The shaping of healthy & organic school meal programs in three Danish municipalities can be understood as a proces of "translation" in actor networks

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P15-28

INFANT UNDER-NUTRITION IN A POOR MAYAN VILLAGE

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OBJECTIVES: Improve our understanding of poor Mayan infant under-nutrition regarding to food intake, ages and the impact of a nutritional course given to the infants' mothers.
METHODOLOGY: We measured weight and length of 84 infants from to 60 months of age and estimated their energy and protein intake. We estimated the Z scores trend with age by linear, quadratic and logarithmic regression. We tested the impact of the nutritional course by pairing the infants' Z scores before and after the course, using Student's t test.
RESULTS: Length and weight in Z scores decreased rapidly after 4 to 6 months of age and continues falling through 60 months. The 24 hours dietary recall showed that under-nourished infants have an average daily energy intake 72% of recommended. The 18 hours nutrition course gave after 4 months, a marginal, non-significant increase in both weight to age and in energy intake.
CONCLUSIONS: Poor infants are born normal on the average, but they suffer reduced length for their age after 3 to 4 months and weight for their age after 6 months. The course on nutrition given to the mothers was able to temper, but on the average not significantly to reverse their undernourished infant status

P15-29

A SUITABLE COMPLEMENTARY FOOD FOR BENINESE INFANTS AGED 06 TO 12 MONTHS

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RATIONALE & OBJECTIVES: This study is carried out to formulate complementary infant flour from raw food ingredients available in Bopa district and to test its acceptability by children 6 to 12 months.
MATERIALS & METHODS: The first phase consisted in formulation and determination of nutritional characteristics of the infant flour. The second step took concerned acceptability tests of gruel made of the infant flour formulated. 65 couples mother/child gathered in six (6) groups formed the study sample. Children acceptability test took place in a morning during three consecutives days. The gruel consumption was ad libitum.
RESULTS AND FINDINGS: caloric density of the flour (433.9 Kcal/100g) was significantly greater than requirements (400 Kcal/100g). Proteins (15.1 %) and lipids contents (10.7 %) were respectively conformed to standards (15 % and 10 % - 25 % respectively). Crude fibers content was lower than 5% as recommended. Ash content was 1.9 %, pH was 6.1 and moisture content was 4.3%.
The infant flour contained microbial germs up to a level of 4.8 log CFU/g. Presence of total coliforms (1.7 log CFU/g) was significantly lower than norms. In addition, microbiological analyses showed absence of yeast, mould and pathogen (Escherichia coli).
CONCLUSION: all mothers asserted their desire to feed their child with this gruel. Various reasons motivated this decision with better nutritional status of children as main one.

P15-30

INVESTIGATION OF RELEVANCE SOME NUTRITIONAL FACTORS WITH DENTAL DECAY AT 3 TO 6 YEARS OF AGE IN CHILDREN OF ISFAHAN (2007-09)

Fakheran, Omid

INTRODUCTION AND PURPOSE: The decay tooth is one of most prevalent disease that people cause to suffer. When it is more important and obvious that we know there is a meaningful relevance between decay tooth at period of milk-teeth and continual teeth. Available information indicates decay teeth more than an inherited disease is an environmental disease. The purpose of this study is some nutritional factors that are effective on decay teeth in our society.
METHOD OF PERFORMANCE: This study is a descriptive (observable) type and carries out at specific period of time. Almost 330 persons of those who referred to hygienic centers of Isfahan city were selected. We provided tools for gathering information and questionnaire .The criteria for measuring decay in children was dmft. After exploiting data and their analysis, developing software SPSSis formed by using descriptive and inferential statistics.
CONCLUSIONS: Among population who exposed study, the average period of breast-feeding in children with good DMFT was 18/9month and 80/3% of them use multivitamin drop regularly. And in bad DMFT group was 21momth & 68/4 respectively.
The average weight of children was 15/79kg and in DMFT=0 & DMFT>0 was 14/48kg & 16/36kg respectively.
DISCUSSION: The effect of some nutritional factors like breast-feeding, multivitamin drop using, average weight of children & daily using of sweets on tooth decay was approved.
KEY WORDS: DMFT, children, weight, nutritional factors

P15-31

MATERNAL DEPRESSION INFLUENCES HOME ENVIRONMENT AND GROWTH IN RURAL INDIA

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RATIONALE AND OBJECTIVES: This paper studies the influence of maternal depression and self esteem on HOME and growth of rural Indian infants at 15-months-age.
METHODS: Maternal depression (CES-D), self-esteem (Rosenberg) and Home Observation for Measurement of Environment (HOME) were administered to 600 mothers from a follow up study. Data were analyzed controlling for maternal education and socio economic status as potential confounders.
RESULTS: Maternal depression was found to be negatively correlated with height-for-age and weight-for-age, ($p<0.05$) and HOME ($p<0.001$), while self-esteem was positively correlated with the same. Regression analysis showed reduced maternal depression, higher family assets, higher maternal education, and type of intervention (education on complementary feeding and responsive feeding and play) to be significantly and positively associated with HOME ($R2=0.24$). Assets and HOME score were positively related with height-for-age ($R2=0.09$).
CONCLUSION: Maternal depression had a negative and stronger association with the quality of the home environment than self esteem. Family assets and HOME scores were significantly and positively associated with height-for-age.

P15-32

LONG-LASTING BIFIDOGENIC EFFECT OF A PREBIOTICS MIXTURE ADDED TO STARTING FORMULA DURING THE FIRST 6 MONTHS OF LIFE

Agostoni, Carlo; Bonza, Matteo; Giovannini, Marcello; Ruscitto, Antonia; Salvatici, Elisabetta; Salvini, Filippo

RATIONALE AND OBJECTIVES: galacto-oligosaccarides (GOS) with fructo-oligosaccarides (FOS) have bifidogenic effects in newborns. Aim of this study was to determine

the persistence of the bifidogenic effect beyond a 6-month supplementation in infants.
MATERIALS AND METHODS: 20 formula fed newborns were randomly assigned to either a standard formula with 0.8 gr/dl GOS/FOS (ratio 9:1) or maltodextrines during the first 6 months of life. Faecal flora composition (DNA analysis) and pH were examined at birth, 3, 6 and 12 months.
RESULTS AND FINDINGS: the two infant groups were similar at birth as far as anthropometry, mode of delivery and Bifidobacteria and Lactobacilli in fecal flora. Faeces from infants fed prebiotics had more Bifidobacteria and Lactobacilli than controls at any evaluation ($p< 0.0001$). Bifidoacteria increased up to six months of life ($p<0.0001$, Fisher test) and remained stable afterwards. Faecal pH was significantly lower in the prebiotic group at any time-point ($p<0.0001$). The prebiotic mixture was well tolerated, and no effects on growth were recorded.
CONCLUSION: a starting formula including a prebiotic mixture (GOS/FOS ratio 9:1) has a significant bifidogenic effect persisting at least up to one year of age.

P16: Food Fortification for Optimal Nutrition I

P16-01
ANTIOXIDANT PROPERTIES AND SENSORY PROFILES OF RYE BREADS FORTIFIED OF GREEN TEA EXTRACT

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RATIONALE & OBJECTIVES: Interest in functional foods is increasing. The antioxidant properties, polyphenols content and sensory profiles of rye breads with different levels of green tea extracts (GTE) were analyzed.
MATERIALS & METHODS: The sensory quality of breads fortified with GTE added at the levels of 0 (control bread) 5, 8 and 11g/kg rye flour respectively was carried out using hedonic test. The total polyphenols (TP) in respective types of breads were determined according to the Folin-Ciocalteu method and expressed as mg of catechine equivalents (CE)/g d.w.. The antioxidant properties were measured by the 2,2,-diphenyl-1-picrylhydrazyl (DPPH) colored radicals method.
RESULTS & FINDINGS: The results showed that supplementation up to 11g GTE/kg flour could be included in bread formulation without altering the sensory acceptance of the bread. TP in all samples of bread ranged from 2,03 ± 0.02mg CE/g d.w. (control bread) to 7,08 ± 0.01mg CE/g d.w. (bread with 11g GTE/kg flour), demonstrating significant differences between treatments, also the incorporation of GTE in rye bread markedly increased the antioxidant property of the bread as tested by DPPH method.
CONCLUSION: The present study showed that fortification of green tea extracts (11g GTE/kg flour) in rye breads has a beneficial health potential.

P16-02
WHEAT BREAD FORTIFIED WITH IRON AND VITAMIN A IMPROVED IRON STATUS OF ANEMIC SCHOOLCHILDREN

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RATIONALE AND OBJECTIVES: To determine the efficacy of pandesal baked from wheat flour fortified with iron, with or without VA, in improving iron and anthropometric status. MATERIALS AND METHODS: Anemic 6-12 year-old Filipino children (n=250) were randomized to receive two 60g pandesal daily for 8 months using (1) iron-fortified (either hydrogen-reduced or electrolytic iron at 80mg/kg, or ferrous fumarate at 40mg/kg), (2) iron and VA-fortified, (3) VA-fortified (490RE/100g), or (4) non-fortified flour to compare hemoglobin (Hb), zinc protoporphyrin (ZnPP) and anthropometry at post-intervention.
RESULTS AND FINDINGS: Mean Hb increased by 1.3g/dL ($P<0.001$) and mean ZnPP decreased by 24.4µmol/mol ($P<0.001$) after 8 months. After controlling for baseline concentration, age and gender, Hb was significantly higher in the Iron+VA group compared to the non-fortified group ($P=0.034$). The odds of being iron-deficient were significantly lower in the Iron group compared to the non-fortified group ($P=0.006$). No significant differences in anthropometry among groups.
CONCLUSION: Iron-fortification of flour significantly reduced ID prevalence among anemic schoolchildren; double fortification with iron and VA significantly improved Hb status.

