were classified as pre-obese, 13% (n = 42) obese class I, 7.1% (n = 14) obese class II and 9.0% (n = 30) obese class III. The EAR cut-point method indicated that not all age groups met their nutritional requirements. Most consumed high amounts of carbohydrates and protein and low quantities of dietary fibre and other micronutrients.

Conclusion: Undernutrition, over-nutrition and poor dietary diversity are prevalent in rural KZN. The prevalence of inadequate nutrient intake was high in most age groups. The study findings indicate that there is a need to increase the availability, accessibility and utilisation of diverse foods through appropriate agricultural and nutritional interventions.

12. Hydration status of professional football players competing in elite division football league in Ghana: Implications on performance and competitiveness

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Background: Dehydration compromises physiologic function and negatively influences performance especially when undertaken in tropical temperature such as Ghana. Onset of significant dehydration is preventable, when hydration protocols are followed to assure productive and safe athletic experience.

Objectives: To assess knowledge on hydration and determine hydration status of professional footballers competing in the premiership league in Ghana.

Method: A cross-sectional study involving randomly selected eighty apparently healthy footballers. Validated questionnaire was used to assess physiological indicators of hydration and modified 3-day 24-hr dietary recall to determine dietary fluid intake. Hydration status was determined by urine specific gravity. Percentage total body water (TBW) measured using TANITA bio-

electrical impedance analyser. Data was analysed using SPSS version 20.0 and 'MicroDiet version 3.0' (Downlee UK). Chi-square was used to test for associations of interest. Differences between variables were considered statistically significant where p -≤ 0.05.

Results: Players mean age was 23.44 ± 2.198. Most (63.8%) were informed about need for good hydration through media. Most (61% vs 67.5%) athletes were dehydrated according to their urine specific gravity and % TBW respectively. Hydration status based on urine specific gravity and % TBW significantly correlated with dietary fluid intakes (p = 0.043) and monthly salary (p = 0.001) respectively.

Conclusion: Even though most footballers were well informed about need for good hydration, most were not adequately hydrated to meet their level of physical activity. Hence the need to translate their knowledge into lifestyle practices, if these athletes want to remain competitive and perform well.

13. The development of a food guide for pre-diabetic consumers in lower socio-economic communities in the City of Cape Town, South Africa, using community-based participatory research (CBPR)

Ms Dezlynn Jansen[1], Dr Jillian Hill[2], Dr Anniza de Villiers[2], Assoc Prof Irma Venter[1]

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Introduction: Interventions using food- and nutrition-related educational resources may assist in the prevention of type 2 DM in LSES communities. The aim of the study is to develop a practical food guide (PFG) promoting healthful food consumption and dietary practices suitable to the needs of pre-diabetic consumers in LSES communities, using community-based participatory research (CBPR) methods.

Methods: In eight LSES communities (four Black and four Coloured) participants were screened to estimate risk of developing T2DM, further tests were conducted and a questionnaire was administrated, identifying those at risk. For the intervention (two Black and two Coloured communities), focus-group discussions (FGDs) were conducted and a questionnaire was administered. The Conceptual Logic Model of CBPR was adapted, directing a stepwise approach applying mixed research methods: Step 1: Reviewing food- and nutrition-related interventions and consumers' determinants influencing dietary practices. Step 2: Community-based situational analysis. Step 3: PFG development. Step 4: Assessment of the practicality/usability and appropriateness of the developed PFG.

Results: The South African Food-Based Dietary Guidelines (SAFBDG) will be tailored and used as the basis of the PFG. In the eight communities, 332 participants were identified as at risk. 65 Participants (72.3% female, 63.1% Black, 38.4% aged between 45 and 65) took part in the intervention. FGDs identified that social, cultural and economic determinants influenced participants' dietary practices and that knowledge and attitudes towards food and nutrition is poor.

Conclusion: The outcome of this study, the PFG, should address the food and nutrition needs of pre-diabetic consumers in the identified LSES communities.

14. Development [tailoring] of the South African Diabetes Prevention Programme (DPP) intervention: validating a healthy lifestyle DPP in at risk communities in Cape Town

Mrs Debbie Jonathan[1], Dr Jillian Hill[1]

[1]South African Medical Research Council

Background: The overall purpose of the SA-DPP is to develop and evaluate a culturally-relevant model of diabetes prevention programme for SA, using evidence from successful diabetes prevention effectiveness and implementation programmes.

Objective: The adaptation of existing DPP intervention components to be contextually and culturally relevant to targeted communities.

Methods: Black and mixed-ancestry participants, ≥ 25 years of age and without known diabetes, from eight low-socioeconomic communities were screened using a brief questionnaire, and anthropometric and blood pressure (BP) measurements to estimate their risk of diabetes by the African Diabetes Risk Score. An oral glucose tolerance test, other biochemical and clinical assessments, and a detailed questionnaire were thereafter administered to participants identified as risk for developing diabetes. Additionally, two rounds of focus groups (FGs) [n = 66] were conducted with said participants [n = 12] to determine diabetes and nutrition knowledge, as well as to explore environmental and personal barriers and enablers to optimal nutrition and physical activity.

Results: Among the 844 adults (53% Black, 80,5% woman, mean age = 47.3) screened in eight [four Black and four Coloured] communities, 322 were identified as at risk for developing diabetes. FGs revealed limited nutrition and related knowledge, familial, environmental and economic barriers to living a healthy lifestyle. Participants however showed a strong willingness to change.

Conclusions: Preliminary results indicate that adapting a healthy lifestyle intervention that addresses the barriers to optimal nutrition and physical activity identified, might be successful in these communities.

15. Dietary intakes of a group of young adults in the North West province: The African-PREDICT study

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Introduction: Ethnicity and socioeconomic status (SES) contribute to individuals' dietary intake, which, in turn, plays an important role in the development of non-communicable diseases (NCDs). South Africa is currently in the middle of a

health transition which has a negative effect on dietary intake. Comparisons between the different ethnic and socioeconomic groups will give a better understanding of the dietary intake differences of these groups.

Methods: The African-PREDICT study is a prospective observational study and includes 18 to 30 year old participants. Each participant completed three 24-hour dietary recall interviews. The questionnaires were coded and household measures were converted to grams. The analyses of dietary data was done by using the food composition tables for SA. Non-parametric tests were used to compare the differences in dietary intakes between the groups as the data was not normally distributed.

Results: Clear differences were seen between the dietary intake of the black and the white population across all SES classes. Even though the white population consumed a larger variety of foods both the black and the white populations did not meet the nutrient recommendation for 18 of the 20 micronutrients. These results were reflected in the food groups consumed by the different groups.

Conclusion: The white population in this study had more consumers of the different food groups but still did not reach the recommended intake of micronutrients. Recommendations for consuming a variety of foods should be accompanied by the number of portions that should be consumed to ensure reaching recommended intakes.

16. Brewers' spent grain: A neglected nutritious food and biodegradable food packaging material for Africa

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Introduction: Despite many people in African still suffering from macro- and micronutrient malnutrition, many African countries have thriving brewing industries. These industries generate vast quantities of brewers' spent grain (BSG), a waste material generally disposed as landfill. However, BSG is rich in protein, dietary fibre and minerals. This study is investigating using BSG in staple foods and in packaging material applications.

