Abstracts

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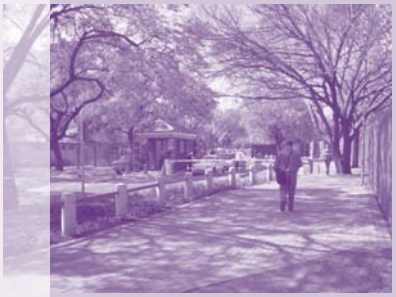

28 September – 2 October 2008

Pretoria

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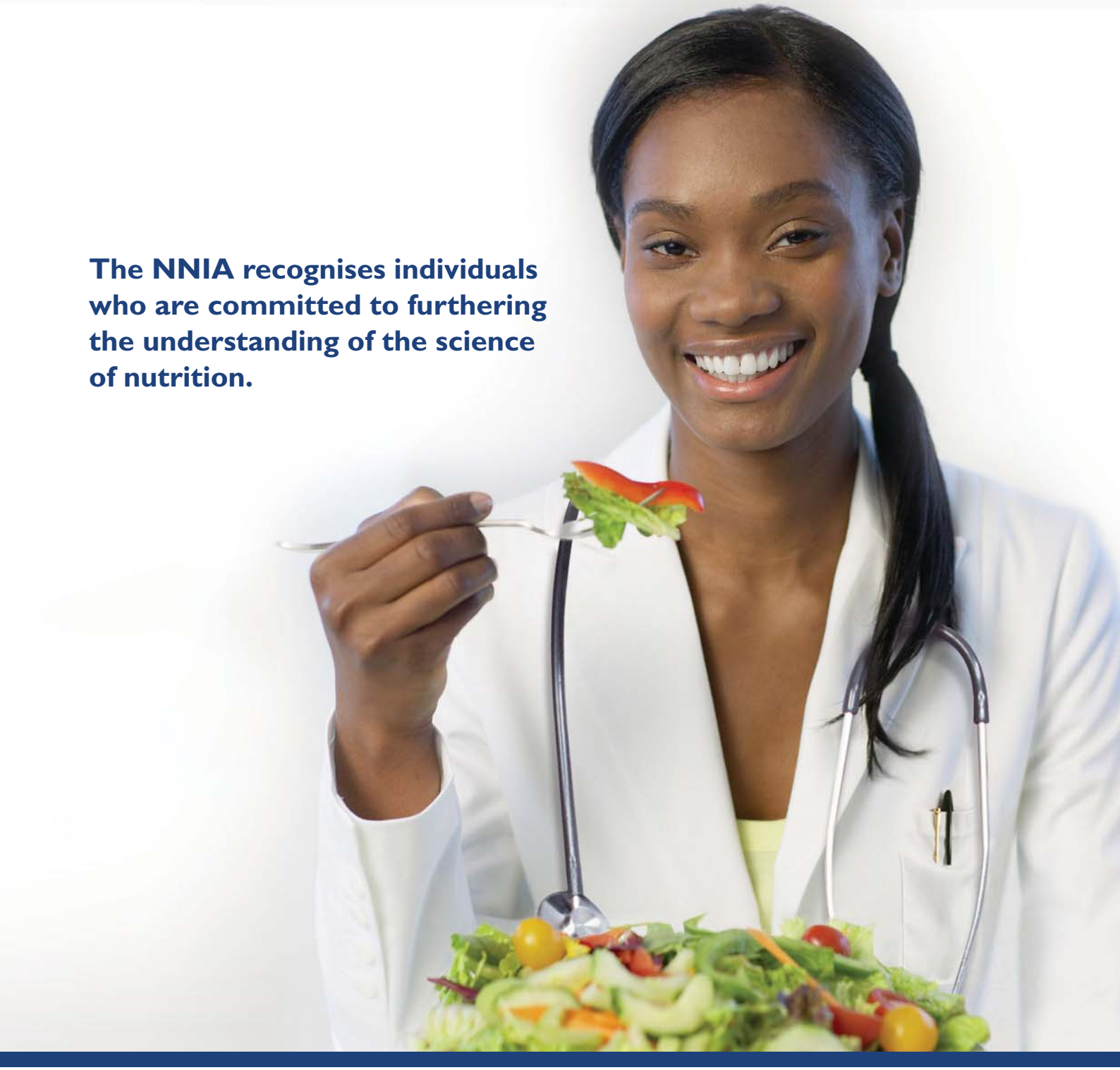
The NNIA invites nominations for its annual 2008 Scientific Awards.



The NNIA recognises individuals who are committed to furthering the understanding of the science of nutrition.

Nominations will be considered for medical doctors, dieticians, registered nurses and nutrition scientists, in all Pan-African countries, that have made significant academic, service or research contributions in nutrition.

Nominees will be considered in the following categories:

- Best scientific publication
- Major contribution to paediatric nutrition
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SUBMITTED ABSTRACTS FOR THE

28 September – 2 October 2008

Pretoria

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Oral Presentation Abstracts - Programme

SUNDAY 28 SEPTEMBER 2008

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11. Recommendations for the development of a primary school diabetes prevention programme based on profiles of eating behaviour, physical activity and associated factors of grade four learners in disadvantaged schools in the Western Cape. *Senekal M, Bacon J, Palian N, Booley S, Lambert EV*
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15. Nutritional assessment of an elderly population in Sharpeville, South Africa. *Samuel FO, Oldewage-Theron WH*
16. Nutrition knowledge and dietary intake of an elderly community in Sharpeville. *Egal AA, Oldewage-Theron WH*
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22. Impact of a Micronutrient and Health Programme on the prevalence anaemia in Malawian rural preschool children. *Kalimbira AA, Randall Simpson J, MacDonald C*
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25. Beta-carotene rich vegetable gardens, nutrition education and growth monitoring to address vitamin A deficiency in Lusikisiki. *Laurie S, Faber M, Mulandana S*
26. Factors that contribute to compliance with the consumption of iron and folate supplements by pregnant women. *Cherane MJ, Mbhenyane XG*
27. Iron status in women of childbearing age: dietary, biochemical, lifestyle and genetic determinants. *Kunneke E, Wolmarans P, Laubscher R, Mansveldt EPG, Vorster HH*
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33. Healthkick school-based diabetes prevention programme formative research: results of the "100 Schools Survey". *Lambert EV, De Villers A, Draper C, Sauls L, Hill J, Ndamane Z, Matizifora L, Fourie J, Parker W, Barkhuizen G, Pretorius J, Steyn NP and the HealthKick School-based Diabetes Prevention Programme Writing Group*
34. Designing a primary school-based healthy lifestyle intervention (Healthkick) by means of intervention mapping. *De Villiers A, Murphy K, Sauls L, Hill J, Steyn NP, Abrahams Z, Draper C, Lambert EV*
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50. Implementation of hazard analysis and critical control point (HACCP) system in a food service unit (FSU) serving low bacterial diets to immuno-compromised hematopoietic stem cell transplant (HSCT) patients. *Vermeulen EE, Hanekom SM, Oldewage-Theron W*

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53. The utilization of traditional leafy vegetables and possible implications for nutrition in rural households in South Africa. *Vorster HJ, Stevens JB, Steyn GJ*

54. Nutrient intakes and food security of a rural population living in the Eastern Cape Province.
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55. Dietary diversity in relation to other household food security indicators. *Faber M, Schwabe C, Drimie S*
56. Qualitative research exploring the influence of household composition and intra-household dynamics on nutrition security among farm workers, North West Province, South Africa. *Heumann N, Lemke S, Leonhaeuser I-U, Kruger A*
57. We spend the farm wage immediately when we get it – gender-specific livelihoods in the context of nutrition security among farm workers, North West Province, South Africa. *Lemke S, Heumann N, Sithole S, Matenge S*

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- Challenges for the diabetic profession. *Winkler MF*

58. Service excellence in the dietetic profession. *Kassier S*
59. The personality typing of dieticians and dietetic students in the Western Cape. *Van der Merwe L, Le Roux D, Marais C, Conradie J, Hendricks M, Marais D*
60. ICD10 - summary of the diagnosis that paying patients have when consulting a dietician. *Scharf O*
61. Computer-based learning for the enhancement of breastfeeding training for South African undergraduate dietetic students.
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WEDNESDAY 1 OCTOBER 2008

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- GAIN's fortification programme in Africa. *Umunna L*
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69. Anthropometric status of children 12-108 months and women 16-35y old in South Africa: the national food consumption survey – fortification baseline. *Kruger HS, Swart R, Labadarios D, Dannhauser A, Nel JH, Steyn NP*
70. Folate, iron, vitamin A and zinc status of children 12-108 months and women 16-35y old in South Africa: the national food consumption survey – fortification baseline.
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71. Knowledge, attitude and behaviour (KAB) on food fortification of women of child bearing age (national food consumption survey — fortification baseline).
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72. Practices regarding the use of fortified foods and the field detection of Vitamin A in maize.
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73. The Iodine content of household salt and drinking water, and the Iodine status of South African women and children in 2005. *Jooste PL, Labadarios D, Nel H, Strydom E*
74. A measure of hunger of children (1-9 years) and women of child bearing age (National Food Consumption Survey — fortification baseline). *Gericke GJ, Labadarios D*
75. Micronutrient status and C-reactive protein levels in overweight and obese 3 to 9 year old children from Gauteng and Mpumalanga. *Symington EA, Gericke GJ, Labadarios D*

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- Guideline daily amounts and diabetes mellitus. *Bussell G*

76. Effect of glycaemic control on fibrin network characteristics of Africans with uncontrolled type 2 diabetes. *Covic N, Pieters M, Jerling JC, Van Zyl DG, Rheeder P, Weisel JW*
77. Dietary intake, diet-related knowledge and metabolic control of children with type 1 diabetes mellitus aged 6-10 years attending the paediatric diabetic clinics at Grey's Hospital, Pietermaritzburg and Inkosi Albert Luthuli Central Hospital (IALCH), Durban, Kwazulu-Natal.
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Chancellors Building: Vd Bilj Hall
10:30-12:30: SAAFoST: Food science and technology perspectives

- Green revolution to gene revolution: foods from modern biotechnology. *Chassey B*
- An appetising palette or a nutritional empty adornment. *Martin V*
- Flavours: feed the fear or find the facts. *Wiltshire N*
- An industry response to the global epidemic of non-communicable diseases. *De Witt C*

Oral Presentation Abstracts: Presenters

1. Ethical decision-making in clinical practice

De Villiers F

Department of Paediatrics, University of Limpopo, Medunsa campus
E-mail: johnchild@ul.ac.za

There is a strong focus on the need for practitioners to practice ethically today. Practitioners in the past were not unethical or unaware of their obligations to practice ethically. Indeed, some would argue that people were acting with more moral rectitude in the past. For many today, there is moral laxity in many sections of society. Maybe that is why the professions should be at the forefront of applied ethics. Certainly, it is true that if the professions do not regulate themselves, and this includes looking into their moral and ethical obligations, it will be done for them, possibly with disastrous effects.

It is instructive to learn from the concept of Respect for Persons, which Immanuel Kant espoused in the late 1700s. Kant stated that persons deserve respect in and of themselves, simply because they have reason and they can use this reason to distinguish right from wrong, and to act morally. This faculty means that persons should never be used as a means to an end. Because of their ability to act morally, they should be respected.

In terms of professional ethics, four principles are generally held to be helpful guides to help us to act ethically from day-to-day. These are the by now well known principles of beneficence, non-maleficence, patient autonomy and justice.

Beneficence refers to the duty of the clinical practitioner to do the best for her patient. We frequently hear practitioners talk about "doing my best for the patient" or "it is in the best interests of the patient".

Non- maleficence is as it were the other side of the coin of beneficence; it refers to the duty of the practitioner not to do any harm. The expression "Primum non nocere" means "at first to do no harm" and is a reflection of this duty. For example, this requires the practitioner to withhold harmful therapies or medications.

Patient autonomy requires the practitioner to realise that the patient has the right to be involved in decision-making on his/her behalf. This is the opposite of therapeutic paternalism. Until recently practitioners thought that they knew better than their patients; patients were frequently informed what the treatment plan is without being involved in the decision-making process. The need to obtain full informed consent for major therapeutic decisions, especially those for which the evidence of benefit is marginal, as well as consent of operations is examples of patient autonomy.

Justice means equity or distributive justice; every patient should have an equal opportunity to obtain appropriate therapy. In a country with limited resources, with a wide disparity of income between the lower income and the upper income groups, with a vast pre-dominance of the population having to use public hospitals, and with a rural population without access to health services, this principle is frequently problematic.

While this discussion does not bring anything original to the fore, it is hoped that it will set the tone for the actions of nutritional professionals for the future.

2. Ethical and professional rules

Rasekhala A

Private Consultant
E-mail: arasekhala@hotmail.com

The Health Professions Council of South Africa has, in consultation with the professional boards and with the approval of the Minister of Health, under section 49 read with section 61(2) and 61A (2) of the Health Professions Act, 1974 (Act No. 56 of 1974).

Practice as a health care professional is based on a relationship of mutual trust between patients and health care practitioners. The term "profession" means "a dedication, promise or commitment publicly made". To be a good health care practitioner requires a life-long commitment to sound professional and ethical practices and an overriding dedication to the interests of one's fellow human beings and society.

In the course of their professional work health care practitioners are required to subscribe to certain rules of conduct. To this end the Health Professional Council of South Africa has formulated a set of rules regarding professional conduct against which complaints of professional misconduct will be evaluated.

3. Micronutrient interactions: from molecular biology to public health

Zimmermann MB

Laboratory for Human Nutrition,
Swiss Federal Institute of Technology (ETH) Zürich, Switzerland
E-mail: michael.zimmermann@ilw.agrl.ethz.ch

The risk of multiple, coexisting micronutrient deficiencies is high in developing countries, due to monotonous diets based on staple foods of low nutrient density. Interactions of micronutrient deficiencies at the molecular level can have significant effects on public health.

Vitamin A and iodine: Vitamin A (VA) deficiency (VAD) has multiple effects on the pituitary-thyroid axis; VA status modulates thyroid gland metabolism, peripheral metabolism of thyroid hormone, and production of thyrotropin (TSH) by the pituitary. A recent study in South Africa has reported that VA supplements are effective in treating VAD in areas of mild ID and have an additional benefit – through suppression of the pituitary TSHβ gene, VAS can decrease excess TSH stimulation of the thyroid and thereby reduce the risk of goiter and its sequelae.

Iron and iodine: A high prevalence of iron deficiency among children in areas of endemic goiter may reduce the effectiveness of iodised salt programmes. These findings are likely mediated through an impairment of the thyroid peroxidase enzyme at the apical membrane of the thyrocyte. They argue strongly for improving iron status in areas of overlapping deficiency, not only to combat anaemia but also to increase the efficacy of iodine prophylaxis.

Iron and lead: Chronic lead poisoning and iron deficiency are concentrated in urban children from lower socioeconomic strata, and both impair neurocognitive development. Both lead and iron are absorbed via the DMT1 transporter in the duodenum, and iron deficiency upregulates transporter activity and increases intestinal lead absorption. A recent study in urban, lead-exposed, iron-deficient Indian children suggests providing iron in a fortified food to lead-exposed children may reduce chronic lead intoxication. Iron fortification may be an effective and sustainable strategy to accompany environmental lead abatement.

Vitamin A and iron: VAD impairs iron metabolism, and vitamin A supplementation of vitamin A-deficient populations may reduce anaemia. In vitro and in animal models, VA treatment increases the production of erythropoietin (EPO), a stimulant of erythropoiesis. A recent trial in schoolchildren has reported that, in children deficient in VA and iron, VA supplementation mobilises iron from existing stores to support increased erythropoiesis, an effect likely mediated by stimulation of EPO production by kidney cells and increases in circulating EPO.

4. Iodine deficiency during pregnancy and childhood

Zimmermann MB

Laboratory for Human Nutrition,
Swiss Federal Institute of Technology (ETH) Zürich, Switzerland
E-mail: michael.zimmermann@ilw.agrl.ethz.ch

Iodine is required for the production of thyroid hormones, which are essential for normal brain development, and the fetus, newborn, and young child are particularly vulnerable to iodine deficiency. The iodine requirement increases during pregnancy and recommended intakes are in the range of 220–250 µg/day. Monitoring iodine status during pregnancy is a challenge. New recommendations from World Health Organization suggest that a median urinary iodine concentration 150–250 µg/L indicates adequate iodine intake in pregnancy. A recent Swiss study has suggested that thyroid-stimulating hormone concentration in the newborn is a sensitive indicator of mild iodine deficiency in late pregnancy. Recently, a new collection method and a reference range for urinary iodine concentration for newborns in the first week after birth has become available. The potential adverse effects of mild iodine deficiency during pregnancy are uncertain. Controlled trials of iodine supplementation in mildly iodine-deficient pregnant women suggest beneficial effects on maternal and newborn serum thyroglobulin and thyroid volume, but no effects on maternal and newborn total or free thyroid hormone concentrations. There are no long-term data on the effect of iodine supplementation on birth outcomes or infant development. New data from well-controlled studies indicate that iodine repletion in moderately iodine-deficient school-age children has clear benefits: it improves cognitive and motor function; it also increases concentrations of insulin-like growth factor 1 and insulin-like growth factor–binding protein 3, and improves somatic growth.

5. Vitamin D status in South African children

Poopedi MA, Norris SA, Pettifor JM

University of the Witwatersrand. Johannesburg, Birth To Twenty Research Programme
MRC Mineral Metabolism Research Unit, Chris Hani Baragwanath Hospital, Birth to Twenty Research Programme, University of the Witwatersrand, Johannesburg, South Africa.
E-mail: machuene.poopedi@wits.ac.za

Vitamin D is important for the maintenance of mineral homeostasis and normal skeletal architecture. In South Africa few foods contain vitamin D naturally and only a small number are fortified with vitamin D. Therefore, we depend on dermal synthesis of vitamin D from sun exposure for the maintenance of optimal levels. The aim of the study was to determine gender and ethnic differences in vitamin D status in 10-year old children living in Johannesburg-Soweto.

Data were collected on 475 children (159 black girls, 64 white girls, 181 black boys, and 71 white boys), who formed part of the Birth-to-Twenty longitudinal cohort. The evaluation of subjects included DXA-derived bone mass, anthropometric measurements, dietary intake, lifestyle factors, 25(OH) D status and biochemical markers of bone turnover.

White children had higher 25(OH) D than black children ($p = 0.0001$). There were significant ethnic and seasonal variations in 25(OH) D, in particular, during autumn ($p = 0.01$) and summer ($p < 0.0001$) months with white children having increased 25(OH)D. In conclusion, there are gender and ethnic differences in vitamin D status in children, but hypovitaminosis D is uncommon with 7% of children having 25(OH)D levels of less than 20 ng/ml.

6. Comparison of the efficacy of NaFeEDTA, ferrous fumarate and electrolytic iron as fortificants in South African brown bread

Van Stuijvenberg ME, Smuts CM, Lombard CJ, Dhansay MA

Nutritional Intervention Research Unit, Medical Research Council
E-mail: lize.van.stuijvenberg@mrc.ac.za

The choice of iron fortificant usually represents a balance between bioavailability of the compound and its tendency to cause organoleptic problems. The aim of this study was to evaluate the efficacy of NaFeEDTA and ferrous fumarate at levels compatible with South African brown bread (10mg/kg flour for NaFeEDTA and 20mg/kg flour for ferrous fumarate), in a randomised controlled trial; electrolytic iron was evaluated at the level (35mg/kg flour) currently used in South Africa. Schoolchildren (n=361), aged 6–11 y, from a low socio-economic community, with Hb ≤125 g/L were randomly assigned to one of four groups, each receiving 4 slices of brown bread, supplying either (i) no fortification iron, (ii) 2.35 mg iron as NaFeEDTA, (iii) 4.70 mg iron as ferrous fumarate, and (iv) 8.30 mg iron as electrolytic iron, per intervention day. These amounts simulated a bread intake of 6 slices per day over the 34-wk study period, at fortification levels of 0, 10, 20, and 35 mg/kg flour, respectively. Haemoglobin and iron status was assessed at baseline and after 34 wk of intervention. There were no significant intervention effects for haemoglobin, serum ferritin, serum iron, transferring saturation or serum transferring receptor in any of the three iron groups. Our results suggest that electrolytic iron at the level currently used in South Africa is not effective in improving iron or haemoglobin status. Neither does NaFeEDTA or ferrous fumarate appear to be suitable alternatives for the fortification of wheat flour, when included at levels that do not cause colour changes.

7. Status of micronutrient nutrition in Zimbabwe

Gadaga TH, Madzima R, Panagides D, Nembaware N

National University of Lesotho
E-mail: th.gadaga@nul.ls

More than 65% of the Zimbabwean population live in the rural areas and are food insecure especially due to droughts. The population therefore experiences fluctuating levels of malnutrition including vitamin and mineral malnutrition. This paper reviewed the micronutrient malnutrition status of the Zimbabwean population, focusing on the period from 1980 to 2006, using data from nutrition surveys, the demographic health surveys, sentinel surveillance and monitoring programmes. Data collated from the numerous surveys shows that a significant proportion of children under 5 years of age, school children, pregnant and lactating women experience malnutrition. In 1999, 35.8% of children 12–71 months of age were vitamin A deficient. Vitamin A capsule distribution during Child Health Days has been an effective strategy to reach many of the affected children. In 2005 about 82% of the targeted children received vitamin A capsules during Child Health Days. More than 95% of households in the country have access to iodised salt. The median urinary iodine in 2005 was about 200µg/L. In 1999, 31% women of child bearing age were found to be anaemic. However, in 2005 only about 43% of pregnant women were receiving iron supplements. There is need, therefore, to increase efforts to reduce micronutrient deficiencies in the country. Staple food fortification is recommended as a long term strategy to achieve this.

8. Dietary practices of patients living with chronic disease: better or worse than their healthier counterparts?

Dreyer M, Noach A

Discovery Health Medical Scheme
E-mail: marieked@discovery.co.za

Introduction: Chronic diseases of lifestyle, particularly hyperlipidaemia, diabetes and hypertension, result in prolonged illness and disability, and decreased quality of life.[1] Many of these conditions are preventable through lifestyle interventions that include healthy eating and regular physical activity.[1] To increase awareness regarding a healthy diet, Discovery Vitality launched a nutrition assessment in 2006. The purpose of the assessment was to identify members at risk for the development of chronic disease and to educate members about healthier dietary practices.

Objective: To compare self-reported dietary practices of members with chronic diseases, specifically hypertension, hyperlipidaemia and diabetes, to those without. In addition, claims patterns within and between groups are compared.

Methodology: Data was collected from 2596 assessments completed 2006 and 2007. Self-reported medical history, key dietary scores known to be associated with chronic diseases of lifestyle, and claims data were analysed.

Results: 10% (n = 257) of the sample reported a diagnosis of a chronic disease. An analysis of the data reveals that members with chronic conditions report superior dietary habits with respect to the intake of fat, saturated fat, sugar, cholesterol, monounsaturated fat, legumes and fruit. Claims patterns between, and within, the two groups will be presented.

Conclusions: It often takes a life-changing event, such as the diagnosis of a chronic disease to implement lifestyle change. These results indicate that members with a chronic condition are perhaps more educated regarding healthy nutrition and are implementing healthy dietary practices. Emphasis therefore needs to be placed on primary prevention strategies to prevent the some 59% of global deaths related to chronic lifestyle associated diseases (WHO).

Reference

1. US Department of Health and Human Services: Centre for Disease Control. *Physical Activity and Good Nutrition: Essential Elements to Prevent Chronic Diseases and Obesity.* February 2008.

9. The prospective urban and rural epidemiology study in South Africa (PURE-SA study)

Kruger A, Wentzel-Viljoen E, Schutte AE, Potgieter JC, Roux AA, De Ridder JH, Watson MJ, Olckers A

North-West University
E-mail: annamarie.kruger@nwu.ac.za

Background: The Prospective Urban and Rural Epidemiological (PURE) study will track changing lifestyles, risk factors and chronic disease over a period of twelve years in urban and rural areas of twenty countries in transitions. The International PURE study is coordinated by Dr S Yusuf, Population Health Research Institute, Hamilton, Canada. The South African leg of the PURE study is coordinated by Dr A Kruger, AUTHeR, NWU.

Hypotheses: Lifestyle (activity and nutrition) and psychosocial transitions secondary to urbanisation and industrialisation lead to behaviours that lead to obesity, the development of elevated BP, glucose levels and lipid levels, with a consequent increase in CVD.

The PURE study consists of two phases:

Phase 1: paired urban and rural cohorts in each country to determine the extent to which the degree of urbanisation is associated with the health transition.

Phase 2: annual follow-up of all subjects in Phase 1 for 12 years to evaluate whether changes in urbanisation will modify key lifestyle and risk factors associated with the health transition. (Measurements will be done every 3 years.)

Purpose of this paper is to give an overview of the methodology followed and samples collected in the baseline done on 3000 urban household and 1003 urban subjects and 3000 rural households and 997 rural subjects, as well as results from the annual follow-up data. Preliminary mortality and drop out data after 18 months indicated that 13 (1.3%) rural participants were dead and 14 (1.4%) withdrew from the study, and 18 urban participants were dead (1.8%) and 28 (2.9%) withdrew from the study.

10. Investigation of articles and snippets containing general and weight management related nutrition information published in popular South African magazines over a 12 month period

Senekal M, Herrmann F, Booley S, Storm C, Musakwa O

University of Cape Town
E-mail: marjanne.senekal@uct.ac.za

Aim: To describe and assess the quality of general and weight management nutrition information in articles and snippets published in South African magazines.

Methods: A total of eighty one editions of *Cosmopolitan, You, Men's Health, Bona, Seventeen, True Love* and *Your Family* published over 12 months were included in the study. The priority, purpose, nature, focus, coverage of core principles and cited sources of nutrition information of selected articles/ snippets in magazines were determined for 57 general nutrition and 41 weight management articles (GNA and WMA respectively) and 163 general nutrition and 58 weight management related snippets (GNS and WMS respectively). Quality assessment, namely % correct, % incorrect and % questionable information; core nutrition principles violated and recommendations with a potentially harmful effect was done for a sub-sample of 40 GNA and 90 GNS and 28 WMA and 35 WMS. Quality assessment was executed by an expert panel of seven registered dietitians using an instrument developed for these purposes.

