O001 / #105

Oral Presentations
ORAL PRESENTATIONS SESSION 01: NEONATAL & PREMATURITY
08-26-2021 9:00 - 10:00

MACRONUTRIENT AND MICRONUTRIENT CONTENTS IN PASTEURIZED DONOR HUMAN MILK – A LITERATURE REVIEW

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Background and Aims:

When mother's own milk (MOM) is unavailable or insufficient, pasteurized donor milk (PDM) is recommended by the American Academy of Pediatrics as the preferred alternative for preterm infants. The nutrient content of PDM could differ from MOM due to pasteurization, freezing, late lactational stage, and other factors related to PDM handling and donors' characteristics. A review was conducted to understand the quantity of macronutrients and micronutrients in PDM.

Methods:

Embase and PubMed were searched for articles published between 1985 and 2020. Studies that reported means for protein, lipid, carbohydrate, lactose, energy, vitamins, minerals, DHA, and/or ARA of PDM acquired from human milk banks or processed in a lab were included. Studies that measured nutrient content prior to pasteurization and that used samples without freezing/thawing were excluded.

Results:

A total of 39 articles published in English met the above criteria and were selected. Weighted means of all reported means for each macronutrient were calculated. Weighted means±SD (g/dL, n=sample size) for total protein, lipid, and total carbohydrate were 1.10±0.23 (n=1731), 3.0±0.75 (n=1859), and 7.1±0.30 (n=863), respectively. The weighted mean for energy was 60.9±7.05 (kcal/dL; n=1759). Few studies reported vitamins or minerals in PDM making it difficult to calculate a weighted mean of means for most micronutrients.

Conclusions:

To our knowledge, this is the first review that reports weighted mean of means for macronutrients of PDM, which could serve as a valuable reference for neonatal physicians and dietitians. This review also highlights the lack of research on micronutrient content in PDM.

O002 / #9

Oral Presentations
ORAL PRESENTATIONS SESSION 01: NEONATAL & PREMATURITY
08-26-2021 9:00 - 10:00

HEAD CIRCUMFERENCE IS RELATED TO CHANGES IN WEIGHT GAIN IN VERY PRETERM BABIES: A REGISTRY ANALYSIS OF Z-SCORE CHANGES FROM THE EPIC LATINO NETWORK.

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Background and Aims:

Optimal extrauterine growth is subject of debate among experts. If there is more weight gain up to the 36 weeks (w) post-menstrual age (PMA) reaching the same birth percentile, does the head circumference (HC) grow at the same rate and reach the same level of recovery?

Methods:

2016-2019, babies from EpicLatino network ≤33w gestational age (GA) survived to 36w PMA were included. We compared changes in Z-scores from birth to 36w PMA for weight and HC using the Fenton Growth Chart. We measured correlation between these two measurements for all cases and then by GA (< 30w and ≥30w). We measured Spearman correlation and then, we created clinical meaningful groups of changes in Z-score for weight starting at < -2 and by 0.4 increments from o until >0 and -2.0; then, we create a regress model to confirm relation among those groups.

Results:

379 patients were included. We found a moderate positive Spearman correlation of rho = 0.43 (All measurements), 0.44 for GA <30w and 0.38 for ≥ 30w. The changes in weight Z-score was significantly related to changes in HC Z-score ($p < 0.001$) as was GA ($p = 0.003$).

Figure 1. Scatter plot is shown with fitted values and trend lines for Z-scores changes in Weight and HC (Delta W Z-Score and Delta HC Z-Score) between birth and 36 weeks(w) PMA. Cases grouped by <30w (red) and 30-32w (blue) are plotted.

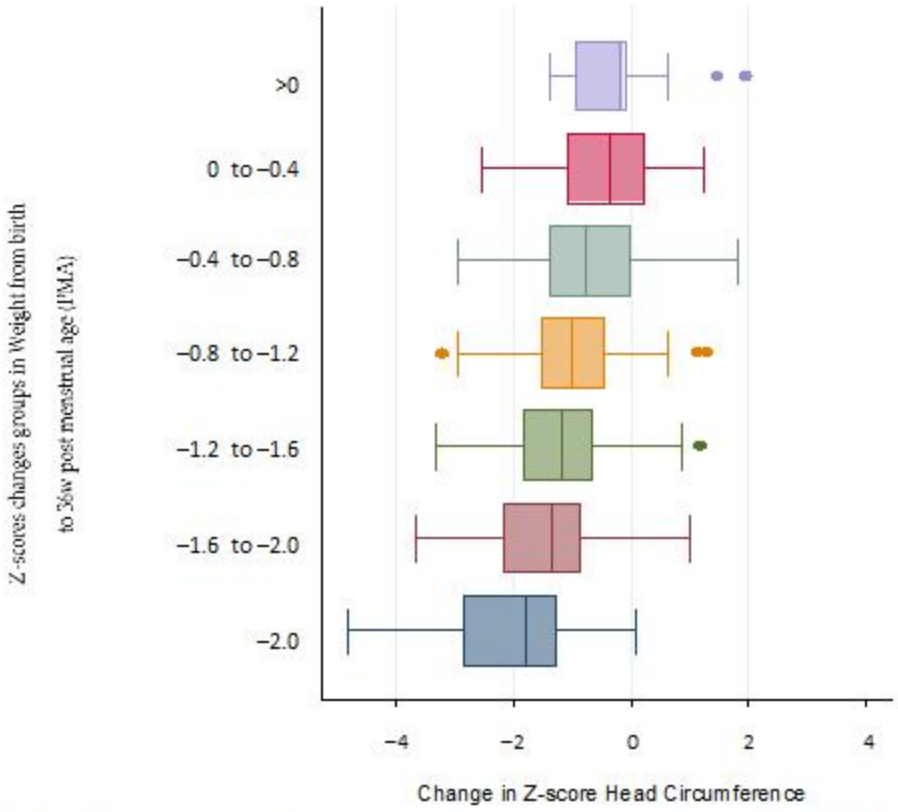

Figure 2. Boxplots show median Z-scores in weight and head circumference (HC) at birth and at 36 weeks(w) post mestrual age (PMA) by <30w and 30-32w.