Methods: Barley BSG was obtained from a brewery and sorghum BSG was produced from conventional and biofortified high protein digestibility sorghum lines. The production of wheat-BSG composite breads was investigated using various pre-treatments including sourdough fermentation. The production of bioplastic food packaging materials using sorghum BSG is being investigated, including protein bioplastic films and protein- and fibre-rich rigid packaging.

Results: On dry basis, barley BSG contained dietary fibre (51.4%), protein (26.3%), iron (23.4%), zinc (9.1%) and sorghum BSG contained about 21.4% protein, which was richer in lysine 3.3 g/100 g protein than the original sorghum grain. BSG-wheat composite bread dietary fibre contained 71.4% more than wheat brown bread. Iron in BSG-wheat composite bread was 91.2% higher than brown wheat bread. Zinc was 12.9% higher in BSG-wheat composite bread than brown wheat bread.

Conclusions: BSG-wheat composite bread has increased nutritional properties than brown wheat bread.

17. Evaluation of the impact of Child Support Grant on Household Food Security in Vhembe District of Limpopo Province, South Africa

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Introduction: The Child Support Grant (CSG) is one of the government's key interventions for improving the living standards of children living in poverty and it enhances women's power in controlling over household decision making in financial matters, general household spending and in relation to child wellbeing. The aim of the study was to determine the impact of child support grant on household food insecurity.

Methods: A quantitative cross-sectional study was conducted amongst 60 snowball sampled households of Tshirenzheni village. Descriptive statistics was used to determine the HFIAS occurrence in relation to three the domains of food security and also, household food insecurity status and the relationship between CSG and household food insecurity status. Pearson correlation was used to describe the impact of between socio-economic status and household food insecurity status and the relationship between CSG and household food insecurity status.

Results: The findings revealed that CSG has a positive impact in the household food security, with 70% of households being food secure. However, its effectiveness depends on the various appropriate uses of it. Factors such as low-educational level, unemployed and single parenting were identified as leading causes to household's food insecurity.

Conclusion: The current study concludes that child support grant has a positive impact on household food security if used for its intended purposes.

18. Prevalence of overweight and obesity among children aged three to five years in Vhembe district, Limpopo province

Ms Tirhani Asnath Masia, *Ms Fhulufhelo Tshivhase, Ms Gabisile Dakalo Nekhalale, Mr Delisa Andries Kubheka, Mr Tjale Cloupas Mahopo, Ms Tshifhiwa Cynthia Mandiwana*

University of Venda

Introduction: The prevalence of overweight and obesity has escalated at an alarming rate and is not only limited to the adult South African population but it is emerging in young children worldwide. The study aims to determine the prevalence of overweight and obesity among children aged three to five years Vhembe district.

Methods: The study used cross-sectional quantitative method. Simple random sampling was used to select 180 children (51.7% girls and 48.3% boys) from eight purposively selected early childhood development centres. Questionnaire was used to collect data and analysed using descriptive statistics. Weight and height were interpreted using World Health Organisation Z-score classifications.

Results: Ninety percent mothers of children were aged 20-40 years. Mothers with post-secondary education were 48.3%. Breakfast was eaten by 88.3% of the children before they go to the centres. All children consumed one fruit per day as they were given at the centres. The results show that 64.2% of children had normal weight-for-age, 55.8% had normal weight-for-height and 65% had normal body mass index-for-age z-scores. Overweight was identified among 11.7% and 10% of the children with regard to weight-for-height and body mass index-for-age z-scores, respectively. Only 0.8% of the children were found to be obese as far as weight-for-height and body mass index-for-age z-scores are concern.

Conclusion: The study revealed very low prevalence of overweight and obesity among children. However, intervention has to be taken to ensure healthy growth and development of children.

19. Investigation of the dietary intake of women 5 years post GDM-Pregnancy to determine the risk for developing type-2 diabetes in South Africa

Mr Risuna Mathye

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Topic: Investigation of the dietary intake of women 5 years post GDM-Pregnancy to determine the risk for developing type-2 diabetes in South Africa.

Background: Gestational Diabetes Mellitus (GDM) and Type 2 Diabetes Mellitus (T2DM) have become seemed to be important and problems that have been affecting most people world-wide. Gestational diabetes mellitus has been defined as glucose intolerance or diabetes which is found in during pregnancy. The prevalence of gestational mellitus has been reported to be on the rise and has been significantly related to two current epidemics of type 2 diabetes mellitus and obesity childbearing.

Aim: This research is aimed at investigating the dietary intake, weight status and body image perceptions and associations with the development of type 2 diabetes in women 5 years post-GDM pregnancy from Cape Town.

Research design: A cross-sectional study. Dietary intake will be assessed as well as the factors that could influence the dietary intake of women 5 years post GDM-Pregnancy to determine the risk of developing type 2 diabetes in South Africa.

Setting: South Africa

Sampling: Women 5 years post GDM-Pregnancy recruited at Groote Schuur Hospital and Chrishani Baragwana hospital will be recruited. Non-random sampling (N = 270). Informed consent will be obtained from the mothers.

Method: The methodology will investigate the various interacting groups of factors which determine the dietary intake of women 5 years post GDM-Pregnancy. The design of the study, study setting, the population of the study, data collection and data analysis are also described.

20. Perceptions of Early Childhood Development (ECD) Practitioners about a Nutrition Training Programme in Nelson Mandela Bay health district

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Introduction: During 2015, dietitians from the Nelson Mandela Bay Health District (NMBHD) were involved in the development of a 3-day nutrition training programme for Early Childhood Development (ECD) practitioners based on the National ECD nutrition guidelines. This training provided teachers with basic nutrition and child health knowledge and included: breastfeeding, complementary feeding, paediatric food based guidelines, healthy lunch boxes, hygiene, starting a vegetable garden, menu planning, growth monitoring, plotting and interpreting growth charts and identifying malnutrition.

Aim: The aim of this qualitative study was to describe perceptions from ECD practitioners about the nutrition training programme.

Method: Feedback was obtained from 16 participants from 11 ECD centres using a semi-structured open-ended questionnaire. Results were thematically analysed which resulted in three themes. Important nutrition topics for ECD practitioners in the course, including breastfeeding and knowledge about the Road-to Health booklet; the need to get more information about the management of sick children and assistance with menu planning and recipes were expressed; and the value from communication with other ECD practitioners and to disseminate the nutrition knowledge into the communities.

Conclusion: Recommendations included ensuring that training remains a three day workshop to allow for sufficient time for practitioners to adopt the new information. Standardisation of training slides and handouts was suggested. Lastly, participants suggested a follow up visit within two weeks after training by a dietitian for further mentoring and support.

21. Effects of processing on nutrients and antinutrients in African leafy vegetables (ALVs)

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Introduction: African leafy vegetables (ALVs) have been part of food systems in many African countries. Despite their promising nutritive value these vegetables are seasonal. Nevertheless, traditional processing such as blanching and drying can be used to ensure availability when out of season. ALVs contain antinutrients which hinder mineral absorption. Therefore, the aim of the study was to evaluate the effect of processing on nutrient and antinutrient contents.

Methods: Gynandropsisgynandra (spider plant), Amaranthusthunbergi (pigweed), Corchorusspp (wild jute), Vignaunguiculata (cowpea leaves) and Brasica Carinata (African kale) were purchased from local farmers in Botswana. The

vegetables were processed either by being freshly cooked, blanched-dried or fermented–dried. The vegetables were then analysed for mineral and antinutrient content.