Core results: Coverage of nutrition principles in GNA is poor, with weight management principles being better covered in WMA. Dietitians are rarely mentioned as a source of information used by authors (1 in 4 only). Between 64 and 81% of information in articles and snippets was judged to be factually correct, 14 to 30% questionable and 2 to 6% incorrect. Violation of core nutrition principles and recommendations with potentially harmful effects occurred frequently, especially in articles.

Conclusion: The quality of nutrition and weight management related information published in popular magazines may not be optimal.

11. Recommendations for the development of a primary school diabetes prevention programme based on profiles of eating behaviour, physical activity and associated factors of grade four learners in disadvantaged schools in the Western Cape

Senekal M, Bacon J, Palian N, Booley S, Lambert EV

University of Cape Town
E-mail: marjanne.senekal@uct.ac.za

Aim: To assess the weight status, eating behaviour and physical activity of grade four learners to formulate recommendations for the development of a diabetes prevention programme.

Methods: One hundred and seventeen grade 4 learners from four randomly selected schools in the Cape Metropole were interviewed using a questionnaire and data collection tool in the form of a game developed and standardised for the purposes of this study.

Results: Most children had a normal BMI (80.3%), but 9.8% were at risk of becoming overweight and 9.8 % were overweight. Most children consumed breakfast (95%), lunch (88%), supper (97%) and snacks at school (94%). Depending on the day of the week 50.4–71.1% brought a lunchbox to school, 45.3–83.8% brought money to school, 6–8.6% brought nothing to school and 20.5–33.8% received food from the feeding scheme. General nutrition knowledge was poor. Most indicated that it is important to eat fruit (74.4%) and vegetables (88%) to be healthy, but the mean frequency of fruit intake per week was 4.3 ± 2.4 and 3 ± 2.1 for vegetables. Sugar/sweets/crisps were eaten on a daily basis. Physical activity at school during break times (playing games and non-organised sport) was common (± 70%), but uncommon after school. TV watching/computer activities increased from 18.8% in early afternoon to 60% after supper. Participation in organised sport is very uncommon (< 10%). Total active time was 137 minutes and total sedentary time 203 minutes.

Conclusion: Intervention programmes need to focus on weight management, nutrition knowledge and the actual implementation thereof, foods sold at schools (tuck shops) and increased physical activity.

12. Recommendations for the development of a primary school diabetes prevention programme based on profiles of the parents of grade four learners in disadvantaged schools in the Western Cape

Senekal M, Booley S, Kariem M, Davids F

University of Cape Town
E-mail: sharmilah.booley@uct.ac.za

Aim: Assess parents' weight status, eating behaviour, physical activity and perception of factors influencing the lifestyle of children.

Methods: Fifty parents (8 male; 42 female) of grade 4 learners from schools in the Cape Metropole were interviewed using a questionnaire including a non-quantified food frequency and GPAQ for physical activity assessment.

Results: The age of the parents was 40 ± 9.5; 30% were normal weight, 27.5% overweight and 42.5% obese, while 58% thought their weight was normal. Breakfast was consumed by 68%, lunch by 84% and supper by 96%. Most indicated that it is important to eat fruit (70%) and vegetables (82%) to be healthy, while the mean frequency of fruit intake per week was 9.1 and 9.6 for vegetables. The physical activity level of 56% of parents was high (GPAQ). Parents think the main cause of weight gain is how you eat (82%); that you need to do aerobic/cardio exercise (48%) and/or walk (38%) to be healthy; and that the tuck shop at school (84%) and/or television (advertisements) (74%) influence a child's eating behaviour most. Parents feel that the safety of the environment (80%); having friends (78%); availability of playgrounds (74%); sport at school (74%); and time available (74%) influence physical activity of children most.

Conclusion: The impact of the high level of overweight/obesity, inaccurate body shape perception, poor nutrition knowledge, moderate intake of fruit and vegetables and breakfast habits of parents as well as their insight in factors influencing the lifestyle of children need to be considered in intervention planning.

13. Response to nutrition intervention and alcohol consumption for the prevention of cardiovascular disease in patients with the metabolic syndrome depends on their individual genotype

Van Velden DP, Van der Merwe S, Fourie E, Kidd M, Blackhurst DM, Kotze MJ, Mansvelt EPG

University of Stellenbosch
E-mail: dpvv@sun.ac.za

The metabolic syndrome is a target for dietary prevention of cardiovascular disease. The effect of adding red wine to the diet has not been fully investigated. This study examined whether a Mediterranean-like diet complemented with red wine and mild exercise had an impact on patients with the metabolic syndrome in the short term.

Twelve patients with the metabolic syndrome consumed a Mediterranean-like diet for 4 weeks without and with red wine respectively and performed mild exercise. They were also screened for multiple genetic markers implicated in cardiovascular disease. Weight, body mass index, abdominal circumference and blood pressure were measured, as well as various biochemical, haematological and inflammatory markers.

There was a significant decrease in the body weight ($p = 0.04$) and an increase in ORAC value ($p = 0.035$) after the diet intervention. A significant decrease in systolic blood pressure ($p = 0.045$) was observed. Red wine had no additional benefits. Although diet reduced weight and blood pressure, the lipoprotein and pro-coagulant profile in patients with the metabolic syndrome were not affected in this study. These findings may be explained partly by the diverse genetic profile identified among the study participants, as 50% of cases have mutations involved in lipid metabolism that may influence the response to dietary intervention and alcohol consumption.

14. Health status of the elderly: a case study from Sharpeville, South Africa

Oldewage-Theron WH, Venter CS

Institute of Sustainable Livelihoods, Vaal University of Technology
E-mail: wilna@vut.ac.za

Objective: The objective of this cross-sectional study was a comprehensive nutrition and health assessment to provide a basis for future intervention strategies for an elderly population ($n = 450$) attending a day-care centre.

Methods: Socio-demographic, health and 24-hour recall dietary intake questionnaires were administered and anthropometric and biochemical measurements taken in a random sample ($n = 237$). Data were analysed for descriptive statistics (means, standard deviations, frequencies) and Pearson correlations for relationships between variables.

Results: The majority of respondents had an income of between South African Rand (R) 500 and R1000 per month and most of them reported an occasional lack of funds to meet basic household needs, confirming the presence of food insecurity. Daily dietary intakes (mean±SD) were: 6447 ± 3352 kilojoules (kJ) energy, 64 ± 34 g protein, 56 ± 49 g fat and 180 ± 88 g carbohydrates. The majority (79.5%) of the women were overweight (body mass index [BMI] ≥ 25) or obese (BMI ≥ 30) compared to 44.4% of the men. Mean intakes of micronutrients were low in comparison to reference standards; however, the mean serum nutrient levels were normal. Obesity, hypertension (58.2% of respondents), raised plasma fibrinogen (5.3 ± 2.2 g/l) and low HDL cholesterol (1.0 ± 0.6 mmol/l) levels indicated an increased risk for coronary heart disease.

Conclusions: It can be concluded that low income, household food insecurity and risk factors associated with malnutrition and non-communicable diseases were prevalent in this elderly population. Interventions should be implemented to improve their health.

15. Nutritional assessment of an elderly population in Sharpeville, South Africa

Samuel FO, Oldewage-Theron WH

Institute of Sustainable Livelihoods, Vaal University of Technology, Vanderbijlpark
E-mail: samuelfolake@myway.com

This descriptive study assessed the nutritional status of elderly people in a poor peri-urban area in South Africa. It forms part of a larger project entitled: *Ja Hantle Obe Mafolofolo* adapted from the Florida International University programme entitled: *Eat Better and Move More*. One hundred and seventy participants were randomly selected out of a total of 300 elderly regularly attending a day care centre in Sharpeville. A sociodemographic and health questionnaire was administered, and repeated 24-hour recalls were used to assess dietary intake. Weight and height were taken and body mass index determined.

The mean age of the subjects was 71.7 years. Majority of subjects had an income of R500–1000 per month. The top 5 most frequently consumed items were tea, maize meal porridge, chicken, bread and full cream milk. The mean (±SD) daily nutrient intakes of the subjects were 5041 ± 2115 kJ energy, 50.4 ± 26.4 g protein, 38.9 ± 26.6 g fat and 149.1 ± 67 g carbohydrate. Mean (±SD) BMI were 24.7 ± 6.5 and 31.1 ± 6.4 for males and females respectively. 83.6% of the women were overweight, obese or very obese. 68% of the subjects suffered from hypertension (≥ 160/95 mm Hg). The subjects were not very active as only 14.5% reported heavy exercise/activity levels and 32.3%, 27.4% and 25.8% reported moderate, light or no exercise/activity levels respectively.

These findings confirm nutrition and lifestyle risk factors associated with non-communicable diseases. This will serve as the basis for follow-up nutrition intervention programmes designed for these elderly.

16. Nutrition knowledge and dietary intake of an elderly community in Sharpeville

Egal AA, Oldewage-Theron WH

Institute of Sustainable Livelihoods, Vaal University of Technology
E-mail: abdul@vut.ac.za

Objectives: The main objective of this study was to test nutrition knowledge and dietary intake behaviour of a randomly selected sample (n = 116) of elderly attending a day care centre in Sharpeville.

Methodology: A nutrition knowledge questionnaire, based on the South African food-based dietary guidelines (FBDG), as well as a 24-hour recall and food frequency questionnaire was administered by trained field workers. Nutrition knowledge data were captured and analysed for descriptive statistics on SPSS, version 15.0, and dietary intake data were analysed on FoodFinder®, version 3.

Results: The majority of the respondents [(50.4 (96.6%)] identified the correct answers in 87% of the nutrition knowledge questions, and 50.7% consumed ≤ three portions of vegetables daily. The mean ±SD dietary intakes were: 5854 ± 1499 kilojoules of energy, 60 ± 19 g protein of which 34 ± 16 g animal protein, 31 ± 21 g fat and 210 ± 47 carbohydrates. Calcium, magnesium, selenium, vitamins D and E, as well as biotin intake levels were below the Estimated Average Requirement (EAR) for elderly 51 to 70 years old.

Conclusions and recommendations: Although the general nutrition knowledge of the respondents was good, the dietary intake behaviour was poor. The elderly should be re-educated and encouraged on adherence to the FBDG and healthy food choices to ensure wellbeing and prevention of geriatric nutritional problems. The results of this study were used as a basis for a nutrition education programme.

17. Nutritional value and antioxidant capacity of foods consumed by elderly people of Sharpeville

Gabriel MN, Egal AE, Oldewage-Theron WH

Institute of Sustainable Livelihoods, Vaal University of Technology
E-mail: gabriel@vut.ac.za

Background and aim: The global nutrition transition towards more simplified diets, high in energy but poor in micronutrients and functional properties, is linked with epidemic increase of non-communicable diseases. Several epidemiological studies suggest that frequent consumption of diets rich in phytochemicals and antioxidants is associated with a lowered risk of cancer, heart disease, hypertension and stroke. The main objective of this study was to determine the nutritional value and the total dietary antioxidant capacity (TDAC) of diets consumed by elderly people of Sharpeville in the Vaal region.

Method: Meals consumed by elderly people of Sharpeville were monitored and collected for a two week-period. The menus were evaluated for water, ash, fat, protein, carbohydrates, polyphenols and antioxidant capacity.

Results: Eighteen food items, grouped in seven different menus, were identified. Menus provided about 28% (Range 22%–43%) of the recommended daily energy that fit the acceptable macronutrient distribution range with 10%, 34% and 56% for protein, fat and carbohydrates respectively. TDAC available from the menus was 24.01 µM Trolox equivalent by DPPH (2, 2-diphenyl-1-picrylhydrazyl) and represented 1.5% of the RDA. 37% of TDAC came from fruit which represented 10% of the menus. Total phenolics was 393 mg gallic acid equivalent, and was significantly correlated ($R = 0.869$; $P < 0.01$) to TDAC.

Conclusion: It is recommended that the elderly increase and diversify their consumption of fruits and vegetables in order to reinforce their intake of antioxidants and reduce the likelihood incidence of non communicable diseases.

18. Fast food consumption among 17 year olds: the Birth to Twenty cohort

Feeley A, Norris SA, Pettifor JM

Birth to Twenty Research Programme, Witwatersrand University
E-mail: alison.feeley@gmail.com

Objective: The objective was to assess fast food item consumption in urban Black adolescents.

Method: A random sample of 655 (54% females) black 17 year olds, participating in the Birth to Twenty cohort, Soweto-Johannesburg, completed an interviewer administered questionnaire on fast food item consumption over the past 7-days.

Results: Over the 7-days, participants consumed 5026 fast food items, with the 3 most popular being a local item colloquially referred to as a 'Quarter' (30.6%), fried chips (21.8%) and vetkoek (12.0%). There were no gender differences in terms of preferences. Mean fast food intake/week was 8.1 ± 4.6 and 7.2 ± 4.7 for males and females respectively ($p = 0.01$).

A typical 'Quarter' consists of white bread (4 slices), fried chips, a slice of cheese, vienna, polony and sauces. A macronutrient comparison between a 'Quarter' and a medium Big Mac meal showed that 'Quarters' contribute 5185 kJ (1239 kcal) as compared to 4038 kJ (965 kcal) for a Big Mac meal, resulting in a difference of 1147 kJ (274 kcal). Fat content for the 'Quarter' was 41.6 g and 35.6 g for the Big Mac meal, protein content was similar (32.1 g and 31.7 g respectively), and carbohydrate content was different (169.8 g and 127.35 g respectively).

Conclusion: The average daily energy requirement for a 17 year old is approximately 10,000 kJ (2390 kcal) and one 'Quarter' contributes half of this requirement. Further research on daily dietary intake and the proportion to which the "Quarter" contributes to daily macronutrient intake is required to fully appreciate the "Quarter's" contribution to total energy intake.

19. Use of the World Health Organization (WHO) child growth standards for the classification of child nutritional status

Lartey A

Department of Nutrition and Food Science, University of Ghana, Legon, Ghana, West Africa
E-mail: aalartey@ug.edu.gh

In April 2006, the WHO released an international set of growth standards for assessing the growth and nutritional status of children. The WHO standards were designed to replace the WHO/NCHS reference which was found to be unsuitable for assessing nutritional status. The development of the charts followed a prescriptive approach which describes how well children should grow. This presentation i) presents results of field testing done to evaluate the WHO standards against clinical assessment of children's nutritional status; ii) compares the WHO standards to other growth references (NCHS and CDC2000) in assessing child nutritional status. Paediatricians clinically assessed the nutritional status of children < 5 years in comparison to corresponding z-scores for weight-for-length/height based on the WHO standards. Children clinically assessed as thin were less than -2SD weight-for-length/height and those assessed as normal were on the median weight-for-length/height z-score. There was a positive association in trend between the clinical assessment groups from thin to obese and the WHO weight-for-length/height z-score. This agreement between the clinical assessment of nutritional status of children < 5 years and the WHO standard based indicators confirm the clinical soundness of the WHO standards. Growth data from healthy breast-fed infants were plotted on the MGRS, NCHS and CDC2000 reference. In the latter two references, the healthy breast-fed infants appeared to be growing rapidly in the first 2 months and thereafter, growth faltering set in until 12 months. However, with the WHO standards, the healthy breast-fed infants were actually tracking along the median. The WHO standards provide a better tool than the NCHS or the CDC2000 reference for monitoring the growth of breast-fed infants.

20. The Impact of Food Fortification in Reducing Maternal and Child Undernutrition

Macdonald B

GAIN
E-mail: bmacdonald@gaingeneva.org

Maternal and child undernutrition is a significant contributor to the total global burden of disease. The recently published Lancet Series on nutrition estimated that undernutrition in children under 5 years of age is responsible for 3 million deaths annually and that iron deficiency among pregnant women is responsible for an additional 115,000 maternal deaths per year. Undernutrition suffered by children during gestation and their first two years of life has irreversible consequences in adulthood including increased susceptibility to chronic disease and decreased human capital.

One means to prevent undernutrition among women and children, particularly micronutrient malnutrition, is through the fortification of commonly consumed staple foods and condiments with vitamins and minerals. The Global Alliance for Improved Nutrition (GAIN) provides financial and technical assistance to 18 large-scale food fortification programs in 17 countries, including South Africa. During this presentation, literature examining the impact of food fortification on maternal and child undernutrition will be reviewed including emerging evidence from countries where GAIN provides support to national and sub-national programs. Examples include reductions in anemia detected through sentinel site data in China following soy sauce fortification and reductions in neural tube defects following the introduction of folic acid fortification in South Africa.

Most of the fortification programs receiving GAIN support are now at a mid-term stage of implementation. Lessons learned from these programs will be presented including an examination of how GAIN's project model is evolving to better address maternal and child undernutrition.

21. Predictors of anaemia in Malawian preschool children from communities that participated in a Micronutrient and Health Programme

Kalimbira AA, Randall Simpson J, MacDonald C

University of Malawi
E-mail: akalimbira@yahoo.com

In this study, we aimed to determine the predictors of anaemia among children under the age of 5 years from communities that participated in an integrated community-based micronutrient and health (MICAH) programme that was implemented between 1996 and 2005 in Malawi. We used a prospective study of two large-scale cross-sectional surveys conducted in 2000 and 2004 in MICAH and Comparison areas. Preschool children (6.0–59.9 months) from randomly-selected households that responded to a household questionnaire had their Hb measured from finger-prick blood samples using the HemoCue®. The results showed that in MICAH and Comparison areas in 2000 and 2004 surveys, children aged ≥ 24 months had a significantly lower probability of being anaemic than their younger counterparts: odds ratio (OR) range: 0.43, 95% confidence interval (CI) = 0.33–0.57) in 2000 MICAH areas, to OR = 0.56, 95% CI = 0.46–0.70 in 2004 MICAH areas. Children who had malaria parasitaemia were 2 to > 3 times more likely to be anaemic than those without: OR = 3.63, 95% CI = 2.65–4.96, p<0.001 in 2000 MICAH areas, and OR = 2.08, 95% CI = 1.48–2.94, p < 0.001 in 2000 Comparison areas. Growing fruit trees was protective of anaemia, but only among children from 2000 Comparison areas (OR = 0.61, 95% CI = 0.44–0.84, p= 0.002). Community-based interventions aimed at combating childhood anaemia in rural areas in Malawi should pay particular attention to children < 24 months, prevent malaria infections, promote the raising of fruit trees, and improve the overall social and economic status of households.

22. Impact of a Micronutrient and Health Programme on the prevalence of anaemia in Malawian rural preschool children

Kalimbira AA, Randall Simpson J, MacDonald C

University of Malawi
E-mail: akalimbira@yahoo.com

An integrated community-based micronutrient and health (MICAH) programme was implemented between 1996 and 2005 in Malawi, to improve the nutrition and health status of women and children through a wide range of interventions such as iron supplementation, dietary diversification, and prevention and control of infections. We aimed to assess the impact of the MICAH programme on anaemia in preschool children, using a prospective study of three large-scale cross-sectional surveys conducted at the baseline in 1996, and during evaluation of the programme in 2000 and 2004 in MICAH and Comparison areas. At the baseline, Hb (mean ± standard deviation) was low (89.4 ± 17.5 g/L), with 87.6% of the children being anaemic. By 2000, mean Hb concentration had significantly increased in MICAH children (100.1 ± 18.8 g/L) compared to their Comparison counterparts (95.2 ± 17.5) (p < 0.001). Although the prevalence of anaemia declined in both areas, it was significantly lower in MICAH than Comparison areas (66.8% in MICAH areas vs 78.1% in Comparison areas, χ^2 = 59.0, p < 0.0001). At the end of the programme in 2004, mean Hb had further increased in both MICAH and Comparison children: 103.7 ± 17.5 g/L vs 99.2 ± 16.0 g/L, respectively (p < 0.001). Proportionately more children from Comparison areas (70.6%) than MICAH areas (58.6%) remained anaemic (χ^2 = 15.7, p < 0.0001). Severe anaemia (Hb < 70 g/L) affected 13.6% of children at the baseline, declining to 3.0% in MICAH and 4.1% in Comparison children in 2004 (χ^2=2.0, p=0.2). The MICAH programme is a potential model for combating anaemia among rural preschool children in Malawi, and possibly in similar low-income sub-Saharan African countries.

23. Nutrition education has potential to improve growth among children in rural communities

Kabahenda M

Makerere University, Department of Food Science and Technology, Uganda
E-mail: mkabahenda@agric.mak.ac.ug

Background: Many Sub-Saharan African countries may not attain the UN Millennium Development Goal of halving the 1990 number of underweight children by 2015 because of limited interventions targeted to high risk groups. Simple and sustainable interventions are needed to improve child-caregiving practices and dietary intake of young children vulnerable to under nutrition.

Methods: This research was a controlled longitudinal study conducted to assess the effectiveness of nutrition education on improving growth patterns of young children of less-literate rural subsistence farmers. Participants were female caregivers and their young children (6–43 months) recruited from two rural areas in western Uganda. Caregivers attended a 9-session nutrition education programme that lasted 5 weeks and their children's growth was monitored for a period of one year. A control group of caregivers concurrently participated in sewing classes and their children's growth was also monitored for 1 year.

Results: Baseline prevalence of underweight was 14.5% and 19.1% in the intervention and control groups respectively. Following the intervention, mean weight-for-age improved among children in the intervention group (-0.84 ± 0.15 to -0.61 ± 0.15) but declined among the controls (-0.77 ± 0.16 to -0.99 ± 0.16). Changes in height-for-age, weight-for-height, and MUAC-for-age were also in a positive trend for children in the intervention group but not statistically different from the controls. Changes in weight-for-age and weight-for-height were negatively related to caregiver's age.

Conclusions: This intervention demonstrates that nutrition education can improve nutritional status and growth of young children. Special interventions may be needed for less-literate older caregivers.

24. Fruit and vegetable consumption in South African children aged 12 to 108 months: a secondary analysis of the national food consumption survey data

Naudé CE, Kruger HS, Labadarios D

Stellenbosch University and Tygerberg Academic Hospital
E-mail: cenaude@sun.ac.za

Objective: To estimate fruit and vegetable consumption in South African children.

Methods: Secondary data analyses in 12 to108 month-old children (weighted sample n = 2200) from the 1999 National Food Consumption Survey. Mean fruit and vegetable consumption per capita, percentage of 'eaters' and frequency of intake was determined and related to anthropometric z-scores and socio-economic markers. Micronutrient intake, nutrient adequacy ratio (NAR) and mean adequacy ratio (MAR) were also calculated. Bonferroni (Dunn) t-test and Pearson correlations were used for statistical analysis.

Results: Mean daily consumption per capita of fruit and vegetables was 110.1 grams (95% CI = 103.8 to 116.4) [SD 150] (n = 2200) (24-H-RQ) and 204.9 grams (CI = 196.9 to 212.9) [SD 188.2] (n = 2133) (QFFQ) and was considerably lower than current recommendations. Fruit was not eaten daily by all children (0.81 times) (CI = 0.77 to 0.85) [SD 0.96] (n = 2133) and vegetables were eaten approximately once daily (1.34 times) (CI = 1.3 to 1.38) [SD 0.92] (n = 2040). Underweight (weight-for-age < -2 SD, NCHS 50th percentile) and wasted (weight-for-height < -2 SD, NCHS 50th percentile) children consumed significantly less (Bonferroni $p < 0.05$). There were significant correlations between intake and vitamin C ($r = 0.59$; $P = <0.001$), vitamin A ($r = 0.48$; $P = <0.001$), NAR (%) vitamin C ($r = 0.59$; $P = <0.001$) and NAR (%) vitamin A ($r = 0.50$; $P = <0.001$) and age.

Conclusion: The poor fruit and vegetable consumption documented in this study calls for effective policies and programmes, aimed at increasing fruit and vegetable consumption among young children.

25. Beta-carotene rich vegetable gardens, nutrition education and growth monitoring to address vitamin A deficiency in Lusikisiki

Laurie S, Faber M, Mulandana S

Agricultural Research Council – Vegetable and Ornamental Plant Institute
E-mail: slaurie@arc.agric.za

A crop-based project aimed at alleviating vitamin A deficiency was developed, monitored and evaluated at Ndunakazi during the 1990's. As a result of the success of this project, a similar approach was implemented in Lusikisiki, Eastern Cape, in 2002, but with less input from the research team, and with the focus on technology transfer to and mobilisation of the local community with support from governmental departments.

The project was evaluated three years after implementation by collecting information on nutritional knowledge, dietary intake and gardening practices. Questionnaires were completed for households with children 5 years and younger participating in the project (n = 219) as well as non-participating neighbouring households as control households (n = 223).

Compared to control households, more caregivers knew that vitamin A is a nutrient in food (83% versus 53%; $P < 0.001$), and could name three food sources rich in vitamin A (56% versus 27%; $P < 0.001$). Fewer 1 to 5-year-old children in the project households reportedly experienced vomiting (6% versus 13%; $P = 0.012$), fever (30% versus 42%; $P = 0.008$), skin sores (6% versus 19%; $P < 0.001$), continuous runny nose (20% versus 33%; $P = 0.002$), diarrhoea (2% versus 7%; $P = 0.026$) and poor appetite (7% versus 14%; $P = 0.016$). Children from project households more frequently consumed butternut ($P = 0.002$), spinach ($P = 0.004$), carrot ($P = 0.008$) and orange-fleshed sweet potato ($P = 0.028$) than children from control households.

The commitment of the project health volunteers was critical and involvement of the local Departments of Agriculture and Health strengthened the project and contributed to sustainability. The results show that the approach can be implemented on wider scale.

26. Factors that contribute to compliance with the consumption of iron and folate supplements by pregnant women

Cherane MJ, Mbhenyane XG

Department of Health, North West
E-mail: mcherane@nwpg.gov.za

Background: Anaemia in pregnancy is a major health problem in many developing countries where nutrient deficiency, malaria and other parasitic infections contribute to increased maternal and perinatal mortality and morbidity. Women often do not meet the increased iron and folate needs of pregnancy. It is believed that limited compliance with iron and folate supplements is a major challenge for the low effectiveness of anaemia-prevention programmes.

Objectives: The aim of the study was to investigate the factors that contribute to compliance with the consumption of iron and folate supplements by pregnant woman.

Design: A descriptive, exploratory, and cross-sectional.

Setting: Ten clinics in Mafikeng Sub-District.

Subjects: 57 pregnant women and 10 health workers.

Method: Data was collected using three methods (self-reported questionnaire, focus-group discussions, and structured interview guide for health workers). Open coding was used to analyse quantitative data.