Table 1. Demographics and Z-score results at birth and at 36 weeks PMA

Variable	n (p50)	% (p25, p75)
Gestational age	(31)	(29, 32)
< 30 w	132	33%
= 30 w	268	66%
Total	400	
Sex		
Male	205	51.2%
Female	194	48.5%
Indeterminate	1	0.3%
Small gestational age at Birth	61	15.3%
Weight		
Z-score birth	(-0.49)	(-1.02, 0.07)
Z-score 36 PMA	(-1.56)	(-2.26, -0.97)
Change	(-1.11)	(-1.55, -0.68)
Head circumference		
Z-score birth	(-0.26)	(-0.74, 0.73)
Z-score 36 PMA	(-1.10)	(-1.79, -0.34)
Change	(-1.02)	(-1.69; -0.39)

PMA: Post menstrual age

Table 1. Descrptive statistics of 397 neonates discharge home from 23 neonatal units = 32 weeks gestational age (GA) at birth, n: number of patients, min: minimum, max: maximum, SD: standad deviation.

Conclusions:

Changes in weight from birth have positive impact on head growth using Z-scores. This has implication on head growth and consequently a probable neurological outcome and needs to be confirm in other cohorts. If confirm, optimal extrauterine grow should be based on Z score weight/HC gain not on absolute or relative daily gain.

O003 / #111

Oral Presentations
ORAL PRESENTATIONS SESSION 01: NEONATAL & PREMATURITY
08-26-2021 9:00 - 10:00

EFFECT OF PARENTERAL MOLAR CA:P RATIO AND CALCIUM INTAKE ON THE INCIDENCE OF HYPERCALCEMIA IN VERY LOW BIRTH WEIGHT INFANTS

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Background and Aims:

Calcium and phosphorus are essential for bone growth and mineralization in preterm infants. In early parenteral nutrition (PN) when phosphorus intake is low and protein and energy are optimized, the incidence of early hypercalcemia and hypophosphatemia increases. For the past decade, we used PN solutions with a molar Ca:P ratio of 1:1.24. Due do position-paper recommendations from 2016, the molar Ca:P ratio was changed to 1:1. Likewise, we increased by 1.4X the amount of calcium in the first postnatal day's solution, without adding phosphorus.

To evaluate whether the molar Ca:P ratio and the amount of calcium in the new parenteral nutrition solutions (NPNS) increased the incidence of hypercalcemia compared to the former parenteral nutrition solution (FPNS).

Methods:

A single-center retrospective case control study based on medical records of very low birth weight (VLBW<1500 gr.) infants born in Kaplan Medical Center between the years 2015 and 2018.

We included 120 preterm infants: 60 in the study group (NPNS) and 60 in the control group (FPNS). Matching was made according to gestational age and birth weight.

Hypercalcemia was defined as iCa >1.45 mmol/L, serum calcium >12 mg/dl.

Results:

No significant differences were found between groups in serum calcium and ionized calcium levels (p=0.177, p=0.287 respectively). No increase in the incidence of hypercalcemia was observed in the NPNS group 21/54 (39%) compared to the FPNS group 21/50 (42%) (p=0.842).

Conclusions:

Changes in the molar Ca:P ratio and the amount of calcium in parenteral nutrition solutions did not increase the incidence of hypercalcemia in VLBW infants.

O004 / #112

Oral Presentations
ORAL PRESENTATIONS SESSION 01: NEONATAL & PREMATURITY
08-26-2021 9:00 - 10:00

THE IMPACT OF A MULTIDISCIPLINARY POST-DISCHARGE INFANT NUTRITION CLINIC ON BREASTFEEDING RATES AND GROWTH TRAJECTORIES IN PREMATURE AND LOW BIRTH WEIGHT INFANTS.

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Background and Aims:

The benefits of breastfeeding are more pronounced in premature and low birth weight (P/LBW) infants. The Post-Discharge Infant Nutrition Clinic (PDINC) at London Health Sciences Center (LHSC) began offering feeding support in 2012. This unique clinic relies on a multidisciplinary team whose goal is to provide feeding support thereby improving growth and health outcomes in high-risk infants. The aim of this study is to determine if enrollment in the PDINC has improved breastfeeding rates and growth in P/LBW infants

Methods:

Retrospective clinic data was collected for P/LBW 125 infants and was analyzed to assess breastfeeding rates and infant growth.

Results:

Mean gestational age at birth was 34 weeks with 52% (65) being male. On average patients made 5 visits to clinic over 116 days. Half of all infants seen at the first visit were also seen at the fifth visit. By the 5th visit (55 weeks, corrected age) 42% were exclusively breastfeeding while 44% were still receiving some breastmilk daily. Over the course of clinic involvement, the daily mean weight gain, increase in head circumference and head circumference z-score for males and females was 24.86 vs 25.52grams, 1.0 vs 0.9cm, and -1.27 vs -0.28 respectively.

Conclusions:

PDINC support was shown to have a positive impact on breastfeeding rates at 6 months with 86% of infants receiving at least some breastmilk compared to the national Canadian average of 57% for term infants. Clinic support had a positive growth trajectory for females with mean z-scores around the 50th percentiles with no effect shown for males.

O005 / #23

Oral Presentations
ORAL PRESENTATIONS SESSION 01: NEONATAL & PREMATURITY
08-26-2021 9:00 - 10:00

GROWTH PROFILE IN PREMATURE INFANTS LESS THAN 1500G IN THEIR FIRST TWO YEARS OF LIFE. DOES THE TYPE OF FEEDING INFLUENCE?