Results: There was no consistent pattern on mineral retention by processing methods, the retention of minerals depended on the type of vegetable. Iron contents of cooked, blanched and fermented ALVs ranged from 133.6 to 617.2 mg/kg, 181.3 to 389.5 mg/kg and 164.2 to 528 mg/kg respectively. Fermentation retained about 56 to 164% of iron. Total polyphenols were reduced during blanching while fermentation increased polyphenols. Both, fermentation and blanching reduced the content of tannins and oxalates in ALVs.

Conclusion: Our results show that fermentation and blanching of ALVs have a minimal effect on the loss of nutrients. In contrast, processing reduced antinutrients, which may improve mineral absorption. Thus, these processing methods may be used in food strategies to alleviate malnutrition.

22. Desirable diabetes nutrition education programme for type 2 diabetes adults at a tertiary hospital: insights from stakeholders

Dr Jane Muchiri, *Ms Gerda Gericke, Prof Paul Rheeder*

University of Pretoria

Background: Patient education is vital in diabetes care. The education should be relevant and offered in a structured manner.

Aim: To describe the desirable characteristics of a diabetes nutrition education programme (NEP) as perceived by stakeholders at a tertiary healthcare setting, in order to inform the adaptation of a NEP from a primary healthcare setting.

Method: This qualitative study was implemented at an outpatient diabetes clinic of a teaching tertiary hospital of the University of Pretoria (UP). Convenience samples of 28 type 2 diabetes adults (40-70 years) [mean age 59 ± 9 years; 11 females] and 10 health professionals (HPs) [3 doctors, 5 dietitians, 2 nurses] serving them participated. Five focus group discussions generated data from the patients. Self-administered open-ended questionnaire obtained data from HPs. Thematic framework data analysis was conducted. [Ethical approval: FHS, Research Ethics Committee, UP (no. 4/2016)].

Results: Six common themes emerged. The themes include preferred programme content, meetings suggestions, delivery format, delivery approach to enhance learning (e.g. food tasting sessions), support for behaviour change and educator characteristics. Keeping participants' motivated (e.g. success stories testimonials) was an additional theme from patients. Some issues in the common themes differed e.g. only HPs suggested portion control and meal regularity topics.

Conclusions: Key stakeholders provided comprehensive insight on desirable diabetes NEP. Most of aspects identified were similar to those in the original NEP; confirming programme relevance and appropriateness. In adapting the NEP, the differing aspects (e.g. monthly instead of weekly meetings) have been incorporated to enhance its fit to the new setting.

23. Determinants of nutritional anthropometry for under-five children living with tenant mothers on smallholder tobacco farms in northern Malawi

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Introduction: Understanding of the nutritional anthropometry determinants could contribute to the attainment of the Sustainable Development Goal 2.2 of eradicating all forms of malnutrition by 2030.

Aim: To assess the nutritional anthropometry and identify its determinants for under-five children on smallholder tobacco farms in Mzimba North district, Malawi.

Methods: A cross-sectional descriptive correlational study was conducted with 110 households (139 under-five children) obtained through proportional systematic random sampling. Structured questionnaires obtained data on socio-demographics and food access (i.e. Household Food Insecurity Access Scale, Household Hunger Scale, Months of Adequate Household Food Provisioning and Individual Dietary Diversity Scale) by interviewing the children's mothers. Anthropometric measurements were collected from the mothers and their under-five children. WHO Anthro was used to compute Z-scores for children's anthropometric status. BMI assessed mothers' anthropometric status (WHO cut-offs). Random-effects GLS and Instrument Variable (IV) regression analyses were done. [ETHICS APPROVAL: NAS Ethics Committee (Number EC151215-028)].

Results: The under-five children, for weight-for-height, 23% (N = 131) were malnourished (12% severely wasted, 8% wasted, 2% overweight, 1% obese). For height-for-age, 31.3% (N = 131) were stunted (11.5% severely stunted, 19.8% stunted). For the weight-for-age, 34% (N = 133) were underweight (12% severely underweight and 22% underweight). Significant determinants influencing the under-five children's nutritional anthropometric indicators were assets, income, mother's age and BMI, child's gender and age, the experience of food insecurity access and annual food access.

Conclusion: Undernutrition was a problem for the under-five children. Interventions addressing the identified determinants are required to improve the children's nutritional anthropometry.

24. Dietary self-management problems: Perceptions of type 2 diabetes adults at a South African tertiary hospital clinic

Dr Jane Muchiri, *Ms Gerda Gericke, Prof Paul Rheeder*

University of Pretoria

Background: Identifying issues surrounding dietary and related self-care is critical to planning effective diabetes self-management education interventions.

Aim: To explore and describe the challenges with dietary and other self-care areas of adults with type 2 diabetes (T2DM). The ultimate goal was to inform the adaptation of a nutrition education intervention (NEI) from a primary to a tertiary healthcare setting.

Methods: A qualitative study (interpretive phenomenological design) was conducted with a convenience, purposive sample of 28 T2DM adults [40 to 70 years; 11 females; mostly on insulin (82%) and unemployed (71%)] attending the diabetes outpatient clinic of Steve Biko Academic Hospital. Five focus groups discussions guided by a semi-structured questionnaire obtained data. Thematic framework analysis was conducted. [Ethical approval: FHS, Research Ethics Committee, University of Pretoria (no. 4/2016)].

Findings: Five major problems/themes emerged. These include i) knowledge deficits, ii) poor adherence to treatment recommendations (e.g. portion size control, missing injections, irregular/no exercise), iii) barriers to effective self-management (e.g. hunger and food cravings, unaffordable foods, forgetting medication, laziness/ lack of motivation for exercise, co-morbidities), iv) strategies for coping with challenges (e.g. overeating for fear of hypoglycaemia), and v) challenges affecting quality of life (e.g. stress, frustration with daily medication, complications related pains/discomforts).

Conclusion: Challenges with dietary and other diabetes self-care areas are rife in this patient population and differ in some ways from those of patients in primary care. The problems are in the personal and socio-economic domains. In adapting the NEI, feasible strategies to address these problems need to be incorporated.

25. Mapping food access indicators and associating factors for Smallholder tobacco tenants in Mzimba North District, northern Malawi

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Introduction: Lack of empirical evidence can impede initiatives to improve tobacco tenants' food access situation.

Aim: To assess food access and determine its associating factors for smallholder tobacco tenants in Mzimba North district (northern Malawi).

Methods: This was a cross-sectional descriptive correlational study conducted with 110 households obtained through proportional systematic random sampling. Interviews with the women during the hunger season collected demographic, socio-economic and food access data. Household Food Insecurity Access Scale (HFIAS), Household Hunger Scale (HHS), Months of Adequate Household Food Provisioning (MAHFP) and FAO's Individual Dietary Diversity Scale (IDDS) questionnaires measured food access. Data analysis comprised descriptive and multivariable statistics. [ETHICS APPROVAL: NAS Ethics Committee (Number EC151215-028)].