Results: The findings of the study revealed good antenatal attendance, availability of supplements and 93% compliance with the consumption of iron and folate supplements.

Conclusions: Data in this study showed good antenatal clinic attendance and compliance with the consumption of iron and folate supplements by pregnant women. Health workers used attendance, support, whether supplements were finished, and biochemical measures to measure compliance.

27. Iron status in women of childbearing age: dietary, biochemical, lifestyle and genetic determinants

Kunneke E, Wolmarans P, Laubscher R, Mansveldt EPG, Vorster HH

University of the Western Cape
E-mail: ekunneke@uwc.ac.za

Iron deficiency (ID) remains the most prevalent micronutrient deficiency in women. The main aim of the study was to determine the iron status of women of childbearing age. This was a descriptive study done on a convenient sample of 140 women, aged between18 and 45 years. Dietary intake was assessed using 3 times 3-day estimated dietary records. Information on parity, gravidity, menstrual patterns, blood donation, smoking, supplementation and oral contraception was obtained. Blood was analysed for haemoglobin, ferritin and serum transferring receptor (TfR) concentrations. The log TfR/Ferritin (T/F) ratio was also calculated. Testing for mutation G277S in the transferring gene was done on a sub-sample of 70 women. Thirty-four percent of the participants had never been pregnant, 35% used contraceptives and 21% smoked. Mean (SD) daily dietary iron intake was 10.5 (2.8) mg/day, with fortified iron the highest contributor to total iron intake. Mean (SD) percentage of the EAR for iron was 129 (34) %. Sixteen percent of the population had Hb levels < 12g/l and 71% had ferritin levels < 15ug/l. Fifteen percent had TfR levels > 8.3ug/ml and 8.5% of the sub-group was heterozygous for the G277S mutation. The T/F ratio differed significantly between the normal group and ID group. There were no significant differences between the groups for dietary iron intake. Contraception use significantly influenced Hb, ferritin and TfR levels. Menstruation patterns significantly influenced ferritin levels and the T/F ratio. In conclusion, the prevalence of ID was high in the study population and dietary iron intake could not explain the variation in iron status.

28. Notes

Abstract 28 has been cancelled at the time of printing. We apologise for any inconvenience.

29. Obesity in Africa: is there a health paradox and can we prevent the growing burden of non-communicable disease? Epidemiology, potential mechanisms and public health implications.

Lambert EV, Goedecke JH & Levitt NS

MRC/UCT Research Unit for Exercise Science and Sports Medicine, Department of Human Biology
E-mail: vicki.lambert@uct.ac.za

The epidemiological transition is reflected in increasing global prevalences of both obesity and physical inactivity as major risk factors contributing to the burden of chronic disease. The developing world is faced with the challenge of a dual burden of disease: non-communicable disease juxtaposed with infectious disease, childhood stunting and under-nutrition. With urbanization, physical activity levels demonstrably decrease and there is an associated increase in the energy density of the diet. These changes are typically accompanied by increased prevalence of obesity, impaired glucose tolerance, hypertension and other cardiovascular risk factors. Furthermore, there is evidence of an atypical clustering of metabolic risk factors, differences in fat patterning and pathophysiological sequelae associated with obesity, in particular, in women from different ethnic backgrounds. Moreover, there are potentially confounding factors, such as diet composition, which may interact with specific genotypes, thereby, altering the phenotypical presentation of obesity, Finally, there is growing evidence that HIV/AIDS and the therapeutic regimen of anti-retroviral treatment will exacerbate the presentation of metabolic syndrome and associated lipodystrophy, further confounding these relationships. There has been little by way of nutritional and physical activity surveillance in this region, however, recent WHO initiatives have yielded a growing body of evidence suggesting that trends in physical inactivity and obesity are increasing. Furthermore, factors such as education, culture and socioeconomic status may act as barriers to physical activity and healthy eating in developing communities. While there are nascent community-based interventions, as well as educational and policy initiatives in African countries, however, few have been evaluated for effectiveness. There is a growing need for health promotion strategies aimed at primordial prevention of both obesity and associated co-morbidities, as South Africa moves rapidly through the epidemiological transition.

30. A review of school nutrition interventions globally as an evidence base for the Healthkick Programme

Steyn NP, Lambert EV, Parker W

Medical Research Council, University of Cape Town
E-mail: nelia.steyn@mrc.ac.za

Aim: The aim of this study was to review all school interventions with a nutrition focus published in peer-reviewed literature between 1995 and 2006 and to document activities that were successful as well as possible barriers in order to develop a best practice school intervention for South Africa.

Methodology: A systematic review of school studies revealed 62 interventions which complied with the predetermined search criteria. The following outcome measures were considered in the evaluation of the interventions: (i) Changes in nutritional knowledge, attitudes, self-efficacy, intentions and stage of change (ii) changes in dietary behaviours; (iii) changes in clinical/physical markers such as: body weight or BMI, blood pressure or serum cholesterol concentrations; and (iv) process and/or policy outcomes.

Results: Key success factors of school-based interventions appeared to be:

A nutrition-based curriculum offered at school by trained teachers generally improved behavioural outcomes. A physical activity programme/component was associated with most of the best practice clinical and behavioural outcomes. All the best practice studies included a parental/family component.

All the best practice studies were grounded on a firm theory of behaviour, such as social cognitive; social marketing or stages of change. Most of the interventions which included a food service component had best practice behavioural outcomes.

Conclusion: Numerous school nutrition interventions have shown significant improvements in children's nutritional health and behaviours. However, it is necessary to plan programmes based on existing evidence of what works.

31. The nutrition environment in primary schools in the Western Cape (Healthkick Project)

Sauls L, De Villiers A, Fourie J, Steyn NP, C Draper, Lambert EV

Medical Research Council
E-mail: lucinda.sauls@mrc.ac.za

Aim: To assess the nutrition and health-related environment in disadvantaged primary schools through a formative assessment process.

Methodology: Primary schools (n = 100) were randomly selected from two school districts, Overberg and Metropole North. A key informant was interviewed at each school regarding school health issues and specifically to identify health priorities for learners, educators and parents. Fieldworkers completed an observation schedule of the school grounds, and nutrition and physical activity practices during break times.

Results: The most common items sold at tuck shops, at school events and by vendors are chips, fizzy drinks, and sweets. Mostly school educators are involved in the management of the tuck-shops. Some vendors and tuck shops also sell cooked meals. Thirty-four schools have vendors selling food through the school fence, during break times. At 63 of the schools, the school name is displayed on a large sign outside along with that of Coca Cola. Very few lunchboxes were observed during learners' break times. The two top health priorities identified for learners at school were unhealthy diet (high fat, saturated fat and high sugar) and physical inactivity; for teachers these were physical inactivity and chronic diseases of lifestyle.

Conclusion: The formative assessment showed that the primary school setting contributes toward learner's food choices during the day. This setting has the potential to influence learners' knowledge, attitudes and behaviours towards eating habits and physical activity at an early age.

32. Barriers faced by parents and caregivers in trying to encourage healthy lifestyles for their children

Evans WD, Hill J, De Villiers A, Draper C, Steyn NP, Lambert EV

Medical Research Council
E-mail: jillian.hill@mrc.ac.za

Objectives: To determine socio-economic barriers to healthy eating and physically active lifestyles and to identify parents' preferred sources of health information as a tool to overcoming such barriers.

Methodology: Out of a random sample of 100 schools selected for the HealthKick Project situation analysis, 22 schools were purposefully selected from the lowest three socio-economic quintiles in both urban and rural areas. Within each school area parents were selected by convenience and interviews were held with them at the schools.

Results: Results showed that the family and community nutrition and physical activity environments are highly complex. The concept of healthy eating varies from family to family and from one community to the next. Parents reported major concerns as being: lack of safety for children being active outside, lack of organised markets or other sources of healthy foods in rural and urban areas, financial constraints, and lack of resources for physical activity. Preferred sources for receiving health information were primarily through print and radio. Possible channels to reach parents were identified and potential message strategies to promote healthy lifestyles similar to some HIV/AIDS social marketing campaigns were identified.

Conclusion: The information gathered from the parents will be of great value when it comes to planning and implementing a parent's intervention. Barriers to implementation have been noted and strategies to overcome these are planned.

33. Healthkick school-based diabetes prevention programme formative research: results of the "100 Schools Survey"

Lambert EV, De Villers A, Draper C, Sauls L, Hill J, Ndamane Z, Matizifora L, Fourie J, Parker W, Barkhuizen G, Pretorius J, Steyn NP and the HealthKick School-based Diabetes Prevention Programme Writing Group

Department of Human Biology, University of Cape Town and Chronic Diseases of Lifestyle Unit, Medical Research Council of South Africa, Cape Town
E-mail: nelia.steyn@mrc.ac.za

Aim: The aims of the present study were 1) to conduct a formative assessment of schools from the Western Cape Province, with a view to establishing the extent and priority of problems of inactivity, unhealthy eating, obesity and smoking in school-age children, and 2) to conduct a situational analysis of the school health environment.

Methodology: One hundred schools were randomly sampled from the lowest 3 socioeconomic quintiles. A structured interview was undertaken with the principal of each school after which an observational schedule was completed by the research team. The structured interview was comprised of questions related to health promotion, school health priorities for learners, teachers and parents, physical activity (PA) and nutrition concerns, smoking, school connectedness, family involvement and life orientation curriculum.

Results: The mean number of learners per school surveyed was 560 + 404, with 33.7 + 5.8 learners per teacher. The most concerning health issues for learners were unhealthy diet (50%), lack of PA, underweight, tobacco use. For teachers, the health priority concerns were lack of PA (33%), chronic diseases of lifestyle, overweight, unhealthy diet and tobacco use. For parents, the outcomes were very different, with principals primarily concerned with substance abuse (66%), tobacco use, unhealthy diet, and HIV/AIDS. Only 19% of schools considered their facilities to be adequate for PA and sport.

Conclusion: Lower quintile schools in South Africa are faced with numerous challenges with regard to physical activity and healthy eating amongst learners and teachers. However, many of these challenges are modifiable, through targeted school goal setting and actions.

34. Designing a primary school-based healthy lifestyle intervention (Healthkick) by means of intervention mapping

De Villiers A, Murphy K, Sauls L, Hill J, Steyn NP, Abrahams Z, Draper C, Lambert EV

Medical Research Council
E-mail: anniza.de.villiers@mrc.ac.za

Aim: To develop a school-based intervention aimed at increasing knowledge and promoting the adoption of healthy eating behaviours for the prevention of diabetes in children, their parents and teachers in primary schools in the Western Cape (WC) province.

Methodology: *Step 1:* Needs assessment: A situational analysis was done at a random sample of 100 schools in the WC and parent and learner interviews were conducted in 30 of these schools. Chronic disease risk assessments were completed for 520 teachers in 82 of the schools. *Step 2:* The information gathered was used to determine desired outcomes in knowledge, attitudes and behaviour in children and in the environment.

Results: Eight behaviours, including increasing the number of fruit and vegetables eaten daily and decreasing the consumption of high-fat and high-sugar snacks/foods were targeted for change. For each of these behaviours personal and environmental performance objectives were formulated and matrices of change objectives created. The following provides an example: Behaviour: Decrease the consumption of high-fat snacks. Environmental performance objective: Tuck shop manager to decrease the amount of high fat foods available. Change objective: The manager believes that high fat foods are detrimental to children's health. Step 3: Theoretical methods and design strategies to bring about the change objectives were planned as part of the intervention (above example: social cognitive theory with the specific method persuasive communication).

Conclusion: Intervention mapping ensures a systematic procedure whereby change objectives are formulated with appropriate methods for intervention and evaluation.

35. Risk factors for type 2 diabetes in teachers: Healthkick study

Ndamane Z, Senekal M, De Villiers A, Steyn NP, Lambert EV, Matizirofa L

Medical Research Council
E-mail: zibuyile.ndamane@mrc.ac.za

Principal objectives: To determine modifiable risk factors for type 2 diabetes in teachers in primary schools in the Western Cape Province: BMI and waist circumference; blood pressure; level of physical activity; tobacco-use; blood glucose and cholesterol levels.

Methods: A risk assessment questionnaire measuring physical activity, diet and tobacco-use was completed by 528 teachers in 82 schools randomly selected. Weight, height and waist circumference were measured by trained fieldworkers; blood pressure was measured by an Omron and glucose and cholesterol by a finger prick test.

Results: Results indicated that 32 % of teachers were overweight (BMI > = 25-29.9); 47% were obese (BMI > = 30). Fifty five per cent of teachers had a high blood pressure reading (> 90/140), 80% currently smoked cigarettes and 34% were inactive at work and at leisure time. Two per cent of teachers had high glucose values (> 10.0 mmol/L) and 29% had high cholesterol values (> 5 mmol/L).

Conclusion: Overall the teachers had an average of 3.5 risk factors out of the 6 factors tested for developing diabetes or other chronic disease. The major risk behaviours were overweight, physical inactivity and high blood pressure.

36. The relationship between nutritional status, quality of life and CD4 cell count in HIV/AIDS infected adults

Venter E, Gericke GJ

Department of Human Nutrition, Faculty of Health Sciences, University of Pretoria
E-mail: evette_venter@yahoo.com

Aim: To determine if there was a relationship between CD4 cell count, nutritional status and self-reported quality of life (QoL) in HIV/AIDS infected adults.

Setting: The out-patient ARV clinic at Dr George Mukhari Hospital (Ga-Rankuwa).

Design: Descriptive study in the quantitative research domain.

Sample: The study group (n = 90) consisted of male (n =34) and females patients (18–50 years) diagnosed with HIV/AIDS. Convenience sampling was used.

Methodology: Anthropometry (weight, height, BMI, MUAC, TSF), dietary intake (24 recall) and QoL (WHOQoL-HIV questionnaire) were assessed. Data collection was done from January to April 2007.

Results: Significant correlation was found for the following anthropometrical parameters and the CD4 cell count: weight ($r = 0.37$; $p = 0.00$), BMI ($r = 0.39$; $p = 0.00$) and MUAC ($r = 0.36$; $p = 0.00$). The study population had a poor dietary quality. Significant correlation with the CD4 cell count was found for the following domains of the QoL: physical activity ($r = 0.27$, $p = 0.01$), psychological ($r = 0.27$, $p = 0.01$), level of independence ($r = 0.36$, $p = 0.00$) and environmental ($r = 0.27$, $p = 0.01$). The overall QoL assessment was average according to the WHOQoL-HIV questionnaire score.

Conclusion: Significant positive relationships existed between specific anthropometry and the CD4 cell count, and also between certain QoL domains and the CD4 cell count. Strategies to increase dietary diversity and QoL ought to be identified and implemented in communities.

Recommendations: Longitudinal studies would give better understanding of the relationship between nutritional status, the CD4 cell count and QoL.

37. Prevention of mother-to-child transmission (PMTCT) programme at Dr George Mukhari Hospital (DGMH): Growth of infants

MacDougall GC, MacIntyre UE, Labadarios D

Department of Human Nutrition, Dr George Mukhari Hospital
E-mail: caida_fivaz@yahoo.com

Objective: Since the start of the PMTCT Programme at DGMH in 2001, there has been no evaluation of the effect of formula feeding on the growth and dietary intakes of enrolled infants. This descriptive, longitudinal study determined the short-term growth, anthropometry and dietary intake of infants entered into the PMTCT Programme at the Department of Human Nutrition, DGMH from two to ten weeks of age.

Methods: Infants entering the PMTCT Programme between November 2006 and March 2007 were enrolled into the study. Written informed consent was obtained from their mothers. Weight, length and head circumference were measured and feeding practices and dietary intake determined at 2, 6 and 10 weeks of age. A socio-demographic interview and a usual food intake interview were also performed.

Results: The sample comprised 75 males and 76 females. 82% of infants were exclusively formula fed. The remainder received water, water with sugar and/or complementary feeds. Mean energy and macronutrient intakes of both males and females were below recommendations at age two weeks. Catch up growth was evident and nutrient intakes improved as the study progressed. The mean weight gain of all infants from visit 1 to 2 was 1.22 (SD 0.32) kg and 0.91 (SD 0.30) kg from visit 2 to 3, exceeding the CDC 2000 recommendations for both males and females.

Conclusion: The majority of infants in this study grew well in their first ten weeks of life. Growth accelerated as infants became older and growth faltering improved by ten weeks of age.

38. Multi-micronutrient supplementation in HIV-infected children reduced the number of episodes of diarrhoea and pneumonia

Mda S, Van Raaij JMA, MacIntyre UE, De Villiers FPR, Kok FJ

Department of Paediatrics and Child Health, University of Limpopo
E-mail: siyazi.mda@wur.nl

Background: Micronutrient deficiencies are common in HIV-infected children. The number of episodes of diarrhoea and pneumonia is reported to be higher in HIV-infected children than in uninfected children.

Objectives: To determine whether multi-micronutrient supplementation will improve micronutrient status and reduce the number of episodes of diarrhoea and respiratory symptoms in HIV-infected children.

Subjects and Methods: HIV-infected children (aged 4 to 24 months) were randomly assigned to receive daily a multi-micronutrient supplement (containing vitamins A, B complex, C, D, E, folic acid as well as copper, iron, selenium and zinc at levels based on recommended daily allowances) or placebo for six months. Children were followed up bi-weekly and assessed for respiratory symptoms and diarrhoea. Serum concentrations of zinc, retinol and iron were measured at intervals of three months.

Results: A total of 121 children completed the study. Micronutrient status at enrolment was poor as evidenced by low concentrations of zinc, vitamin A and iron. However, over six months there was no significant improvement in micronutrient concentrations. The number of monthly episodes of diarrhoea (0.36 ± 0.36) in the placebo group was marginally higher ($P = 0.087$) than in the supplement group (0.25 ± 0.31) and the number of monthly episodes of respiratory symptoms was significantly higher ($P < 0.05$) among children on placebos (1.01 ± 0.67) than those on supplements (0.66 ± 0.51).

Conclusion: Although the multi-micronutrient supplementation did not improve the micronutrient status as measured by serum concentrations, it reduced the number of episodes of diarrhoea and respiratory symptoms by about 30%.

39. Monitoring and evaluation framework for community-based food and nutrition interventions for people living with HIV

Oketch JA

University of KwaZulu-Natal
E-mail: 205525695@ukzn.ac.za

Aim: To review indicators and develop monitoring and evaluation framework for community-based food and nutrition interventions for people living with HIV

Methods: Five reports from different programmes in Africa were reviewed to collect information on indicators that are being used to monitor and evaluate food and nutrition interventions for people living with HIV. The review included two evaluation reports, a report by FANTA that summarises indicators from fifteen programmes and two guides for measuring the impact of target food assistance. The information was used to develop a generic monitoring and evaluation frameworks for community based food and nutrition interventions.

Results: The indicators are designed in four levels. First the **input indicators** such as adequacy and competency of human resource, availability and utilisation of budgets and infrastructure: Second are the **output indicators** such as coverage in terms of number/proportion of people receiving the intervention: Third are the **outcome indicators** such as changes in practice (increase meals eaten per day): and Fourth are the **impact indicators** such as anthropometric impact (change in weight), physical function indicators (change in the performance activity scale) and quality of life impact such as changes in social functioning and health perceptions.

Conclusion: The development of the monitoring and evaluation framework is an attempt to provide a practical management tool that can be adapted to improve quality of community based food and nutrition interventions for people living with HIV. Nevertheless validity of the assessment tools that are used for monitoring and evaluation need further research.

40. Nutritional programming of fetal and neonatal metabolism

Crowther NJ

Department of Chemical Pathology, National Health Laboratory Service and University of the Witwatersrand
E-mail: Nigel.Crowther@nhls.ac.za

Many studies have demonstrated that subjects born with a low birth weight have an increased risk of developing type 2 diabetes during adulthood. It has also been shown that in neonates and infants a negative relationship exists between birth weight and plasma glucose levels. Furthermore, high postnatal weight gain in combination with low birth weight accentuates the negative effect of poor fetal growth on glucose tolerance. The thrifty phenotype hypothesis (Hales CN, Barker DJP: Diabetologia 35:595-601, 1992) explains these effects by suggesting that poor fetal growth caused in part by poor maternal nutrition, results in reduced pancreatic beta cell mass and increased insulin resistance. High postnatal weight gain would impose further metabolic stress on the beta cells. Studies in rodents have confirmed that protein restriction in pregnant rats causes reduced beta cell numbers in the offspring and many human studies have demonstrated that low birth weight is related to insulin resistance. Thus, it has been shown in humans that low birth weight leads to lower levels of skeletal muscle expression of peptides involved in insulin receptor signaling. Evidence from human studies that maternal nutrition is the factor that links low birth weight to an increased risk of type 2 diabetes is sparse. However, one study has demonstrated an increased prevalence of type 2 diabetes in the offspring of mothers exposed to famine conditions during their pregnancy. The molecular mechanism by which maternal nutrition may programme the metabolic profile of the fetus is not known. One suggestion is that a poor in utero environment leads to the survival of only neonates that have a metabolic profile that allows them to withstand such conditions. An alternative hypothesis is that during pregnancy fetal metabolism adapts to the prevailing conditions so ensuring survival. The possible mechanisms by which fetal metabolism becomes programmed is uncertain, however the involvement of epigenetic factors is currently an attractive theory.

41. Development and tracking of central patterns of subcutaneous fat of rural South African children: Ellisras Longitudinal Growth and Health Study

Monyeki KD, Makgae PJ, Brits SJ, Kemper HCG

Medical Research Council
E-mail: dan.monyeki@mrc.ac.za

To investigate the development of triceps, biceps, subscapular and suprailiac skinfolds and skinfolds ratios of rural South African children over time (November 1996 to November 2003). The existence of tracking of the skinfolds and the trunk extremity skinfold ratio was investigated. The participants for the study comprise pre-school children (born between 1993–1991) and primary school children (born between 1990–986). A total of 2225 (550 preschool children mean age 4.4 years SD = 0.99 and 1675 primary school children mean age 8.0 years SD = 1.11) at baseline were followed throughout the periodic surveys. A total of 1771 subjects (489 preschool children mean age 11.4 years SD = 0.96 and 1282 primary school children mean age 14.9 years SD = 1.11) were measured in November 2003. Percentage body fat, fat mass and fat free mass were investigated over time. 90th Percentiles for the sum of four skinfolds by age and gender were used to define the development of overfatness over time in this population. A significantly higher ST, SST, SSTB ratio was observed at all the ages for the girls than boys ($P < 0.001$) except for the age 13 years. Girls showed significantly ($p < 0.001$) higher percentage body fat, fat mass and fat free mass than boys during adolescent stage. The tracking coefficient was lower than 0.56 for preschool children and 0.72 for primary school children. Girls had greater skinfold thickness and ratios than boys over time. From a preventative point of view, tracking coefficients were too low to be of predictive value.

42. A critical apraisal of different methods used to validate the RAPP dietary assessment tool

Lombard MJ, Burger HM, Steyn NP

Nutrition and Dietetics Division, University of Cape Town
E-mail: hester.burger@mrc.ac.za

Objective: During the validation of the RAPP tool (a dietary assessment method) a variety of validation methods was used. These methods were compared to determine which methods are the most appropriate for similar populations in South Africa.

Method: Sixty male and female volunteers from Centane (EC) were recruited. Two 24-hour recalls and one RAPP assessment were collected during two visits. The mean intakes of the two 24-h recalls were compared against the RAPP assessments. The means of the recalls were combined to determine if the number of repeats play a role. 24-Hour urinary biomarkers (sodium, potassium and protein) were measured and energy expenditure (EE) was calculated using the Schofield equation and also measured by using a physical activity questionnaire.

Results: Results indicated that the RAPP tool over-reported during both measures. A decrease in intake between the first and second measure was detected but not between the number of repeats. Spearman correlations ranged between 0.06 (selenium) and 0.56 (vitamin D) (first measure), 0.10 (vitamin E) and 0.56 (sodium) (second measure) and 0.03 (riboflavin) and 0.41 (sodium) (third measure). Spearman correlations for urinary biomarkers were poor (–0.26 to 0.29). Correlations for calculated EE were –0.31 and –0.08, while measured EE ranged between –0.20 and –0.08. Measured EE provided better results than calculated EE. In conclusion, both the RAPP Tool and the physical activity questionnaire over-reported. The use of a 24-hour urinary biomarkers and physical activity questionnaire was failed as a validation method in this specific population. The selection of validation methods and careful interpretation of results are crucial.

43. Dietary intakes and physical activity patterns and risk of hypertension and overweight of rural African children in Tshanda village, Vhembe district, Limpopo

Mbhenyane XG, Amusa LO, Mushaphi LF, Mabapa NS, Mbhatsani HV, Mandiwana TC, Amey AKA, Ndaba LK, Monyeki KD

Department of Nutrition, University of Venda
E-mail: xikombiso.mbhenyane@univen.co.za

Background: Uncontrolled dietary patterns, physical inactivity and sedentary lifestyle during childhood have been linked to development of chronic disease later in life. Prevention is therefore recommended during childhood. Change in lifestyle habits can be integrated to the school curriculum.

Objectives: The aim of the study was to determine dietary and physical activity patterns and risk of hypertension and overweight of rural African children in Tshanda village, Vhembe district, Limpopo.

Design: A descriptive, exploratory and longitudinal.

Setting: 10 rural primary schools in Mutale municipality.

Subjects: 607 primary school children aged 6–13 years and dietary patterns were only done on a sub-sample of 180.

Method: Dietary patterns and intakes were determined using a food frequency questionnaire administered by recently qualified nutrition students. Anthropometric parameters were taken and BMI was determined. Blood pressure was measured using a conventional mercury sphigmanometer. Food Finder version 3 was used to analyse dietary intakes and SPSS 14 was also used.

Results: The finding revealed dietary patterns with poor micronutrient intakes, poor food variety and generally poor eating patterns. Furthermore, body fattening patterns and prevalence of hypertension particularly in girls was prevalent and increased with age/grade.

Conclusions: Nutrition education focusing on food based dietary guidelines and diversification of diets using local/indigenous foods is important in order to improve the food availability and variety and sources of micronutrients. Physical activity needs to be integrated as part of primary school children activities. This will indirectly impact on the growth of the children.

44. The prevalence and degree of dehydration in rural South African forestry workers

Biggs C, Maunder EMW, Patterson M

University of KwaZulu-Natal
E-mail: biggsc@ukzn.ac.za

Objectives/scope: To determine prevalence and degree of dehydration in rural forestry workers during winter and autumn.