P16-03
DISPOSITION TOWARDS "SPRINKLES": LAYING FOUNDATION FOR USE AND INTEGRATION IN THE PHILIPPINES

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One of the promising food-based strategies is home fortification through "Sprinkles". The efficacy of "Sprinkles" in improving iron status has been demonstrated in various studies, and can be a novel intervention to address the pervasive problem of anemia in the Philippines. As part of a UNICEF-UPLB project, the disposition towards "Sprinkles" of various stakeholders from the national to community level was identified. Health infrastructures and set-ups at the community level were also dissected to identify opportunities and challenges for effective distribution and integration of the intervention. Data were collected mainly through key informant interviews and focus group discussions. Positive disposition on the acceptance and utilization of "Sprinkles" among various stakeholders and availability of service providers set forth the avenues for its distribution. The establishment of distribution systems, determination of price and market promotion strategies, and creation of policies and guidelines for implementation are challenges for action. Social marketing and communication strategies are also essential to ensure adoption and use.

P16-04
EFFECT OF A NUTRITIONAL SUPPLEMENT ON BONE MINERAL DENSITY (BMD) AND BONE MINERAL CONTENT (BMC) IN PRE SCHOOL CHILDREN

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RATIONALE & OBJECTIVES: Trials in adolescents have shown a positive effect of calcium intake on bone mineral accretion. We evaluated the effect of a cereal-based supplement, fortified with micronutrients (450mg calcium and 100IU of vitamin D per serving) on BMD and BMC in a group of pre-school children aged 3-5 years on a national intervention.
METHODS: 39 children were supplemented with fortified meal (50g/day) and 44 children as control group given non-fortified meal (single blind study). BMD and BMC of the spine and proximal femur were measured at the baseline and after 9 months of intervention.
RESULTS: The mean (SD) BMD of spine at baseline were

0.465 (0.06) in the supplemented and 0.435 (0.04) g/cm2 in the control groups (p=0.07). After 9 months it has improved in the supplemented and control groups to 0.483 (0.06) and 0.455 (0.04) g/cm2 respectively; p=0.36.
CONCLUSIONS: Nine months supplementation has no significant effect on bone mineral accruement.

P16-05
REDUCING SODIUM IN CHICKEN SOUP USING GLUTAMATE SALTS: ESTIMATING THE EFFECTS OF MAGNESIUM AND CALCIUM GLUTAMATE AND THEIR COMBINATIONS WITH SODIUM GLUTAMATE
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Sodium intake is one of the largest controllable factors that contribute to cardiovascular diseases. Glutamate is an amino acid which activates taste receptors and elicits a unique bouillon-like taste called umami taste. Its sodium salt (monosodium glutamate, MSG) has been already reported to reduce soup's sodium content without reducing palatability by some researchers. This study's purpose was to estimate the efficacy of monomagnesium di-glutamate (MMG) and monocalcium di-glutamate (MCG) on reducing sodium, by calculating their optimal concentrations with and without MSG at restricted sodium levels.
Thirty subjects evaluated palatability of the chicken soups designed according to central composite design. We estimated the sodium-lowering effects of MSG, MDG, MCG, MSG+MDG and MSG+MCG from an equation derived by response surface methodology. As a result, soups included 0.51% NaCl at 0.25% MSG, 0.65% NaCl at 0.16% MDG, 0.54% NaCl at 0.26% MCG, 0.48% NaCl at 0.26% MSG and 0.22% MDG, 0.47% NaCl at 0.15% NaCl and 0.25% MCG, and 0.73% NaCl with no glutamate were all estimated to have a same palatability. We indicate that chicken soup's sodium content is reduced by approximately 10% to 30% by adding glutamate salts and the effects are: MSG+MCG > MSG+MDG > MCG > MSG > MDG.

P16-6
IMPACT OF FOLIC ACID FORTIFICATION ON FOLATE STATUS AND PLASMA TOTAL HOMCYSTEINE CONCENTRATIONS: THE US EXPERIENCE
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RATIONALE: Beginning January 1998, the FDA mandated that all processed cereals are to be fortified with folic acid in the US at the level of 140 µg/100 g of food to reduce the risk of having a child with neural tube defect.
OBJECTIVE & METHODS: We investigated changes in serum and RBC folates and circulating total homocysteine (tHcy) concentrations from pre- to post-folic acid fortification period utilizing the data reported in four nationally representative sample surveys conducted on US residents (1988-2004). Three post fortification surveys were concatenated into one analytic database (1999-2004)
RESULTS: Geometric mean serum folate, RBC folate, and tHcy concentrations changed 12.1 to 28.1 nmol/L (132% increase; P<0.0001), 435 to 659 nmol/L (55.5% increase; P<0.0001), and 8.7 to7.5 µmol/L (13.8% decline; P<0.0001), respectively, from pre- to post fortification period. By and large, these changes were uniform across various demographic US populations. As a result, there was a significant change from 1988-1994 to 1999-2004 in prevalence of low serum folate (17.9% to 0.5%; P<0.0001), low RBC folate (45.8% to 7.5%; P<0.0001), and high tHcy (13.2% to 5.7%; P<0.0001).
CONCLUSION: The mandated folic acid fortification has lead to virtual elimination of low serum folate concentrations in the US.

P16-7
PLASMA TOTAL HOMOCYSTEINE CONCENTRATIONS HAVE INCREASED AFTER A SIGNFICANT DROP FOLLOWING FOLIC ACID FORTIFICATION IN THE US
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RATIONALE: Beginning January 1998, the FDA mandated that all processed cereals are to be fortified with folic acid in the US at the level of 140 µg/100 g of food to reduce the risk of having a child with neural tube defect.
OBJECTIVE & METHODS: We investigated the trends in plasma total homocysteine (tHcy) concentrations utilizing the data reported in nationally representative sample surveys conducted on US residents in the post-folic acid fortification period (1999-2004) (n=15,226).
RESULTS: Geometric mean plasma tHcy concentrations increased from 7.04 µmol/L in 1999-2000 to 7.61 µmol/L in 2001-2002 (a 8.1% increase; P<0.002) to 7.81 µmol/L in 2003 to 2004 (a 10.8% increase; P<0.0001). In elderly people (>70 y), tHcy concentrations increased from 9.5 µmol/L in 1999-2000 to 11.0 µmol/L in 2001-2004 (a 15.8% increase; P<0.0006). Overall, the prevalence of high tHcy (>13 µmol/L) did not increase significantly from 1999-2000 to 2003-2004 (4.8% to 6.4%; P=0.06). However in elderly people, prevalence of high tHcy increased significantly from 17.4% from 1999-2000 to 28.2% in 2003-2004 (61.5% increase; P<0.007).
CONCLUSION: Increased tHcy may be likely due to declined folate status in the post fortification period.

P16-8
THE EFFECTIVENESS OF FLOUR FORTIFICATION AMONG WOMEN OF CHILDBEARING AGE IN MOROCCO
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BACKGROUND: The prevalence of anemia among Moroccan women at childbearing age was 32,6% in 2000(National survey). A National program of flour fortification with elemental iron and vitamins B groups was launched in 2005.
OBJECTIVE: to explore the impact of consumption of iron fortified flour on iron status among women at childbearing age and to establish a long-tem monitoring system.
METHOD: Four surveys were conducted in 15 regions among women aged between 15–49 years. Globally, 1481, 1627, 1539, and 1476 women were concerned by hemoglobin measurement and respectively in May-June 2006, December-January 2006, November-December2007 and May-June 2008. Hemoglobin was measured by HemoCue method.
RESULTS: The prevalence of anemia in May-June 2006, December-January 2006, November-December2007 and May-June 2008 was respectively 31.5%, 28.3%, 33.33% and 32.9%.
CONCLUSION: Anemia remains high among women at childbearing age in Morocco. Other investigations must be carried out in order to follow the evolution of anemia among our target population and the fortification program should be

complemented with the implementation of other interventions (supplementation).

P16-09
IMPACT OF VITAMIN A FORTIFIED OIL ON VITAMIN A STATUS OF CHILDBEARING AGE WOMEN IN MOROCCO
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RATIONALE & OBJECTIVES: In, 10% of women in childbearing age vitamin A deficient (VAD). Vitamin A oil fortification is used to reduce VAD among women. The objective of this study is to assess the impact of consumption of vitamin A–fortified oil on vitamin A status of women in childbearing age.
MATERIALS & METHODS: A longitudinal evaluation of serum retinol levels of childbearing age women was performed. Two consecutive surveys were executed in 260 women in May-June 2006 and in 364 women in December-January 2008. Those surveys were conducted in fifteen Moroccan provinces.
RESULTS & FINDINGS: The prevalence of vitamin A deficiency in May-Jun 2006 was 8.8%. In
December-January, this prevalence was 6.9% (p=0.361).
CONCLUSION: The reduction in the vitamin A deficiency prevalence is still not significant. It is recommended to continue promoting fortified oil consumption and monitoring plasma retinol of women.

P16-10
DEVELOPMENT OF PLUSE BASED HIGH PROTIN INSTANT CHAPPATIHI MIX
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Pulses are the major source of proteins in the diets of population. Incorporating pulse flour with cereals for the preparation of high protein foods will not only enhance the protein content of the product, but also increase the nutrition value, there by helping in combating malnutrition. A study was undertaken to explore the feasibility of preparing pulse based high protein instant chappathi mix for commercial usage. The pulse based high protein chappathi mix was prepared by using mixed pulse flour (green gram+ bengal gram + peas) at 20,30 and 40 percent levels, packed in polyethylene bag with and without vacuum (R, and R2) and stored for 270 days at room temperature. The protein content of the instant chappathi mix was significantly increased while increasing the mixed pulse flour incorporation levels to maida which is ranged from 11.70 – 21.12 g / 100 g. The increase in the levels of mixed pulse flour incorporation had simultaneously increased the nutrients such as acidity, total and reducing sugars, fiber, ash content and minerals (calcium and iron) and vitamins (β – carotene and thiamine). The pulse based high protein instant chappathi mix may be developed by incorporating in combination of 3 or more pulse flours not for combating the protein maturation among children but also for the general benefit of the consumers of all age groups.