Results: Households, for the i) the HFIAS (mean score = 12.89 ± 7.89), 75%, 11% and 7% were severely, moderately and mildly food insecure respectively, ii) HHS (mean score = 1.98 ± 1.80), 19% and 36% were severely and moderately hungry respectively, iii) MAHFP (mean scor e= 8.45 ± 2.42), 44% had inadequate access to food for one- to-three months, while 41% had inadequate access to food for ≥ four months (previous 12 months), and iv) IDDS (mean score=2.5±0.8 for women, 2.5 ± 0.9 for children), majority consumed ≤ three food groups (91% women and children). Significant associating factors influencing the food access indicators were women's age, marital status, household size, loan access, income, labour, food security and nutrition training and food security and nutrition decisions made in the households.

Conclusion: All four measurement tools depicted poor food access. Significant factors were identified that can be addressed through appropriate interventions.

26. Dietary diversity and household food access among rural small holder farming households in Central Uganda

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Introduction: Ending hunger and achieving diet quality remain global targets as not everyone has access to healthy diets that eliminate hunger, are safe, reduce and protect against malnutrition, promote health, and are produced sustainably. This study assessed dietary diversity, food availability and access among rural smallholder farming households exploring avenues to improve dietary diversity.

Method: Cross sectional survey of rural smallholder farming households (n = 182) in Kiboga district, central Uganda assessed food group consumption and food insecurity access.

Results: Over seven-days, households consumed starchy staples (88-97%), legumes (100%) and animal products (30-60%). For 74-89% of households consuming roots, tubers, bananas; vitamin A-rich fruits and vegetables; legumes and other fruits, the source was their farms. Meat, fish, other vegetables, and other food items were sourced from markets by 79–95%. Households sourcing grains and dairy from their harvest and market appeared balanced (50%). Households had 7.6 ±0 .2 months of adequate food access regardless of food source. Typologies generated, 1st with 32% of households, mild food insecurity, lowest household food consumption score and dietary diversity. The 2nd with 17% of households, most food insecurity access and moderate dietary diversity. While the 3rd typology with 50% of households was relatively food secure.

Conclusion: Households had low consumption of micronutrient rich foods and food insecurity access. Markets played a significant role in achieving dietary quality. Efforts to improve dietary diversity and food security need not look at improving and diversifying production alone but also explore improvement and effective use of incomes and markets.

27. Development of gluten-free doughs using sorghum kafirin and cassava starch

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Introduction: Some 1 in 150 people suffer from celiac disease or have some form of intolerance to wheat products. However, wheat gluten plays an essential role in the textural characteristics and nutritional quality of staple foods like bread and pasta.

Sorghum prolamin protein (kafirin), which does not elicit an adverse response in celiacs, may play a similar role after being suitably modified and formed into gluten-free doughs with non-wheat starches. Since sorghum and cassava are grown widely in Africa, the development of kafirin-cassava starch doughs could be a local alternative for gluten-free products.

Objective: To develop sorghum-based gluten-free doughs and breads.

Methods: Isolated kafirin will be subject to a newly developed coacervation type process whereby it exhibits gluten-like visco-elasticity and mixed above its glass transition temperature with cassava starch and kneaded to form a dough. The dough tensile properties will be determined by dough rheometry and microstructurally in comparison to wheat doughs and experimental zein (maize prolamin)-starch doughs.

Expected results: The doughs will have adequate visco-elastic and gas-holding properties with a fibrillar gluten-like microstructure. The doughs may be slightly stiffer than wheat doughs but more elastic than zein-based doughs.

Conclusions: The scientific concepts applied to produce wheat bread flour and zein-starch doughs can be adapted for the development of gluten-free bread dough using sorghum kafirin prolamin protein and non-wheat starch. Keywords: Kafirin, Cassava, Gluten-free.

28. Awareness and perceptions of University of Venda students on sugar tax policy

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University of Venda

Introduction: The consumption of foods high in sugar particularly the sugar sweetened beverages have become a conspicuous feature of the diet of many individuals all over the world despite overweight and obesity amongst other diseases of lifestyle still being a significant cause of mortality and morbidity. Hence, the role of health policies is crucial for addressing these challenges and achieving health equity.

Methodology: The study was exploratory and explanatory. Qualitative approach was used. Twenty third year students from the School of Health Sciences were purposively selected. Random selection was done to get five students from each of the four departments offering undergraduate programmes in the school. Unstructured interview schedule was used for data collection. Data was analysed using thematic analysis, the interviews were transcribed verbatim and organised into themes and subthemes.

Results: Participants were largely females, aged between 20 and 25 years mainly staying on campus. Awareness sub-themes included policy comprehension, its importance and stakeholder role. Perception sub-themes were on stakeholder role, policy effectiveness and factors leading to sugary foods consumption. Participants presented awareness of sugar tax policy but had negative perception about it. To them this policy would be non-effective as price would not influence purchasing decision. Participants' gestures during interviews also confirmed their negative perceptions.

Conclusion: Students were aware of sugar tax policy but had negative perceptions. Campus campaigns aimed at changing mind sets could be planned. Key words: tax policy, perceptions, awareness, overweight, obesity.

29. Nutritional status of secondary school learners in the Eastern Cape, South Africa

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Introduction: Malnutrition is a major problem among secondary school learners in low and middle-income countries.

Objective: To determine nutritional status and their predictors in secondary school learners.

Methods: Body mass index (BMI) calculated for 1357 learners from 18 randomly selected secondary schools using International Obesity Task Force age-and-sex-specific BMI cut-off points for defining excessive weight and obesity.

Results: The prevalence of underweight, overweight, and obesity was 13.0%, 15.0% and 8.0%, respectively. Females learners had higher prevalence of overweight (21.3%) and obesity (11.6%) than male learners (5.3% overweight, 2.3% obesity); while males had a higher prevalence of underweight than females (21.3% versus 8.1%). Urban learners had a higher prevalence (11.5%) of obesity than rural learners (6.7%); p=0.007. Prevalence of overweight and obesity increased with age (12.8% -17.0%, 6.1% -9.6%; $p < 0.001$). In the binary logistic regression, after adjusting for confounders, school location (OR = 2.0, CI; 1.3-3.1), gender (OR=7.0, CI; 3.5-14.0) and grade level (OR = 2.4, CI; 1.4-4.1) independently and significantly predict obesity among the learners. However, only age (OR = 2.0, CI; 1.3-3.2), grade (OR = 1.8, CI; 1.1-2.8) and gender (OR = 3.4, CI; 2.4.4.8) were independent and significant predictors of underweight. Female learners and learners in grades 10 to 12 are 6.6 times more likely to be overweight or obese compared to male learners. Urban learners were approximately 2 times more likely to be overweight or obese.

Conclusion: The prevalence of underweight, overweight and obesity is high among adolescents in this setting; which could have implications for their health. School-based interventions may assist in curbing this double burden of nutrition.

30. Malnutrition in the elderly and associations with socio-demographic factors & indicators of nutritional status

Dr Jennifer Osei, *Mrs Rose Kokui Turkson, Miss Mariette Nel, Prof Corinna May Walsh*

University of the Free State

Introduction: The objective of this study was to establish the nutritional status of elderly residents in Lesotho and to determine how it is associated with socio demographic factors.