Methodology: A cross sectional study of a convenience sample of 103 workers (autumn in Nelspruit) and 79 (winter in Richmond). The prevalence was determined by urine specific gravity (USG) measurements taken before and at the end of shift and the severity by the per cent loss of body weight (BW).

Results: In autumn 43% ($n = 43$) and in winter 47% ($n = 37$) arrived at work dehydrated (USG > 1.020 g/ml). By the end of shift this had significantly increased to 64% ($n = 64$, $p \leq 0.001$) in autumn and 63% ($n = 42$, $p = 0.043$) in winter. Approximately 22% in each area had lost more than 2% of their BW. Dehydration was not related to season, gender or job category. In autumn 23% ($n = 23$) and in winter 13% ($n = 10$) arrived at work overhydrated (USG < 1.013 g/ml). By the end of shift 4% ($n = 4$) in autumn and 2% ($n = 1$) in winter had remained overhydrated. Overhydration was not related to season, gender or job category.

Principal conclusions: At least 40% started their shift already compromised to work to capacity due to dehydration (USG > 1.020 g/ml). The majority were dehydrated at the end of the shift, some to the extent (> 2% BW) that both work capacity and mental ability would be significantly compromised. A select group was overhydrated and was therefore susceptible to potentially fatal dilutional hyponatraemia. Fluid intake guidelines for males of 450 ml per hour appeared to be safe. Fluid guidelines for females need investigation.

45. Physique and blood pressure of rural South African children aged 6 to 13 years: Ellisras Longitudinal Growth and Health Study

Makgae PJ, Brits SJ, Monyeki KD

Medical Research Council
E-mail: dan.monyeki@mrc.ac.za

The objective of this study was to determine the association between somatotypes, BMI and blood pressure in 6 to 13 year old Ellisras rural children. A total of 1884 subjects (967 boys and 917 girls), aged 6 to 13 years, who were part of the Ellisras Longitudinal Study were studied. The Heath-Carter method of somatotyping was used. International recommended cut-off points for BMI in children were used. Hypertension was defined as average systolic (SBP) and diastolic (DBP) blood pressure greater than or equal to the 95th percentile for age and sex measured at least three separate occasions. There was a gradual increase in the somatotype component across the age. The prevalence of hypertension was evident in the balanced mesomorphy and endomorphic mesomorph in this sample. The prevalence of obesity was evident in the endomorphic mesomorph for boys while for girls it was evident in the balanced endomorphy. The regression analysis exhibited a positive significant association between SBP and endomorphy and mesomorphy. The fact that endomorphy components and SBP correlate better than other somatotype components raises a serious concern in this sample. Follow up studies should investigate the relationship between blood pressure and dietary electrolytes (sodium, potassium, calcium), dietary protein, lipids and fibers, alcohol and total energy consumption of these children.

46. The effect of supplementation with a probiotic Lactobacillus reuteri on the incidence and duration of lung infections in cystic fibrosis patients

Read M, Biggs C, Maunder EMV

University of KwaZulu-Natal
E-mail: biggsc@ukzn.ac.za

Objectives/scope: To determine whether supplementation with a probiotic *Lactobacillus reuteri* reduces the incidence and duration of lung infections in cystic fibrosis (CF) patients.

Methods: Twenty three CF patients (6–31 years) from the KwaZulu-Natal CF clinics started the study although only 16 completed it. The study was a randomised, double blind, placebo controlled crossover trial with six months on placebo and six months on probiotic. Forced expiratory volume in 1 second (FEV_1) and forced vital capacity (FVC) were measured, sputum collected and a symptom diary completed over the 12 month period.

Results: Compliance was poor. Most took 50% of the required daily dose of *L reuteri.* Probiotic supplementation showed a slight (non significant) trend to improve FEV_1 and FVC, while no significant difference could be seen in the number and duration of the lung infections. Sputum analysis showed a non significant trend towards the probiotic reducing the number of bacteria in the sputum. There was a significant reduction of symptoms for fever, running nose, sore throat and ear ache while on placebo.

Conclusion: Due to a small sample size and poor compliance no firm conclusions could be drawn. However a slight (non significant) improvement could be seen in favour of the probiotic for FEV_1, FVC, and sputum analysis. Although all other findings were not significantly different it would be of benefit to carry out further investigation across centres with a larger sample size and measures to improve compliance with the probiotic to see if the parameters set out above could be improved.

47. The nutritional status of children with cerebral palsy and/or epilepsy attenting the paediatric neurology clinic at Dr George Mukhari hospital during 2007

Mosetlhe D, Lubisis J

Nelson Mandela Academic Hospital
E-mail: duncanmosetlhe@gmail.com

Objectives: The objectives of this study were to assess anthropometry using weight-for-age and skin folds; determine dietary intakes; and describe clinical symptoms relating to the nutritional status.

Methods: There were three distinctly different types of cases studied in this research, namely children diagnosed with cerebral palsy, epilepsy and both cerebral palsy and epilepsy; therefore a stratified random sampling method of selection was used. The selected sample was further stratified into equal numbers of gender categories. For nutritional status, weight, heights, skin fold thickness (triceps and sub scapular) were measured according to standard conventional methods. Total caloric intake was assessed using a 24-hour-recall and calculated as a percentage of the dietary reference intakes. Lastly, the clinical signs were also taken following the standardised procedures.

Results: Among the 60 children, 51.7 % of children were malnourished with the nutritional status being worse in the CP with epilepsy children (95 %) when compared to CP (55 %) and Epilepsy (10 %). Dietary intake resulted unbalanced (high total daily protein and some micronutrients, with only vitamin D being low). Clinical signs associated with the diseases were present.

Conclusion: Malnutrition is common in children with cerebral palsy and epilepsy and is associated with poorer health status.

48. Rehabilitation

Dolloway K

Life Entabeni Rehabilitation Unit
E-mail: kdolloway@telkomsa.net

The positive outcome of an inpatient rehabilitation programme depends on the successful and consistent carry over of techniques learnt during formal therapy sessions, into the ward environment, to ensure application of new skills over 24 hours. It is therefore important that nursing staff, responsible for patient care for every hour of the week, and accustomed to doing the bulk of tasks for, rather than with, the patient, understand the importance of their role in rehabilitation. Equipping these essential members of the team with the necessary skills in rehabilitative care has been identified as an essential link in delivering a comprehensive programme to our neurologically disabled adult patients.

A 6-month in service training programme for hospitality attendants has been developed by the Life Rehabilitation units, and piloted for implementation at the Life Rehabilitation Unit at Entabeni Hospital, Durban, with 10 hospitality attendants already working in the rehabilitation setting.

This paper explores the value of such training on the delivery of the rehabilitation service, the effectiveness of this initiative on patient satisfaction, and the extent of the skills acquired by the trainees. It also makes recommendations on how this programme can be further developed and utilised to enhance services within the field of rehabilitation.

49. Development of a web-based application for the planning of renal diets

Herselman MG, Esau N, Labadarios D

Stellenbosch University and Tygerberg Academic Hospital
E-mail: nfanie@pgwc.gov.za

Planning of renal diets can be complex, time-consuming and guidelines for the management of renal patients can quickly become outdated as new scientific evidence becomes available.

The aim of this project was to develop a web-based application for the implementation of the latest evidence-based scientific guidelines in the planning of renal diets.

The project team consisted of 2 experienced renal dietitians and a web-site designer. Testing of the application was undertaken in 2 stages: 1) internal testing by the developers 2) external testing by a statistician, a nephrologist, a medical doctor, and finally testing the application in clinical practice by 13 dietitians.

The application allows for the nutritional assessment of patients, formulating a dietary prescription, development of a meal plan, follow-up notes with graphical display of anthropometric and biochemical measurements, pre-tested pamphlets for patient education and other printable material, as well as an interactive bulletin board. The application allows for individualisation of patients' prescription, based on the clinical judgment of the dietitian.

This user-friendly web-based application makes a unique contribution to the application of science in the clinical management of patients with chronic renal failure. Advantages include rapid and accurate planning of renal diets accompanied by a reduction in consultation time of dietitians, the availability of downloadable educational material, a more uniform approach to the nutritional management of renal patients, improved communication between health care professionals, as well as opportunities for ongoing research.

50. Implementation of hazard analysis and critical control point (HACCP) system in a food service unit (FSU) serving low bacterial diets to immuno-compromised haematopoietic stem cell transplant (HSCT) patients

Vermeulen EE, Hanekom SM, Oldewage-Theron W

North-West University
E-mail: grieta.hanekom@nwu.ac.za

Objective: To supply recommendations to implement a HACCP system in a FSU serving low bacterial diets for prevention or decrease of infection rates in HSCT patients, the current food safety and hygiene status in the FSU was investigated by means of a pre-tested questionnaire (ten categories) and bacterial swabs taken from the FSU, and subsequent data was used to develop a structured action plan for implementation of HACCP standards in the FSU.

Design: The research was conducted in a 350-bed private hospital FSU. One unsuspected audit was done. Percentages were allocated to each of ten categories. Four surface swabs and four food samples were taken and tested for microbiological safety (5 microbes). Results of the audit, swabs and food samples were used to evaluate the current Food and Safety System of the FSU according to internationally approved HACCP standards.

Results: Average score (10 areas) of 37% was calculated (normal < 80%). Microbiological tests showed relatively high microbial counts. Total Aerobic Count for patient food tray and chopping board was above 1000 cfu/cm^2 (normal = 0-100 cfu/25 cm^2). *Coliforms* on patient food tray (> 1000 cfu/cm^2) and chopping board (>1000 cfu/cm^2) (none should be present). *Escherichia coli* on patient food tray was 870 cfu/cm^2 and chopping board 350 cfu/cm^2 (normal = 0-100cfu/cm^2).

Conclusion: Results confirmed that instead of mainly focusing on the selection of low bacterial food items and the cooking methods used in HSCT diets, the type of food service, together with the food and safety protocol that the FSU follows, could play an important role in providing save food to HSCT patients.

51. WHO child growth standard for children under five years

Lartey A

Department of Nutrition and Food Science, University of Ghana, Legon, Ghana, West Africa
E-mail: aalartey@ug.edu.gh

Background: In 1997, the World Health Organization (WHO) embarked on a Multicenter Growth Reference Study (MGRS) to develop international growth standards for assessing the growth of children under five years. The WHO/NCHS in use was found to be inappropriate for assessing nutritional status.

Objective: This presentation describes the implementation of the WHO-MGRS.

Methods: The study was conducted in six sites: Brazil, Ghana, India, Norway, Oman and USA. The study design combined a longitudinal study and a cross-sectional study design. For the longitudinal study, mother-infant pairs were recruited within 24 hours after birth. They were followed up in 21 home visits, until the children turned 24 months. With the cross-sectional study, children 18–71 months were recruited. Strict eligibility criteria were applied: no known environmental constraints on growth, willingness of mother to follow study's feeding recommendations (exclusive breast-feeding for 4–6 months, timely introduction of complementary foods), gestational age ≥ 37 and < 42 weeks, single births, non-smoking mother and absence of significant morbidity. Anthropometric measurements were taken at birth, 2, 4, 6 and 8 weeks; monthly until 12 months and bimonthly thereafter until infant turned 24 months. Rigorous methods of data collection, standardised procedures and quality control measures were followed by all sites.

Results: By following the prescriptive approach, the MGRS children from all 6 sites grew uniformly in weight and length from 0 to 24 months. The final growth standards were released in April 2006. The growth of healthy breast-fed infants from developed countries tracked along the new WHO standards better than on the NCHS reference.

Conclusion: The WHO Child Growth Standards are consistent with current infant and young child feeding recommendations and establish the breast-fed infant as normative model.

52. Traditional leafy vegetables – their potential role to improve nutrition

Faber M

Medical Research Council
E-mail: mieke.faber@mrc.ac.za

The South African population consumes a diet that is low in fruit and vegetables. The average daily per capita intake of 200 gram is much lower than the World Health Organization's recommendation of 400 gram per day to protect against cardio-vascular disease and certain cancers. It is estimated that 80% (23.6 million) of people over 15 years of age consumed less than 400 gram fruit and vegetables in South Africa in 2000. Affordability and availability are major constraints for a frequent intake. Including wild growing vegetables into the diets of people may be a practical and sustainable way to increase vegetable intake.

Traditional leafy vegetables are generally rich sources of micronutrients and anti-oxidants, and can thus make an important contribution towards combating micronutrient malnutrition, provide food security and have a protective effect against certain chronic diseases of lifestyle. Traditional leafy vegetables have other desirable traits. For example, they are often easier to grow than conventional cultivated species, and are more resistant to pests and diseases.

When promoting traditional leafy vegetables for improved nutrition, several factors affecting nutrient content and its bio-availability need to be considered. The nutrient content of the crop may differ between species, and is affected by geographical site, climate, the part of the plant consumed and stage of maturity. Nutrient content is also affected by food processing, different cooking methods and the use of certain food additives. Leafy vegetables are seasonal and highly perishable, and methods used for storage could affect nutrient content, for example drying.

The bioavailability of micronutrients in leafy vegetables is affected by substances that can either inhibit or enhance nutrient absorption. Dark-green leafy vegetables are known to contain, for example, oxalates and phytates known to reduce the absorption of certain micronutrients in the body. Some compounds increase micronutrient bio-availability, for example iron absorption increases when combined with vitamin C.

Nutrient content of traditional leafy vegetables is often reported for the raw leaves, and expressed in terms of dry mass. However, to be able to determine the nutrient contribution of traditional leafy vegetables, nutrient content needs to be available per cooked edible portion. It is therefore preferable that the nutrient content of traditional leafy vegetables is measured after cooking or processing to reflect the nutritional composition of the food as eaten. Availability of such data will assist in the promotion of the nutritional value of these crops.

The use of traditional leafy vegetables within the context of a diversified diet is promoted in the current literature. Promoting frequent consumption of these crops within communities may, however, not be that easy, as people are not always aware of their nutritional value and, more importantly, traditional foods are often regarded as inferior. It has been suggested that promotion campaigns should focus on the younger generation, as they are less familiar with the crop. The image of these crops could be improved through awareness-raising, but this should be based on sound scientifically generated nutrient content data.

53. The utilisation of traditional leafy vegetables and possible implications for nutrition in rural households in South Africa

Vorster HJ, Stevens JB, Steyn GJ

Agricultural Research Council
E-mail: ivorster@arc.agric.za

Many rural households still depend to a large extent on traditional leafy vegetables (TLVs) for their food security strategies. The objective of this study was to determine the utilisation practices associated with TLVs and possible ways of collaboration between indigenous knowledge and science to improve practices where needed. A quantitative questionnaire survey and qualitative study using participatory rural appraisal techniques was done in 4 rural villages (n = 240). These represent different ethnic compositions and different agro-ecological zones, to determine the utilisation practices of TLVs. TLVs were found to be important fresh crops from very early in the rainy season. They are also of importance to help address the food shortages experienced by many rural households during the hunger months of late winter and spring when no fresh crops were available and the stored dried produce has been largely depleted. Pumpkins and cowpea are popular for food security as they supply more than one product (leaves, seed, fruit and flowers). Wild plants such as *Amaranthus* spp, *Cleome gynandra* and *Corchorus* spp are very popular. The cooking and blanching times between the villages vary greatly and raise some concern for the loss of nutrients. The drying and storage methods for TLVs illustrate possible detrimental practices for retaining nutrients. The various practices render caution in determination of nutrient content of the foods, and small changes to preparation and drying methods can potentially improve retention of nutrients considerably. Many TLVs are readily available in rural areas within South Africa, and are tasty and easy to cultivate with minimal management.

54. Nutrient intakes and food security of a rural population living in the Eastern Cape Province

Burger HM, Lombard MJ, Steyn NP, Gelderblom WCA

PROMEC Unit, Medical Research Council
E-mail: hburger@mrc.ac.za

A study was undertaken to assess nutrient intakes and the food security using a validated dietary assessment (RAPP) tool among a high oesophageal cancer risk population living in the Centane area of the Eastern Cape Province. Apparent healthy volunteers (n = 319), between the ages of 18 and 65 were recruited. An adapted version of the hunger scale was used to determine the level of hunger exposure in this area. The hunger scale indicated that 9.1% were not exposed to hunger, 24.4% were at risk of being exposed to hunger while another 66.6% were exposed to hunger. The RAPP tool indicated a median intake of 19 872 KJ, 118g protein, 144g fat and 679 g carbohydrates. Although these median nutrient intakes indicated a low exposure to hunger, it is known that the RAPP tool over-reports average macronutrient intake up to 40%. Therefore, it is proposed that hunger exposure is present in this area and may contribute to malnutrition.

55. Dietary diversity in relation to other household food security indicators

Faber M, Schwabe C, Drimie S

Medical Research Council
E-mail: mieke.faber@mrc.ac.za

Background: Dietary diversity is an easy to apply indicator that can be used as proxy measure for the access dimension of household food security and the nutritional quality of the diet.

Objectives: To describe dietary diversity in relation to other food security indicators used in a livelihood survey as part of the piloting of a Food Insecurity and Vulnerability Mapping System.

Methods: A cross-sectional survey of 499 randomly selected households within five municipalities in Greater Sekehukhune, Limpopo Province, South Africa was done. Indicators calculated using data collected by questionnaire included dietary diversity score (DDS), living standards measure (LSM – an asset poverty indicator), months of food shortages, and household food insecurity and access scale (HFIAS). Households with DDS # 4 (n = 267) and DDS > 4 (n = 232) were compared using analysis of variance and χ^2-test.

Results: Eighty-three percent of households with DDS # 4 fell in the low LSM category versus 67% of households with DDS > 4 ($P < 0.001$). Compared to households with DDS > 4, households with DDS # 4 had fewer assets (e.g. fridge 22% versus 43%, $P < 0.001$), fewer savings accounts (36% versus 60%, $P < 0.001$), experienced more food shortages, and had a higher HFIAS (16.0, 95% CI 15.0 – 17.0 versus 9.8, 95% CI 8.8 – 10.9; $P < 0.001$). Spearman correlation analysis showed an inverse correlation between DDS and HFIAS ($r = -0.450$; $P < 0.01$).

Conclusion: Households with low dietary diversity had limited assets, experienced periods of food shortages and were likely to be food insecure. Dietary diversity therefore is a promising indicator for food security.

56. Qualitative research exploring the influence of household composition and intra-household dynamics on nutrition security among farm workers, North West Province, South Africa

Heumann N, Lemke S, Leonhaeuser I-U, Kruger A

Centre for International Development and Environmental Research, Justus-Liebig University, Giessen
E-mail: nicole.heumann@gmail.com

Nutrition security is not only determined by access to and availability of food, but also by underlying social factors such as conflict about income and other resources. This paper illustrates household composition, intra-household dynamics and nutrition security on farms, a setting where in-depth research is largely missing.

Research was carried out from 2004 to 2008 among 44 farm worker households on three commercial farms in the North West Province, South Africa, using structured open-ended interviews, household food inventories and observation. Intra-household dynamics were explored in a sub-sample of 18 conjugal households, interviewing both partners separately.

Almost every second household is nutrition insecure (47.8%). Households are mainly conjugal (55.1%), women led (24.5%) and men led (20.4%). More than half of conjugal households are nutrition insecure (58.3%) whereas more women led households are nutrition secure (75.0%). Most couples (n = 18) are not married (88.9%). Men (46.2%) report that they cannot afford bride wealth, while women (41.1%) state that they are afraid to be abused and controlled by their partners as soon as they are married. Only 35% of women and 40% of men discuss important matters with their partner. None of the women regard their partner as the main decision-maker. In contrast, half of the men state that decisions are made equally. In most relatively nutrition secure households (85.7%) women regard themselves as the main decision-maker.

Intra-household dynamics reveal mistrust and differing perceptions between partners, negatively impacting on nutrition security. Future programmes aimed at enhancing nutritional status need to take these household dynamics into account.

57. We spend the farm wage immediately when we get it – gender-specific livelihoods in the context of nutrition security among farm workers, North West Province, South Africa

Lemke S, Heumann N, Sithole S, Matenge S

Institute for Social Sciences in Agriculture, Gender and Nutrition, University of Hohenheim, Germany
E-mail: stefanie.lemke@uni-hohenheim.de

Health and nutrition surveys often do not take into account complex household formation and informal incomes. This paper aims to address this gap, exploring gender-specific livelihoods among farm workers.

Research was carried out from 2004 to 2008 among 74 farm worker households on four commercial farms in the North West Province, employing structured open-ended interviews, focus group discussions and observation.

Farm workers mostly depend on farm employment and struggle to access jobs outside the farms, largely due to the lack of infrastructure and lack of skills. Most women depend on their male partners' income and accommodation, but obtain additional incomes and resources through social grants, remittances, informal businesses and multiple networks, with men having less access to these alternative sources. While minimum wages result in farm workers having fewer resources, farm owners still play a major role in supporting workers and their families with food and money. Households stretched over several residential units or households led by men or women alone are formed to overcome nutrition and livelihood insecurity. Households with higher and more diversified incomes, being led by women, with women earning an income, having proximity to town and availability of grocery stores are more likely to be nutrition secure.

Even in the limiting setting of farms livelihoods are diverse. Women, despite being unemployed, are not as badly off financially as often suggested in quantitative surveys. Complex livelihoods and household formation have to be acknowledged in order to obtain more reliable data on socio-economic status of men and women.

58. Service excellence in the dietetic profession

Kassier S

University of KwaZulu-Natal
E-mail: kassiers@ukzn.ac.za

The purpose of this paper is to discuss the concept "service excellence", provide background literature to justify its relevance of and application in the dietetic profession. Case studies will also be used to illustrate the successful application of this concept in other health professions.

Service excellence is the ability to provide excellent service to patients and other health professionals, especially in a clinical environment. Although the term is often used in the context of the hospitality industry, it has been implemented with great success amongst health professionals such as nurses and dermatologists. Guidelines published by the Johns Hopkins University School of Medicine as well as the American Dietetic Association illustrate the implementation of this concept in a step-wise manner that includes concepts such as creating positive first impressions in terms of what the health professional says, how they say it and how patients perceive body language and actions displayed by health professionals. Guidelines are also provided on how to counsel more effectively and in the event of patient dissatisfaction tips on service recovery are given. Other aspects of service excellence include guidelines on how to deal with cultural diversity. Pointers for managers on how to ensure that this concept is implemented and standards maintained are also given.

59. The personality typing of dieticians and dietetic students in the Western Cape

Van der Merwe L, Le Roux D, Marais C, Conradie J, Hendricks M, Marais D

Stellenbosch University and Tygerberg Academic Hospital
E-mail: dm@sun.ac.za

Personality typing has been used in a wide variety of fields to study the human character in relation to careers. Various studies have been conducted using the Myers-Briggs Type Indicator (MBTI) showing that certain personality types are predominant in the broad health sector, indicating that people who are orientated to detail and who are organised are attracted to these professions. This study aimed to determine the personality typing of a convenience sample of dieticians and dietetic students in the Western Cape. A descriptive cross-sectional study was conducted using the MBTI to determine personality typing. Individuals are forced to choose between two opposites which then identify their dominant preference in four different categories i.e. Introvert (I) or Extrovert (E); Sensing (S) or Intuition (N); Thinking (T) or Feeling (F) and Perceiving (P) or Judging (J), allowing for 16 possible personality typings. A total of 123 dieticians and dietetic students took part in the study, comprising academic, tertiary- and district hospital, foodservice, community and private practicing dieticians (n = 50) and BSc Dietetics students at Stellenbosch University (n = 73). A socio-demographic questionnaire was also administered. The personality types ESTJ, ISTJ, ISFJ and ESFJ were predominant. In the academic field ISTJ was predominant, in the clinical field ISFJ and in foodservice, private practice and community, ESTJ. A high preference for Judging vs Perceiving and Sensing vs Intuition scores was found for the whole study population. Dieticians and dietetic students tend to be organised, like to plan ahead and use their senses to gather concrete information. They are practical, detailed, systematic and decisive.

60. ICD10 – summary of the diagnosis that paying patients have when consulting a dietician

Scharf O

Dietetic Services/Program Management
E-mail: scharf@icon.co.za

Objective: To investigate exactly the most common to the least common conditions a group of private practice dieticians see in their practices using a "short list" of ICD10 codes

Design: Collecting patient data from the practices and by summarising the data; epidemiology reports may be generated over any time frame and across any anthropomorphic criteria e.g. gender, age descriptive statistical means would be adequate as the sample is very large. The privacy of the patients is not compromised as their names and address details are removed.

Results: A list of the most common to the least common diagnosis will be presented.

The age of the patient will also be available so it would be possible to determine the age when a diagnosis is first made e.g. diabetes; and using future longitudinal studies to determine any changes in the diagnosis answer the questions : Are more people becoming diabetic? At what age? Does gender play a role?

Ceu courses can focus their attention on the changes in disease pattern. We would be able to see if the ICD10 diagnoses vary upon the language and university education of the dietician as it does in Canada (pers comm)

The medical schemes (insurance companies) have access to the universal data set in South Africa – This abstract would be a plea that the ICD10 data is made available to all researchers.

61. Computer-based learning for the enhancement of breast-feeding training for South African undergraduate dietetic students

Du Plessis LM, Marais D, Labadarios D, Singh T

Stellenbosch University and Tygerberg Academic Hospital
E-mail: lmdup@sun.ac.za

Introduction: There is a great need for breast-feeding training for students of health care professions. Students of today relate well to the use of computers in the learning environment. It was decided to explore this teaching method as a means to enhance breast-feeding learning.

Aim: To adapt and validate an Indian computer-based undergraduate breast-feeding training module intended for use by SA undergraduate dietetic students.

Methods: The Indian module was adapted to suit the SA scenario and converted into web-based interactive material. Face and content validity was assessed by 19 peer reviewers and 17 third year SU dietetic students by means of self-administered questionnaires. The impact on knowledge was evaluated on second year SU (n = 14) and UWC (n = 15) dietetic students by means of pre- and post-tests.

Results: All the reviewers rated their IT skills as sufficient and enjoyed the delivery mode. Third year students indicated that computer-based learning was a "nice way of learning", but pleaded that it should not be used as the sole source of instruction. The majority of the peer reviewers and students (53%, n = 19) rated the mode of learning to be equally effective compared to conventional lectures, 35% rated it as being more effective and 11% as less effective. There was a significant increase in the knowledge test scores for second year students.