P17: Dietary Diversification/Modification I

P17-01
HOME GARDENING AND ITS ASSOCIATION WITH THE DIETARY INTAKE OF FILIPINO PRESCHOOL CHILDREN
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[2]University of the Philippines, Manila, Manila, PHL

RATIONALE AND OBJECTIVES: To determine the association between home gardening and the dietary diversity of preschool children and households.
MATERIALS AND METHODS: The dietary intakes of children aged 2-5 years (n=200) were determined during a cross-sectional household survey.
RESULTS AND FINDINGS: Children from households with gardens had higher diet diversity score (6.12 vs. 5.62; P=0.040) compared with children who lived in homes without garden. Homes with gardens were more likely to have children who ate vegetables 4-7 times a week (OR 2.04; 95% CI 1.24 to 3.36) and children who ate more than 1/4 cup of vitamin A-rich fruits and vegetables per day (OR 1.67; 95% CI 1.08 to 2.57). There was no significant difference in food security.
CONCLUSIONS: Having a home garden was associated with the child's diet diversity, frequency and amount of vegetable consumption and amount of VA-rich fruits and vegetables consumed; and with the frequency and the amount of vegetables consumed for a 3-month period at the household level.

P17-02
FRUIT AND VEGETABLE VARIETY IS ASSOCIATED WITH NUTRIENT INTAKE AMONG SCHOOLCHILDREN
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RATIONALE & OBJECTIVES: Fruit and vegetable variety (FVV) is considered to be associated with dietary adequacy. The study aimed to evaluate the association between FVV and nutrient intake among schoolchildren.
MATERIALS & METHODS: A cross-sectional survey was conducted in 780 Austrian schoolchildren (6-15 years). Nutrient intake was assessed by 3-d-food records. FVV was determined by counting different types of fruits and vegetables reported in food records (minimum amount 20 g). Associations between FVV and intake of 32 nutrients were tested; adjusting for total energy intake, total amount of fruit and vegetable intake, sex, body mass index and age.
RESULTS & FINDINGS: High FVV was associated with significantly higher intakes of 21 nutrients. Strongest associations were found for beta-carotene, vitamin A, vitamin C, vitamin E and iodine, e.g. beta-carotene intake increased by 60% when going from FVV of 4 or less to 10 or more items ($p<0.001$).
CONCLUSION: A diet diverse in fruits and vegetables is independently from the amount of fruit and vegetable intake highly associated with nutrient intake.

P17-03
MUCH HEALTH GAIN STILL TO BE ACHIEVED BY INCREASING CONSUMPTION OF VEGETABLES, FRUIT AND FISH
van Rossum, Caroline; Büchner, Frederike; Hoekstra, Jeljer; van den Berg, Saskia; Van Raaij, Joop RIVM, Bilthoven, NLD

RATIONALE & OBJECTIVE: Health effects of nutritional interventions to prevent diet-related chronic diseases become obvious on the long term. With simulation models expected health effects may also be quantified.
MATERIALS & METHODS: Five dietary risk factors were selected: saturated and trans fat, fish, fruit and vegetables. Risk factor intake classes were defined. Three scenarios were modeled: recommended scenario - all people in recommended intake class; worst-case scenario - all people in most unfavorable intake class; and zero scenario - people are in their actual intake class. The RIVM Chronic Disease Model was used to estimate life expectancy, health-adjusted life expectancy, and mortalities.
RESULTS: Actual intakes of saturated and trans fat (zero scenario) are not very different from recommendations, so with

fat composition most health gain is already achieved. However, much health gain is still to be achieved by increasing intakes of vegetables, fruit and fish.
CONCLUSION: Simulation models are very helpful to quantify potential health gain by nutritional interventions.

P17-04
EFFECT OF RED MEAT CONSUMPTION ON IRON STATUS IN DIETING PRE-MENOPAUSAL WOMEN
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RATIONALE: Iron deficiency is frequent, especially in young women. Excluding red meat while slimming is common, with implications for iron status.
OBJECTIVES: to determine the effect on iron status of a 24 week weight management program either including or excluding lean red meat in women with low iron status.
METHODS: randomized- controlled-trial of 36 overweight women with mean serum ferritin 15.8 + 3.1 ug/l. Dietary advice, delivered one to one, was reviewed two weekly.
RESULTS: Thirty women completed the study. Weight change at week 12 was -2.8 (SD1.9) kg, $p<0.0001$ (meat), -2.6 (SD 2.4) kg, $p<0.0001$ (no meat). In women consuming meat, better adherence to dietary advice, with greater weight loss, suggested greater improvements in serum ferritin ($p = 0.07$). Serum ferritin at week 24 for both groups combined improved, +3.24 (SD 9.02) ug/l $p=0.03$.
CONCLUSION: Excluding red meat, and replacing it with poultry and fish did not adversely affect iron status or weight loss. The data, though inconclusive, suggest better iron status with regular consumption of red meat.

P17-05
GENDER DIFFERENCES IN INTELLECTUAL DEVELOPMENT OF UNDERFED CHILDREN
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The effect of malnutrition on IQ development has been well established. Nutrition supplements can mitigate this effect, but the effects may differ for boys and girls.
Anthropometry and IQ development of malnourished pre-school children were compared before and one year after supplementation. The supplemental children (n=59) were selected from a large urban slum within city using the criteria: aged between 24 to 48 months and wt for age <60% of the NCHS. A comparison group (n=48) was identified using the same criteria, except that the wt-for age was >60% of the NCHS. Supplements given to the child (120 Kcal/kg and protein=3g/kg body weight) were provided daily for the first week, thereafter increasing to 150 Kcal/kg and 4g/kg body weight. IQ was measured by using Tandon's Battery of Intelligence Test.
Nutrition status in both groups improved over the one-year period, but weight gain for the cases was significantly higher than the comparison group. At the initial assessment, the intelligence scores for both groups were not significantly different. After one year, the cases showed a greater rate of improvement in IQ scores than the control. IQ development was different between the sexes. The initial IQ scores of boys and girls were similar, but the girl's scores tended to increase at a greater rate than the scores of the boys, in spite of having lower body weights. As they grew older, the difference in scores was reversed and boys had greater increases in scores. This pattern might be explained by the children's attachment to their mother and imitating what they see in the family, but societal norms allows boys to go outside their homes earlier than girls who then miss the opportunity for new learning and as a result their intellectual capacity can falter and fall behind. In the prevailing high malnutrition situation in a country like Bangladesh, parents should give equal attention to their children irrespective of their gender.

P17-06
FUNGAL FERMENTATION OF MUCUNA (MUCUNA PRURIENS VAR.UTILIS)
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Mucuna (Mucuna pruriens var.utilis) was pre-treated and subjected to fungal fermentation to produce mucuna. pH, total crude protein, soluble constituents as well as the residual levels of the toxic principle, L-Dopa, were evaluated. pH increased during mucuna tempe fermentation. Total crude protein remained fairly constant while soluble solids and soluble protein increased dramatically during fermentation. Non-protein nitrogen followed the same trend. Pre-treatment of the bean before fermentation provided the most effective means of reducing L-Dopa in mucuna seeds. In the treatment that reduced about 90 % (89.95 %), the beans were boiled for 45 min, dehulled, soaked for 12 or 24 hr with removal and replacement of water after 12 hr, then boiled in fresh water for an additional 45 min. Further reduction was obtained during fungal fermentation suggesting the production of an L-dopa – degrading

P17-07
CHANGES IN ACIDIFICATION AND STARCH BEHAVIOUR DURING CO-FERMENTATION OF CASSAVA (MANIHOT ESCULENTA CRANTZ) AND SOYBEAN (GLYCINE MAX MERR) INTO GARI 'FARINA'
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Acidification and starch retrogradation properties generated during fermentation of cassava dough into gari are critical quality attributes with resultant improvement in taste, flavor, color and texture. Fortification of the cassava used with soybean is expected to enhance the nutritive value of the product. This work studied the changes in acidification and starch behavior during the production process.
MATERIALS AND METHODS: A 3x4 factorial experiment was performed with fermentation time and soybean concentration as variables. Titratable acidity, pH and starch content and starch pasting characteristics were evaluated using standard analytical methods.
RESULTS AND FINDINGS: pH decreased with concomitant increases in titratable acidity during co-fermentation of cassava dough. Soy-fortification up to 30% caused significant effects on pH, titratable acidity and starch content during fermentation with minimal and insignificant effect at 20% soy level. Fermentation caused significant differences in pH, titratable acidity and starch concentration at all soy levels. Starch decreased within 48 h fermentation with soy-fortification. Starch pasting characteristics showed only minimal changes with the fermentation and soy fortification process at and below 20% level.
CONCLUSIONS: Cassava could be co-fermented with soybean up to 20% concentration during gari processing, with only minimal effect on acid production and starch retrogradation properties.

P17-08

EFFECT OF SOY-SUBSTITUTION ON THE NUTRITIONAL QUALITY OF TAPIOCA

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RATIONALE & OBJECTIVES: Tapioca (partially gelatinized irregular starch grits made from cassava) was enriched with varying proportions of soybean (0, 85-15%, 75-15%, 50-50%) to produce Soy-tapioca.
MATERIALS AND METHOD: Nutritional quality (proximate and mineral composition), anti-nutritional (cyanogenic potential (CNP), trypsin inhibitor (TI), tannin, phytic acid and oxalate) were determined by standard methods. Acceptability of the soy-enriched samples was determined by means of sensory evaluation.
RESULTS & FINDING: The results showed a significant increase in the protein, fat and mineral contents as the level of soy-substitution increased. Anti- nutritional analyses indicate a decrease in the cyanogenic potential (CNP) as soy-substitution increased and an increase in the level of TI while the tannin, phytic acid and oxalate contents of the soy-tapioca samples were below minimum level of safety. Soy-tapioca (50-50%) was more nutrient dense than the other products, but soy-tapioca (85-15%) was more accepted in terms of color, taste and texture.
CONCLUSION: The increase in the nutritional quality coupled with low level of anti-nutritional factors in soy-tapioca (85-15%) suggests a safe, nutritious and acceptable food product for consumers.