Methods: In a cross-sectional survey, a total of 300 elderly participants were recruited from 16 semi-urban communities in Maseru district. Socio-demographic data was collected using a questionnaire. Nutritional status was determined using the mini nutritional assessment (MNA) questionnaire. Scores of

< 17, 17-23.5, ≥24, were interpreted as undernutrition, at risk of malnutrition and well-nourished respectively.

Results: More than half (66.0%) of participants were at risk of malnutrition, while 19.4% were malnourished. A significantly higher percentage that were well-nourished used electricity for cooking (39.6%) compared to participants (23%) that were malnourished and at risk of malnutrition combined [95% CI -30.2%; -3.5%]. A significantly higher percentage of well-nourished respondents used flush toilets compared to those that were malnourished and at risk of malnutrition [95% CI -30.8%; -7.7%]. Perceived poor health status and nutritional problems were significantly (positively) associated with malnutrition [95% CI 19.3%; 36.0%] and [95% CI 22.2%; 37.8%] respectively. A significantly higher percentage (9.5%) of respondents that were malnourished had dementia/depression compared to those that were well-nourished (0%) [95% CI 2.6%; 13.9%].

Conclusion: A large percentage of this elderly sample were at risk of malnutrition or malnourished. These findings further confirm the role of socio economic status and perceived health, on nutritional status, and the need for routine screening thereof in the elderly to ensure timely diagnoses and management of malnutrition.

31. Amino acid and protein content of lean beef

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The importance of protein quality was emphasized by both FAO/WHO 'Protein and Amino Acid Requirements in Human Nutrition' reports. These reports questioned the validity of current measures to determine crude protein content and protein absorption and called for more research on AA.

The objective was to determine the crude protein and amino acid (AA) profile of selected cuts from four ages of South African beef.

The study sample included three cuts (raw and cooked) from 36 beef carcasses. Moisture, fat (ether extraction), nitrogen (Kjeldahl method) and ash were determined at Nutrilab, University of Pretoria. Protein was calculated using the Jones conversion factor of 6.25. The AA profile was determined by the ARC Analytical Laboratory using HPLC with fluorescence detection. Sum of all AA was compared to calculated protein to evaluate using nitrogen and a specific Jones factor to define protein quantity in beef. Statistical analyses was done using ANOVA and Fishers protected t-test Least Significant Difference (LSD) was applied.

The sum of amino acids was lower for all age groups and cuts compared to calculated protein. A statistically significant difference was found between protein as sum of amino acids and calculated protein (Nx6.25) for cooked beef cuts. This could be due to other components, such as elastin and collagen that contain non-protein nitrogen.

Calculating protein content of beef by using the Jones factor creates the risk of over calculating. When analysing protein for scientific purposes the most accurate methodology would be to calculate protein as the sum of amino acids.

32. Mycotoxin occurrence in red meat

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Introduction: The carry-over of mycotoxin contamination through animal source foods, (meat products, milk and eggs) can have a high impact on human and animal health, causing deleterious effects. Meat products can be contaminated with mycotoxins via two methods. Firstly, if the animal is fed mycotoxin contaminated feed and secondly during preparation and packaging. The objective is to determine the occurrence of mycotoxin contamination of meat from rural areas in South Africa.

Methods: Triplicate samples of beef and pork meat were obtained from local abattoirs in the Vhembe District, Limpopo. The same beef cuts were also obtained from the Transkei, Eastern Cape. Meat samples were deboned, weighed and divided to create 24 pairs. One half of the samples were frozen and the other half was cooked to an internal temperature of 70°C. All samples were analysed for total aflatoxin, ochratoxin A, deoxynivalenol and zearalenone using ELISA.

Results and discussion: Contradictory to the evidence of mycotoxin contaminated feed found in the rural areas and milk found at retailers, no detectable traces of mycotoxins were found in any of the meat cuts.

Conclusion and recommendations: No detectable traces of mycotoxins could be found in meat samples from rural areas in South Africa. This does not rule out the possibility that meat could be contaminated at a later stage in the food chain by inappropriate handling and storage. Research suggests that mycotoxin contamination is a possible cause of stunting in children. More research on mycotoxin contamination of South African commonly consumed foodstuff is recommended.

33. Sodium proficiency testing in processed pork products in South Africa

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The South African Department of Health published salt reduction regulations in 2013 to reduce the levels of sodium / salt found in processed foods. Wide variations were seen in sodium content among different brands of the same processed pork products (as indicated on the labels). This might be due to analytical variation related to method differences used by the various manufacturers and laboratories. If the methods used by these laboratories are not validated and accurate, the wrong message regarding the sodium content in processed products is portrayed by the industry to the Department of Health.

This project aimed to provide proficiency testing on processed pork meat products for laboratories to measure accuracy.

Two samples, a certified reference material (BB501b) and a sample of Vienna sausages were send to each participating laboratory for moisture, sodium and salt analyses.

Laboratories that participated in the inter-laboratory study, included commercial and government laboratories. The methods used by laboratories were classified according to sample digestion and quantification method.

The reported moisture levels in the CRM for all laboratories were lower than the certified range, and therefore the reported sodium levels tended to be high, although still within the certified range. When evaluating results for the viennas, two laboratories reported results deviating from the mean with more than one standard deviation ($-1 \leq z\text{- score} \geq 1$). From the supplementary information provided by the laboratories regarding methods used, microwave digestion resulted in more accurate analyses. Quantification method in this study had no effect on accuracy.

34. Availability, accessibility and suitability of food composition databases to assess infants' food intake in Africa: A case study of Kenya, Nigeria and South Africa

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Introduction: The global focus on actions to improve the first 1000 days highlights knowledge of infants' food and nutrient intake as a fundamental determinant of programmatic action, and necessary input to inform communication to mothers. Many African countries already suffer from lack of dietary intake data: Kenya, Nigeria and South Africa have no national dietary intake data for infants < 1 year.

Objective: The objective of this exercise was to assess the availability, accessibility and suitability of food composition data to assess infant's food intake in Kenya, Nigeria and South Africa.

Methodology: Each country contact drafted a locally relevant 24-hour recall for an urban breastfed 9-month-old infant and attempted to assess the nutrient intake. The intake data purposefully included at least one popular commercial product and one traditional foodstuff commonly used for infant feeding.

Main findings: The exercise proved to be frustrating and delayed due to lack of food composition data.

Key challenges faced included: lack of up-to-date food composition databases (Kenya, Nigeria), lack of update of infant foods in the database (South Africa), and no (Kenya, Nigeria) / only paid-for software (South Africa) to assess dietary intake.

Conclusions: Over and above the significant progress being made in infant food marketing regulations, nutrient intake data on foods commonly consumed by infants is vital if we are to accelerate research and action to improve infant nutrition and health in Africa. We need to raise the profile and urgency of food composition compilation and dissemination, and encourage the food industry to share product information.

35. Should we be promoting the potato for complementary feeding in South Africa?

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Introduction: Current complementary feeding practices in South Africa are poor, with early introduction of foods, limited dietary diversity and popular use of commercial infant cereal and maize meal porridge. Potatoes form part of the typical household basket in South Africa making up 7% to 8% of the staple foods in the basket being consumed by all the different income groups.

Aim: The aim of this study was to assess the nutritional, sensory and economic value of potatoes to other popular complementary foods in South Africa.