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Background and Aims:

The rate of growth is closely linked to health and nutritional status. Its evaluation in very low birthweight infants (VLBWI) raises great interest, since it influences their development and/or increase cardiovascular risk in the future.

OBJECTIVES

Analyzing type of feeding and its correlation with anthropometric development in VLBWI (Birth weight≤1500g) at 6, 12,18 and 24 months of life, according to sex, breastfeeding duration and complications.

Comparing catch–up growth in first two years of life between VLBWI with Intrauterine Growth Restriction(IUGR) and those without IUGR.

Methods:

Analytical, observational, retrospective study.

N=164, VLBWI admitted to Neonatal Intensive Care Unit(NICU) between 2008-2015.

Three groups: [24-28+6weeks] 39.63%; [29-32+6weeks] 48.17%; [33-36weeks] 12.20%.

Analysis: Chi-Square and ANOVA tests

Results:

N=164, 56.71%males and 43.29%females. Mean gestational age at birth: 29weeks. 40.85%received breastfeeding(BF), 35.98%mixed lactation(ML), and 23,17%artificial lactation(AL). 50.6%presented complications (48.19% hyaline membrane disease). 10.9% were VLBWI with IUGR (50%symmetric, 50%asymmetric).

The most used diet in the three groups was BF, without statistically significant differences found. [24-28+6weeks] group maintained BF longer (mean 7.38months).

Complications in immediate-neonatal period: more in [24-28+6weeks] group, which presented the longest mean stay($p>0.05$).

All groups showed an increase in weight, length, and cranial perimeter at 6months. VLBWI with asymmetric IUGR and non-IUGR fed with AL and BF had similar growth speeds. Those with asymmetric IUGR did perform catch-up at 2 years($p>0.05$).

Conclusions:

The type of feeding did not influence anthropometric-growth during the first two years, but it is observed that highest growth speed occurs in all groups up to 6 months and those who received ML had higher gain.

O006 / #242

Oral Presentations
ORAL PRESENTATIONS SESSION 01: NEONATAL & PREMATURITY
08-26-2021 9:00 - 10:00

BODY COMPOSITION OF PREMATURE INFANTS WITH BRONCHOPULMONARY DYSPLASIA AT 4-6 MONTHS POSTNATAL AGE

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Background and Aims:

Our aim was to study the nutritional status of premature infants with bronchopulmonary dysplasia after discharge from the hospital.

Methods:

The study involved 21 premature infants with bronchopulmonary dysplasia born at 28.0 [27.0-28.3] weeks of gestation without intrauterine growth retardation: Z-score of weight at birth = -0.10 [-0.29 - 0.41], Z-score of body length = -0.31 [-1.17 - 0.71]. At the time of examination the postnatal age was 5.85 [4.70 - 6.40] months. The INTERGROWTH-21st calculator was used to calculate the anthropometric indicators at birth, and the WHO Anthro program (2009) Z-scores were assessed at the time of the examination. Body composition was determined by air plethysmography using PEA POD apparatus (LMi, USA).

Results:

At the time of examination, WAZ (weight for age Z-score) calculated for postnatal age was -4.01 [-4.60 - -3.27], WAZ for corrected age was -1.82 [-2.60 - -1.13]. HAZ (body length for age Z-score) was -4.51 [-.32 - -4.08] for postnatal age and = -1.57 [-2.31 - -1.02] for corrected age, respectively. Body composition included 3.78 [3.32 - 4.22] kg lean mass and 0.87 [0.71 - 1.05] kg fat. The fat mass was 19.8 [16.9 - 22.0]%.

Conclusions:

Low anthropometric Z-scores at the postnatal age of 6 months in premature infants with bronchopulmonary dysplasia were due to both lean and fat mass deficiency. Modern approaches in feeding of such infants including the long-term use of specialized formulas after discharge from the hospital do not avoid nutritional deficiency at the age of 6 months.

O007 / #324

Oral Presentations
ORAL PRESENTATIONS SESSION 01: NEONATAL & PREMATURITY
08-26-2021 9:00 - 10:00

INFECTION AND NUTRITION IN PREGNANCY - IDENTIFYING POTENTIAL DRIVERS OF BIRTH WEIGHT IN A LONGITUDINAL COHORT STUDY IN PAPUA NEW GUINEA

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Background and Aims:

Papua New Guinea (PNG) has high rates of stillbirth and newborn mortality. Being born small is the biggest risk factor for newborn mortality, yet the nature and relative importance of key drivers of birth weight in PNG are unknown. To address this, we established a longitudinal cohort of pregnant women in PNG. We measured the prevalence of nutritional deficiencies, anaemia, and major infections and assessed their impact on birth weight, and adverse pregnancy outcomes.

Methods:

699 pregnant women attending their first antenatal clinic were enrolled, an interview conducted and biological samples collected. Samples were tested for haemoglobin, reproductive tract infections (RTIs), malaria (by qPCR), inflammation (CRP) and micronutrients (ferritin, zinc, calcium, copper and vitamin D). Pregnancy outcomes, birth weight and key aspects of early essential newborn care were recorded.

Results:

Adverse pregnancy outcomes were common (stillbirth rate 2%, 11% babies < 2.5kgs) and many women experienced a high burden of disease (69% iron deficient, 82% anaemic, 12% malaria positive, 15% had a mid-upper arm circumference of £ 23cm, and most women (68%) had at least one sexually transmitted infection or bacterial vaginosis. Results for other micronutrients (zinc, vitamin A, calcium, copper, vitamin D, vitamin A, folate and B12), associations with birth weight and multi-morbidity interactions will be presented.

Conclusions:

The high burden of malnutrition, infections and multi-morbidity in pregnancy emphasizes the importance of increasing access to affordable prevention, diagnosis and treatment and a renewed focus on ensuring quality care for pregnant women and their newborns.