P17-09

OPPORTUNTIES FOR BANANA (Musa) IN ALLEVIATING MICRONUTRIENT DEFICIENCY IN THE GREAT LAKES REGION OF EAST AFRICA

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RATIONALE AND OBJECTIVES: This article is a review and justifies need to utilize banana, among existing food based malnutrition interventions in East Africa. Also opportunities to be exploited are highlighted.
METHODOLOGY: Literature review was done. Re-analysis of available banana production and consumption data from FAO, IFPRI, population census reports and DHS reports.
RESULTS: 20 million tons of bananas are produced in the region, and it has the highest per capita consumption, peaking in Uganda at 304 kg/person/year. Iron Deficiency Anemia affects 60% of East African population and it is highest in Burundi at 82% among children aged below five years. Vitamin A deficiency among children is highest in Kenya (70%) and the deficiency affects more than one third of the children in the region. The average vitamin (298.5 µg/100g) and iron 4.032 mg/100g) content of bananas in East Africa, can not meet vitamin A and mineral requirements of a child of 2-5 years old consuming 250 g of food daily. Preparation methods of bananas significantly lead to nutrient losses.
CONCLUSION: Investment in research targeting improving nutritional quality of the banana fruits and banana-based products is worth. Food preparation methods that maximize nutrient retention should be promoted.

P17-10

EFFECTS OF ANIMAL SOURCE FOODS (ASF) ON NUTRITION OF RURAL VIETNAMESE WOMEN OF REPRODUCTIVE AGE (WRA)

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RATIONALE AND OBJECTIVES: We previously found rural Vietnamese WRA at risk for deficiency of iron, zinc, vitamins A and B12. The current study examines effects of daily ASF for six months on diet and micronutrient status.
MATERIALS AND METHODS: 115 women 18 to 30 years old were randomized to receive daily ASF or non-ASF snacks, providing the respective median daily nutrient amounts: 21 g and 8 g protein, 8 and 0.9 mg iron, 4 and 0.8 mg zinc, 800 µg and 0 µg RAE vitamin A, 6 µg and 0 µg vitamin B12, and ≤ 150 kcal.
RESULTS AND FINDINGS: ASF increased usual iron and zinc intakes by 80% and 50%, vitamin A and B12 by 130% and 200%. Among respective ASF and non-ASF groups at baseline, 48.3% and 48.5% had BMI < 18.5, and mean (SD) hemoglobin was 131(10.1) and 130(8.9) g/L. Micronutrient status over 6 months will be available for presentation.
CONCLUSION: Local ASF may provide sustainable nutritional improvement for rural Vietnamese women.

P18: School Nutrition I

P18-01

NUTRITIONAL AND HEALTH PROFILES OF SCHOOLCHILDREN IN RURAL UGANDA

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RATIONALE AND OBJECTIVE: Health and nutritional status of schoolchildren is not well reported in the children under five years that have been extensively reported. The study aimed to assess the nutritional and health status of primary school children from rural Uganda.
MATERIALS AND METHODS: A cross-sectional survey conducted in the district of Kumi, Eastern Uganda, following a two-stage cluster sampling. Nutritional aspects included anthropometric measurements (n=645), micronutrient assessments (iron n=145, iodine n=87, vitamin A n=145), geohelminth examination (n=189) and malaria examination (n=115). Demographic factors and information on asset ownership was gathered using a structured questionnaire for parents/ caretakers.
RESULTS: Prevalence rates for stunting (8.7%) and geohelminth infection (4.8%) were not high, but thinness (18.6%) and underweight (13.0%) were high, significantly higher among boys compared to girls. Anemia (24.1%), iron deficiency (16.6%) and vitamin A deficiency (30.3%) indicated that these micronutrients are a problem even at school age in Uganda. Malaria infection rate was high (47.8%). Factors that predicted the nutritional and health status of children included age, sex, kind of house, mothers' educational level, water source and presence of a bicycle in a home.
CONCLUSION: There are some levels of under nutrition (thinness, underweight, micronutrient deficiencies) and poor health (malaria infection) among schoolchildren in rural Uganda, which can be defined as significant public health problems. There is need to extend child health programs intended for children under five to school age so as to benefit them and ensure their education is not compromised by poor health and nutrition.

P18-02

FOOD CONSUMPTION BEHAVIOR OF ADOLESCENT MALE AND FEMALE STUDENTS IN ALEPPO CITY

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Food consumption behavior was studied in a sample of 712 adolescent male and female aged between 12-18 years in city, Syrian Arab Republic in the year 2008. A non-quantitative food frequency questionnaire (FFQ) was used to describe this behavior and to assess food consumption pattern among members of this sample. The FFQ incorporated a group of questions designed to study food consumption behavior among adolescent males and females representing the sample of the study. It also included questions on the consumption of 35-food item distributed among 7 food groups: carbohydrate, vegetables, fruits, milk and dairy products, meat, fat and sweets, and beverages. Results showed that 62.7% of the respondents either skipped breakfast or did not take breakfast regularly, and that 51.8% took between 2-3 main meals daily. It has also been found that 55.6% of those investigated in the study did not take vitamin supplements compared to only 10.5% who did. The study found that physically activity was not a daily practice among (56.3%) of adolescents in Aleppo city, and the vast majority (77.7%) did not follow any special dietary regimen. On the other hand, fast food and carbonated soft drinks, was found to be a preferred choice for more than two-thirds of those adolescents. Whole wheat bread was not regularly consumed by the vast majority (70.2%) of the respondents, while 36.4% of the respondents said to consume white bread on a daily basis. One-fifth of the adolescents consumed carbonated soft drinks every day, and French fries were a daily choice among over one-third of those adolescents. Only 14% did not eat sweets at all. However, it was found that 30% of the respondents did not drink milk compared to only 5.6% who did drink milk every day. Fish was either banned or rarely consumed by more than 80% of adolescents in Aleppo city. Almost 21% and 27% consumed fresh vegetables and fruits respectively on a daily basis.

P18-03

ASSESSMENT OF NUTRITION KNOWLEDGE OF IN-SCHOOL ADOLESCENT GIRLS IN IBADAN NORTH LOCAL GOVERNMENT, OYO STATE, NIGERIA

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RATIONALE AND OBJECTIVE: Adolescent girls require adequate nutrients for optimal growth and there is a dearth of information on how well informed they are about nutrition. This study was conducted to assess their nutrition knowledge.
MATERIALS AND METHODS: Three hundred and sixty nine adolescent girls in the age group of 10-19 years were selected randomly from public and private secondary schools in north, Nigeria. Nutrition knowledge and practices were assessed using a structured questionnaire with 15 yes or no, 26 short notes and four multiple-choice questions. Focus group discussions were held to obtain an in-depth analysis.
RESULTS AND FINDINGS: Ninety five percent of students have never been involved in Nutrition education or training classes. Seventy two percent know nothing about food pyramids, recommended dietary allowances, micronutrients and eating disorders. Focus group discussions supported the fact that adolescents lack knowledge about nutrition, and eating disorders, and are likely to misconstrue food groups and nutrients.
CONCLUSION: Adolescent girls lack appropriate nutrition knowledge and nutrition education need to be designed and incorporated into their curriculum.

P18-04

THE PATTERN OF USAGE OF A SELECTED COMBINATION OF FOOD ADDITIVES IN IRISH CHILDREN AND TEENAGERS

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RATIONALE & OBJECTIVES: Recent research has suggested that consuming a combination of 7 additives may contribute to behavioral problems in children. The purpose of this work is to ascertain the probability of the intakes of these target additives in the diets of Irish children and teenagers.
METHODS: Information from the National Children's Food Survey (NCFS) and the National Teen's Food Survey (NTFS) was merged with information from the Irish National Food Ingredient Database (INFID) based on brand ID, where the surveys documented the habitual eating patterns of the participants and INFID provided information on the ingredients and nutrient composition of these foods.
RESULTS & FINDINGS: Over the 7-day survey periods, the children consumed a total of 72,024 foods over 19,795 eating occasions; teenagers consumed 46,473 foods over 13,542 eating occasions. Irish children did not consume any foods containing 6 or 7 of the target additives, while no teenager consumed any food containing 7 of the target additives. The majority of additive-eating occasions for both the children and teenagers involved only 1 additive.
CONCLUSION: The probability of Irish children and teenagers consuming these target additives was very low. Future work exploring actual exposure to these additives is being carried out.

P18-05

ENERGY PROTEIN INTAKE AND NUTRITIONAL STATUS OF PRESCHOOL CHILDREN AT BUDI MULIA II KINDERGARTEN SCHOOL

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Energy Protein Intake and Nutritional Status of Preschool Children at Budi Mulia II Kindergarten School, Septriana, Th. Ninuk Sri Hartini, Respati University.
BACKGROUND: Preschool age children are nutrition susceptible, while their body is growing and developing, and therefore they need good nutrients. School-lunch program as one of health programs which organized by school.
OBJECTIVES: To know energy and protein intake among preschool children and it's correlation with nutritional status.
METHODS: An observational study with cross-sectional design is conducted at Budi Mulia II Kindergarten School. Subjects are students and their parents or nursemaid at class "A" assigned using purposive sampling technique. 24-hours recall method in 3 consecutive days is performed among parents or nursemaid to gain information of food consumed by the children at home. While data of food consumed at school obtained from 10 days menu served at school. Data analyzed using descriptive analytic technique.
RESULTS: Energy and protein intake from school-lunch program are 508.22 Kcal and 15.24 grams, whereas from homemade food are 1231.74 Kcal and 31.13 grams. The correlation test showed significant correlation and positive configuration between energy and protein intake with nutritional status.
CONCLUSION: The higher energy and protein intake the better the nutritional status.