Conclusion: The SA breast-feeding module can be integrated effectively as part of multi-media methods to increase knowledge and enhance breast-feeding training for undergraduate dietetic students, as well as other students of health care professions.

62. An investigation of foodservice practices in the National School Nutrition Programme in Pietermaritzburg schools

Meaker JL, Maunder EMW, Marais ML

University of KwaZulu-Natal
E-mail: meakerj@ukzn.ac.za

Aim: To investigate foodservice management practices in primary schools implementing the National School Nutrition Programme (NSNP) in Pietermaritzburg, KwaZulu-Natal

Methods: A cross-sectional, observational study was conducted to assess 23 schools by interviewing the site manager (SM) and food handler (FH) and observing foodservice practices during preparation and service.

Results: More than 60% of learners ate the food regularly at 74% of schools. On the day of the visit 78% of schools served food that complied with menus prescribed by the DoE, 30% used standardised recipes and 52% served food at or before 10am. Receiving and storage procedures were adequate at most schools. Most schools cooked on gas and 35% of schools had no running water in the kitchen. Insufficient space for preparation and cooking was reported by 22% of FHs. Some schools had insufficient plates (26%) and cutlery (35%). Standardised portion sizes were served at 70% of schools and FHs reported that learners usually finish all the food. FHs at 70% of the schools had received training in food safety and hygiene but 26% of these had only received training once.

Conclusion: The NSNP is running reasonably well in Pietermaritzburg. Improvements could be made by adhering to prescribed meal times, using standardised recipes, improving kitchen facilities and provision of adequate utensils. FH training could also be conducted more regularly.

63. The three musketeers – industry, government & science

Jerling JC

North-West University
E-mail: johann.jerling@unw.ac.za

The emergence of functional foods as a consumer driven strategy to enhance health and well-being has been welcomed by government, health professionals, scientists and industry alike. The success of functional foods as an innovative and effective contributor to public health in South Africa is dependent on the fragile relationship between government, science and industry. This relationship is primarily built on trust and requires a thorough understanding of each others priorities, strengths and weaknesses as well as having a common goal. A number of recent examples from Europe have shown how such a partnership could be effective and lead to significant advances in health and nutrition policy. The Process for the Assessment of Scientific Support for Claims on Foods (PASSCLAIM) is one such example, illustrating the importance of the inputs of all partners in the relationship. The UK Government's Foresight programme uses science based methods to provide visions for the future. Although the future can not be predicted, our research methods are useful in helping us to identify the potential risks and opportunities in relation to science and technology, which can enable policy makers to develop strategies to manage our future health better. This process requires strong decisive visionary leadership and a motto "One for all and all for one".

64. An industry approach to front of pack labelling: a critical review

Steyn NP

Medical Research Council, University of Cape Town
E-mail: nelia.steyn@mrc.ac.za

There is robust evidence that dietary factors are related to the development of chronic diseases such as heart disease, stroke, obesity and diabetes. When consumed in high amounts, trans fat, saturated fat, sodium, sugar, and energy have been convincingly associated with undesirable health effects. The WHO Global Strategy on Diet Physical Activity and Health recommends the private sector to limit the levels of these nutrients in existing and innovation products in order to reduce the burden of chronic diseases on society. Some food products fit better within a healthy diet than others, but how can consumers tell? The 3 main systems punted by the food industry globally for front of pack labelling are: GDA, traffic lights and Choices, each with its own merits.

Consumers want to make a healthy choice but find it difficult because they often do not understand nutrient tables especially at the supermarket shelf where time is of the essence. The various health claims and press around certain ingredients also adds to the confusion. The Choices programme is a simple and internationally-applicable front-of-pack system to help consumers make a healthy choice on food and beverages and to stimulate industry towards healthy product innovation in all food groups. The Choices logo is applicable to all food and beverages that meet the qualifying criteria based on international dietary guidelines for saturated fat, trans fat, sodium and sugars as well as energy and fibre where relevant. The criteria have been developed and will be periodically reviewed by an International Scientific Committee made up of independent leading scientists

65. Applying the elaboration likelihood model to consumers' perceptions of food additive labelling

Dicks EG, Van der Merwe D

Vaal University of Technology
E-mail: emsie@vut.ac.za

Objective: The primary objective of this study was to apply the Elaboration Likelihood Model of Persuasion on consumers' perceptions of food additive labelling.

Scope: There is currently a lack of data concerning consumers' perception about food additive labelling in South Africa. The information is required to improve public health; improved understanding of consumer needs can assist in designing labelling regulations.

Research methodology: A qualitative research project consisting of eight focus group sessions, with 39 food additives label readers was conducted in the Vaal Triangle area, South Africa. Content analysis was used to categorise the data into concepts and themes to facilitate interpretation of the findings. Triangulation, credibility and transferability checks as well as dependability and conformability audits were used to ensure trustworthiness.

Results: The results indicated that additive terminology, claims and E-numbers on the label contributed to consumers general perceptions of additives. Participants searched food labels for specific types of additives such as tartrazine, MSG and artificial sweeteners. Participants were confronted with various blocking mechanisms when searching for and selecting food products containing additives. On the other hand, participants used various risk reducing strategies to reduce their concerns.

Conclusion: In order to understand the results the Elaboration Likelihood model was adapted and applied to food additive labels. The adapted model illustrates how the consumers' perceptions of additive labels and the additional information search influence their purchasing behaviour to different extents.

Recommendations: More attention should be given to consumer education with regard to additive terms used on food labels.

66. Alternative food quality dynamics in South African milk and dairy products: a focus on nutrient benefit claims

Vermeulen H, Schönfeldt HC

School of Agricultural and Food Sciences, University of Pretoria
E-mail: hester.vermeulen@up.ac.za

Alternative food quality movements globally and to an increasing degree in South Africa have led to a turn from the mass consumption model toward a growing qualitative differentiation of products. Consequently, in addition to price, other factors are gaining importance in transmitting product quality information to consumers – including nutrient benefit claims.

The paper discusses the incidence and associated price premiums of nutrient benefit claims on South African milk and dairy products and evaluates the claims' legislative validity. The nutrient benefit claims and prices of an extensive range of dairy foods were investigated through in-store observations at major SA retailers. Data analysis involved the estimation of price premiums and the interpretation of nutrient benefit claims in the context of applicable target markets and food labelling legislation.

The most commonly occurring nutrient benefit claims on SA dairy food are 'Low fat' and 'Live … cultures' and 'Rich in / Source of calcium and vitamins (various, but especially Vitamin D). Numerous products are fortified with vitamins / minerals. In childrens' foods the absence of artificial colourants / flavourants is particularly mentioned. Price premiums were absent for 'naturally occurring' nutrient benefits mentioned, as well as for low fat product alternatives. Price premiums were mainly observed for 'functional' dairy foods and varied substantially depending on the target market, with an average price premium of 11% for 'simple' functional foods compared to 97% for 'sophisticated' functional dairy foods. Local nutrient benefit claims of dairy products correspond to international trends in food product development and legislation

67. The impact of food fortification on micronutrient intake

Danster N, Wolmarans P

Nutritional Intervention Research Unit, Medical Research Council
E-mail: natasha.danster@mrc.ac.za

Introduction: Mandatory fortification of maize meal and wheat flour became law in South Africa in 2003. Nutrient information for maize meal and bread in the 1991 MRC Food Composition Tables is therefore outdated. Nutrient information on South African fortified maize meal and bread was recently generated.

Objective: To determine the impact of fortification of staple foods on an individual's micronutrient intake.

Methodology: A one day sample menu, including half a cup of unfortified special maize meal porridge (soft) and four slices of unfortified brown bread, was analysed using FoodFinder 3 (containing 1991 MRC food composition data). The same one day sample menu was re-analysed but the new values on fortified special maize meal porridge (soft) and brown bread were used, not the unfortified nutrient values. Menus were analysed for energy, minerals (iron, zinc) and vitamins (A, B_6, thiamine, riboflavin, niacin and folate) and the differences compared. Intake was expressed per 1 000 kJ.

Results showed that when comparing the micronutrient intake of the two menus, all six vitamins, iron and zinc increased. Vitamin A intake illustrated a difference of 23%. Analysis of niacin and zinc showed that intake increased by 39% and 59% respectively. Thiamine intake showed a difference of 44% between the two sample menus.

Conclusion: The new food composition data available on staple foods makes it possible to demonstrate how food fortification has a positive influence on micronutrient intake.

68. Socio-demographic characteristics of children 12–108 months and women 16–35y old in South Africa: the national food consumption survey – fortification baseline

Swart R, Labadarios D, Kruger HS, Nel JH

University of the Western Cape
E-mail: rswart@uwc.ac.za

Introduction: Nutritional status is the outcome of a number of interrelated biological, social, economic and environmental factors.

Aim: Within this context the socio-demographic component of the NFCS-FB aimed to investigate biological, educational, infrastructure, social security, income and utilisation of selected health services in the study population.

Methodology: A representative sample with proportionate provincial representation of children 12–108 months and women 16–35 years in South Africa). A questionnaire was administered by trained fieldworkers.

Results: The overall response rate was 91% (2469 children aged 1–9 years and 2450 women 16–35 years). In 73% of households the mother of the child was the respondent. Fifty-seven percent of the study sample lived in urban settings. Of all participants 68% resided in brick houses, 60% had access to a dedicated household tap and 45% to flushable toilet facilities. Household income remained low with 60% of households spending more than 40% of income on food. Seventy-four percent of households received social support, the majority being child support grants (63%). Utilisation of high dose vitamin A supplementation varied by province with only 20% of eligible children benefiting from this programme during the previous 6 months. Self-initiated supplementation of women and children in the study sample was negligible.

Conclusion: Despite notable improvements in infrastructure and household services, many households lived under adverse socio-economic conditions and food security remained a problem. The coverage of the high dose vitamin A supplementation programme requires attention.

69. Anthropometric status of children 12–108 months and women 16–35 years old in South Africa: the national food consumption survey – fortification baseline

Kruger HS, Swart R, Labadarios D, Dannhauser A, Nel JH, Steyn NP

University of the North-West
E-mail: salome.kruger@unw.ac.za

Aim: A nationally representative study (1999; weighted sample) showed that 19.3% of South African children 12–108 months old were stunted and 17.2% were overweight/obese. The South African National Demographic and Health Survey (1998) indicated a low prevalence of underweight, but more than half of adult women were overweight/obese.

Aim: To assess anthropometric status in a representative sample of children 12–108 months and women 16–35 years in South Africa, and to compare the results with the previous national studies.

Methodology: Subjects were weighed, the supine length in children younger than 36 months was determined and stature of older children and women was measured. For children weight-for-height (WHZ), weight-for-age (WAZ), height-for-age z-scores (HAZ) and body mass index (BMI) were calculated.

Results: Stunting (HAZ =/< -2) remains the most common nutritional disorder, especially among 12–36months old children in rural areas, but the prevalence decreased significantly to 18%, with the best improvement in rural areas. The prevalence of overweight/obesity among children was highest in the urban areas and lowest on commercial farms. The percentage of women being underweight remained low, but more than 50% of women were still overweight/obese. Overweight and underweight prevalence among children remained relatively stable compared with the 1999 survey, with a trend of a decrease in overweight/obesity based on BMI.

Conclusion: The prevalence of stunting demands action, especially among younger children in rural areas. The improvement of health services for young children should still be seen as a national priority. The high prevalence of obesity among women indicates a need for obesity prevention programmes.

70. Folate, iron, vitamin A and zinc status of children 12–108 months and women 16–35 years old in South Africa: the national food consumption survey – fortification baseline

Labadarios D, Van Rensburg E, Louw R, Moodie IM, Nel JH, Dhansay MA, Marais CDeW

Stellenbosch University and Tygerberg Academic Hospital
E-mail: demetre@sun.ac.za

Aim: To assess the micronutrient status in a representative sample of children aged 12–108 months and women aged 16–35 years in South Africa, and to compare the results with the previous national studies, as applicable.

Methodology: Standard HPLC, nephelometric, radio assay and atomic absorption techniques were used for sample analysis.

Results: Nationally, folate status among the children and women included in the survey was almost universally normal. The prevalence of anaemia in both women and children was 29.4% and 27.9%. Iron depletion was present in 7.7% of women and 5.7% of children. Iron deficiency anaemia among women was 10.5% and the corresponding prevalence in children was 7.6%. The prevalence of poor iron status (combined depletion and iron deficiency anaemia) was 18.2% in women and 13.3% in children. The prevalence (63.6%) of serum vitamin A concentration below 20 µg/dL found in this survey identified the country as having a serious public health problem of vitamin A deficiency. Also of importance was the finding that a significant percentage of children (13.7%) had serum vitamin A concentrations lower than 10 µg/dL. Of equal concern was the high prevalence (27.2%) of inadequate status among women of reproductive age. Nationally, 45.3% of the children included in the survey were zinc deficient. There were no significant differences between mean serum zinc (68.4 µg/dL vs 69.3 µg/dL) or zinc deficiency (47.8% vs 39.3%) for urban and rural populations.

Conclusion: The normal folate status probably reflects the early beneficial effects of the implemented food fortification legislation. Until sufficient time has elapsed for the full benefits of food fortification to be evaluated, other measures need to be put in place to address the poor iron, vitamin A (women and children) and zinc status (children) in the country.

71. Knowledge, attitude and behaviour (KAB) on food fortification of women of child bearing age (national food consumption survey — fortification baseline)

Gericke GJ, Labadarios D, Ntsie PR

Pretoria University
E-mail: ggerik@med.up.ac.za

Aim: The main domain investigated was the awareness of and intention to purchase fortified foods in a randomly selected group of the population of South Africa.

Methodology: The Theory of Planned Behaviour was used as a framework for conceptualising, measuring and empirically identifying factors that determined the purchasing behaviour of the respondents in respect of fortified foods. The KAB questionnaire was developed and validated for use and was administered by appropriately trained fieldworkers. Data analyses included frequencies, correlations as well as internal consistency and reliability.

Results: Nationally, 70% of the respondents (n = 2450) believed that adding vitamins and minerals to food was healthy and beneficial. The health professional, radio/TV and school, but not the husband, exerted a strong normative influence in 74% of the participants. Half of the women indicated that they would buy fortified foods even if they were "a little more" expensive. The terminology "food fortification" was not easily understood/ correctly interpreted even though almost 50% knew about the legislation and had previously seen the logo. Eighty percent indicated their intention to buy fortified foods, had a sound to very good basic nutrition score on vitamins and minerals, except iodine. A positive to very positive attitude with regard to healthy eating was portrayed by 60% of the participants. Findings differed among the provinces.

Recommendation: Educational messages that will impart instrumental knowledge on the already motivated public ought to be developed. Well-planned communication campaigns are necessary to ensure that terminology around food fortification is more customer-friendly and better understood. This can be addressed within the current framework of the Integrated Nutrition Programme.

72. Practices regarding the use of fortified foods and the field detection of Vitamin A in maize

Maunder EMV, Kuzwayo PMN, Labadarios D

University of KwaZulu-Natal
E-mail: MaunderE@ukzn.ac.za

Aim: To determine practices with regard to the procurement and use of fortified foods (maize meal, wheat flour, bread and salt) and prevalence of the presence of vitamin A in maize in South African households.

Methodology: A nationally representative cross-sectional, observational household (HH) study. Data was collected using a food procurement questionnaire, a household inventory questionnaire and a field kit for the detection of vitamin A in maize.

Results: The vast majority of households procured maize meal (96.2%), wheat flour (75.6%), bread (86.7%) and salt (96.6%) for consumption. The household inventory showed a similar prevalence of maize meal (91%) and salt (97.4%) in the households; the prevalence of wheat flour (53%) and bread (58.1%) was lower. The field test detected the presence of vitamin A in 74.5% of the maize samples tested nationally, with a lower frequency in rural (67.6%) when compared with urban areas (80.4). The lowest frequency of detection of the presence of vitamin A in maize was in the tribal areas (66.6%).

Conclusions: These findings indicate wide consumption of the fortified foods in South Africa. The majority of the maize meal tested showed vitamin A to be present. These findings show the success of the fortification programme.

73. The iodine content of household salt and drinking water, and the iodine status of South African women and children in 2005

Jooste PL, Labadarios D, Nel H, Strydom E

Nutritional Intervention Research Unit, Medical Research Council
E-mail: pieter.jooste@mrc.co.za

Aim: Iodine was one of the micronutrients included in the National Food Consumption Survey – Fortification Baseline in South Africa in 2005 for assessment.

Methodology: A nationally representative sample of households with provincial representation was drawn based on the 2001 Census information. In the selected households, drinking water, table salt and urine samples from women aged 16 to 35 years and children aged 6 to 9 years were collected and analysed for the iodine concentration by the titration method in salt and the Sandell-Kolthoff method in urine and water.

Results: Nationally, 97% of households used salt with any amount of iodine but only 77% used salt containing more than 15 ppm of iodine, with large interprovincial variation. More urban households (82%) used adequately iodised salt than rural households (70%). The iodine concentration in drinking water was low in all the provinces except in the Northern Cape, where it was high, and to a lesser extent in Limpopo. Based on the median urinary iodine concentration the iodine status of women was in the optimal range nationally as well as in 5 of the nine provinces, more than adequate in another 3 provinces and excessive in 1 province. The median urinary iodine concentration in children was generally higher than that of women. In 2 provinces, where sample sizes were small, it was excessively high.

Conclusion: The data suggest that the coverage of adequately iodised salt needs to improve from 77% of households to the required level of 90%. Overall, the iodine status of women and children is adequate or more than adequate in all but two provinces, where indications of excessive intake need to be investigated. In future the successful elimination of iodine deficiency should be maintained, but the salt iodisation programme needs to be carefully monitored.

74. A measure of hunger of children (1–9 years) and women of child bearing age (National Food Consumption Survey — fortification baseline)

Gericke GJ, Labadarios D

Pretoria University
E-mail: ggerik@med.up.ac.za

Aim: To estimate hunger and food insecurity as an additional indirect means of reflecting on the parameters studied in the survey.

Methodology: The CCHIP Hunger Index was used to determine domestic hunger. For each aspect of hunger (eight questions) temporal and periodicity of such food insecurity over a period of 30 days were also assessed. Data analyses included frequencies, the Kruskal-Wallis test (significance testing), the Bonferonni test (direction of the significance between the various with-in group comparisons) and factor analysis.

Results: Nationally, 50% of households (HH) experienced hunger, 30% were at risk for hunger and 20% appeared to be food secure. HH at risk of or experiencing hunger procured less fortified foods, tended to be from informal dwelling types, and had the lowest monthly income. The mothers of such HH had a lower education level. Prevalence of HH experiencing hunger was highest in Eastern Cape, Northern Cape and Limpopo. Provincially, the positive responses on each question revealed the same trend: the frequency of an affirmative response was the highest, with temporal severity being experienced consistently to a lesser extent. Periodicity was lower than temporal severity. Overall consistent association between the hunger risk classification and anthropometric status was revealed. Factor analysis showed factor loading which explained 80%, 78% and 79% of the variance respectively at the urban, rural and national level.

Recommendation: Food insecurity should be consistently addressed within the current frameworks of the Food Security Strategy for South Africa and the Integrated Nutrition Programme. Sustainable multi-sectoral interventions should be planned and implemented.

75. Micronutrient status and C-reactive protein levels in overweight and obese 3 to 9 year old children from Gauteng and Mpumalanga

Symington EA, Gericke GJ, Labadarios D

University of South Africa (UNISA)
E-mail: syminea@unisa.ac.za

Objective: To determine the micronutrient status of overweight and obese 3 to 9 year old children in Gauteng and Mpumalanga. Correlations of these factors with C-reactive protein (CRP) were also examined.

Sample: 3- to- 9 year old children (n = 539) from Gauteng and Mpumalanga.

Methodology: Analyses were performed on selected data of the National Food Consumption Survey (Fortification baseline); gathered during 2004. Nutritional status was determined by means of anthropometry and biochemistry on vit A, iron and zinc status.

Results: 7.8% were overweight and 6.3% obese (14.1% of sample was at least overweight) and 32.1% had low zinc values (< 65 µg/dL). Half of the children (50.5%) had low vit A levels (10–19,9 µg /dL) and 9.7% were vitamin A deficient (< 10 µg/dL). No significant correlations were found between BMI and CRP (P = 0.69) or between BMI and vit A (P = 0.64), iron (ferritin: P = 0.53 and haemoglobin: P = 0.96), or zinc (P = 0.053). CRP had a strong negative correlation with vit A (P = 0.0003; r = -0.23) and a very strong positive correlation with ferritin (P < 0.0001; r = 0.57). Although CRP had a positive correlation with ferritin, it had a negative correlation with haemoglobin levels (P = 0.03; r = -0.12). There was no correlation between CRP and zinc (P = 0.22).

Discussion: The inflammatory risk factor, CRP, did not seem to correlate significantly with obesity in 3 to 9 year old children. However, the CRP seemed to correlate significantly with some micronutrients.

Conclusion: More research is necessary to determine the relationship between CRP and micronutrients in children of varying nutritional status.

76. Effect of glycaemic control on fibrin network characteristics of Africans with uncontrolled type 2 diabetes

Covic N, Pieters M, Jerling JC, Van Zyl DG, Rheeder P, Weisel JW

North-West University Potchefstroom Campus
E-mail: namukolo.covic@nwu.ac.za

Introduction: Type 2 diabetes increases cardiovascular disease risk and mortality. Alterations to fibrin network structure possibly due to fibrinogen glycation contribute to increased cardiovascular disease risk. The study's aim was to determine whether glycaemic control would reduce fibrinogen glycation and alter fibrin network structure.

Method: Twenty black South Africans with uncontrolled type 2 diabetes and 20 age and BMI-matched non-diabetic volunteers were included. Diabetic volunteers were treated with insulin to control blood glucose. Blood samples were drawn both at baseline and after glycaemic control was achieved and maintained for 8 days. Fibrin network structure variables were measured in plasma and in fibrinogen purified from volunteer plasma.

Results: Fibrinogen concentration was elevated in both groups (4.25 vs 4.02 g/l). Baseline fibrinogen glycation was higher for diabetic than non-diabetic volunteers (7.84 vs 3.89 mol glucose/mol fibrinogen, respectively; p = 0.0002). Glycaemic control reduced fibrinogen glycation (7.84 to 5.24 mol glucose/mol fibrinogen; p = 0.0007). In the purified model glycaemic control increased clot permeability (p = 0.02) and fibrin network structure variables correlated with markers of glycaemic control e.g. HbA1C, fasting glucose and fibrinogen glycation. In the plasma model, clot rigidity increased and formation kinetics changed with glycaemic control in diabetic volunteers. In plasma, fibrin network structure correlated with fibrinogen concentration and not with fibrinogen glycation.

Conclusion: Glycaemic control reduced fibrinogen glycation resulting in alterations to fibrin network structure. High fibrinogen concentrations may have masked effects of fibrinogen glycation in the plasma model. Since the intervention was done under out-patient conditions these results are applicable to the general diabetic population.

77. Dietary intake, diet-related knowledge and metabolic control of children with type 1 diabetes mellitus aged 6–10 years attending the paediatric diabetic clinics at Grey's Hospital, Pietermaritzburg and Inkosi Albert Luthuli Central Hospital (IALCH), Durban, KwaZulu-Natal

Pillay K, Maunder EMW, Naidoo KL

Dietetics and Human Nutrition, University of KwaZulu-Natal
E-mail: Pillayk@ukzn.ac.za

Aim: To assess the dietary intake, diet-related knowledge and metabolic control in children with type 1 Diabetes Mellitus between the ages of 6–10 years attending the Paediatric Diabetic Clinics at Grey's Hospital, Pietermaritzburg and IALCH, Durban, KwaZulu-Natal.

Methods: A cross sectional, observational study was carried out in a total of 30 subjects out of a possible 35 subjects from both sites. Dietary intake was assessed using a three day dietary record (n = 20) and a 24 hour recall of the third day of the record (n = 16). Diet-related knowledge was assessed using a multiple choice questionnaire and metabolic control was assessed using glycosylated haemoglobin (HbA1C).

Results: The mean percentage contribution of macronutrients to total energy was very similar to the International Society for Pediatric and Adolescent Diabetes (ISPAD) Consensus Guidelines (2002). The mean percentage contribution of macronutrients to total energy from the 3 day dietary records and the 24 hour recalls were as follows: carbohydrate (52% and 49%); sucrose (2% and 2%); protein (16% and 17%); fat (32% and 34%). Micronutrient intake was adequate except for calcium and vitamin D which showed low intakes. The mean diet-related knowledge score was 67%. The mean latest HbA1c for the sample was 9.7% and the mean HbA1c over the previous 12 months was 9.6%.

Conclusion: The macronutrient intake was found to be similar to the ISPAD Consensus Guidelines (2002) while calcium and vitamin D intakes were low. Overall the sample displayed good diet-related knowledge while metabolic control was found to be poor.

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PRESENTERS: POSTER PRESENTATION ABSTRACTS

1. Designing a tuck-shop programme for a school-based healthy lifestyle intervention (HealthKick)

Abrahams Z, Zwart M, Sauls L

Heart & Stroke Foundation SA
E-mail: zulfa@heartfoundation.co.za

Aim: To develop a healthy tuck-shop programme for the HealthKick project based on existing evidence and experience obtained by the Heart and Stroke Foundation South Africa (HSFSA) during their ongoing tuck-shop advisory service.

Methodology: The HSFSA introduced a tuck-shop programme following statistics which revealed that 17% of South African children one to nine years are overweight. Firstly, dieticians from the HSFSA made on-site visits to schools (n=15) in order to assess the type of snacks sold at school tuck-shops. Their assessment showed that the most common snack foods sold were typically high in fat, saturated, trans fats, and added sugar i.e. crisps, pies, sweets, and soft drinks. Fruits, vegetables and dairy products were seldom available. The tuck-shop managers at selected schools were provided with assistance and education in making healthier choices when purchasing stock for the school shops. This advice included increased availability of fruits, vegetables and whole grain foods; providing more baked snack foods instead of deep fried foods; and placing limits on the fat, sugar and caloric content of foods served. In order to provide continuous nutrition education, teachers and parents were provided with regular newsletters electronically.

Results: Subjective feedback from teachers and principals has indicated that the consumption of healthier snack foods at schools which implemented the dietary advice has resulted in decreased hyperactivity and improved concentration in learners.

Conclusion: The experience gained from this programme of the HSFSA will be utilized in the development of a tuck-shop programme within the HealthKick intervention.