O008 / #93

Oral Presentations
ORAL PRESENTATIONS SESSION 01: NEONATAL & PREMATURITY
08-26-2021 9:00 - 10:00

THE COMPARISON OF METABOLIC EFFECTS OF EARLY SODIUM GLYCEROPHOSPHATE VS MINERAL-FREE PARENTERAL NUTRITION IN VERY PRETERM INFANTS

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Background and Aims:

We opted to carry out a study with the introduction of phosphorus as sodium glycerophosphate in parenteral nutrition from the first day onward following the surge in the incidence of hypercalcemia and hypophosphatemia.

Methods:

In this single-center, prospective, observational cohort study, inborn babies <32 weeks and <1250 g between August 2017-July 2018 were enrolled consecutively. Infants born in the first 6-month were initiated parenteral nutrition (PN) (Group 1) containing phosphorus (1 mmol P/ 100 ml, sodium glycerophosphate) immediately after birth, and in the 2nd six-month, mineral-free standard PN (Group 2) was commenced up until 48 hours of life. Serum mineral and electrolyte levels were measured and compared between the groups. The primary outcome was the presence of hypophosphatemia and hypercalcemia in the first week of life. The secondary outcome was electrolyte imbalances and preterm morbidity.

Results:

A total of 261 infants were included in this study. There were 130 babies in Group 1 and 131 in Group 2. Demographic characteristics were similar in the groups. While the incidence of hypophosphatemia in Group 1 and 2 was 20.8% and 72.5% ($p<0.001$), hypercalcemia was noted to be 7.7% and 34.4%, respectively ($p<0.001$). No difference in terms of hypernatremia or hypo/hyperkalemia was noted. Moderate-severe BPD was 7% and 18.3% in Group 1 and Group 2, respectively ($p<0.05$).

Conclusions:

Adding phosphorus to parenteral nutrition in the first hours of life reduced the frequency of hypophosphatemia and hypercalcemia without any hypernatremia or increasing morbidity. Nutrition guidelines need to be urgently revised accordingly in terms of early mineral/electrolyte supplementation.

O009 / #336

Oral Presentations
ORAL PRESENTATIONS SESSION 01: NEONATAL & PREMATURITY
08-26-2021 9:00 - 10:00

MATERNAL UNDERNOURISHMENT STIMULATES FETUIN-B AND IMPAIRS PLACENTAL DEVELOPMENT

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Background and Aims:

Low birth weight (LBW) significantly increases the risk for multiple diseases, including cardiovascular and kidney diseases. Low birth weight can be caused by a variety of factors, including maternal undernourishment (MUN) during pregnancy. In our study here, we investigated the effects of MUN on the developing placenta, with particular focus on the role of oxidative stress and fetuin-B in placental impairment.

Methods:

Using a mouse model of MUN to generate LBW offspring, in which the pregnant mother consumes reduced total calories and protein during gestation, we examined placental vascularization, vascular reactivity and blood perfusion using immunofluorescence, myograph and laser-doppler flowmetry, respectively. We further examined placental pathology during MUN and pharmacological intervention through histology, immunofluorescence staining and immunoblotting. Trophoblast cell cultures were also used in experiments.

Results:

We observed reduced vascular density, vascular reactivity and blood perfusion in the placenta during MUN, along with a reduction in total placental trophoblasts. Further analysis revealed that MUN significantly increases the expression and secretion of the small protein fetuin-B in the placenta. Treatment of trophoblasts with fetuin-B increased the activity of NF-kB in these cells, while also stimulating their generation of reactive oxygen species. Subsequently, fetuin-B effectively reduced trophoblast quantity by impairing their proliferative expansion and stimulating their apoptosis. Treatment of MUN pregnant mothers with antioxidants (ethyl pyruvate, Tempo and mitoTempo) improved placental vascular function and helped preserve placental trophoblast pools.

Conclusions:

MUN upregulates fetuin-B and oxidative stress in the placenta, effects which consequently impair placental development and vascular function.

O010 / #182

Oral Presentations
ORAL PRESENTATIONS SESSION 02: INFANCY I
08-26-2021 10:00 - 11:00

RESTING FUNCTIONAL MRI REVEALS ASSOCIATIONS BETWEEN HUMAN MILK OLIGOSACCHARIDES AND BRAIN FUNCTIONAL NETWORKS

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Background and Aims:

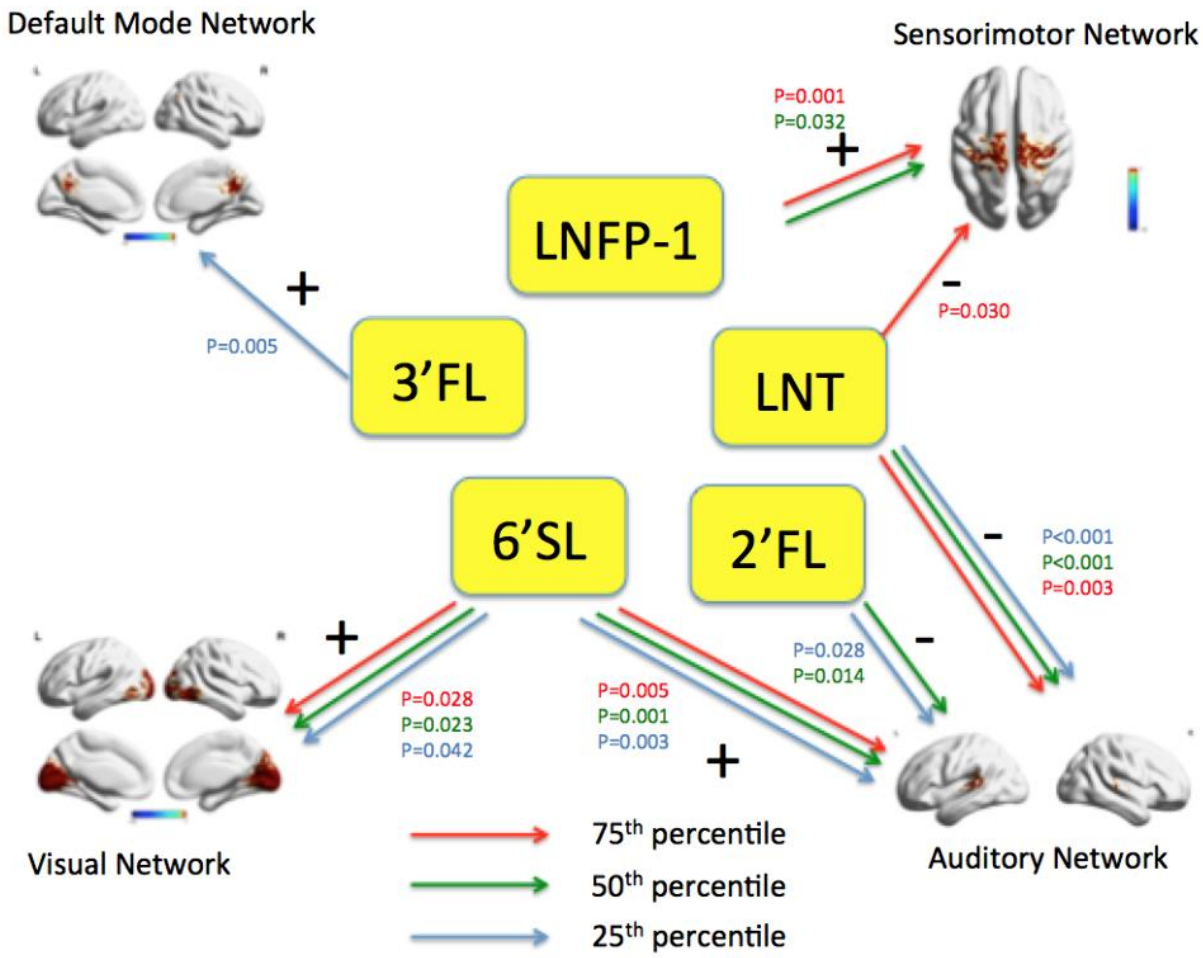
We used resting functional MRI (rsfMRI) to discern potential associations between human milk oligosaccharides (HMOs) and cognition during early infancy.

Methods:

Ninety-one healthy infants (0-20 months old) underwent longitudinal rsfMRI scans (n=153). Human milk (HM) samples were obtained from the mothers of the participants at each visit and analyzed for HMOs. Brain functional network connection strengths (CS), implicated to reflect cognitive development during early infancy, were calculated for the visual (VI), default mode (DMN), sensorimotor (SM), and auditory (AU) networks. Age effects of CS and HMOs were removed. Multivariate quantile regression of CS with mixed effects (with Bonferroni correction) was used to examine associations between HMOs and CS among all infants stratified into detectable (A-tetra+) or undetectable (A-tetra-) A-tetra in the HM received based on our previous findings relating HMOs and language functions in infants.

Results:

In the A-tetra+ subset (33 subjects) positive associations were observed between 6'SL and VI (all quantiles) and between 3'FL and DMN (25^{th}quantile). The composite effects of multiple HMOs, specifically LNFP-1 (+, $75^{th}$and 50^{th}) and LNT (-, 75^{th}) associated with SM, and 6'SL (+, all quantiles), LNT (-, all quantiles) and 2'FL (-, $25^{th}$and 50^{th}quantiles) with AU were observed (Figure). No associations were observed in the A-tetra- subset.



Conclusions:

The observed associations between HMOs and different quantiles of brain functional networks suggest that these associations are CS quantile dependent. These results revealed potential neural basis underpinning the observed associations between different HMOs (jointly or individually) and cognition during early infancy.

O011 / #284

Oral Presentations
ORAL PRESENTATIONS SESSION 02: INFANCY I
08-26-2021 10:00 - 11:00

ASSOCIATIONS BETWEEN EARLY LIFE WEIGHT TRAJECTORIES AND APPETITIVE BEHAVIORS AT 7 YEARS OF AGE

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Background and Aims:

Noncommunicable diseases in adulthood are influenced by early developmental experiences, such as growth trajectories. However, it is not clear how early life growth may influence later appetite. We aimed to explore associations between weight trajectories from birth to 5 years and appetitive behaviors at 7 years.

Methods:

Participants were mothers and children from the Generation XXI birth cohort with variables of interest (n=3232). Weight trajectories were previously identified by normal mixture models and labeled as “normal weight gain”, “weight gain during infancy”, “weight gain during childhood” and “persistent weight gain”. Appetitive behaviors were assessed through the validated Children`s Eating Behavior Questionnaire. Generalized linear models with Bonferroni correction (co-variates: maternal body mass index (BMI), age, education, feeding practices, child sex and BMI z-score) were performed.

Results:

Compared with the “normal weight gain” trajectory, those with “weight gain during infancy” showed greater Enjoyment of Food (β=0.22, 95%CI:0.09;0.35), Food Responsiveness, i.e. a higher general interest in eating and responsiveness towards foods (β=0.29, 95%CI:0.16;0.42) and Slowness in Eating ((β=-0.15, 95%CI:-0.30;-0.01) at 7 years. Gaining weight during childhood and persistent weight gain also affected child`s appetite at 7 years, but these associations were not statistically significant after adjustments.

Conclusions:

Weight trajectories during infancy play a role on appetitive behaviors at 7 years, being associated with higher enjoyment of food and food responsiveness, and faster eating. Interventions could target children gaining weight during infancy because of its association with later appetitive behaviors, that could lead to excessive weight gain later in life.