P18-06

SCHOOL LUNCH IN BAVARIA / GERMANY VARIES SUBSTANTIALLY WITH RESPECT TO NUTRITIONAL QUALITY AND ORGANISATION

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OBJECTIVES: In recent years, several school reforms have induced the establishment of school canteens in. Policymakers agree that support for schools is essential to ensure a health promoting food service. Therefore, a comprehensive understanding of the status quo is required.
METHODS: In July 2008, an online census with the headmasters of all mainstream schools in Bavaria was conducted focusing on food supply and organization.
FINDINGS: Out of 2139 participating schools (response rate: 53%) 41% provide lunches, while 14% are planning this for the near future. Lunches are prepared (partly) in schools (56%) or delivered as ready-to-eat meals (44%). In 59% of the schools salads are freshly prepared on the spot. In 51% of the schools students cannot choose between different meals; only 45% offer a vegetarian dish every day. In 40% of the schools beverages are provided with meals, rarely soft drinks. 96% of the secondary schools provide beverages via vending machines.
CONCLUSION: School lunch in Bavaria varies substantially with respect to nutritional quality and organization. Reaching the political goal of a health promoting food service in schools requires counseling and support tailored to individual circumstances.
FUNDS: Bavarian State Ministry for Food, Agriculture and Forestry.

P18-07

CHILDHOOD OVERWEIGHT PREVENTION PROGRAMS: EVIDENCE FOR SUCCESS

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RATIONALE & OBJECTIVES: A previous review showed 67% of childhood obesity interventions to be effective. This study is an update of that review, focusing on interventions to prevent childhood overweight.
MATERIALS & METHODS: Included are diets or physical activity related interventions, targeting children 6 to 19 years of age, evaluated using anthropometric outcomes, and published in a peer review journal. Excluded are treatment programs, interventions targeting high-risk children, and pilot studies. Intervention effectiveness is defined by statistically significant differences for BMI or skinfold outcomes compared to controls.
RESULTS & FINDINGS: Forty interventions met the inclusion and exclusion criteria, 17 were new studies. From this total, 31 (78%) were effective, mostly short term. Nineteen studies reported both BMI and skinfold outcomes, 10 were effective by skinfolds (53%) and 7 were effective by BMI (37%). Seven studies were effective only for girls, two only for boys.
CONCLUSION: The difference in BMI versus skinfolds explains why other reviews, focusing on BMI measures, draw less optimistic conclusions. Interventions may need to target boys and girls differently. Overall, most interventions are effective in the short term.

P18-08

NUTRITION FLAG FOOD CONSUMPTION OF TEACHERS/STUDENTS IN HEALTH PROMOTING SCHOOL

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The objective of this research was to give the knowledge of Nutrition Flag (NF) for food consumption to teachers/students in the school (HPS) which were in the Health Promoting school project since 1998. The subjects were trained how to practice NF for consumption and be evaluated six month later.
The study founded that the ability of both teachers and students to choose fresh food were increase significantly especially for teacher was from $\bar{X}$+SD=8.00+ 2.56 to 8.97+2.04 ($P < 0.05$). For the food consumption, both teachers and students chose ready made food more correctly especially the students increased from $\bar{X}$ +SD=8.74 + 3.19 to 9.50 + 2.52 ($P < 0.01$) and 8.53+2.79 to 9.66 +1.48 ($P < 0.05$) for the teachers.
The defining of food consumptions per day which qualified by nutrition flag correctly were increased in both groups. Both group had good attitude toward NF and bring the knowledge apply to their daily life,
especially the students increased from $\bar{X}$ +SD=2.36+1.48 to 2.80 +1.39 ($P < 0.01$).
The result of this study suggested that the Nutritional Flag knowledge should be put into the student curriculum or in textbook in order to improve health promotion and prevention of the malnutrition which still existed in the school.

P18-09

DIETARY PRACTICES AND NUTRITIONAL STATUS IN SCHOOL-AGED ADOLESCENTS IN KELANTAN, MALAYSIA

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Dietary and food practices during growing years are important to influence general well-being, optimal growth and development throughout the lifespan. The aim of the study was to examine the dietary practices and nutritional status in a cohort of 192 school-aged adolescent boys and girls in the District of Kota Bharu, Kelantan, Malaysia. Body composition profiles, and dietary practices profiles were assessed using a standard validated protocols. The participants had a mean age of 14.6 ± 1.3years with the mean body weight and height were 48.5 ± 14.2kg and 1.56 ± 0.09m. Mean body mass index of the participants was 19.8 ± 4.5 kg/m2 with about 75.5% of them being in the normal range. In contrast, only 15.6% and 8.9% of the participants, respectively, were classified as underweight and overweight, which was based on the recent WHO Child Growth Standards. Dietary practices profiles revealed that only half of them (55%) reported to have their breakfast daily, and about 30.6% and 16.4% of the participants, respectively, had taken fruits and vegetables daily, with the mean daily serving of fruit and vegetable was 1.0 ± 0.9 serving/day and 1.3 ± 1.8 serving/day, respectively. Almost all participants (89%) did not meet the Malaysia Food Guide Pyramid recommendations for at least 5 servings of fruit and vegetable. In addition, only 58.3% of the participants reported to consume milk or dairy products weekly. There were no significant differences in dietary practices profiles between adolescent boys and girls. The present results show that dietary practices of breakfast status, fruits or vegetables intake and milk consumption in these school-aged adolescent boys and girls are unsatisfactory. Therefore, promoting healthy dietary practices such as adequate intake of breakfast, fruits and vegetables as well as and milk and dairy products should be encouraged throughout adolescence to minimize the risk of developing obesity and various lifestyle-related chronic disease.

P18-10

HEALTHY SCHOOL SNACK INITIATIVE IN KUWAITI ELEMENTARY SCHOOLS: CHALLENGES

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INTRODUCTION: The rates of overweight and obesity among Kuwaiti children have been increasing significantly over the years and other nutrition related health problems exists, especially iron deficiency anemia.
The current school canteens provide snacks that are high in fat and low in fruits, vegetables, whole grains and legumes.

The coordinated effort of Ministry of Education (MOE) and Ministry of Health's (MOH) National Program for Prevention of Overweight and Obesity (NPPOO) has developed a Healthy School Snack (HSS) menu to be provided to the elementary school children.
THE OBJECTIVE OF HSS IS TO: Provide healthy snacks to meet 25% of the Dietary Reference Intakes for calories, protein, vitamin A, vitamin C, iron, and calcium. Reduce the increasing trend in overweight and obesity and to improve overall nutritional status.
CHALLENGES: HSS may assist in reducing the problem of overweight and obesity among this group. However, it would be more effective if other issues are addressed such as enforcing physical training classes, promoting applied nutrition education in the curriculum, involving parents and conducting research to assess effectiveness of this initiative.

P18-11
THE NUTRITIONAL AND HEALTH STATUS OF SCHOOL GOING CHILDREN IN MACHAKOS AND SUBA DISTRICTS, KENYA: A COMPARATIVE STUDY
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RATIONALE AND OBJECTIVE: Malnutrition and ill health among school children negatively affects schooling. The objectives were t o compare the nutrition and health status of school children in Machakos and Suba Districts, which have similar poverty characteristics.
MATERIALS AND METHODS: A descriptive cross-sectional survey was conducted among 300 pupils from 4 schools in Machakos and 250 pupils from 4 schools in Suba. Schools were randomly selected and pupils systematically. Structured questionnaires, anthropometry and focus group discussions were used to collect data. SPSS and Nutri-Survey computer packages were used to analyze data in descriptive and inferential statistics.
RESULTS AND FINDINGS: Although not significantly different, ($P>0.05$) underweight levels in Machakos District were higher (14.5%) than the levels reported in Suba District (10.9%). Stunting levels in both districts were not different at 28.9% and 28.7% for Machakos and Suba districts respectively. Wasting levels in Suba district were 7.2% almost twice the level reported in Machakos District (3.9%). Food consumption patterns were not different for cereals and vegetables. Malaria, diarrhea and vomiting were the common diseases in Suba district while upper respiratory infections were the common infections in Machakos district.
CONCLUSION: High poverty levels in the districts contributed to the high stunting levels, since stunting is a result of chronic malnutrition.

P18-12
EXISTENCE AND FUNCTIONING OF SCHOOL CANTEENS IN SANTA CATARINA, SOUTH OF BRAZIL
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OBJECTIVES: Santa Catarina was the first Brazilian State to create a legislation regarding foods available for purchase in school. The objective was to assess the school canteens functioning, investigating whether the foods sold were in accordance with Law.
METHODS: A questionnaire was completed by the responsible for the canteens. Item Response Theory was used to examine the levels of alignment with the Law.
RESULTS: In all 345 schools took part. Of these, 156 (45%) had a canteen. The private sector stood out with regard to the presence of such an establishment ($p<0.001$). The majority of the canteens (68.2%) did not sell fried snacks, soft drinks, industrialized popcorn, boiled sweets, lollipops and chewing gum and industrialized savory snacks. The items which were least likely to be in alignment with the Law were juices and the availability of fruits.
CONCLUSION: Many canteens offered items of low nutritional value. The inspection of these establishments is necessary, together with educational actions.