Methods: This study compared the nutritional value of potatoes to other commonly used complementary foods: soft maize meal porridge, commercial infant cereal, carrots and butternut, and potato with selected additions (peanut butter, hard margarine). For comparison purposes a 100g portion of these 6 foods was assessed against the nutritional requirements of a 6-8 month old for energy, protein, vitamin A, iron and zinc. The nutrient density of each food was also assessed, along with the cost.

Results: Nutrient density assessments reveal that potatoes are a valuable source of nutrients. The cost of potatoes is lower when compared to other cereals and vegetables. Furthermore, the potato offers convenience in terms of portion size, texture and a flavour base for other foods.

Conclusion: The availability and affordability factors associated with potatoes in conjunction with its nutrient density and textural appeal make potatoes a food that could be recommended for weaning alongside vitamin A rich vegetables.

36. Consumer demand response to rising staple food prices in South Africa

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Maize meal, followed by bread, rice and potatoes dominate the staple food complex in South Africa (SA). The severe 2015/2016 drought in SA caused dramatic food price hikes. The study explores the staple food demand dynamics and underlying relationships in SA focusing on the effects of the 2015/2016 drought and the potential price recovery process and nutritional implications.

National intake of main staples is estimated on a per capita food guide unit (FGU) basis and staple food unit costs are explores over time with associated demand changes.

Average per capita FGU estimations for 2006-2016 show that maize is the dominant staple (39%) followed by bread (30%), rice (21%) and potatoes (10%). Following ten-year retail price increases of 170% for maize meal and 111% for rice, maize meal was 42% more expensive than rice in 2016, projected to recover

towards 2018 to being 15% less expensive than rice. Lower prices as a result of drought recovery might still leave very little room for expenditure on other food groups that would allow for dietary diversity as illustrated with selected balanced food basket analyses. We also illustrate the expenditure gap between ideal and actual staple food expenditure levels across the socio-economic spectrum.

Selected staples (maize meal and bread flour) are fortified as a medium term solution to malnutrition and should price dynamics shifts consumption away from these products towards unfortified rice (like in the case of the drought), nutrient intake levels of individuals most at risk could be affected negatively.

37. Food accessibility of a community of informal settlement households in pretoria west, south africa

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Background: Worldwide, one in nine people still go to bed hungry making food insecurity a global issue affecting many communities' health and nutrition. According to the South African Constitution, all citizens have the right to food. South African informal settlements often have limited access to adequate, safe food. Food accessibility is one of three components under food security, and is indicated by household dietary diversity and the individuals experiencing hunger within the household. Food security has been researched in South African urban and rural settlements, however, little is known about the food security in informal settlement communities.

Aim: To determine the household food accessibility of the informal settlement community using the Household Food Insecurity Access Scale (HFIAS).

Methods: A descriptive study was conducted in an informal settlement in Pretoria West. Eighty households were randomly sampled. The HFIAS was administered by the researchers with the assistance of trained translators from the community. This data was used to categorize households into different levels of food security based on the HFIAS. Data was analysed using descriptive statistics.

Results: Of the total households studied, 15.0% were food secure, 4.0% had mildly food insecure access, 35.0% had moderately food insecure access, and 46.0% had severely food insecure access.

Conclusion: Majority of the households were found to have severe food insecure access. More research is needed to investigate the food security status of household in informal settlements in South Africa in order to inform interventions aimed at improving food security status of such communities.

38. Breakfast consumption and the relationship to socio-demographic and lifestyle factors of undergraduate students in the school of Health Sciences at the University of KwaZulu-Natal

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Introduction: Breakfast intake is linked various health benefits. Skipping breakfast is linked to fatigue, decreased concentration and increased obesity risk and is common among university students worldwide. Due to paucity of data among South African health science students further research is required to investigate breakfast consumption in this population.

Objectives: To investigate breakfast consumption and the socio-demographic and lifestyle profile of undergraduate students in the School of Health Sciences, at the University of KwaZulu-Natal (UKZN).

Methods: A cross-sectional, descriptive study was conducted using a self-administered questionnaire. Weight and height measurements were taken using standardised procedures and mean values were used to calculate BMI.

Results: Of 353 participants, most were between 19 to 20 years old, were female, lived at university residence and were in their first year of study. Most reported their health status to be good, did not smoke or consume alcohol and were physically active. Breakfast was consumed by 82.1% however only 50.5% consumed it daily. Breakfast consumption was associated with improved alertness and less fatigue. Reasons for consumption were to satisfy hunger, for energy, keep alert and prevent fatigue. Breakfast was skipped due to time constraints and lack of appetite. Breakfast skipping was associated with being in third year of study, smoking and fast food consumption. Familial support was associated with daily breakfast consumption.

Conclusion: Breakfast was consumed by the majority but only half consumed it regularly. Barriers to consumption exist in the university environment and intervention is required to promote regular breakfast consumption among university students.

39. The effect of maternal HIV status and duration of treatment on body composition of HIV-exposed and HIV-unexposed preterm, very and extremely low-birth weight infants

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Introduction: There is an evidence gap regarding the relationship between HIV exposure, body composition (and the quality thereof) and preterm infants.

Aim: This study determined the body composition of HIV-exposed, preterm very low-birth weight (VLBW) and extremely low-birth weight (ELBW) infants and to assess the effect of maternal HAART duration on the body composition of this vulnerable population.

Methods: A descriptive cross-sectional study was conducted. HIV-exposed and -unexposed preterm infants (< 37 weeks)

with a birth weight of ≤ 1200 g were included. Maternal medical background was recorded. Infant body composition measurements were recorded weekly during the 28-day follow-up period.

Results: Thirty preterm infants (27%) were HIV-exposed. HIV-exposed infants had significantly (p=0.01) lower gestational ages than HIV-unexposed infants (25–28 weeks). HIV-exposed infants had significantly lower measurements on day 21 and day 28 for triceps skinfold (TSF) (2.5 mm vs 2.7 mm, p = 0.02 and 2.6 mm vs 2.9 mm, p < 0.01), subscapular skinfold (SSSF) (2.3 mm vs 2.6 mm, p=0.02 and 2.4 mm vs 2.7 mm, p=<0.01) and fat mass percentage (FM%) (0.9% vs 1.4%, p =0.02 and 1.0% vs 1.5%, p = 0.03). HIV-exposed infants whose mothers received HAART for ≥ 20 weeks were heavier and had a higher FM% and lower fat-free mass percentage (FFM%) at birth than HIV-exposed preterm infants whose mothers received highly active antiretroviral therapy for ≥ 4 – < 20 weeks.

Conclusion: Mothers receiving HAART could have an increased risk of preterm delivery, and the duration of maternal HAART affects postnatal body composition of their infants. Body composition differs between HIV-exposed and HIV-unexposed preterm infants.

40. Folic acid content of maize meal (dry and cooked) consumed in the Vhembe region, Limpopo Province

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Introduction: Maize porridge is a staple food in the Vhembe region. Mandatory maize meal fortification, including folic acid, was implemented in South Africa in 2003.

Objective: To determine, by chemical analysis, folic acid content of fortified maize meal and porridges consumed in the Vhembe region.

Methods: As part of a study on environmental health, three bags of two brands super (A; B) and one brand special (C) maize meal were purchased from outlets in Thohoyandou during November 2017. 500 g samples were drawn from each brand's composite. Using brand C, five fieldworkers each cooked three pots stiff and fermented porridge. Composite samples (500 g) were taken from each fieldworker and porridge type. Folic acid content was analysed in duplicate by the in-house method of the South African Grains Laboratory and dry sample values compared to fortification standards.