O012 / #16

Oral Presentations
ORAL PRESENTATIONS SESSION 02: INFANCY I
08-26-2021 10:00 - 11:00

DEVELOPMENT AND APPLICATION OF A METAGENOMICS PIPELINE FOR STRAIN LEVEL CLASSIFICATION OF THE INFANT MICROBIOME

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Background and Aims:

At birth, the exposure to specific microbial strains dictates the shaping of our microbiome and its symbiotic function as we age. Studies link diet and other factors to microbial diversity evolution in infants. Strain specificity is key in determining the 'window of opportunity' as well as 'immune training' in infants. Hence several studies and commercially available infant milk formulas target the microbiome at strain level.

Methods:

We present an integrated computational shotgun metagenomics pipeline for quantifying abundance and strain-level classification of bacteria specifically within the infant microbiome.

To improve meaningful classification, a database was constructed of all current available reference genomes of bacterial strains found in the infant gut. For example, fecal B. longum subsp. infantis compared to B. bifidum strains leads to functional consequences for the infant (Vatanen, 2018). This level of classification is relevant for clients working in infant nutrition, such as companies that produce infant formulas, human milk oligosaccharides, potential probiotics, and other dietary supplements but also large scale multigenerational population studies such as LifeLines-UMCG.

Results:

Database optimization and bioinformatic tools comparison led to the increase of accurate and meaningful strain identification in infant metagenome datasets, especially compared to more generic databases. This high performing taxonomic profiling pipeline is tested and validated, both for real-life communities from clinical trials and in silico created mock communities.

Conclusions:

Our customized pipeline can discriminate bacteria at strain level which is a big plus for the industry aiming to link host-microbe interactions, next generation microbe associated products, and gaining an understanding for gut-brain-skin axis.

O013 / #196

Oral Presentations
ORAL PRESENTATIONS SESSION 02: INFANCY I
08-26-2021 10:00 - 11:00

SNACKING PATTERNS IN CHILDREN 0 TO 4 YEARS FROM THE FEEDING INFANTS AND TODDLERS STUDY IN THE UNITED ARAB EMIRATES

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Background and Aims:

The United Arab Emirates (UAE) have undergone a nutritional shift towards western-type dietary patterns. Snacking is common in children however, data on the composition of the snacking occasion is scarce. The objective of this study is to describe and quantify food group, energy and nutrient distributions in the snacking occasion of infants and young children in the UAE.

Methods:

A population-based cross-sectional survey in children 0 to 13 years was carried out including multiple pass 24-hr recalls, to estimate dietary intakes per eating occasion. Here we present food, energy and nutrient sources for the snacking occasion in children 0 to 4 years (n=525).

Results:

Beyond 6 months of age, the prevalence of snacking was 59%, 88%, and 92% in ages groups 6-11.9, 12-23.9 and 24-47.9 months respectively. Overall, the contribution of snacking to daily energy increased with age reaching 28% in children 24-47.9 months. Fruits and 'sweets, dessert and sweetened beverages' (SDSSB) were the top food groups consumed. While more children consumed fruits than SDSSB in the 6-11.9-month age group, we observed an increasing consumption of SDSSB and decreasing consumption of fruits in older age groups (66% and 46% for SDSSB and fruits respectively at 24-47.9 months). SDSSB made up 40% of the energy intake from snacks in the older age group.

Conclusions:

Snacking in UAE children is a significant energy source with SDSSB being the main snacks among older age groups. Nutritional quality of the snacking occasion can be improved by encouraging the replacement of SDSSB with fruits, vegetables and dairy foods.

O014 / #24

Oral Presentations
ORAL PRESENTATIONS SESSION 02: INFANCY I
08-26-2021 10:00 - 11:00

SUPPLEMENTATION OF INFANT DIETS WITH SMALL QUANTITY LIPID-BASED NUTRIENT SUPPLEMENTS DOES NOT IMPROVE INTESTINAL HEALTH AMONG 18-MONTH-OLD MALAWIAN CHILDREN

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Background and Aims:

Lipid-based nutrient supplements (LNS) have been found to improve child growth and reduce child mortality. However, the exact mechanism of action is unclear. One potential pathway is linked to improvement in intestinal health status through impacting on biomarkers of intestinal inflammation, regeneration and repair, and permeability. Our study aimed to test the hypothesis that small-quantity LNS (SQ-LNS) could reduce the levels of intestinal inflammation, regeneration and repair, and permeability in 18-month-old children.

Methods:

In this analysis, we included children whose mothers participated in a completed follow-up (n=869) in the randomized controlled trial in rural Malawi. We divided these children into two groups according to those who received or not received SQ-LNS from 6 to 18 months. We compared intestinal health assessed by fecal calprotectin, regenerating 1B protein (REG1B), and alpha-1 antitrypsin at 18 months of age (after 12 months of supplementation) between those receiving and not receiving SQ-LNS.

Results:

Among 651 children at 18 months of age, mean concentration of calprotectin, REG1B and alpha-1 antitrypsin was 230 µg/g, 105 µg/g, and 7.3 mg/dl, respectively. No associations between SQ-LNS supplementation and these biomarkers at 18 months were found. Additionally, there was no association between SQ-LNS and these biomarkers at 30 months.

Conclusions:

We conclude that SQ-LNS did not improve child intestinal health in rural Malawi. Similar research in other populations is encouraged to understand the impact of SQ-LNS on intestinal health.

O015 / #123

Oral Presentations
ORAL PRESENTATIONS SESSION 02: INFANCY I
08-26-2021 10:00 - 11:00

EFFECTS OF A PARTIALLY HYDROLYSED INFANT FORMULA ON THE DEVELOPMENT OF COW'S MILK RELATED ALLERGIC MANIFESTATIONS IN EARLY INFANCY: THE ALLERGY REDUCTION TRIAL

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Background and Aims:

In this multicentre double-blinded clinical trial, the risk reduction effect on Milk Related Allergic Manifestations (MRAM) and Atopic Dermatitis (AD) of a partially hydrolysed whey infant formula (pHF) was assessed in high-risk infants compared to a standard intact protein formula (IPF).