P18-13
NUTRITIONAL STATUS AND READING ABILITIES OF SCHOOL CHILDREN
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RATIONALE AND OBJECTIVE OF THE STUDY: To find out the relationship between nutritional status and reading abilities among school children. Nutritional status of children does not affect reading abilities.
METHODOLOGY: Children (123, 10-12 years) were selected from two schools. Survey was carried to obtain information on dietary intake from parents. Heights and weights and Hemoglobin were assessed standard methods. Raven's Color progressive matrices and Rutter's Performa, reading tests of English (Jayabai) and Kannada (Aaron) language were carried out.
FINDINGS: 59 were slow learners and 64 were toppers. The Frequency of consumption of protective foods by slow learners was lower (45%) when compared to toppers (80%). Higher percentage of slow learners (82%) was under weight when compared to toppers (70%) but there was no significant difference between the two groups. Although slow learners were more anemic (50%) than toppers (32%), there was no significant difference between them. Data obtained from parents reveals that higher percentage of slow learners (16%) was under weight when compared to toppers (11%) had low birth weight. When reading abilities were assessed, higher percentage of toppers (92%) scored well in RCPM, Rutter's, English and Kannada word reading. Relationship between nutritional status and reading abilities revealed that weight had no association with the reading abilities among toppers and slow learners. However hemoglobin levels had association with English and Kannada reading and RCPM among toppers.
CONCLUSION: Nutritional status of children namely weight, hemoglobin, consumption of protective foods were better in toppers than in slow learners with reference to reading of English and Kannada languages. In order to improve academic performance, there is a need for multi-prong approach to enrich health and nutrition knowledge, practice and school environment.

P18-14
THE SHAPING OF HEALTHY & ORGANIC SCHOOL MEAL PROGRAMS IN THREE DANISH MUNICIPALITIES CAN BE UNDERSTOOD AS A PROCESS OF "TRANSLATION" IN ACTOR NETWORKS
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Promotion of healthy eating in some Danish public school settings has become a preferred option to counteract the growing rates of obesity among young people. The purpose of study was to explore how these Danish school meal programs are shaped in their local communities. The study analyses the actor-groups in three municipalities using an actor network theoretical framework. The "translation" process of the actor network was utilized to unfold the infrastructure of the school food service space in the municipalities. The first stage is the

statement of core problem in the research so that define actors in the shaping process of school meal programs and influences them together to achieve the aim. Then distributes and locks each actor into its proper group: municipality, school or food provision. Afterwards interaction and relationship among all actors in three groups is illustrated. The last stage demonstrates possible movement among the actors, which is mobilization of the process. The study shows that the shaping of school food programs is complex process due to the local conditions and local power relations etc, but actor networks play a crucial role to influence upon building of "localness" and "bottom up" of school meal programs in the country.

P18-15
FOOD AND NUTRITION POLICIES ASSOCIATE WITH INDICATORS OF HEALTHY EATING: RESULTS FROM A WEB SURVEY AMONG FOOD SERVICE COORDINATORS IN PUBLIC PRIMARY SCHOOLS IN DENMARK
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The increasing prevalence of overweight and obesity has resulted in more focus on the role that public settings such as school for children can play in promoting healthy lifestyle. As a consequence increasingly organizational efforts have been directed towards this issue and policy instruments have become one of the preferred organizational tools to frame these efforts. The purpose of this paper is to investigate the association between having a local food & nutrition policy and indicators of healthy eating at school. It is based results from a web survey among food service coordinators in 179 public primary schools in Denmark. A pilot test was carried out in the sampling schools before performance, and the variables were defined. Based on the 80 questions, of which 74 have been closed, used a variety of question format from differential scales to checklists in the questionnaire, three issues, the attitude of school respondents regarding promoting organic food and healthy eating habits through school environment, the existing policies concerning healthy school food and the development of school food serving practice, were analyzed by using statistic tools. The results indicate a strong relationship between having a food & nutrition policy and indicators of healthy eating praxis.

P18-16
A PROCESS EVALUATION OF SCHOOLS SELF ASSESSMENT REGARDING HEALTHY LIFESTYLE
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RATIONALE & OBJECTIVES: In we have children being malnourished and stunted and on the other hand we have overweight children, both conditions predisposing them to chronic diseases of lifestyle later in life. This study aims to evaluate the process of implementation of the HealthKick diabetes prevention programme in schools, which aims to kick-start diabetes prevention through nutrition and physical activity.
MATERIALS & METHODS: A qualitative approach will be adopted to best determine the experiences of the participants and the underlying factors involved. I will be using 2 of the three most common qualitative research methods namely, in-depth interviews and focus groups, utilising interview schedules.
RESULTS: (This study is still in progress) The first round of assessments showed a great need for school interventions targeting healthy lifestyles, but a number of barriers were also recognised. The final round of assessments will be completed at the end of July.
CONCLUSION: The results of this study will be used to greatly improve the process of the HealthKick Diabetes Prevention Schools Programme.

P19: Food-based Strategies/Interventions for Optimal Nutrition (Others)

P19-01
THE FOOD MULTIMIX CONCEPT: POTENTIAL OF AN INNOVATIVE FOOD BASED APPROACH ON NUTRITIONAL STATUS IN PREGNANT WOMEN IN RESOURCE-POOR COMMUNITIES
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RATIONALE & OBJECTIVES: The Food Multimix (FMM) concept states that 'limited food resources can be combined using scientific knowledge to meet nutrient needs of vulnerable groups at low cost utilizing the 'nutrient strengths' of individual or candidate foods in composite recipes within a cultural context.
METHODS: The method employed the food-to-food approach for recipe development using traditional food ingredients. Recipes were subjected to proximate and micronutrient analyses and optimized to meet at least 40% of recommended daily intakes. End products including breads, porridge and soup were developed.
RESULTS: FMM products were employed in a feeding trial among 120 healthy pregnant women in Gauteng, South Africa resulting in improvements in serum iron levels from baseline values of 14.59 (±7.67) µmol/ and 14.02 (±8.13) µmol/L for control and intervention groups (p=0.71), to 16.03 (±5.67) µmol/L and 18.66 (±9.41) µmol/L (p = 0.19). The increases from baseline to post-intervention were however statistically significant within groups. Similarly, Mean Cell Volume values improved from baseline as well as serum ferritin and transferritin levels.
CONCLUSION: The FMM concept has potential value in feeding programs for vulnerable groups including pregnant and lactating mothers.

P19-02
SIMULATION OF EFFECTS OF A SCHOOL FEEDING PROGRAMME BASED ON LOCALLY PRODUCED FOODS ON IRON INTAKE AND STATUS OF 6 TO 12 YEAR OLD CHILDREN IN A COMMUNITY FROM ECUADORIAN HIGHLANDS
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The prevalence of chronic malnutrition among children in Ecuador is high and iron deficiency is still the most prevalent micronutrient disorder, being the most important cause of nutritional anemia. Ecuador does effort to improve status of children through school feeding programme (SFP) Therefore, in TELFUN research attempt is made to base SFP on locally produced foods as a strategy to strengthen food sovereignty. Objective of this study is to simulated effects of a SFP based on locally produced foods to improve iron status of schoolchildren.
METHODOLOGY: An observational study, in one of the most important lupine producing communities from Ecuador. Differences were tested using one-way ANOVA and Kruskall-Wallis between children who receive or not the SFP. To strengthen food sovereignty in the locality, lupine was chosen. Iron adequacy was based on the Estimated Average Requirement (EAR) and bioavailability of iron was determined to be 10%. Preliminary analysis showed that milk from the SFP is the main contributor of iron intake in the community. Therefore six simulated strategies contain this milk, was applied: 1) Milk + muffin, 2) Milk + muffin + vitamin C, 2) Milk + muffin + "sprinkles" 4) Milk + vitamin C, 5) Milk + meat, 6) Milk + meat + vitamin C. "Sprinkles" were used as a simulated fortification. To determine the effect of implementing these strategies, change in hemoglobin levels were calculated after simulated six months of intervention with a consumption frequency of three

times a week.
RESULTS: 54% of the schoolchildren were stunted. No significant difference in nutrient intake existed between the subpopulations ($p>0.05$). With implementing the strategies milk + muffin + vitamin C, milk + muffin + "sprinkles", and milk +meat + vitamin C the iron adequacy will increase to 164%, 204% and 174%, respectively. The strategy milk + muffin + "sprinkles" exceeded an increase of 5 g/L, which is considered clinical relevant.
CONCLUSIONS: Apparently, the current SFP does not give a significant contribution to the iron intake in this population. Simulated strategies based on locally produced foods show that only with vitamin C or meat, iron intake and anemia will probably remain the same or improve. However, only adding fortification in the form of "sprinkles" will probably lead to a relevant increase of hemoglobin levels.

P19-03
IDENTIFICATION OF FACTORS PREDICTING FONIO (Digitaria exilis) CONSUMPTION AMONG URBAN MALIAN WOMEN OF REPRODUCTIVE AGE
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Fonio is a West African traditional cereal with potentialities for improving household food security because it matures earlier than the other cereals and demonstrates good nutritional and cooking properties. However, its consumption is still low, especially in urban areas. We seek to identify factors determining intention to consume fonio among women, based on the Theory of Planned Behavior and Health Belief Model with 108 women aged 15–49 yrs in Bamako city (Mali). Intention was significantly correlated with fonio consumption ($rs = 0.78$, $P = 0.000$). Attitudes towards behavior (ATB) were the best predictor for intention to consume fonio, (standardized $\beta = 0.32$, $P = 0.016$). Health behavior identity (HBI) was significantly correlated with ATB ($rs = 0.67$, $P = 0.000$) and perceived barriers ($rs = 0.33$, $P= 0.000$). Health value ($\beta = 0.23$, $P = 0.010$) contributed significantly to the prediction of HBI. Perceived barriers were a significant interaction term in the relation between intention and behavior (standardized $\beta = -0.72$, $P = 0.037$). A comprehensive program for fonio promotion should stimulate positive attitudes towards fonio consumption, influence men, family and neighbors' opinion and overcome barriers like the difficult processing and the low know-how of women about fonio cooking.