2. Investigation of the effect of ginger on the lipid level

Akhbardeh M

Tabriz Medical University and Hospital Shams Group
E-mail: mahdi_akhbardeh14@yahoo.com

Background: Use of medical plants as a pharmacologic modality in prevention alternation in lipid metabolism has received wide attention form several workers. The lipid lowering effect of ginger was evaluated in this study.

Methods: This study is a randomized control trial that were performed on patients with hyperlipidaemia. Exclusions were diabetes mellitus, hypothyroidism, nephrotic syndrome, alcohol, pregnancy and peptic ulcer. Patients were randomized to receive ginger capsule (3gr/day in 3 divided doses) for 45 days. Lipid profile concentrations before and after treatment are measured by enzymatic assay and with demographic information analyzed by SPSS 10 and Fisher's exact, paired test and Mann-Whitney.

Findings: There was significant reduction in triglyceride, cholesterol, LDL, VLDL, concentrations of both groups ($p<0.05$). Mean changes in triglyceride and cholesterol concentrations of ginger group were significantly higher than placebo group ($p<0.05$). Mean changes in LDL and HDL and HDL concentrations of ginger group were higher than placebo group but in VLDL concentrations of placebo were higher than ginger so there were no significant difference ($p>0.05$).

Conclusion: Results show that ginger has cholesterol and triglyceride lowering effect compared to placebo but no effect on other parameters.

3. An assessment of the dietary intake of pregnant women in the West Coast/ Winelands region, Western Cape Province: Relation to low birth weight (LBW), a case-control study

Booley S

University of Cape Town, Department of Human Biology, Division of Human Nutrition
E-mail: Sharmilah.booley@uct.ac.za

Aim: To develop variety and diversity scores to assess the dietary intake of pregnant women and to determine the association thereof with LBW. Further to determine the association of these scores with: smoking and/or alcohol intake, maternal socioeconomic/ demographic (SESD) characteristics and BMI.

Methods: The full term LBW (<2500g, n = 104) and full term normal birth weight (NBW) (≥2500g, n = 199) groups were conveniently selected from Paarl Referral Hospital. Data collection involved structured interviews and review of antenatal records. A non-quantified food frequency questionnaire was used to record subject's food consumption during the previous month. This formed the basis for construction of the food variety score (FVS = count of food items consumed weekly) and the dietary diversity score (DDS = count of food groups consumed daily and weekly).

Results: LBW was positively associated with the following: maternal weight ($p = 0.0002$), smoking and/ or alcohol intake ($p = < 0.0001$), FVS ($p = 0.0088$), DDS-daily ($p = 0.0216$), the mean weekly consumption of maize ($p = 0.0081$), vitamin A-rich vegetables ($p = 0.0352$), and added sugar ($p = 0.0006$). No association was found for height ($p = 0.0570$), BMI and DDS- weekly.

Conclusion: Higher food variety and dietary diversity was positively associated with infant birth weight.

4. Is soyamilk a nutritional alternative for cow's milk throughout the life cycle?

Booysen L, Schönfeldt HC

University of Pretoria, School of Agricultural and Food Sciences
E-mail: laryssa.booysen@gmail.com

Concerns have been made about the substitution of cows' milk with soya based milks, not only for infants but throughout the life cycle. Not only might this substitution lead to lower nutrient intakes, but the consumption of soya milk might even have adverse health effects.

Soya-based milk formula is often given to lactose intolerant infants or when allergic to cow's milk protein, however the unfavourable effects of soy consumption also include allergenicity among others. Although soybeans are high in fat (rich in essential fatty acids) and protein and low in carbohydrates, the content and bioavailability of essential vitamins and minerals in cows' milk remain higher. Soy beans are high in iron, and most soy milks are fortified with calcium, but the bioavailability of these nutrients remain poor. The calcium bioavailability from fortified soy beverage is about 25 % lower than dairy milk, although positively the isoflavones present in soy milk may reduce calcium loss from bones.

Soyfoods are said to have chemo protective properties - reducing prostate, postmenopausal breast cancer and menopausal systems. However, concerns have been made on humans' reproductive ability and consumption, as in cases ovulation was delayed in pre-menopausal women. Maternal soy consumption during pregnancy has also been associated with an increased risk of infantile leukaemia.

The nutritional contribution of cow's and soy milk will be reviewed and presented.

5. The use of a validated dietary assessment tool in a human mycotoxin exposure study

Burger HM, Lombard MJ, Shephard GS, Van der Westhuizen L, Gelderblom WCA

PROMEC Unit, Medical Research Council, South Africa
E-mail: hburger@mrc.ac.za

Mycotoxin contamination of food sources is a major problem affecting animal and human health. Environmental monitoring of human exposure to mycotoxins provides many methodological challenges. Because diet and nutritional factors are the bases of human exposure, accurate assessment is necessary when determining risk. In the former Transkei region of South Africa fumonisin-contaminated maize is the staple diet of Xhosa-speaking Africans living in this region. A validated and culturally specific dietary assessment method, the ratio and portion size pictures (RAPP) tool was developed to assess dietary exposure. This tool consists of life size photographic pictures of the types of foods mostly consumed and a food frequency questionnaire, focusing on the dietary intake of the past month. A study conducted in the Centane area (n = 319 volunteers, mean age 45 years, mean body weight 69.7kg) showed a mean maize intake of 985g person^{-1}day^{-1} which included maize-based dishes. The basic dietary habits indicated that 77% of the participants consume maize as the main dietary cereal and have two meals per day consisting either of bread and a maize-based dish or only maize. Total fumonisin exposure, estimated as the probable daily intake (PDI), was 2.7 (range 0.031 to 11.3) μg kg^{-1} body weight day^{-1} and exceeds the provisional maximum tolerable daily intake (PMTDI) of 2 μg kg^{-1} body weight day^{-1} as proposed by the Joint FAO/WHO Expert Committee on Food Additives (JECFA). Accurate dietary intakes and patterns are important for determining exposure, health risk, and to develop intervention strategies.

6. The technical development and future of Guideline Daily Amounts

Bussell G

Nutrition Manager for the Food and Drink Federation, UK
E-mail: gaynor.bussell@fdf.org.uk

Background: The seminar will first explore the history of the Guideline Daily Amount (GDA); how they started life in 1996 as Daily Guideline Intakes (DGIs) and were set for fat, saturated fat, sodium, sugar and fibre in grams per day for men and women. Then in 1998 a labeling set of GDAs for calories, fat and saturated fat for men and women were developed. This work was a collaboration between UK government, consumer organisations and the food industry and overseen by the Institute of Grocery Distribution (IGD) and resulted in most of the major retailers labelling back of packs with GDAs. In the summer of 2004, it was decided to re-look at GDAs so that they could be updated and used by the whole of the food chain: food manufacturers, retailers and the hospitality industry. A technical group was set up; again under the auspices of IGD, comprising industry technical experts and academics, and the first meeting took place in September 2004.

Why were GDAs developed?: The seminar will explore why GDAs were developed; this includes the fulfillment of a food industry commitment to providing information on the back of food packaging in order to ensure consumers are provided with information to help them understand what is in the food they are eating and to help them manage their diet.

Technical development: Some time will be taken to explain how the GDA technical working group developed a range of GDA nutritional values for males, females, and children covering a range of ages how the UK. Most of the values are based on the Governments COMA figures, with the exemption of the fibre figures, where data from the US was used, and salt figures, where the more recent UK SACN figures were used. This section will cover the limitations on the GDA values, for example they are not relevant for weight loss or for someone who is very active.

A different EU set of figures: An EU set of GDAs was developed and the seminar will explain how and why these were developed. These are slightly in some respects to the UK values as they are based on Euro diet recommendations. The differences will be explored and whether they are significant.

Front of pack: Once IGD released its GDA values, the GDAs for energy, fat, saturated fat, sugar and salt were used as a set of prominent icons on front of pack by the largest UK supermarket, Tesco. This was quickly followed by several food manufacturers and other retailers and now also some of the hospitality industry. FDF took over the co-ordination of this campaign for the food manufacturers in order to ensure consistency and to develop messaging on how these front of pack GDAs could be used by consumers. The aim of the front of pack GDA scheme (called the 'What's inside Guide') is to enable the consumers to better understand what they are eating and how to balance their diet. The seminar will look at why these icons were developed in this format, how they look and how they are intended to be used. The seminar will also cover how they are being communicated to consumers and to healthcare professionals, and also explore how they are being accepted by that audience.

Where now?: The seminar will finish by quickly looking at what other signpost labelling schemes are in the UK and also what the new nutrition labelling proposal from Europe says about the use of GDAs. How GDAs may evolve will be explored because of current thinking on labelling, research results, pressure from UK authorities and legislation. I will also briefly mention the work being undertaken by the European Food Safety Authority to develop a new EU wide set of reference intake values and how this will change the current UK set of GDA values.

7. Dietary regimes used for type 2 diabetes patients in Limpopo Province public hospitals

Ceronio V, Mbhenyane XG

Polokwane-Mankweng Hospital Complex, Limpopo
E-mail: smabapa@univen.ac.za

Background: The increasing prevalence of Type 2 diabetes and the continuous dietary transitions, especially in the South African and African populations, require a focused diabetes intervention programme. The management of Type 2 diabetic patients also requires standardisation (South Africa Demographic and Health Survey of 1998).

Objectives: The objective of this study was to investigate the dietary regimes used for Type 2 diabetic patients in the public hospitals of Limpopo Province.

Design: A descriptive, evaluative and quantitative study.

Setting: 45 public hospitals in Limpopo Province

Subjects: 30 dietitians and 15 patients

Method: A self-reported questionnaire for dietitians was used in all 30 hospitals. An observation checklist was also used by the researcher in 12 visited hospitals. The researcher used thematic analysis to analyse the structured interviews, observation checklists and the self-reported questionnaires.

Results: Most of the dietitians (85.7%) did not compile individual diabetic menus. Only 9.5% of dietitians used the Glycaemic Index concept and 52.4% used foods to avoid/allowed lists. Meals were not prepared by trained chefs, as 66.7% hospitals used food-service aids to prepare meals. Dietitians used a variety of procedures when counselling patients and no standard counselling guide existed.

Conclusions: The findings revealed that in Limpopo Province the dietitians practiced different diet regime approaches in the dietary treatment of Type 2 diabetics.

8. Effect of a protein supplementation on the weight-loss and hypolipemic properties of dietary fibers: an experimental study with Fenugreek Galactomannan

Dakam W, Matsinkou SR, Ngondi JL, Oben J

Department of Biochemistry, University of Yaounde I, Cameroon
E-mail: wildakam@yahoo.fr

Dietary fibers constitute an easily-available and low-cost approach to the control of the global epidemic of obesity. This study seeks to improve the possible health benefits of fenugreek galactomannan (FG) in lowering plasma lipid levels and body weight. Three different formulations were prepared with FG as the main product plus: water (FG), sodium bicarbonate 4% (FGB) or sodium bicarbonate 4% and albumin 1% (FGBA) respectively. Distilled water (C_1) and sodium bicarbonate (C_2) were used as controls. All the formulations were administered over a four-week period to male Wistar rats at the dose of 250 mg/kg body weight. FGBA was the most effective in reducing body weight ($p<0.001$) in rats. FGBA and FGB brought about the most important reduction in plasma total cholesterol ($p<0.005$) and LDL cholesterol ($p<0.001$) levels. All the formulations brought about significant increases in HDL cholesterol levels with the highest increase resulting from FGBA administration ($p<0.001$). Oral glucose tolerance tests showed that glycaemic control was improved with FGB and FGBA formulations in comparison with FG. We conclude that albumin and sodium bicarbonate have the ability to improve some physiological effects of fenugreek galactomannan by working synergistically. This finding could have applications in the areas of obesity, weight loss and the control of blood lipids.

9. Snack food consumption patterns of primary school children aged nine to thirteen years old in the Vaal region

Du Plessis RM, Kearney JE, Oldewage-Theron WH

Department of Hospitality and Tourism
E- mail: madeleen@vut.ac.za

Background: Approximately 45% of South Africans are overweight, including 20% of children (< six years). Snack foods are now targeted in the food industry globally as an obesity prevention initiative, focusing on children to ensure the adoption of a healthy lifestyle from an early age.

Objectives: The purpose of this study was to determine the snacking patterns in a randomly selected sample (n = 280) of primary school children, aged 9-13 years old in the Vaal Region.

Methods: A pre-tested questionnaire was administered by trained fieldworkers. Data were captured and analysed for descriptive statistics (frequencies, means and standard deviations).

Results: The results showed that the children in the sample knew the meaning of healthy snacks, although the majority consumed unhealthy lunch boxes. The top 10 snack foods most commonly consumed daily were: coffee (48.3%), tea (46.1%), crispy chips (39.1%), fruit juice (38.0%), chicken (35.1%), fried potato chips (33.6%), carbonated drinks (26.9%), biscuits (26.2%), toffees (26.2%) and yoghurt (25.8%). The majority (56.8%) of the respondents indicated that they received R 2-5.00 extra per week for tuck shop money, besides their monthly pocket money (64.6%). Most of the respondents (45.4%) spent their pocket money on snack food items and these are mainly consumed watching TV (36.9%) and when bored (29.5%).

Conclusions and Recommendations: This study proved that primary school children knew healthy snack foods, but behaviour indicated a large consumption of unhealthy snack foods. Nutrition education is recommended as well as the availability of nutritious, palatable and affordable snack food items on the market.

10. Development of a soy energy bar for children with compromised immunity

Erasmus V, Kearney JE, Oldewage-Theron WH

Department of Hospitality and Tourism
E-mail: valerie@vut.ac.za

Objective: The main objective of this study was to develop a cost-effective and nutrient-dense energy bar for children 6-13 years old, with compromised immunity in the Vaal region, by using locally grown and affordable food items in order to improve their nutritional and health status.

Methodology: This was an experimental study. The research methodology involved two phases: phase 1 was the formulation and preparation of the energy bar, and phase 2 the sensory evaluation and shelf-life testing.

Results: The energy bar provided 2782 kJ, 17 g protein, 57 g fat, 21 g carbohydrate, 11 g dietary fibre, 6.8 mg iron and 5.3 mg zinc. The shelf life studies indicated a shelf life of 168 days at 4°C and 21 days at room temperature (32°C). Sensory analyses showed that the energy bar was acceptable for taste (95%), smell (90%), colour (80%), texture (90%), and overall acceptance (95%).

Conclusion: The results of this study showed that a nutrient-dense and cost-effective product, that is safe and acceptable for the target community, can be developed to meet specific criteria.

Recommendations: It is recommended that this product be tested in a clinical intervention study to determine the impact on nutritional status of children with compromised immunity.

11. Development of questionnaires for the first phase of the HealthKick project

Fourie JM, De Villiers A, Lambert EV, Draper C, Steyn NP

Chronic Diseases of Lifestyle Unit (CDL), MRC
E-mail: jean.fourie@mrc.ac.za

Objectives and scope: The main objective of this study is to reduce risk factors for diabetes and other chronic diseases in the school environment. Specific areas addressed included nutrition, physical activity and tobacco use. The first phase of the 'HealthKick Project' involved a formative assessment in 100 primary schools within the Western Cape Education Department (WCED). Information collected in this phase was used to develop an intervention programme as part of the second phase.

Methodology: Two questionnaires were developed for the first phase and were adapted from a similar study in the USA, the SHPPS 2006 (CDC) School Health Policies and Programs Study questionnaire. These questionnaires, the situational analysis and an observational schedule, went through rigorous scrutinising after being piloted in five schools not included in the study sample. The situational analysis questionnaire was translated into the language of the target audience, which was mainly Afrikaans.

Results: Various changes were made to the questionnaires that went through three drafts before being presented to the WCED. Final revisions included making use of visual aids for certain questions and rephrasing others. Since a fieldworker did the observational schedule that included observing environmental factors, this questionnaire remained in the source language, English.

Conclusions: When developing questionnaires to be used in a multi-phase study it is important to know the target audience. Before finalising questionnaires, they should be tested and piloted to ensure accurate data collection.

12. "HACCP made easy" tool for the foodservice industry

Fuller L

Department of Hospitality and Tourism
E-mail: valerie@vut.ac.za

The hospitality industry is accepted as one of the growth engines of the South African economy. This sector includes the catering industry, both large-scale catering and small and less developed businesses (SLDBs).

It has been legislated that "any place producing food for public consumption" will have to be HACCP (Hazard analysis critical control point) compliant. The introduction of a HACCP system is facilitated in a manufacturing environment but the dynamic environment of the foodservice industry makes the implementation of HACCP more difficult. Many barriers to the implementation in foodservice and in particular SLDBs have been identified, namely high staff turnover, lack of training and expertise, not having pre-requisite programmes in place and a large number of complex meals, to name a few. Furthermore there is an apparent confusion between what has in actual fact been legislated and which standards should be used to measure performance.

In order to assist SLDBs to practise HACCP based principles, Salford University together with the Foods Standard Agency (FSA) in the United Kingdom (UK) developed a complete yet simple, user-friendly tool to facilitate the process. Various versions of this tool, adapted for different sections of the catering industry, have been widely accepted and rolled-out by the FSA in the UK.

This poster sets out to showcase the tool used and to explain possible adaptations and indications for SLDBs within South Africa. The benefits include the reduction in the perception of HACCP demanding "excessive paperwork." Furthermore, the tool could be used as a basis for alignment within the National Qualifications Framework.

13. Status of micronutrient nutrition in Zimbabwe

Gadaga TH, Madzima R, Panagides D, Nembaware N

National University of Lesotho
E-mail: th.gadaga@nul.ls

More than 65% of the Zimbabwean population live in the rural areas and are food insecure especially due to droughts. The population therefore experiences fluctuating levels of malnutrition including vitamin and mineral malnutrition. This paper reviewed the micronutrient malnutrition status of the Zimbabwean population, focusing on the period from 1980 to 2006, using data from nutrition surveys, the demographic health surveys, sentinel surveillance and monitoring programmes. Data collated from the numerous surveys shows that a significant proportion of children under 5 years of age, school children, pregnant and lactating women experience malnutrition. In 1999, 35.8% of children 12-71 months of age were vitamin A deficient. Vitamin A capsule distribution during Child Health Days has been an effective strategy to reach many of the affected children. In 2005 about 82% of the targeted children received vitamin A capsules during Child Health Days. More than 95% of households in the country have access to iodised salt. The median urinary iodine in 2005 was about 200µg/L. In 1999, 31% women of child bearing age were found to be anaemic. However, in 2005 only about 43% of pregnant women were receiving iron supplements. There is need, therefore, to increase efforts to reduce micronutrient deficiencies in the country. Staple food fortification is recommended as a long term strategy to achieve this.

14. Development of a rapid assessment method for the determination of glycaemic index

Gibson N, Schönfeldt HC

School of Agricultural and Food Sciences, University of Pretoria, South Africa
E-mail: nicolette.gibson@up.ac.za

A rapid assessment method to determine the Hydrolysis Index of foods was developed. The glycaemic index (GI) concept is a measurement used to classify foods according to their potential for raising blood glucose. High glycaemic foods are seen as culprits in weight gain and obesity, and worldwide people are trying to lose weight. The new South African draft labelling regulations have included the recommendation that the labelling of all carbohydrate rich foods should show an indication of the product's glycaemic index.

The GI of a foodstuff is generally measured in humans, by determining the increment in blood glucose concentration accompanying the consumption of a test meal over a set period of time and comparing it with an isoglucidic control meal. Not only is the utilization of human subjects time consuming and expensive, but relying on humans for the assessment of a food products' GI has been greatly criticized. By determining the degree at which carbohydrate type foods undergo starch hydrolysis through an *In Vitro* simulation of the human digestive processes, a hydrolysis index (HI) can be calculated. These HI values have been correlated with the GI values determined by *In Vivo* methods. The utilization of such a rapid assessment method can be executed within a short period of time, under controlled conditions and at a much lower cost than the *In Vivo* methods currently used.

15. Evaluation of an insulin infusion protocol and factors influencing glycaemic fluctuation in an intensive care setting: A prospective chart review

Herrmann FA, Hill LT, Van der Lith D, Wilson J, Smith J

Division of Human Nutrition, University of Cape Town
E-mail: Fiona.Herrmann@uct.ac.za

Hyperglycaemia in ICU patients increases morbidity and mortality.

Objectives: To investigate glucose control achieved by insulin-infusion protocol and factors influencing glycaemic control in elective surgery (E), trauma (T) and septic medical patients (S).

Methods: During a single centre prospective chart review in the 24-bed ICU of a tertiary hospital, data from 97 patients (E=35, T=42, S=20) for 420 patient days were collected. Data were collated daily from patient records for a maximum of 5 days. Hypoglycaemia was defined as blood glucose <4mmol/l and hyperglycaemia as >6.1mmol/l.

Results: Mean percentage time spent hyperglycaemic during ICU stay despite an insulin protocol was 57.17±12 (E), 53±32 (T), 58.7±31 (S), using 29.5±10, 21.4±26, and 42±53 units of insulin respectively. Hyperglycaemic time was significantly lower for trauma vs the other groups ($p<0.05$). In trauma 87% of time was spent in the blood glucose range 4-8mmol/l. Hyperglycaemic time was significantly higher in patients receiving corticosteroids in electives ($p=0.002$) and septic patients ($p<0.0001$), but not in trauma patients. In the elective and sepsis patients, no correlation was found between hyperglycaemic time and carbohydrate intake. However, in the trauma group, the carbohydrate dose was associated with significantly increased hyperglycaemic time ($R=0.35$, $p<0.0001$). The response of nurses to blood glucose measurements deviated from the stated insulin infusion protocol in 20% of occasions in trauma, 27% in electives and 23% for sepsis, and mainly related to inappropriate response to hyperglycaemia.

Conclusion: Current practice favours the maintenance of hyperglycaemia in the ICU. This may negatively impact on patient outcomes.

16. A comparative analysis of two commercial products used for school feeding in the Vaal region

Kearney J, Venter CS, Oldewage-Theron WH

Department: Hospitality and Tourism
E-mail: jkearney@vut.ac.za

Objectives: This study was a follow-up of five school feeding strategies in the Vaal region. This paper will focus on two commercial products, namely Sejo (wheat-based) and corn soy blend (CSB) to determine the impact on the iron and zinc status of a randomly selected sample of children (n=120), aged 6-13 years old.

Methods: The methods included a comparison between the dietary intake and nutritional status. Statistical analyses included descriptive statistics [mean and standard deviation (SD)], and independent t-tests to determine statistical significance between groups.

Results: In both groups the intakes of the majority of nutrients were lower during the intervention than at baseline. The biochemical data (mean ±SD) for CSB showed an improvement in serum ferritin from 31.2±16.9 to 36.7±20.7 µg/l from baseline to after the intervention. Similar results were obtained for serum transferrin (2.8±0.5 to 3.1±0.4 g/l), haemoglobin (13.1±1.7 to 13.4±0.9 g/dl), total protein (75.2±6.7 to 78.4±5.2g/l) and albumin (43.4±4.6 to 47.6±5.7 g/l). In the Sejo group higher serum values were observed after the intervention for iron (17.5±5.8 to 17.6±6.8 µmol/l) and transferrin (3.3±0.5 to 3.4±0.4 g/l) only.

Conclusions: The dietary intake data indicated lower intakes during the intervention. Improvements were measured in the nutritional status data of both groups after the intervention, with better results in the CSB group.

Recommendations: The results of this study will provide all stakeholders of school feeding programmes with information on the most cost effective and efficient strategy for school feeding. Nutrition education is recommended for both the children and caregivers.

17. Moringa Oleifera as a nutrient supplement for people living with HIV/AIDS: A case study of PLWHA in Morogoro municipality, Tanzania

Kinabo J, Makori N

Sokoine University of Agriculture
E-mail: jkinabo@suanet.ac.tz

A Randomized Control Study (RCT) study examined the use of Moringa Oleifera as a nutrient supplement for people living with HIV/AIDS.

Methods: The experimental group was fed with Moringa Oleifera leaf powder for a period of four months. The variables height, weight and haemoglobin level were monitored every month and CD 4 cell count was measured at the start of the intervention and at the end (after 4 months). A structured questionnaire was used to collect information on social demographic information, food sources and disease pattern. In addition, a qualitative twenty-four hour dietary recall was used to gather information on food intake. Data were analysed using SPSS version 11.5.

Results: Haemoglobin concentration increased by 2.25 g/dl (19.35%). At the start of the intervention the haemoglobin concentration ranged from 5.30 g/dl and 11.80 g/dl and at the end of the study it was 8.50 g/dl and 14.20 g/dl. A significant difference ($p < 0.05$) was observed in the increase of haemoglobin level between the two periods.

CD 4 cell count increased from 248 ± 23.07 to 333 ± 35.45 for the experimental group (16.31%) but for the control group the CD4 count was 223 ± 14.01 and 215 ± 18. There was a significant association ($p < 0.05$) between use of Moringa Oleifera leaf and increase in CD 4 cell count. Weight gain was 2.72 kg (5.43%).

Conclusion: Moringa Oleifera corrected nutritional deficiency such as iron deficiency and increased the CD4 cell count. Moringa Oleifera helped to reduce bone pains and poor vision.

18. Household food security and mortality in children under-five years of age in rural South Africa

Crowther P, Twine W, Marinda D, Clark B, Kahn K, Tollman S, Klipstein-Grobusch K

School of Public Health, University of the Witwatersrand, Johannesburg
E-mail: penny.crowther@gmail.com

Background: In South Africa, where three out of four children live in poverty, food insecurity and its multiple negative effects are among the most urgent social issues affecting households and their children.

Objectives: The study's main objective was to assess the association of food security (FS) with under-five mortality in the Agincourt Health and Demographic Surveillance Site (AHDSS) in 2004.

Methods: A secondary cross-sectional analysis of 2004 AHDSS census data was conducted, involving 7790 black children under the age of five years. Indicators of FS were analysed with respect to child mortality using logistic regression.

Results: Thirty-seven percent of the study population experienced household FS. Limited dietary diversity and insufficient food quantities experienced by the majority of the population were supplemented by the local growth of crops and gathering of food from the bush. Of the 79 children under-five who died in 2004, most (24%) died of HIV-related diseases, followed by diarrhoea, respiratory infections and malnutrition. Expecting less food availability in the coming year was significantly associated with an increased mortality risk compared to the prediction of the same amount of food (OR 2.0, 95% CI 1.07-4.35), and to more food (OR 4.4, 95% CI 1.18-16.67) in multivariate analysis. The latter association was age-specific to infants and cause-specific to HIV deaths.