Methods:

From a total of 331 healthy term infants with a family history of allergy, randomized to either the pHF or the IPF (including both exclusively formula-feeding and mixed-feeding) and followed up until 6 months of age, 225 infants completed the study (pHF: n=105, IPF: n=120). Primary outcomes were risk reduction on MRAM and AD within the first 6 months of life between groups.

Results:

MRAM incidence by 6 months of age did not differ between the two groups in either the PP (P=0.364) or the ITT (P=0.127) population. AD occurred in significantly less infants in the pHF vs. the IPF group (PP population: 11.4% vs. 24.2%; relative risk reduction: 51%, p=0.021; similar results in ITT population). Additional adjustment for family history of AD showed a significant risk reducing effect of pHF on the incidence of AD compared to IPF in infants with a family history of AD in the ITT population (6.5% vs. 27.3%; relative risk reduction: 76.1%, p=0.018).

Conclusions:

Although MRAM did not differ between the two groups, the risk for AD in the first 6 months of life was significantly lower in the pHF group compared to the IPF group. A stronger effect was observed when family history of AD was present.

O016 / #292

Oral Presentations
ORAL PRESENTATIONS SESSION 02: INFANCY I
08-26-2021 10:00 - 11:00

THE GUT MICROBIOME FUNCTIONAL METABOLIC CAPACITY OF INFANTS FED FORMULA WITH FIVE HUMAN MILK OLIGOSACCHARIDES SHIFTS CLOSER TO BREASTFED INFANTS AND RELATES TO IMMUNE MATURATION

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Background and Aims:

Human milk oligosaccharides (HMOs) drive a healthy gut microbiome establishment and immune maturation in early life. Here, the effect of infant formula supplemented with five HMOs (2'-fucosyllactose, 2',3-di-fucosyllactose, lacto-N-tetraose, 3'-sialyllactose, 6'-sialyllactose) on the functional capacity of the gut microbiome in relation to immune maturation was evaluated.

Methods:

In a European multicenter study, healthy infants (7-21 days old) were randomly assigned to a standard cow's milk-based infant formula (Control); the same formula with either 1.5 g/L HMOs (Test1); or

2.5 g/L HMOs (Test2) (n~140/formula group). Breastfed infants (BF, n=63) were enrolled as reference. Fecal samples collected at 3-months age were analyzed for secretory immunoglobulin A (sIgA) and microbial functional metabolic pathway modules by shotgun sequencing.

Results:

Abundance of approx. 60 metabolic pathway modules in Test1 and/or Test2 were significantly different compared to Control (approx. 30% up- and 70% downregulated vs. Control; False Discovery Rate (FDR) <0.1). More than 95% of these pathway modules in the Test groups moved closer towards BF, with one third being comparable to BF (a.o. transport systems, amino acid metabolism). Thirty-five out of the 60 modules were associated with sIgA (FDR<0.1), a marker of intestinal immune response. Specifically, pathway modules linked to leucine and succinate metabolism were positively correlated with sIgA (FDR<0.1), while twelve pathway modules linked to antimicrobial resistance negatively correlated with sIgA (FDR<0.018).

Conclusions:

Infant formula supplemented with a diverse blend of five HMOs shapes the early life gut microbiome functional metabolic capacity closer to that of breastfed infants, with specific functional pathways associated to intestinal immune maturation.

O017 / #26

Oral Presentations
ORAL PRESENTATIONS SESSION 02: INFANCY I
08-26-2021 10:00 - 11:00

EFFECTS OF CAMPYLOBACTERIOSIS ON INFANTS GROWTH AND NUTRITION

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Background and Aims:

Campylobacteriosis is the leading cause of bloody diarrhea worldwide. It can cause to long-term digestive disorders possibly slowing down growth and weight gain. The study aimed to investigate a role of campylobacteriosis on infants growth.

Methods:

120 children aged 1–3 years were examined: group 1 (n=60) after campylobcateriosis; group 2 (n=30) after viral gastroenteritis; group 3 (n=30) healthy volunteers. The diagnosis of campylobacteriosis and viral gastroenteritis was established on the basis of clinical picture and detection of the pathogen in the feces by RT-PCR. The study included children with severe forms of intestinal infections (Vesicari scale > 12). Anthropometric data was evaluated using AntroPlus (WHO software). The following Z-score figures were calculated: WAZ (body mass for age), HAZ (height for age) and BAZ (body mass index for age). All data was included in points 6,3,1 months before the illness, and every 3 months within 1 year after illnes.

Results:

Z-score before illnes was in normal range indicating harmonious development of children. There were no changes in Z-scores in group 3. Campylobacteriosis mostly affected on WAZ. In 23 children (38,3%) WAZ was <-2 (in comparison to group 2 n=2, 6,7%, p=0,003) confirming delay in weight gain in 6 months after infection. Disorders were more common in boys. On the 9^{th} and 12^{th} WAZ remained <-2 omly in 12 children from group 1. HAZ was <-2 in 4 children from group 1 and 1 from group 2.

Conclusions:

Severe forms of campylobacteriosis can cause longterm disturbances in growth parameters of infants more promonent in weight gain.

O018 / #43

Oral Presentations
ORAL PRESENTATIONS SESSION 02: INFANCY I
08-26-2021 10:00 - 11:00

BUTYRATE CONCENTRATION IN HUMAN MILK: A GLOBAL REVIEW

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Background and Aims:

Human milk (HM) contains a variety of fatty acids. One of which, butyrate (C4:0), is important for regulation and maintenance of intestinal health, as well as other systemic metabolic functions. Limited evidence exists for the concentrations of butyrate in HM. The objective of this study was to review HM butyrate concentrations reported in studies globally.