P19-04
REFINED COCONUT OIL CONSUMPTION IMPROVED SERUM LIPOPROTEIN PROFILE OF FILIPINO SCHOOLCHILDREN
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RATIONALE & OBJECTIVES: No published studies evaluating the effect of consuming refined coconut oil among children is available. Thus, we evaluated the effects of refined coconut oil ingested with vegetable meals on the serum cholesterol levels of generally healthy, normolipidemic, and schoolchildren.
MATERIALS & METHODS: Schoolchildren, aged 9-12 y, were randomly allocated to receive standardized meals containing different amounts of refined coconut oil (1, 10, or 24 g/d), for 5d/wk, for 9 wks. Before and after the dietary intervention, serum total cholesterol, HDL-cholesterol, and triacylglycerol concentrations were measured; LDL-and VLDL-cholesterol concentrations were derived following standardized formulas.
RESULTS & FINDINGS: After 9 wks, there were significant increases in the serum concentrations of total cholesterol and HDL-cholesterol and decreases in LDL-cholesterol and total: HDL-cholesterol ratio with no significant differences between the 3 groups.
CONCLUSIONS: A 9-wk ingestion of vegetable meals containing 1, 10, or 24 g of refined coconut oil per day can improve the serum lipoprotein profile of 9-12 y old, generally healthy normolipidemic Filipino children by increasing their serum HDL-cholesterol concentrations.

P19-05
WORKSITE CANTEEN AVAILABILITY AND USAGE AMONG FINNISH EMPLOYEES
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RATIONALE & OBJECTIVES: On average half of the Finnish workforce has lunch at worksite canteen during workday. Well-planned mass catering at workplaces could since have major effects on public health and well being of employees. Our aim was to study the availability of canteens according to employee's socio-demographic factors and characteristics of her/his workplace.
MATERIALS & METHODS: Data was derived from the Health Behavior and Health among Finnish Adult Population survey. Employed Finns aged 19-64 years were included (2659 men, 2926 women).
RESULTS & FINDINGS: Worksite canteen is best available to well-educated white-collar workers working in large workplaces at capital area. The most unsatisfactory situation is among men working at small workplaces with physically demanding jobs, and private enterprisers. However, even when the canteen is on hand, less-educated female unskilled blue-collar workers still eat packed lunches instead eating at canteen.
CONCLUSION: There is obvious lack of worksite canteens among less-educated male workers with physically demanding jobs. Barriers for canteen use should be studied among those female workers who have opportunity to use canteen, but still doesn't do so.

P19-06
NUTRITIONAL QUALITY OF THE MEALS AT WORKSITE CANTEENS IN FINLAND
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RATIONALE & OBJECTIVES: On average half of the Finnish workforce has lunch at worksite canteen during workday. Well-planned mass catering at workplace could since have major effects on public health and well-being of employees. Little is known about the nutritional quality of meals eaten at canteens. Our aim was to examine the nutritional quality of meals eaten at worksite canteens.
MATERIALS & METHODS: Dietary data were collected for 2007 adults by a computer-assisted 48-h dietary recall in the national FINDIET 2002 survey. Employed Finns aged 25-64 years were included (108 men and 153 women).
RESULTS & FINDINGS: Male employees had more (g/MJ) wheat bread ($p<0.003$), fresh vegetables ($p<0.001$), vegetable foods ($p<0.014$), and boiled potatoes ($p<0.021$) when eating at canteen. Women had more fresh vegetable ($p<0.001$), poultry ($p<0.045$), and salad dressings ($p<0.009$) at canteen. On the daily basis men used more fresh vegetables ($p<0.001$), and salad dressings ($p<0.001$).
Even though differences in food selection between eating places

were quite clear, differences in nutrition intake were modest.
CONCLUSIONS: Even though the nutritional differences of the meals between eating places were modest, eating regularly at workplace canteen improved the diets of Finnish employees by increasing their vegetable intake substantially.

P19-07
INADEQUACY OF DIETARY INTAKE OF WOMEN STREET SEX WORKERS AND INJECTION DRUG USERS IN QUEBEC CITY
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Injection drug users are at risk of inadequate dietary intake. The purposes of this study were to estimate a food profile of women who are street sex workers and injection drug users (IDU/SSW) in Quebec City, Canada, and assess the effects of drug injection on their dietary intake. This descriptive study was conducted with 21 women SSW/IDU (out of 60 in Quebec City) who were identified with the help of a syringe exchange program's field workers during Summer 2008. Dietary data were obtained through one 24h recall, followed by qualitative individual interviews that lasted on average 30 minutes. Data suggest that these women food practices were not consistent with Canada's Food guide. Cocaine, in particular, reduced appetite for food. Drug use also involved craving for sweet food, drug dependency and other health complications affecting food intake. Limited food access and poor choices were also observed. Overall, drug injection impacted the quantity and quality of the women's dietary intake. These findings urge to develop dietary interventions specific to these women's context

P19-08
FOOD CONSUMPTION AND DEMAND IN CHINA
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The 3 days 24-hour dietary recall method in 2002 China National Nutrition and Health Survey was used to collect information on food intake. The totle intake of grain, soybean, meat, eggs, aquatic, milk, fruits and vegetable is 14746, 523, 3375, 944 ,1248, 1136, 1856 and 11397 ten thousand tons per year respectively. To expect the totle intake of grain, soybean, meat, eggs, aquatic , milk , fruits and vegetable in 2020, it will be 15297, 1530, 3824, 2550, 3824, 7246, 7246 and 20396 ten thousand tons per year respectively. There are some questions between consumption and demand, such as the obvious contradiction between supply and demand in regional, Variety of structural conflicts. We should take some strategies and methods. First, a reasonable guide to food consumption, the development of science and dietary patterns and adjustment the nutrition structure. Second, strengthen agricultural infrastructure construction, a corresponding increase in investment in agriculture.

P19-09
VITAMIN A AND D STATUS IN IRANIAN INFANTS
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OBJECTIVE: To describe the vitamins A and D status in Iranian infants 15-23 months of age and compare it with other countries
MATERIALS AND METHOD: Cross sectional study was conducted representative population from provinces of who attended health care centers during 25th May to 2nd June, 2001. Sampling method was an unequal cluster with unequal household sizes. Four ml of venous blood from each infant was collected for analysis.
RESULT: At national level, 2% of the infants had vitamin A deficiency, 1.6% had mild and 0.5% had severe deficiency, defined as serum concentrations less than 30 µgram/dl and 20 µgram/dl of retinol, respectively. Vitamin A deficiency was identified in 8 out of 11 groups of provinces. The percentage of infants with mild and moderate vitamin D deficiency was 3.7%. The serum levels of mild and moderate vitamin D3 were < 25 nmol/l and >12 nmol/l respectively. There was no severe vitamin D deficiency in Iran.
CONCLUSION: In comparison with both developing and developed countries, Iranian infants have a favorable vitamin A and D status without severe micronutrient deficiency. This could be due to the supplementation emphasized by Ministry of Health. Iran needs to target provinces with mild and moderate vitamins deficiency.

P19-10
MATERNAL SUPPLEMENTATION WITH FERMENTED SOYBEAN (TEMPE) AND VITAMIN C RICH FRUIT AND INFLAMMATION STATUS AND WEIGHT GAIN IN INDONESIA
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RATIONALE & OBJECTIVES: We previously reported the effect of supplementary food (SF) on maternal iron deficiency. Effect of SF on inflammation and weight gain was also examined.
MATERIALS & METHODS: 252 Indonesian pregnant women were randomly allocated on the village level into SF and control groups. Weekly SF providing 600 g tempe, 30 g red meat/chicken liver/dried anchovy, 45 g soy sauce, 350 g guava, 300 g papaya, and 100 g orange. We measured C-reactive protein (CRP), alpha1-acid glycoprotein (AGP) concentrations at 12-20 wk and at 32-36 wk of gestation and weight gain monthly.
RESULTS & FINDINGS: At near term, CRP decreased significantly in SF; however, mean changes (95% CI): 1.27 mg/L (1.03-1.56) vs. 1.06 (0.86-1.29) as well as mean (SD) weight gain (kg/wk): 0.44 (0.17) vs. 0.42 (0.27) did not differ between SF and control groups. In iron sufficient subjects, AGP had a greater decrease in SF group than in control group [0.15 g/L (0.12-0.18) vs. 0.09 (0.06-0.12), p=0.046].
CONCLUSION: Daily consumption of SF during pregnancy may improve inflammation status.

P19-11
IMPACT OF FENUGREEK GALACTOMANNAN ON THE FUNCTIONALITY OF EXTRUDED CEREAL-LEGUME BLENDS
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Chick pea and field pea are two legumes that can have profound influence on the formulation of high protein, low GI diets. Fenugreek gum (FG) is a novel galactomannan that is extracted from fenugreek seeds, known for its medicinal benefits. The aim was to evaluate the effects of inclusion of FG on the physical and nutritional characteristics of cereal-legume based extruded products, targeted as nutritional snacks.
Base blends of 70:30 chick pea-rice and field pea-rice, replaced with FG at 5, 10, 15 and 20%, was extruded at pre-determined optimum processing conditions. The extruded products were evaluated for their physical characteristics and sensory acceptability. Products with 15% FG were also evaluated for their nutritional chemistry to determine their suitability as healthy snack products.
Addition of FG up to 15% had no significant effect on product expansion, increased the water absorption index whilst water

solubility index decreased compared to the control. The mean scores of sensory evaluation indicated that all products containing FG up to 15% were within the acceptable range.
Extrusion had no significant effect on the macronutrient contents and in vitro protein digestibility of FG-incorporated products, except a reduction in starch and an increase in soluble fiber contents. GI of chick pea-rice and field pea-rice products were 43 and 45, respectively, compared to 68 and 73, respectively, for the control.
CONCLUSION: The results suggest that FG could be incorporated up to a level of 15% in pea-rice blends to develop nutritious, extruded snack products that do not compromise 'snack appeal'

P19-12
NUTRITION KNOWLEDGE, ATTITUDES AND BEHAVIOUR OF IRISH DEFENCE FORCES RECRUITS, CADETS AND APPRENTICES
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RATIONALE & OBJECTIVES: It is unknown whether Irish Defense Forces' trainees are aware of the nutritional requirements for a balanced diet and whether they follow nutritional guidelines for healthy eating. In general there is not a high level of nutrition knowledge among military populations internationally (Kelly-Trent, 1992).
METHODS: One hundred and eighty four trainees from five military training centers completed a researcher-developed questionnaire on their nutrition knowledge, attitudes and behaviors. Scores for each of these parameters were analyzed using SPSS for windows with differences examined using cross-tabulations and chi-squared tests.
RESULTS: The cohort displayed a good level of general nutrition knowledge and a good attitude to healthy eating, which was influenced by rank and education. A high level of compliance with recommendations on the consumption of starches, dairy produce and meat products is contrasted with low intake of fruits and vegetables and frequent consumption of high sugar and high fat snacks. Additionally, water intake is low and consumption of alcohol is above recommended intakes.
CONCLUSION: Rank and education are found to affect the level of nutrition knowledge of personnel in the Irish military. Irish Defence Forces trainees consumption of fruits and vegetables is lower than among and Australian military personnel, it is recommended that this be investigated along with education on nutrition being provided to trainees.