Conclusions: Future household FS was inversely related to under-five child mortality in rural South Africa in 2004, suggesting that policies to reduce child mortality in South Africa should be aimed at ensuring household FS.

19. The use of physical activity and music in the transfer of knowledge on nutrition, a healthy lifestyle and the prevention of obesity

Kruger K, Kruger A, Wright H

Centre of Excellence in Nutrition, Faculty of Health Sciences,
North-West University, Potchefstroom
E-mail: 12782475@nwu.ac.za

Background: The rising prevalence in obesity amongst South African children is of concern. Increased knowledge on healthy lifestyle practices may lead to behaviour modification which could contribute to healthier children and adults. Music as an educational tool can play an important role in transferring the knowledge of the benefits of a healthy lifestyle to prevent and treat obesity.

In this study the researchers aim to integrate the beneficiary effects of music into a holistic learning approach for children between the ages of 6 and 12 years to increase their nutritional knowledge, promote physical activity as well as to establish healthy lifestyle practices.

The information for developing the musical play was obtained over a period of 5 weeks through several sessions in the form of mini-workshops. Twenty five voluntary subjects from a primary school were used to contribute ideas. Data were collected by using competition flyers and a Digital Video Disc (DVDs) recorder.

The aim of this paper is to give:

1. An overview on the process followed in the development of the musical play
2. An introduction to the musical play per se

This play is in the process to be evaluated and tested.

This research is funded by SASA

20. Physical activity and bone health

Leighton CS, Schönfeldt HC

School of Agricultural and Food Sciences, University of Pretoria,
South Africa
E-mail: csl@irenevillage.com

There are several factors that influence bone health. Modifiable factors that promote bone health include regular physical activity, good eating habits, level of calcium consumption and vitamin status of the individual. Modifiable factors that can increase risk for bone loss include cigarette smoking, alcohol abuse, some types of medication and low levels of estrogen in women, or low levels of testosterone in men.

The efficiency with which calcium is absorbed through life varies with age. Absorption is the greatest during the infant and adolescents stage. The rate of bone loss during adulthood gradually outstrips the rate of bone formation – hence the shocking statistics that one in ten Americans suffer from osteoporosis.

Physical activity has health benefits that extend to bone health. Bone mass can be enhanced through regular weight bearing activities such as weight training, walking, running, aerobic dancing, tennis and gymnastics, by slowing bone loss. It has further been shown that physical activity positively affects bone density when calcium intake exceeds 1000 mg per day. Research that has been done on physical activities that can enhance bone health, the type of activity, the duration and intensity of different activities is reviewed in this paper or poster presentation.

21. Comparison of different statistical methods to determine validation of dietary assessment tools

Lombard MJ, Burger HM, Steyn NP

Nutrition and Dietetics Division, University of Cape Town
E-mail: hester.burger@mrc.ac.za

A dietary assessment (RAPP) tool was developed to determine nutrient intake of a rural population in the Eastern Cape (EC). The tool consists of a food frequency questionnaire and life-size photographs. Sixty people were recruited from Centane, EC. The mean intake of four 24-hour recall questionnaires was compared against the RAPP tool assessment. The data was analysed according to different recommended statistical methods. Mean percentage differences indicated poor differences (more than 20% difference) for fat, folate, vitamin A, vitamin C, vitamin D, sodium and selenium. Spearman correlation coefficients indicated poor correlations (< 0.20) for protein, fat, riboflavin, vitamin A, vitamin B12, vitamin C and vitamin E. Tertile classifications showed poor classification (< 50% in the same tertile) for protein, fat, carbohydrates, riboflavin, thiamin, vitamin A, vitamin B12, vitamin C, vitamin D, vitamin E, potassium, sodium and selenium. Bland-Altman data on the other hand indicated poor agreement (< 80% agreement) for none of the nutrients, but concluded that reporting bias was present for all nutrients except vitamin B12 and vitamin C. Different statistical methods lead to different conclusions and results. It is therefore imperative to use different statistical methods to validate dietary assessment tools.

22. Factors contributing to malnutrition in children aged six months to three years attending Shakadza clinic

Maliwichi LL, Lutsinge G

University of Venda
E-mail: Maliwichi@univen.ac.za

The study was conducted at Shakadza Clinic, Mutale, Limpopo Province.

The study sample was made up of 15 mothers from three villages, 4 community workers and the clinic nurse. A questionnaire was used to collect data in face to face interviews. The findings revealed that mothers were from poor households. Eighty seven percent of the mothers used pit latrines, 60% used water from a spring or a borehole and all of them used firewood as a source of energy in the house. Most of the mothers were not taught about child nutrition. All community workers had not received any training to enable them to carry out their duties effectively.

A 24 hour food recall revealed that there was lack of variety in the food given to the children and that there was low frequency of meat products, fruits, vegetables and milk products.

Factors contributing to malnutrition of children were: mothers' heavy workload, lack of time to care for children, early weaning, lack of income to buy food, lack of clean water, lack of clean toilets, poor sanitation, low food production, lack of energy (electricity), poor housing, lack nutrition knowledge and poor access to health facilities.

There is a need to teach mothers child nutrition and crop production (i.e. main source of food and income). The Government must improve the mothers' living conditions by providing: housing (with water, flush toilets and electricity) and rubbish disposal facilities. Community health workers need to receive adequate training to carry out their duties.

23. The role of Primary School Nutrition Programme (PSNP) to nutrition of children at Muswodi village

Maliwichi LL, Matamela P

University of Venda
E-mail: Maliwichi@univen.ac.za

Children receiving free school meals are particularly dependent on the school meal as a source of nutrients. For some school children, the school meal is the only time they sit down and eat with other people.

The aim of this study was to explore the role of PSNP in the nutrition of children attending Muswodi Primary School, in Vhembe District.

Data were collected using questionnaires in face to face interviews from 30 learners in grades 5-7 (10 learners from each grade), two teachers, two community volunteers and the vice principal.

The findings revealed that the PSNP programme was contributing positively to the nutrition of children as it provided the only first meal for the day for most children, and alleviated children's hunger at school. There were improved school attendance and performance especially from poor households, improved pass rates and reduced number of dropouts.

Problems experienced included a menu lacking in dairy and protein foods, irregular food supplies, lack of kitchen/dining, lack of water, lack of energy for cooking and lack of storage facilities. Other problems included lack of training for volunteers on food preparation and lack of food quality control mechanisms resulting in delivery of expired foodstuffs.

For the PSNP programme to serve its goal, there is a need for the program to provide the necessary infrastructure (e.g. kitchen, dining, energy/electricity, water, storage facilities) to train volunteers in food preparation and food handling procedures and to monitor that the quality of food meets the Department of Health guidelines (nutrition and food safety).

24. Diabetic retinopathy and associated risk factors in type 2 diabetes mellitus in Sudan

Mohamed MI, Mohamed ARO, Mohamadein JEA, Abukheir BH, Mukhtar E, Elbashir MI

National Ribat University, Sudan
E-mail: drmaha_ismail2004@hotmail.com

The prevalence of diabetes retionopathy is 18% amongst non insulin dependent diabetics and 43% amongst insulin dependent patients. The study aimed at determining the risk factors associated with diabetic retionopathy. A cross sectional descriptive study in which 400 patients with diabetes mellitus type 2 were selected from Jabir Abu Eleiz health centre. More females than men were recruited (1.7:1). The patients' age ranged between 20 – 75 years; the mean duration of diabetes was 10 years. 48% Patients were overweight and 24.8 % were obese; 70.3 % of the patients were on regular follow up in diabetic centres. A significant correlation was found between diabetic retinopathy and the following variables, older age, duration of diabetes, education level, fasting blood glucose, and HDL and LDL cholesterol ($P < 0.05$). A significant correlation was found between diabetic retinopathy and microangiopathic complications such as diabetic nephropathy and neuropathy ($P < 0.05$), but no correlation was found with the macroangiopathic complication, coronary heart diseases. No significant association was found in the incidence of diabetic retinopathy and gender, smoking, obesity, serum cholesterol, triacylglycerol and different haptoglobin phenotypes.

The findings emphasize the need for good glycaemic control, and early screening for diabetic patients in order to prevent or delay the onset of diabetic retinopathy.

25. Evaluation of the implementation process of the vitamin A supplementation protocol by health workers in institutions in the Mookgophong sub-district of Waterberg, Limpopo Province

Mamaregane DV, Mbhenyane XG

Voortrekker Hospital, Department of Health, Limpopo
E-mail: dihlolelov@yahoo.com

Background: The 1994 South Africa Vitamin A Consultative Group (SAVACG) study, conducted with the support from Department of Health and UNICEF, concluded that the national prevalence of vitamin A was 33% of marginal vitamin A status; this is an indication of a serious public health problem for the country (SAVACG, 1999).

Objectives: The main purpose was to evaluate the implementation process of the vitamin A supplementation protocol by health workers in institutions in the Mookgophong sub-district of Waterberg, Limpopo Province

Design: Evaluative, descriptive and quantitative.

Setting: Six clinics and a hospital in Mookgophong sub-district, Waterberg district.

Subjects: Health workers: 2 pharmacists, 1 medical practitioner, 9 professional nurses and 2 enrolled nurses. Total number of subjects was 14.

Method: A self-administered questionnaire was used to determine the availability of the dosage capsules, the knowledge of the health workers on administration of vitamin A, and to identify the constraints experienced by the health workers during the implementation. Observation check list was also used by the researcher to validate some of the information and to check compliance with the protocol.

Results: The finding revealed poor availability of all types of capsules in stock at 56.3%. About 50% reported to know the preventative schedule while majority of did not know the treatment schedule. There was generally good adherence to the preventative protocol.

Conclusions: The availability of the vitamin A capsules need to be ensured at all times and the health workers should be trained on the implementation of the protocol.

26. Knowledge of preschool teachers on growth monitoring programme in Vhembe and Mopani districts of Limpopo Province, South Africa

Mandiwana TC, Mushaphi LF, Mbhenyane XG

Department of Nutrition, University of Venda
E-mail: mandiwanatc@yahoo.co.uk

Background: Pre-school teachers are expected to have minimum knowledge on growth monitoring and how to deal with common situations involving child health care.

Objective: To determine the knowledge of pre-school teachers on growth monitoring before and after intervention.

Design: Quasi – experimental, intervention study.

Setting: Eight pre-schools in villages of Vhembe and Mopani districts in Limpopo Province.

Subjects: Fifteen pre-school teachers.

Method: Subjects completed pre & post knowledge test questionnaire and an observation checklist was used to assess their growth monitoring knowledge and practices. An intervention in a form of nutrition education (growth monitoring and RTHC) was given.

Results: Few pre-school teachers understand the importance of growth monitoring in diagnosing the problems of under nutrition in children. However, some had little understanding on how regular growth monitoring helps in improving children's health. It was interesting to know that pre-school teachers have their own way of assessing children's growth and development even if they are not using RTCH.

Conclusion: The knowledge that pre-school teachers have on basic measurements, the use of RTHC and importance of growth monitoring was limited. However, there was a slight improvement after intervention.

27. An exploration of the perceptions about being thin, HIV/AIDS and body image in black South African women

Matoti-Mvalo T

Diva Nutritional Products
E-mail: tandimm@mweb.co.za

This study explored the perceptions of black South African women residing in Khayelitsha, Site B about thinness, HIV/AIDS and body image.

Obesity is a major public health problem in developed as well as developing countries. The HIV/AIDS epidemic has been escalating in sub-Saharan Africa and has been said to be the leading cause of death in South Africa. This means that South Africa is being devastated by a double burden of two concurrent epidemics and these are having an effect on each other. Obesity is one of the risk factors for non-communicable diseases (NCDs), while on the other side HIV/AIDS is characterized by severe weight loss and carries a stigma, which has been said to prevent women from adhering to lifestyle behaviour modification especially weight loss, for the purpose of preventing non-communicable diseases (NCDs). This study was therefore conducted to explore these perceptions, beliefs and attitudes among black African women. Data was collected through interviews, direct measurements of weight and height and focus group discussions. The analysis was done using Microsoft excel and the statistical package of SAS version 8. More than 80% of the women who participated in the study were overweight or obese and thought that being overweight or obese was healthy. Large body size had many positive attributes such as dignity, attractiveness and having enough money to feed your family. Whilst some were aware that being overweight and obese was a risk factor for NCDs, they still preferred to be overweight because they did not want to lose weight and risk being associated with HIV/AIDS. This study shows that there are socio-cultural factors that influence the decisions that black South African women make in terms of adopting healthy behaviours. This poses a challenge among policy makers and implementers. There is a need to develop appropriate messages that will address the prevention of all conditions without compromising the other.

28. Dietary diversification among primary school children in Vhembe district of Limpopo Province: an intervention to improve the consumption of indigenous foods.

Mbhatsani HV, Mbhenyane XG, Makuse SHM

Department of Nutrition, University of Venda, South Africa
E-mail: mbatsanihv@yahoo.co.uk

Background: Nutrition knowledge is one of the factors that can influence eating habits. In South Africa the importance of traditional leafy vegetables is not very high. They have been labelled as food for the poor people with the knowledge associated to it as old. These labels have led to a shift in food use and less willingness of the youth to learn about them.

Objectives: The aim of the study was to determine knowledge of primary school children about indigenous foods. An intervention to improve their knowledge was developed.

Design: Quasi experimental.

Setting: The two primary schools from Dzimauli and Phaphazela villages.

Subjects/Population: Children aged 9-14 in grade 5 and 6.

Methods: Data was collected using knowledge questionnaire to test children's knowledge of indigenous foods at baseline and after intervention. The information was obtained from 154 children.

Results: The results indicated that many children had prior knowledge about indigenous foods particularly fruits and vegetables. Data also suggest that the knowledge fairly increased six months after intervention.

Conclusion: Knowledge of indigenous foods depends on availability and accessibility in the community where children live as well as at household level. However, there is need to include indigenous foods knowledge as part of curriculum to improve awareness.

29. Assessing cultural identity, knowledge and self-efficacy to eat healthy and exercise, self-perception and social attributes in South African schoolgirls: a validation study

Mchiza V, Lambert EV, Goedecke J

University of Cape Town
E-mail: z.mchiza@uct.ac.za

Aim: We sought to find valid and reliable constructs assessing cultural identity, health knowledge, self-efficacy to eat healthy and exercise, body status self-perception and contributing social aspects in eating healthy and exercise.

Subjects and Methods: A cluster sample of 332 urban multiethnic South African primary schoolgirls answered questions on cultural identity, diet and physical activity attitudes and behaviours adapted from the Pathways study (Stevens et al., 1999). A total score was assigned for each construct, with a total score closer or equal to 0 representing the least desired response up to the most desired response.

Results: We found that the 9-item self-efficacy construct, the 6-item body size status self-perception construct and the 12-item environmental factor construct were reliable in this group of girls (their Cronbach's α values were 0.74, 0.71 and 0.94, respectively). The remainder of the constructs yielded lower Cronbach's α values (<0.70). Black girls presented with significantly stronger cultural identity but less health knowledge compared to mixed ancestry and white girls (both $P<0.001$). The health knowledge of the girls increased with an increase in socioeconomic status ($r=0.46$; $P<0.01$). On the contrary, health knowledge increased with a decrease in cultural identity ($r=0.38$; $P<0.001$). More so, the girls could identify bigger and smaller body size status in themselves. Conclusion: The self-efficacy, self-perception and environmental factor constructs are reliable self-report measures to assess the associated factors to the aetiology of obesity in South African girls. However, the cultural identity and health knowledge constructs still need further revision.

30. Improved appetite in HIV-infected South African children after six months of multi-micronutrient supplementation

Mda S, Van Raaij JMA, MacIntyre UE, De Villiers FPR, Kok FJ

Department of Paediatrics and Child Health, University of Limpopo, Medunsa Campus, South Africa
E-mail: siyazi.mda@wur.nl

Background: HIV-infected children commonly have micronutrient deficiencies. Micronutrient deficiencies have been associated with poor appetite.

Objectives: To assess the effect of multiple micronutrient supplementation on the appetite of HIV-infected children.

Subjects and Methods: HIV-infected children aged 6 to 24 months who had previously been admitted with diarrhoea or pneumonia were enrolled into a double-blind randomized trial, and were given daily multi-micronutrient supplements or placebos for six months. Appetite tests were performed at enrolment and after three and six months. Appetite was measured as ad libitum intake of a commercial cereal test food, offered to the child by the mother. Body weight was measured, as well as total amount of test food eaten and the time taken to consume the test food.

Results: A total of 99 children completed the study (49 on placebos and 50 on supplements). The amounts eaten per kilogram body weight in the placebo group at enrolment and after six months were 47.1 ± 14.9 g/kg (mean ± SD) and 45.7 ± 13.1 g/kg respectively, while in the supplement group the amounts were 36.7 ± 17.7 g/kg and 41.3 ± 15.0 g/kg respectively. The change in amount eaten per kilogram body weight over six months in the supplement group was significantly higher than that in the placebo group 4.7 ± 14.7 g/kg versus -1.4 ± 15.1 gkg ($P<0.05$).

Conclusion: Six month supplementation with a multiple micronutrient significantly improved the appetites of HIV-infected children significantly by 13-17% per kilogram of body weight.

31. Nutritional status of iodine deficient children in Vhembe district, Limpopo Province

Mabapa NS, Mbhenyane XG, Jooste P, Mushaphi LF

University of Venda, School of Health Sciences;
E-mail: smabapa@univen.ac.za

Background: Iodine deficiency is the single most common cause of preventable mental retardation and brain damage in the world. It causes goiters and decreases the production of thyroid hormones vital to growth and development. Children with iodine deficiency can grow up stunted, apathetic, and mental retarded and incapable of normal movement, speech or hearing.

Objectives: The aim of the study was to determine the nutritional status of iodine deficient children in Vhembe district.

Design: A cross-sectional school-based survey.

Setting: 24 schools from Mutale and Vuwani municipalities.

Subjects: 829 school children aged 6 – 14 years.

Methods: Urinary iodine levels, palpation and thyroid size were determined. The weight and height was used to determine the nutritional status.

Results: About 15.6% of the children had low WAZ, 16.8% had low HAZ and 5.8% had low WHZ. The severity of under-nutrition was similar in the two municipalities. The prevalence of iodine deficiency was found to be mild, with medium urinary levels of 81µg/L.

Conclusion: Medium severity of under-nutrition and low severity of stunting was observed. Mild iodine deficiency and endemic goiter exist in Vhembe district.

32. The effect of a school feeding programme on the nutritional status of a group of primary school children in Gauteng

Napier C, Oldewage-Theron WH, Kearney J

Durban University of Technology
E-mail: carinn@dut.ac.za

Objectives: The main objective of this study was to determine the level of malnutrition in a primary school (children aged six to 13 years old) in an informal settlement and to plan and implement a school-feeding intervention programme.

Methodology: Before and after the intervention blood was drawn from 160 children. Quantitative Food Frequency Questionnaires and 24-hour recall questionnaires were completed in interviews with the parents. Anthropometric measurements included weight-for-age, BMI-for-age and height-for-age. A maize meal whole-wheat vetkoek was developed that provided 25% of the daily needs of the children for zinc and iron, making use of ingredients from the top 20 list. The vetkoek was administered for seven months, daily except for school holidays and weekends, to 60 randomly selected children forming the experimental group, with 60 other children receiving a fruit as the control group and 40 children receiving the Primary School Nutrition Programme (PSNP).

Results: The post-intervention results indicated that the children in all three groups significantly improved in weight and height and their zinc and iron intake also increased significantly. The post-intervention dietary intake results showed that the product contributed 58% more energy to the children's diet.

Conclusion and recommendations: Although few statistically significant changes occurred biochemically, clinical changes occurred in all three groups. This study proved that any food provision can have a beneficial impact on the growth of a malnourished child.

33. Establishing a community-based Growth Monitoring and Promotion programme in Moretele sub-district – A pilot project

Napoles L

Department of Human Nutrition, University of Pretoria (UP)
E-mail: lizeka.napoles@up.ac.za

Background: Growth Monitoring and Promotion (GMP) can be beneficial in reducing child malnutrition and mortality if effectively implemented. A number of factors affecting the effectiveness of a GMP programme in Moretele sub-district were identified through a study by B Dietetics students. These included staff shortage, lack of training, no nutrition counselling, poor caregiver participation and low coverage. Establishing a community-based GMP programme, in accordance with UP's Service Learning Approach in Community Nutrition, is aimed at addressing the above factors.

Objectives: The objectives included: identification of appropriate community sites; training of caregivers and Community Health Workers as well as setting up monitoring systems.

Methods: A three-phase programme was developed consisting of a resource determination and training needs survey; an awareness campaign; development and testing of training material as well as training. A trial run of a GMP day was conducted demonstrating all activities. A monitoring system was established including a children's register; a referral form between the community sites and clinics; statistics records and Master charts.

Results: There is adequate number of caregivers who are willing to participate, 10% of which have formal training. The awareness campaign succeeded in gaining community support and interest.

A week long training of caregivers proved to be inadequate. There is need to also train staff on equipment use and management.

Recommendations: Follow up on-site training is recommended. Growth promotion activities have to be specific according to needs. Initial regular visits by the district community dietician to identify these needs and to provide necessary support is recommended.

34. The acceptability of selected maize meal types in Mthatha in the Eastern Cape Province in SA

Ngqaka AT, Schönfeldt HC

National Department of Health
E-mail: NgqakA@health.gov.za

South African consumption data shows that in very poor households, maize was the most consumed foodstuff. The study investigated acceptability of different maize meal types, as well as awareness of technologies like food fortification and genetic modification in two rural communities of Mthatha.

The first phase of the study employed a qualitative approach in which numerical data was collected using sensory evaluations and second phase being a qualitative approach in the form of focus group interviews.

The sensory evaluation findings of the study indicate that fortified (special) maize meal is preferred over all other maize meal types, based on a higher liking of the aroma and colour. This was followed by unfortified (special) maize meal, although it was not significantly different to sifted white maize meal, sifted yellow maize meal, white sifted non-genetically modified maize meal, white genetically modified maize meal, in descending order. Focus groups were used to capture awareness of food fortification and genetic modification. The findings from the Ngqeleni and Mqanduli villages differed due to different exposures.

In conclusion, this gives an indication that fortified white maize meal is highly accepted amongst the Xhosa communities of Mthatha in the Eastern Cape. The study revealed very interesting differences in preference of different maize meal types.

Better interventions need to be administered in order to achieve complete awareness and understanding on new technologies. This could form part of understanding the dynamics related to staple foods in a rural context.

35. Implementation of HACCP in the design and layout of food laboratories used for training of University of Technology students

Ochse CE, Roeloffze A, Nesamvuni EA, Le Roux MR

Tshwane University of Technology
E-mail: ochsese@tut.ac.za

Introduction: In the process of merging two departments originally situated on two sites, the Tshwane University of Technology (TUT), Departments of Hospitality Management designed new food laboratories to comply with HACCP principles, in order to provide the required skills and competencies to students for the food and beverage industry.

Objectives:

- Do needs analysis amongst lecturers for teaching requirements.
- Perform a market analysis by visiting other leading, similar teaching and industry sites.
- Develop and compile detailed datasheets to guide the architect during design.
- Ensure built-in HACCP compliance in all work areas, equipment and process flow.
- Upgrading food laboratories to prepare and serve safe food with flair.
- Turn over the reins to regular management.

Designing safety:

- Design building and construction to maintain food safety in the process flow from receiving to waste disposal.
- Flexibility, simplicity and modularity of equipment to prepare safe food.
- Creating an efficient flow of materials and personnel/ students
- Temperature and air flow control throughout the department.
- Building finishes that are durable and easy to clean.
- Ease of cleaning of all areas with special attention to drainage.
- Attention to fire hazards.

Conclusion: Safety assurance is not only important in the operational running of foodservice, but HACCP principles have to be taken into consideration even in the design phase. Implementation is on track and the TUT Hospitality Department will have the first intake of new students in January 2009 at the new facilities on the Rand campus.

36. Situation analysis of caregivers in the Boipatong care centre in the Vaal Triangle

Ochse CE, Oldewage-Theron W, Kleynhans IC, Holeni F

Vaal University of Technology
E-mail: ochsese@tut.ac.za

Introduction: SA is seen as a developing country with limited resources, resulting in pockets of poverty, malnutrition and household food insecurity in its population. The objective of this survey was to determine the socio-demographic and health profile of caregivers at the Boipatong centre.

Methods: Pre-tested questionnaires were administered to 52 randomly selected caregivers. A socio demographic questionnaire and health questionnaire were administered. Data were statistically analysed for means and standard deviations.

Results: The majority of respondents (70%) live in brick houses and 30% live in shacks. Those living in brick houses, 48% reported to have more than four rooms. Only 8% of households have to fetch water from elsewhere. Regular waste removal was reported by 75% of the caregivers. About 60% of the caregivers are currently employed. Of the caregivers, 93% live in households with an income below R2000. However 82% of the households spent less than R300 per month on food.

Major health problems were chest problems (94.1%), headaches (82.4%), skeleton problems (51%). Nearly thirty-two percent of respondents took chronic medication.

Substance abuse was low in this community as only 15.7% smoked, 17.6% snuffed and 29.4% used alcohol.

Conclusions: The socio demographic information indicates that a low percentage of income is spent on food and this may lead to malnutrition in children. This information should be correlated with the Living Standard Measures (LSM) to develop suitable nutrition educational material, specifically adapted to the unique situation of the Boipatong Caregiver.

37. Is there a need for nutrition education in pre-primary school children of two informal settlements in the Vaal region?

Oldewage-Theron WH, Egal AA

Institute of Sustainable Livelihoods, Vaal University of Technology
E-mail: wilna@vut.ac.za

Objectives: The focus of this project was to address malnutrition through the development, implementation and evaluation of nutrition education tools to increase the nutrition knowledge of pre-school children and their caregivers in the Vaal Region in order to make informed food procurement decisions and change long-term food intake behaviour for wellbeing and health. The specific objective of this paper was to determine nutrition knowledge of pre-primary school children in two poor informal settlements.

Methodology: A nutrition knowledge questionnaire was developed and tested for internal reliability (Cronbach's Alpha) by 20 randomly selected pre-primary school children. The pre-tested questionnaires were completed with the assistance of trained fieldworkers in 97 Grade R children of two purposively selected schools. Data were captured and analysed for descriptive statistics on SPSS, version 15.0.