Results: Dry sample folic acid met 103%, 86% and 57% of the fortification standards for brands A, B and C respectively. Mean (sd) maize meal: water ratios were 0.42:1 (0.11) and 0.26:1 (0.03), cooking times 24(9) and 21(4) minutes and end temperatures 88C (2C) and 86C (1C) for stiff and fermented porridges. Mean folic acid contents (as is) for stiff and fermented maize porridge were 51.7 (11.6) and 40.8 (2.5) µg/100g.

Conclusion: Dry maize meal folic acid levels were below the standards for two brands while that of fermented porridge was lower than stiff porridge possibly due to a lower pH. The porridge cooking method must be considered when determining folic acid intakes.

41. Frailty Among the elderly in Maseru

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Introduction: Frailty is a complex condition characterized by physical and cognitive deficits that predispose the elderly to increased vulnerability and decreased quality of life.

Aim: The aim of the study was to access the prevalence of frailty among the elderly in Maseru, Lesotho.

Method: This cross-sectional study included 300 free living elderly participants aged 65 years and above, randomly selected from 16 communities in urban Maseru. The frailty scale developed by Rockwood et al. in 2005 was used to determine the prevalence of frailty. Socio- demographic information was also collected. Questionnaires were administered through face to face interviews by trained field staff. Impairment in mobility, function and self -rated health was assessed and participants were categorised as very fit, fit but bladder incontinent, pre–frail and frail.

Results: The majority (71%) of participants were female. Median age was 73.6 years with the oldest being 95 years. Most (65.9%) had only primary education and 44.6% were receiving pension or state grants. About one in ten participants were classified as frail (11.7%) and as pre- frail (9.7%), while 52.4% were fit but bladder incontinent and 26.2% were fit.

Conclusion: The high prevalence of frailty in this population is of concern since it impacts on ability to function independently. Culturally acceptable nutrition and physical activity interventions that can assist the elderly in maintaining a healthy lifestyle to maintain independence need to me implemented in this population.

42. Nutritional status and the use of the Child Support Grant among children, 6 to 23 months, in the Dihlabeng Local Area, Thabo Mofutsanyana District, Free State

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University of the Free State

Introduction: The South African Child Support Grant (CSG) aims to combat food insecurity and malnutrition amongst young children. This study was the first to describe the nutritional status and the use of the CSG amongst infants in the Dihlabeng Local area, Thabo Mofutsanyana District, Free State.

Methods: A descriptive observational was conducted in 2016 on 242 conveniently sampled infants (6-23 months) from three primary health clinics in the Dihlabeng Local Area. WHO growth

indicators were measured and socio-demographics, household food security (CHIPP Index), WHO indicators for child feeding practices, and spending patterns of the CSG, were collected via questionnaires administered during structured interviews with the primary caregivers.

Results: Participants were 100% black, all receiving the CSG; 33.1% were stunted, 3.3% wasted and 6.3% overweight. Primary caregivers were mostly mothers (92%); 53.6% had only primary school education, and only 20% were employed, mostly doing piece jobs. The participant's CSG was the only income in 15.7% of households. Only 23.6% of households were food secure. Notably amongst WHO indicators, only 7.9% of participants had adequate dietary diversity scores and 4.5% had minimum acceptable diets. Overall, 94.6% of caregivers reported spending the CSG entirely on the participant; 96.7% felt it was not enough and asked for a median of R612.10 per month. The CSG was reportedly spent on toiletries, clothes, medicine, and, only fourthly, on food.

Conclusion: In this rural area, infants living in very poor socio-demographical circumstances, despite all receiving the CSG, had high prevalence of food insecurity and malnutrition, particularly stunting.

43. Process for updating the South African Food Composition Database – Experience from Meat group update

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South African Medical Research Council - SAFOODS

Introduction: The meat, milk and eggs food group was updated in 1998, following Department of Health funding of new data analysis for these groups. The study aimed to report on new meat data from targeted publications reviewed.

Methods: Literature sourced from targeted data generators in South Africa. Data quality score sheets were completed for 3 publications (articles[1]beef, [2]mutton and lamb and [3]offal) on meat group. Beef, mutton and lamb, and offal food items, for raw and cooked products, were captured.

Results: Data quality score sheets applied to literature, reviews 8 facets over 24 points: food description, number of primary samples, sampling plan, sample handling, analytical method, number of analytical samples, moisture vales reported, and analytical quality control, used by SAFOODS compilers. A 50% outcome warrants uptake into database.

Articles 1-3 scored: 58%, 54% and 79%, respectively. Data captured for 44 (raw and cooked) beef items across different ages, cuts and processed category; lamb and mutton data for 10 foods; Offal items amounted to 32 additions to the food group. Missing data for moisture recorded 70.5% from 44 raw beef cuts; specifically cuts trimmed of visible fat, subcutaneous fat and untrimmed across the ages A, AB, B and C (n = 12). Article 2 reported 40% missing data for moisture in cooked leg trimmed and untrimmed of lamb and mutton types. No missing data reported for Article 3.

Conclusion: Maintaining a food composition database requires routine updating of food items to be current and comprehensive. Data accuracy and currency is imperative for dietary intake studies.

44. Updating Milk and Milk products data - from COA to FCDB. The South African Food Composition Database process

Mrs Joelaine Meryll Chetty, *Dr Averalda Eldorine van Graan, Mrs Malory Rowena Jumat*

South African Medical Research Council - SAFOODS

Introduction: Food composition data play an essential role in all dietary intake studies. Data quality checks within the South African Food Data System (SAFOODS) results in high standard of nutrient values maintained. Chemically analysed values are rated as gold standard for food composition databases. Changing legislation enforces routine updates within a food database. The study identifies the process methodology incurred for inclusion into SAFOODS reporting on milk update of database.

Methods: Two commercial retailers freely shared nutrient information via certificate of analyses for milk and milk products data, following a targeted call for updated information within the food group identified.

Results: Total of 79 laboratory reports (CoAs) received from two retailers. Nutrient data captured for range of product types: cheese, milk, cream, ice-cream, custard, buttermilk and maas. Twenty components provided on CoA from laboratory.

Total of 1580 data points captured for 79 new food items to group. SAFOODS reference database maintains 175 components for each food item available. New data provided from retailers chemical analysis reports, contributes 11% to reference database. 89% of data points had to be sourced via imputation, matching to similar foods and calculated from similar type of foods for a comprehensive database update for country.

Conclusion: Laboratories provide retailers with a preset labelling profile of analysed nutrients. Additional information can be sourced from the retailer, but advocacy via the South African Food Data Advisory group platform, could suggest a printout report of analysed data which enables SAFOODS to limit the amount of imputation, matching and calculations per food item added.

45. Accuracy of weights of digitally photographed vegetable portions estimated by dietitians

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Introduction: Digital food photography is less labour intensive and time consuming than traditional dietary assessment methods.

Aim: To determine the ability of dietitians to estimate the weights of digitally photographed commonly consumed vegetable portions.