P19-13
IMPACT OF SOY ISOFLAVONES SUPPLEMENTATION ON POST MENOPAUSAL SYMPTOMS
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OBJECTIVE: Objective of the study was to determine the effect of supplementing the diet of postmenopausal women with soy isoflavones in providing relief from symptoms.
MATERIAL AND METHOD: This research was conducted in Ahvas, Iran. Target group for the study comprised of the 61 postmenopausal women. A questionnaire cum interview schedule was used to collect baseline data on socio-demographic profile and postmenopausal symptoms profile. The experimental group subjects were given supplementation of 33 grams of soy in the form of biscuits which contains approximately 54 mg isoflavones for a period of eight weeks. After intervention data on anthropometric profile and postmenopausal symptoms profile were collected from subjects of both experimental and control group.
RESULTS AND FINDINGS: Soy isoflavones supplementation has made a significant difference in the severity and intensity of symptoms such as hot flashes, insomnia, paresthesia, depression, arthralgia, Over 63 per cent of subjects in the experiment group were experiencing moderate to severe symptoms in prephase, however on supplementation with soy the intensity of symptoms among the subjects decreased significantly and the mean total score from 26.8 per cent at pre phase decreased to 9.38 per cent at post phase ($p<0.001$).
CONCLUSION: Results of the study indicates that supplementation with soy had a beneficial effect on the postmenopausal symptoms.

P19-14
INTERRELATIONSHIPS AND IMPACT OF KEYHOLE/ TRENCH GARDENS ON NUTRITIONAL STATUS OF HIV/ AIDS AFFECTED AND UNAFFECTED BENEFICIARIES IN LESOTHO
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RATIONALE AND OBJECTIVE: Lesotho has one the highest HIV/AIDS prevalence in the world making it rank fourth highest with an adult rate of 23%. As part of the response to the HIV/AIDS pandemic several interventions are being implemented including vegetable gardens. To date their efficacy has not been documented, hence the need for this whose aim is to explore interrelationships and impact of home gardens on nutritional of HIV/ AIDS affected and unaffected beneficiaries.
METHODOLOGY: This comparative study will employ a modified positive deviance approach to introduce gardening coupled with nutrition education. The population will be stratified according to the stages of illness to fully elucidate the nutritional and livelihood challenges of the beneficiaries. Nutritional status will be assessed by anthropometry, dietary and clinical data. Lot Quality Assurance Sample questionnaire will be employed to gather the data.
CONCLUSION: This proposed study will provide a basis for learning what works best for people living with HIV/AIDS so that efforts and resources are used efficaciously.

P19-15
A PUBLIC HEALTH NUTRITION INITIATIVE TO REDUCE DIOXIN RISK IN A HOTSPOT IN VIETNAM
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Nutritional and situation analyses were employed to develop a possible intervention to cut down dioxin risk among people living in a Dioxin hotspot in.
OBJECTIVES: To explore whether a public health nutrition initiative can help to reduce dioxin risk among population in a hotspot in Vietnam.
DESIGN: The study included a wide literature review, and a combined qualitative and quantitative approach in Bien Hoa, Dong Nai, a considered Dioxin hotspot in Vietnam.
SUBJECTS: 400 food preparers in the site were interviewed using designed questionnaire. Main stakeholders were interviewed in a qualitative survey as a situation analysis and orientation for solutions
RESULT: Dioxin contamination is observed in living environment and food chain at local setting. Half of interviewees aware of dioxin risk and health consequences but most of them do not have adequate knowledge and practices to prevent the risk. Among respondents, 97% and 91% willing to follow recommendation and avoid high risk foods; 78.3% considered safe food is first priority; 92.5% willing to purchase recommended save food with higher prices.
CONCLUSION: It is possible that public health nutrition solutions can help reducing dioxin risk. The intervention should be taken into account over-reaction among local residents that may result in negative effect to social-economic development at local setting.

P19-16

EFFECT OF FAMILIAL FOOD SUPPLEMENTS ON THE PERFORMANCE OF SUPPLEMENTARY FEEDING PROGRAMMES FOR CHILDREN UNDER 5 YEARS IN SUDAN

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RATIONALE AND OBJECTIVE: Supplementary feeding programs (SFP) have been recording poor recovery rates for the children below five years of age. A study investigating the effects of giving more food supplements to households with malnourished children was conducted to explore the impact of this additional supplement on recovery rates, as well as the overall nutritional status of the community.
MATERIALS AND METHODS: In Aweil East, a fortnightly ration of 3.6 kg of fortified food was provided for each malnourished child enrolled in the SFP over an 8-month period. The households were not supplemented. In Aweil South, an additional ration of 5 kgs of cereals, 1 kg of pulses and 500 grams of salt were given to caregivers to supplement the other household members on a fortnightly basis. The malnourished child enrolled in the SFP received the same treatment ration as Aweil East. The 5520 children completed treatment when they reached 85% weight for height.
RESULTS AND FINDINGS: 44.5% (1162) in Aweil East and 71.1 % (1856) in Aweil South recovered. Malnutrition prevalence changed from 13.9% to 12.8 % in Aweil East and 17.1% to 12.2% in Aweil South. Analytical tests revealed that Children whose households were supplemented had a significant difference in recovery rates compared to the non-supplemented ($p<0.05$).
CONCLUSION: The provision of familial rations helps protect the food supplements for moderately malnourished children from family sharing leading to better recovery of children.

P19-17

FOOD HABITS IN ADOLESCENTS: BREAKFAST, RECESS AND AFTERNOON SNACK, THE AFINOS STUDY

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BACKGROUND: Adolescence is characterized by showing inadequate food patterns.
OBJECTIVE: To assess habitual food behavior with special focus on food intake during breakfast, recess and afternoon snack.
METHODS: 221 adolescents were recruited from; food eating behavior and food intake during breakfast, recess and afternoon snack were assessed by questionnaire and 24-hours recall. Both weight and height were self-reported.
RESULTS: 21% adolescents showed overweight (including obesity). 10% of the whole sample did not follow a regular breakfast. During recess: milk products were consumed by 20% adolescents, boys consumed more sandwiches than girls (47% vs. 30%). The highest consumption of industrial bakery was by overweight boys (17%) and normal-weight girls (15%). 64% overweight girls skipped afternoon snack.
CONCLUSIONS: Food eating behavior was different between boys and girls (recess and afternoon snack) except breakfast. Those girls with overweight self-perception seem to modify their eating patterns towards inadequate habits as an attempt to improve their physical appearance.

P20: Food Processing for Improved Nutrition I

P20-01

EFFECTS OF RHIZOPUS OLIGOSPORUS FERMENTATION ON THE NUTRITIONAL AND SENSORY CHARACTERISTICS COWPEAS (VIGNA UNGUICULATA)

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RATIONALE AND OBJECTIVES: Mould fermentation of cowpea into a tempeh-like product is expected to result in improvement in the nutritional value of the resulting food products. The study investigated how fermentation of cowpeas using Rhizopus oligosporus affected its nutritional and sensory characteristics.
MATERIALS AND METHODS: Nigeria and Togo cowpea varieties were used. Proximate and mineral compositions were determined. Flavor and overall acceptability of the fermented cowpea was ranked for preference using a 7-point hedonic scale.
RESULTS AND FINDINGS: Mould fermentation did not significantly change the proximate and mineral composition of the cowpeas. The zinc content of the samples from Nigeria and Togo cowpea increased from 4.1-8.7mg/100g and 5.4-9.7mg/100g respectively with fermentation. The fermented cowpeas were significantly ($p<0.05$) different from the soybean tempeh. The flavor and overall acceptability of the fermented cowpeas was acceptable.
CONCLUSION: The fermentation of cowpeas into tempeh resulted in an improvement in the nutritional value of the cowpeas and an acceptable product

P20-02

A NUTRITIVE VALUE OF SILKWORM PUPAE POWDER AS ALTERNATE OF NUTRITIOUS FOOD SOURCE FOR HUMAN NUTRITION

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RATIONALE AND OBJECTIVES: Silkworm pupae, the inside part of cocoons, is waste from yarn silk production causing pollution. Many people in South Asian Countries eat silkworm larvae and pupae, as it is, however it is not common yet. The study purpose was to develop an alternate nutritious basic food source for human consumption from silkworm pupae waste in the reeling industry.
MATERIALS AND METHODS: Silkworm pupae was processed following six (6) steps: fresh and fine pupae and clean selected, steamed well for about 10 seconds, ground and sifted it to produce a liquid, 10% maize powder added, dried in an oven at 60ºC for 6 hours, and refined in blender.
RESULTS AND FINDING: A fine powder, so called "PURY", has a well balanced amount of moisture, protein, fat included PUFA, carbohydrate, amino acids, vitamins and minerals.
CONCLUSION: Through simple processing, the dried product of Pury can be used as a basic formula for complementary food and snacks, and can make a great contribution to reduce pupae waste. Research is underway to develop Pury based ingredients for more food-technological uses in order to reduce prevalence of malnutrition among infants in Indonesia.