Results: The internal reliability of the questionnaire was good as the Alpha ranged between 0.708 and 1.0 (n=20 questions). A large percentage of respondents (45.8%) indicated breakfast as the most important meal of the day. The majority of respondents did not know the different types or functions of vegetables and fruit (88.3%), protein- (66.75), dairy- (72.6%) and carbohydrate-rich foods (73.4%). The majority of respondents (76.1%) rated variety in the diet as important.

Conclusions and recommendations: The general nutrition knowledge of the respondents was poor. Children should be educated from an early age on healthy food choices to ensure wellbeing and prevention of many nutritional problems in later life. The results of this study were used as a basis of a nutrition education programme.

38. Development of nutrition education tools for pre-primary school children in the Vaal region

Oldewage-Theron WH, Napier CE

Institute of Sustainable Livelihoods, Vaal University of Technology
E-mail: wilna@vut.ac.za

Objectives: The focus of this project is to address malnutrition through the development, implementation and evaluation of a nutrition education programme (NEP) to increase the nutrition knowledge of Vaal Region pre-school children and their caregivers in order to make informed food procurement decisions and change long-term food intake behaviour for wellbeing and health. The specific objective of this paper was to develop the nutrition education tools for pre-primary school children.

Methodology: The methodology was based on the Food and Agriculture Organisation framework for NEP. Two schools were purposively chosen and teachers (n=25) completed a needs assessment questionnaire for data on the design of the media and tools required. The previously determined nutrition knowledge of pre-primary school children was used for determining the content of the NEP.

Results: The majority of teachers indicated that nutrition is included in the school syllabus for Grade R (92%) for 30-60 minutes per week (60%). No nutrition education tools were available (100%). All the teachers indicated a need for nutrition education in schools and the majority selected activity books (76%), card games (68%) and puzzles (64%) with bright coloured (96%) drawings (72%) in both English and the home language (88%) for the NEP tools to be developed.

Conclusions and recommendations: These results were used to develop the nutrition education tools (activity book, card and board game, and information books). These should be implemented in a NEP in schools to test the impact on the general nutrition knowledge of pre-primary school children.

39. Prevalence of household hunger and copying strategies in households of Sekhukhune district, Limpopo province

Phooko DA, Mbhenyane XG, Nesamvuni CN

Department of human Nutrition, University of Limpopo, Turfloop Campus
E-mail: smabapa@univen.co.za

Background: Hunger is a social disease caused by poverty. Presumably people living in impoverished conditions are food insecure. South Africa has adequate food supplies to feed the entire population at national level; however studies revealed evidence of under nutrition among certain groups of the population (Rose and Charlton, 2001).

Objectives: To determine the prevalence of hunger and copying strategies used in households of Sekhukhune district.

Methodology: Design: Exploratory and correlational community based survey. Setting: Rural villages of Sekhukhune district. Subjects: 180 households with children younger than 12 years.

The standardised Hunger scale was used to determine prevalence of hunger. Data on copying strategies was collected using a questionnaire with mainly open–ended questions. Thematic analysis was used for categorising copying strategies. SPSS version 14 was used to analyse data.

Results: The prevalence of hunger was determined at individual and household levels. The copying strategies reported by mothers were: asking food from neighbours, sending children to relatives and asking for on credit from local shops.

Conclusions: Strategies to deal with the underlying causes of poverty such as economic development, investment on education, health and agriculture are crucial to improve the live hood of the population in Sekhukhune district.

40. Vitamin A content of fortified maize meal and porridge as purchased and consumed

Pretorius B, Schönfeldt HC

School of Agriculture and Food Sciences, University of Pretoria
E-mail: hettie.schonfeldt@up.ac.za

Vitamin A deficiency is after protein-energy malnutrition and iron deficiency anaemia the nutritional health problem of highest public health significance in developing countries. In South Africa, 1 in 3 preschool children has a serum retinol concentration < 0.7 µmol/L (SAVACG, 1996), and 55–68% of children aged 1–9 y consume <50% of the recommended dietary intake of vitamin A (700 µg retinol equivalents) (NFCS, 2000). The Department of Health embarked on fortification of wheat flour and maize meal in 2003.

The success of a fortification program depends on a number of technical aspects, including nutrient interactions, stability of micronutrients added to food under anticipated conditions of storage and processing and bioavailability of the fortification. It is important to verify the micronutrient content in the fortified maize meal from the shelves to the cooked products that are consumed in urban as well as rural settlements.

Sixty four different maize meal samples of sixteen brands were sampled in supermarkets and shops in Giyani, Limpopo Province and the Tshwane Metropole. Retinol concentrations range between < 14µgRE/100g and > 537 µgRE/100g. Seven maize meal samples was analysed for vitamin A over time to determine the stability of the vitamin A fortificant in the maize meal. Over a six month period there was no significant decrease of vitamin A (retinol) concentrations in the maize samples. Ten maize meal samples (different brands) was analysed as raw and cooked samples. The retention of the vitamin A (retinol) in the cooked (porridge) was very low.

41. Micronutrient interactions between mutton and green leafy vegetables

Sainsbury J, Schönfeldt HC

School of Agricultural and Food Sciences, University of Pretoria
E-mail: jeaninevanzyl@24.com

The objective of this study is to investigate the interactions between micronutrients when consuming red meat and green leafy vegetables in the same meal. An estimated 33% of children in South Africa suffer from vitamin A deficiency and 21 % from iron deficiency anaemia with the prime factors being inadequate dietary intake and poor availability of micronutrients from food. Black people in South Africa traditionally practiced mixed farming, which involves the production of both crops and animals on different types of land, but currently the consumption of these foods are very low. Inclusion of green leafy vegetables (GLV) and red meat, two micronutrient rich foods, can be a viable food based strategy to alleviate nutritional deficiencies in South Africa as it has the potential to alleviate numerous micronutrient deficiencies including iron and vitamin A deficiency. It holds the possibility to enhance the absorption of specific micronutrients and thus may pose higher benefits in alleviating malnutrition. Consuming small amounts of red meat and higher amounts of green leafy vegetable at the same time will lead to increased iron absorption in particular non-heme iron due to the presence of vitamin C and heme-iron.

42. Pros and cons of USDA tables verses the NRIND/MRC tables

Scharf 0

Dietetic Services/Program Management
E-mail: scharf@icon.co.za

Since 1974 a group of people have insisted that RSA foods were (are) different to similar foods grown in the USA. This paper investigates the consequences of this assumption.

In the RSA all pharmacies and most food manufacturers and many dieticians assume that the differences between RSA and USA foods is not significant for the same quality of food. They would claim; that prior to the MRC tables; for many years; all RSA foods were based on the USA tables ("the RED book") – no one died. For many years the NRIND/MRC was directly based on the USDA Tables.

However; if the difference was REAL; what would the results be?

1. We would not be able to export our agricultural produce
2. We would have to re negotiate our EU trade treaty.
3. We would have to re formulate our enteral feeds
4. We would have warn all incoming tourists prior to arrival in RSA
5. Our departing diabetic tourists would have to get additional dietary advice.
6. We would have to spend money and manpower analysing our own foods per area/per season /per rainfall e.g. Natal banana/Spring 2007/rain, sufficient
7. Our text books may have to change
8. Our Dieticians would have "retrain" upon leaving RSA prior to working overseas. The saving would be great of we all standardize on the USDA TABLES again.

There will come a time when we will all go back to the USDA TABLES – The sooner the better

43. Challenges with the implementation of nutrition programmes for vulnerable groups in remote rural villages

Schoeman SE, Faber M, Adams V, Lombard C, Smuts CM, Oelofse A, Ford-Ngomane N, Dhansay MA

Nutritional Intervention Research Unit
E-mail: serina.schoeman@mrc.ac.za

Introduction: Inaccessibility to health care deprives rural communities from receiving optimal health and nutritional care. The Health Systems Trust introduced a range of interventions, delivered by trained volunteers via community bases, which addresses some of the challenges of these rural communities. The model functions in close collaboration with the primary health care (PHC) facilities in various catchment areas.

Objective: To evaluate the implementation process of the model and its linkage with the PHC system.

Methods: The study was done in 2007 at 13 PHC facilities in districts of the Eastern Cape and Kwa-Zulu-Natal. One professional nurse per PHC facility was interviewed, and volunteer interventions were observed. Researchers of the Medical Research Council obtained information using structured questionnaires.

Results: Community bases have been established and there was a functional referral system between the bases and PHC facilities. The volunteers established vegetable gardens at all the PHC facilities and only some of them assisted with growth monitoring.

Conclusion: The HST model has the potential to improve service access and delivery to rural communities via the community bases, referral network system and clinic gardens. For sustainability, careful consideration is required in terms of volunteer recruitment, mentoring and supervision.

44. Advantages/disadvantages of homogenized and unhomogenized milk

Schönfeldt HC, Gibson N

School of Agriculture and Food Sciences, University of Pretoria
E-mail: hettie.schonfeldt@up.ac.za

Milk is an oil-in-water emulsion, with fat globules dispersed in a continuous skim milk phase. When raw milk is left to stand, the fat particles would rise and form a cream layer on top of the skim milk phase. Homogenization of raw milk is a mechanical treatment by which the milk is passed under high pressure through a tiny orifice, resulting in a decrease in size, and increase in surface area and number of the fat globules. This results in a reduced tendency of the fat globules to cream and form the fat layer on the top.

In previous years it has been hypothesized that unhomogenized, or raw, cow milk is tolerated better than homogenized milk, by hypersensitive, or lactose intolerant, consumers. Some studies have also suggested that homogenized milk can be associated with various lifestyle diseases, including arthrosclerosis and heart disease. Various, more recent, studies have been conducted to investigate these theories. Studies found to date do not show any impact of homogenization on milk allergy or intolerance in humans, except for a few percent of children allergic to milk who would tolerate less homogenized milk. However, differences of primary immunization could be much more important in infants since most milk proteins are potential allergens, especially when heated.

This review will investigate reported symptoms suggesting hypersensitivity to homogenized cow's milk, after the consumption thereof. It will further discuss studies done on healthy individuals with a good tolerance of milk with reference to immunological response to homogenized versus unhomogenized milk.

45. An assessment of dietary patterns in adult women of greater Letaba municipality, Limpopo province

Seanego AM, Mbhenyane XG

Department of Health, Limpopo Province, South Africa
E-mail: smabapa@univen.co.za

Background: An understanding of the determinants of change in dietary patterns and nutrient intake during the demographic transition in developing countries should inform the development of appropriate strategies and intervention programmes to prevent and control nutrition related diseases. Documenting dietary patterns of South African women is important because they determine the well-being of the future generation. The South African Food-Based Dietary Guideline is an educational tool that can also serve as a basis for assessing adequate nutrition.

Objectives: To assess the dietary patterns of rural women using the South African food-based dietary guidelines.

Methodology: Design: Descriptive correlational community based cross-sectional survey. Setting: Greater Letaba Municipality in Mopani district of Limpopo Province. Subjects: 160 adult women aged 19-45 years

A questionnaire was used to collect data on environmental factors. A FFQ was used to collect data on dietary patterns. Eating patterns were evaluated for compliance using SAFBDGs. Anthropometric measurements were taken to determine the body mass index (BMI). The prevalence of underweight and overweight were also determined.

Results: The BMI revealed that 31% were overweight and 20% obese. The majority of women were found to adhere to FBDGs for starch, used mainly chicken and vegetables, drank sufficient water and used iodised salt. There was low consumption of fruits, beans, red eat, alcohol and fat. There was poor consumption of variety of foods and inadequate availability of food in the household. Most consumed foods were: maize meal, sugar, tea, bread, merogo (variety of vegetables), chicken, non-dairy products, tomato, gravy, cooking oil and salt. The demographic factors that significantly ($p < 0.05$) influenced eating patterns were: level of education, employment status, source of income, geographic location and source of nutrition advice.

Conclusions: The nutritional pattern of women requires continuous assessment and monitoring as it is influenced by a wide variety of national and personal development factors which include urbanization, physical activity, availability and use of resources such as a field for food production.

46. Assessment of the nutritional status of HIV/AIDS patients at Omdurman teaching hospital

Shikieri AB, Mohammed DH

The National Ribat University, Khartoum, Sudan
E-mail: DN7SHIKI@HOTMAIL.COM

Introduction: The HIV/AIDS epidemic has been an important public health issue all over the world. Sudan, which is the largest country in Africa, is one of the countries suffering from the disease.

Study objectives: To assess the nutritional status of patients with HIV/AIDS.

Study methodology: A cross-sectional study was conducted in Omdurman Teaching Hospital. A sample of 100 patients (men and women) aged 25-45 years were included. Body weight and height were measured. Dietary intake was assessed using repeated 24 hr-recall records.

Results and discussion: 64% of the sample aged 25-34 years and slightly higher proportion of males were included (56% males versus 44% females). 44% of the patients were undernourished with BMI <18 kg/m^2 whereas 16% were either overweight or obese. Patients had low energy (1549±41 kcal), carbohydrate (209.4±8.8 g), fat (45.4±1.5 g) and vitamin A (250.7±26.3 mg) daily mean (±SD) intakes and adequate protein (75.5±4.5 g) and iron (37.2±1.6 µg) intakes compared to the RDA. Inadequate fruit intake was reported amongst 86% of the respondents and 61% of the patients consumed vegetables daily. No sex differences were found in the current study.

Recommendations: There is a need for larger epidemiological studies to assess the nutritional status of HIV/AIDS patients, as well as a need for nutritional and health education throughout Sudan.

47. Training of South African salt producers in the titration method to ensure optimal salt iodization

Strydom EE, Jooste PL

Nutritional Intervention Research Unit, Medical Research Council, South Africa
E-mail: estrydom@mrc.ac.za

Background: Iodation of salt is accepted by UNICEF, WHO, ICCIDD, and MI as the most effective long-term strategy to eliminate iodine deficiency, to prevent and control iodine deficiency disorders in populations.

In 2005 salt producers, without an internal quality assurance of iodine in salt at production sites, were largely responsible for the under-iodation and over-iodation of salt.

Project goal: To ensure that all South African salt producers producing table salt perform salt iodine analysis by a standardised titration or the potentiometric method.

Methods: Salt producers were trained and accommodated with a laboratory capable of performing the titration method. After one year salt producers were reassessed and retrained, and additionally evaluated through a quality control (QC) exercise.

Results: Although all salt producers welcomed the training, assessments, and quality control exercise, we observed shortcomings in managerial responsibility; laboratory infrastructure; internal quality assurance regarding laboratory instrumentation; chemicals; and technical ability of analysts.

In the QC exercise the individual values agreed reasonably well with that of the MRC laboratory; only two of the eleven laboratories had a CV above 10%, where six laboratories produced encouraging results below a CV of 5%.

The titration training and assessments improved and standardized the iodine analytical method in the South African salt industry to the extent that all salt producers iodating salt are now equipped and trained in the titration method.

48. Child caring patterns in an urban informal settlement in the Vaal region

Thamaga SA, Oldewage-Theron WH

Institute of Sustainable Livelihoods, Vaal University of Technology
E-mail: agnesthamaga@yahoo.com

Study purpose: The purpose of the study was to evaluate the anthropometric status and caring patterns, especially feeding practices, of children aged 0-60 months old in order to recommend relevant interventions towards improving their survival, protection and rights.

Methodology: A semi-structured questionnaire and an observation checklist were used as measuring tools for data collection. Children's anthropometric data were taken, and reported in terms of United States National Center for Health Statistics parameters.

Results: The results indicate that 95% of the caregivers were females. Although 4.4% had no formal education, 73.3% were unemployed with a monthly income of < R1000.00 (69.4%). Although 89.4% of the children had records of growth charts, the prevalence of stunting was 60.5%. The majority of children (83.3%) were breastfed for 24-60 months (55%), but not exclusively for the first six months of age (88.9%). Solids introduced before three months of age included soft porridge (35.5%), commercial cereals (35.0%), sugar water (12.8%) and mashed potato (11.7%).

Conclusions: The study provides evidence of the crucial role of childcare practices as key input into children's nutritional status. This is true in areas where poverty, household food insecurity and stunting rates are very high. It is crucial that factors determining the child's nutritional status are identified and followed by appropriate implementation of healthcare applications.

49. Consumption patterns of vitamin A-rich foods of 10-13 year old children living in a rural area in Venda, South Africa

Tshihwanambi TP

Department of Health
E-mail: tshililo.tshihwanambi@gmail.com

Methods: A cross-sectional survey was conducted in Vyeboom Village in Limpopo Province, at Makhado local municipality in the Vhembe District. About 155 school children aged 10-13 years (boys and girls) participated in this study, using convenience (area and schools), random (30 per age group) and stratified (ages) sampling to draw the sample from three primary schools.

Results & Discussion: Mothers were the caretakers in the families, because they mostly played a major role in the decision-making, preparation and serving of the food that were consumed by these children.

Conclusion: There was poor consumption of vegetables and fruit at school compared with home. Seasonal availability influenced cultivated and indigenous food intakes. Generally, children consumed two meals at home and one at school including very little vitamin A-rich foods and unhealthy snacks.

50. The effect of thermal processing (boiling) on total phenolics and antioxidant activity of selected South African leafy vegetables

Uusiku NP, Oelofse A, Duodu G, Bester MJ

University of Pretoria, Pretoria
E-mail: s26556881@tuks.co.za

Dietary antioxidants and phenolic compounds protect cells against oxidative damage and have been associated with a reduced risk of chronic lifestyle-related diseases. To promote the consumption of local green leafy vegetables (GLV), it is necessary to determine the antioxidant activity of these plants. The total phenolic content and antioxidant activity were determined in four South African leafy vegetables (amaranth, corchorus, cowpea and pumpkin). The vegetables were boiled for 0, 10, 30 and 60 min in order to determine the effect of cooking on antioxidant levels. The total phenolics content was determined on water extracts of the freeze-dried leaves using the Folin-Ciocalteu method. Total antioxidant activity was determined on water- and acetone-extracts using the Oxygen Radical Antioxidant Capacity (ORAC) assay. The total phenolics ranged from 4.3 - 26.5 mg (Gallic acid equivalent) per gram on dry weight basis. With the exception of corchorus, boiling generally decreased the total phenolics content in amaranth and cowpea. After 60 min of boiling, total phenolics content of pumpkin leaves increased, though not to the same level as the untreated pumpkin leaves. The vegetable extracts were found to have different levels of antioxidant activity depending on the type of vegetable and cooking times. In conclusion, the effect of boiling on the total phenolics and total antioxidant activity depends on the type of leafy vegetable.

51. The energy and nutrient contribution of sorghum to the diet of children aged 2-5 years old in selected rural communities in western Kenya

Vilakati N, Oelofse A, Taylor JRN

University of Pretoria
E-mail: 54192@tuks.co.za

Sorghum is a staple cereal that offers nutrition in semi arid and food insecure areas. In some rural parts of Kenya, sorghum forms part of the diet as ugali, the main staple. This study was carried out to (i) determine the consumption of sorghum by children aged 2-5 years in rural western Kenya and also (ii) to establish the contribution of sorghum to the children's' energy, protein, iron, zinc, vitamin A and vitamin E intakes and these nutrient deficiencies in the children's total dietary intake.

A cross-sectional food consumption survey was conducted using an interviewer administered Quantitative Food Frequency Questionnaire (QFFQ) to 102 mothers and care givers. The diet consumed offered a variety of foods resulting in sufficient nutrient intake for the majority of the children. The mean contribution made by sorghum was 36.4 g for uji and 26.2 g for ugali and the nutrient contribution was: energy 140 kJ (2 %), protein 0.9 g (1.7 %), iron 0.3 (4.3 %) mg, zinc 0.1 mg (2.1 %), vitamin A (0 %) and vitamin E (0 %). The proportion of the population that was deficient in these nutrient was 36.3 % energy, 4.9 % protein, 48 % iron, 21.6 %, zinc, 46.1 %, vitamin A and 17.6 % vitamin E.

Sorghum's low contribution made it a minor cereal in the children's diet. Sorghum was used mainly as an ingredient for making ugali/uji flour. For the deficient children, this was a sign that dietary quantity rather than quality needs to be improved.

52. The concept of professionalism in dietetic students in the western Cape, South Africa

Marais D, Marais M, Visser J, Taylor DCM

Division of Human Nutrition, Stellenbosch University
E-mail: jconrad@sun.ac.za

Members of a Profession are committed to codes of ethics and professionalism. It has been said that the "theory of professionalism must be constructed in dialogue with those we are instructing" therefore we should first determine what students understand by "professionalism".

108 students completing a 4-year dietetics degree at universities in the Western Cape (36% University of the Western Cape, 64% Stellenbosch University) and willing to participate completed a demographic questionnaire and was each given a pack of cards containing 90 attributes of professionalism. Cards had to be sorted into eleven piles, ranging from least agree to most agree. The element of forced choice was introduced by restricting the number of cards in each pile (Q-sort). The average age of the students was 21 (SD 3.1) years and most was female (91%).

PQMETHOD 2.11 was used for the Q-sort data analysis, ranking items by their mode score and giving an indication of which items were most consistently favoured, or dismissed as unimportant. Professionalism attributes for which there was the most level of agreement included: "protect confidential information" and "deal with high levels of uncertainty" followed by "good clinical judgment", "communication skills" and "carry out professional responsibilities". Comparative statistics across socio-demographic variables showed significant differences for various professionalism attributes and indicated that the attainment of these attributes was staged. The findings of this study can form an integral part of Dietetics curriculum planning and can ensure that the assessment of these attributes are relevant and consistent with development over the years.

53. Is research the backbone of dietetics?

Viviers C, Gericke GJ

University of Pretoria
E-mail: christa.viviers@up.ac.za

Problem definition: To describe dietitians' opinion on the relevance and importance of research to the scope of practice of the hospital dietitian, their involvement in role function activities related to research, the relevance and importance of research as a standard, and appropriate indicators to measure the standard of research in a hospital.

Setting: Hospitals in Gauteng, Mpumalanga and South African National Defence Force (SANDF) (n=33).

Sample: All dietitians representing all ranks (n=121).

Data collection: A cross-sectional descriptive survey in the quantitative domain. Data were collected using structured questionnaires and were presented as percentages, frequencies, modes and means.

Results: Research was considered relevant and important to the scope of practice of the hospital dietitian by >80% dietitians.

The average involvement in role functions for all activities related to research was 21%. Dietitians involved with research were mostly applying research information and methods to nutritional practice (60%). The highest frequency for involvement was <once per month reported by less than one third of dietitians doing research (29%).

Research was regarded relevant and important as a standard. The indicator receiving the highest response rate (98%) was for 'applies nutrition expertise to evaluation and selection of products and procedures'.

Conclusions: Although dietitians accepted research as relevant and important to practice and standards for hospital dietitians, a small proportion of hospital dietitians were involved with role function activities related to research and at a low frequency. Findings reflected agreement with the application of new knowledge to their area of work, but not with generating research.

54. Validity of modelling clay as a portion size estimation aid in adolescent girls

Wenhold, F on behalf of Pohorski A, Schlenther C, Spalovsky L, Van Huyssteen A

Department Human Nutrition, University of Pretoria
E-mail: friede.wenhold@up.ac.za

Objectives: To assess the validity of modelling clay and measuring cups as portion size estimation aids (PSEA) for small and large portions of amorphous food (minced meat, pumpkin, rice) in 16-19 year old girls.

Methods: Female volunteers (n=36) observed a plate with three test foods (plus spinach as constant) of known portion size (60-250mL). They then used modelling clay and measuring cups to estimate the quantities. Test-retest reliability was checked, as was participants' liking of each food. Analyses included paired t-tests, two-sample t-tests, one-way analysis of variance (Bonferroni) and (intraclass) correlations.

Results: Mean difference between actual and estimated quantity using modelling clay was non-significant (minced meat: p=0.5495; pumpkin: p=0.7225; rice p=0.5710). There was no significant difference (=0.8020) among the test foods, and reliability was established (intraclass r=0.78 [p=0.0055]).

When using measuring cups, mean difference between actual and estimated quantity was highly significant (p=0.000 for all three foods). Small portions were consistently overestimated. For minced meat, the mean difference between actual and estimated quantity for small and large portions was significant (clay: p=0.0013; measuring cups: p=0.0108), yet for pumpkin and rice this was not the case (pumpkin: p=0.4209 and p=0.7774; rice: p=0.5335 and p=0.1018 for clay and measuring cups respectively). There was no correlation between percentage difference between actual and estimated quantity, and liking of food (minced meat: r=-0.0952 [p=0.5808]; pumpkin r=-0.1008 [p=0.5585]; rice r=-0.0458 [p=0.7909]).

Conclusion: Modelling clay, in contrast to measuring cups, appears to be a valid PSEA for amorphous foods in groups of female adolescents. Portion size may play a role, but liking the food was unrelated.

55. Kefir as a functional food and its nutrition value

Zohri, M, Manafi M

Islamic Azad University – Branch Tehran
E-mail: mztabrizu@gmail.com

Kefir (or kefyr) is an unusual fermented drink which originated in Eastern Europe. It is made by adding a special mixed culture of bacteria and lactose-fermenting yeasts to milk. Some of the bacteria are not unlike those used for making yoghurt, while the yeasts generate carbon dioxide and a small amount of alcohol. Other bacteria produce a viscous gum which holds all the microorganisms together in gelatinous lumps. This allows the kefir \'grains\' to be separated from the milk and re-used once the fermentation is through. The finished product is like a refreshing, fizzy, drinking yoghurt. A wide range of lactic acid bacteria are involved in the fermentation, including *Lactobacillus casei, L. acidophilus* and *Streptococcus lactis*, which produce mainly lactic acid from the lactose in the milk. Flavour components are produced by Lactobacillus bulgaricus which produces acetaldehyde, Leuconostoc cremoris, diacetyl and acetonin, and Lactobacillus brevis, which produce acetonin, acetic acid and ethanol, as well as carbon dioxide. The yeasts Candida kefyr (also known as *Saccharomyces kefir, S. lactis* or *Torulopsis kefir)* and *Kluyveromyces fragilis (K. lactis)* convert lactose to ethanol and carbon dioxide during the cooler ripening period. Consumption of kefir has more advantage for health and advised to this.

LIST OF ALL AUTHORS: POSTER PRESENTATION ABSTRACTS

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