Methods: In a descriptive study, six weighed portions of cooked smooth and coarse pumpkin, cabbage and spinach were photographed on white plates covered with a 1cm grid. One photograph of each vegetable was used as a reference. Remaining photographs were randomised into three sets of 10 and displayed on laptop computers. During the 2014 Nutrition Congress, dietitians estimated portion weights of a set of photographs. Estimated weights (EW) were classified as correct

(EW = actual weight (AW)), accurate (EW within 10% AW), over- or underestimated (EW >/< 10% AW). Frequencies of correct, accurate, over- and under estimations were calculated.

Results: 98 participants viewed 980 photographs. 17% of estimations were correct or accurate and 35% were overestimated. Cabbage (26%) and cubed pumpkin (21%) portions were correctly or accurately estimated more frequently than mashed pumpkin (14%) and spinach (8%). Pumpkin (53%) and spinach (56%) portions were more frequently underestimated than cabbage portions (35%). For all vegetables, coarse consistencies were correctly or accurately estimated more frequently (19%) than smooth consistencies (15%).

Conclusion: Weights of vegetable portions which held their shape, and thus provided visual cues, were more accurately estimated than those which spread on the plate. Ways of improving portion weight estimation from digital photographs, such as the inclusion of fiducial markers, need to be explored.

46. Female adults can estimate portion sizes of 3d printed amorphous foods with bean bags

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University of Pretoria

Background: Bean bags are popular, local portion size estimation aids, yet there is limited evidence regarding their accuracy.

Objectives: To determine female adults' ability to estimate the portion sizes of 3D printed amorphous food models with bean bags. Portion size estimation ability was also analysed by body mass index (BMI), energy density and perceived healthfulness of foods.

Methods: In this cross-sectional study, 72 female staff members (age: 44.5 ± 12.3y; BMI: 22.5 ± 4.6 kg/m2) were conveniently sampled from three Gauteng schools. Using bean bags, participants estimated the volumes of 12 different food models, printed with Makerbot Original 3D printer, and presented in individual booths. Food model and bean bag volumes included ¼, ½, ¾, 1, 1½ and 2 cups. Reliability was determined by repeat assessments of three food models. BMI was categorised. Six of the models represented higher energy dense foods (> 840k J/cup), seven models reflected amorphous masses and five amorphous pieces. Healthfulness of foods was rated on a 5-point attitudinal scale. Data were described. Estimation accuracy was rated as perfect or acceptable, as well as gross under- or overestimation.

Results: Of a total 864 portion size estimations, 28.6% were perfectly, and 73.4% acceptably estimated. Overestimation predominated, regardless of BMI category, energy density, or perceived healthfulness. Amorphous masses were more accurately estimated than pieces.

Conclusion: Using beans bags, female adults can estimate portion sizes of 3D printed, amorphous foods with acceptable accuracy, with a tendency to slight overestimations. Linkage to BMI, energy density or perceived healthfulness of foods was inconclusive.

47. Race/ethnicity differences in resting energy expenditure in South African men and women

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Background/Aim: Overweight/obesity is a public health problem in South Africa; disproportionately so among the black population. For African Americans a contributory role of a lower resting energy expenditure (REE) has been suggested. This study aimed to compare the measured REE of black and white South African adult males and females.

Subjects/Methods: In 328 (63% female; 39% black) healthy South African adults REE was measured with indirect calorimetry (Quark) and body composition with multi-frequency bioelectrical impedance analysis (Quadscan). Body mass index (BMI), fat free mass index (FFMI) and fat mass index (FMI) were respectively calculated as body mass (kg), fat free mass (kg) and fat mass (kg) divided by height (m) squared. Percentage body fat was calculated as fat mass as percentage of body mass. Obesity class was dichotomised, with obese defined as BMI ≥ 30 kg/m2. Black-white differences in REE, as measured and adjusted (ANCOVA), were determined with fixed effects regression.

Results: Measured REE (adjusted for age along with BMI, FFMI, fat mass, FMI or % body fat) of white subjects was significantly higher ($P < 0.001$ for all) than of black subjects for men and women alike and regardless of obesity class.

Conclusion: The REE of black South African adults is lower than of their white counterparts.

48. Body composition, vitamin D and bone health among black preadolescent children (Pretoria, South Africa)

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Introduction: Bone development should be optimized during growth to reduce the risk for osteoporosis later in life. Body composition and Vitamin D play important roles in bone health. This study aimed to describe and examine possible relationships between body composition, vitamin D and bone health among a group of black preadolescent South African children.

Methods: A cross-sectional study, using conveniently sampled black preadolescent children (n = 84) was conducted. Body weight and height was measured with the Seca mBCA514 and Seca274 stadiometer, respectively. Body composition, bone mineral density (BMD) and bone mineral content (BMC) were assessed using Dual X-ray Absorptiometry. Levels of 25(OH)D (n = 59) were assessed using dried blood spots.

Results: Over-nourished children (40%) had significantly greater crude BMD compared to healthy children ($p < 0.05$). One third (34%) of the children had sufficient Vitamin D. Body composition and bone health parameters were not significantly different

across vitamin D groups (p>0.05), except for lumbar spine bone mineral apparent density (p < 0.01). A trend towards a two-fold increase in risk for hypovitaminosis D in obese compared to normal and overweight children (adjusted OR = 2.0 95% CI:0.12; 33.67, p = 0.63) were observed. No relationship was found between bone parameters and vitamin D (p > 0.05). Lean mass explained 81% of the variation in total body less head BMC.

Conclusions: Vitamin D does not appear to be associated with measures of bone health. Lean mass was the greatest body compositional determinant for variations observed in bone health measures. Bone health measures of normal and over-nourished children did not differ after adjusting for body composition.

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SAAFoST SESSION

Nutrition Congress Abstracts - SAAFoST Session

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Abstracts

1. Sugar and sweeteners in food reformulation

David Kruger

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Consumers are taking their health ever more seriously and are looking to reduce a variety of product ingredients and additives for various reasons, such as: clean-labels, reduced kilojoules, health reasons, etc. National and International Health authorities have taken a closer interest in citizen health citing the impact of obesity and related issues as major concerns to be addressed.

In responding to the growing consumer demand for low and no sugar alternatives, food producers formulating or reformulating products must be fully aware, not only of the important role that sugar has to play in any given formulation but also of the wide range of sweetener options and properties available and necessary in order to achieve optimally acceptable results.

2. Sodium reduction regulations – Do we really need them and are they working?

Nigel Sunley

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The sodium reduction regulations gazetted by the Department of Health in 2013 have now reached the stage where the so-called Phase 1 reductions of sodium content in a variety of foods are in place and many of the requirements for the Phase 2 reductions due to be introduced in 2019 have already been met by a number of manufacturers. The process has raised challenges in a number of areas from both a technical and consumer acceptance perspective and it is believed that some of the Phase 2 reductions are going to be very difficult to implement without serious negative effects on product palatability. This paper will summarise the level of compliance that has been achieved and outline the challenges that still exist prior to the introduction of Phase 2. It is also time to consider how the actual effect of the regulations on public health can best be evaluated and the availability of resources in this area is clearly a concern. Furthermore, it is appropriate to consider some of the published literature supporting adequate sodium intake which raises legitimate questions as to whether the campaign against salt, which at times has become almost witch-hunt-like in its nature, is entirely justified, as a considerable body of credible evidence exists that at least warrants a more objective review of the issue.

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