Methods:

Original articles and abstracts were sourced from PubMed, Embase and article reference lists. Search terms included “human milk”; “breast milk”; “composition”; “short chain fatty acids”; “fatty acids”; “butyrate”. Only data analyzed using gas chromatography (GC)-mass spectrometry, GC-flame ionization detection, or ^{1}H-nuclear magnetic resonance were included in this analysis. Mean, standard deviation (SD) and ranges from two weeks of lactation and beyond were extracted for butyrate and converted to mg/100 mL HM. A weighted mean was calculated by adjusting reported means for the number of samples contributing to that mean.

Results:

Twenty-one articles/abstracts were identified; two abstracts and five articles were removed (duplication of results or methodological issues), leaving 11 articles and one abstract for final review. Combined, the total number of subjects were n=1180, contributing 1038 HM samples to the mean, 892 samples to the SD, and 1717 samples to the range values. HM butyrate levels ranged from 0 to 17.36 mg/100 mL, with a weighted mean±SD of 4.07±1.12 mg/100 mL.

Conclusions:

HM butyrate levels vary globally, with some studies reporting minimum values of zero for the population investigated. Further research is needed to understand maternal factors that may influence HM butyrate content.

O020 / #140

Oral Presentations
ORAL PRESENTATIONS SESSION 03: INFANCY II
08-26-2021 11:00 - 12:00

INFANT FEEDING AND GROWTH TRAJECTORIES IN EARLY CHILDHOOD: A COMPARATIVE ANALYSIS OF TWO LONGITUDINAL MODELLING APPROACHES

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Background and Aims:

Whether infant feeding practices influence longitudinal growth trajectories in children remains unclear. This study utilised two longitudinal approaches to examine the associations of infant feeding mode, breastfeeding duration and the timing of solids introduction with body mass index (BMI) z-score trajectories in early childhood.

Methods:

Data from the Healthy Beginnings Trial (n=532) were used. Linear spline multilevel model (LSMM) and group-based trajectory modelling (GBTM) were used to describe BMI z-score trajectories from birth to 60months and to assess its associations with infant feeding practices.

Results:

The LSMM approach demonstrated that the breastfeeding group showed lower BMI z-scores from ages 12 to 60months than the mixed-feeding and the formula-feeding groups. Children who were breastfed for ≥6 versus < 6months exhibited lower BMI z-score trajectory from ages 12 to 60 months. Results from the GBTM approach revealed that the mixed-feeding (OR: 1.8, 95%CI 1.0, 3.2) and the formula-feeding group (OR: 2.0, 95%CI 0.7, 5.9) showed higher odds of following the "High-BMIz" trajectory than the breastfeeding group. Breastfeeding duration ≥6 versus <6 months was linked with lower odds of following the "High-BMIz" trajectory (OR 0.7, 95%CI 0.4, 1.0). Both approaches found no association between timing of solids introduction and BMI z-score trajectory.

Conclusions:

The two longitudinal approaches revealed similar findings that infant feeding mode and breastfeeding duration, but not the timing of solid foods introduction, were associated with BMI z-score trajectory in early childhood. The findings provide robust longitudinal evidence to encourage and support extended breastfeeding for healthy growth.

O021 / #315

Oral Presentations
ORAL PRESENTATIONS SESSION 03: INFANCY II
08-26-2021 11:00 - 12:00

CARERS' AND HEALTH WORKERS' PERSPECTIVES ON MALNUTRITION IN INFANTS AGED UNDER SIX MONTHS IN RURAL ETHIOPIA: A QUALITATIVE STUDY

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Background and Aims:

Improving the management of "small and nutritionally at-risk" infants aged under six months (u6m) is a global health priority. Infants u6m with malnutrition have: high risk of disease and death in the short-term; non-communicable diseases in later life. To inform policy and research, we assessed perceptions and understanding of infant malnutrition and its management among carers, community members and healthcare workers in rural Ethiopia.

Methods:

We conducted in-depth and key-informant interviews from May-August 2020 in Jimma Zone and Deder District, Ethiopia using purposive sampling. Interviews were transcribed into Amharic or Afaan Oromo and then translated into English. Atlas ti-7 was used to support data analysis.

Results:

Carers, community members and healthcare workers reported on five different themes:

1) Perceptions about health and well-being: an 'ideal infant' sleeps well, feeds well, is active, looks 'fat';

2) Perceptions of feeding: knowledge of exclusive breastfeeding was good but practices were suboptimal, notably a cultural practice to give water to young infants;

3) Awareness about malnutrition: knowledge of how to identify small and nutritionally at-risk infants was limited;

4) Reasons for malnutrition: included feeding problems and caregiver's work pressures resulting in the premature introduction of complementary feeds;

5) Perceptions about treatment: carers prefered treatment close to home but were concerned about quality of community-based services.

Conclusions:

Programmes managing small and nutritionally at-risk infants u6m should understand and be responsive to the culture and context in which they operate: our thematic framework could help this. They should build on community strengths and tackle misunderstandings and barriers.

O022 / #47

Oral Presentations
ORAL PRESENTATIONS SESSION 03: INFANCY II
08-26-2021 11:00 - 12:00

INCREASING CONSUMPTION OF BITTER VEGETABLES IN LATE PREGNANCY REDUCES INFANTS' DISLIKING OF BITTER VEGETABLES AT WEANING

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Background and Aims:

Infants first experience flavours in utero providing an opportunity to encourage healthful childhood dietary patterns via enhanced fruit and vegetable (F&V) consumption in the maternal diet.

Methods:

Women in late-pregnancy (n=55) ate soups with (treatment) or without (control) bitter vegetables for 24-days. Habitual F&V consumption was assessed by questionnaire which yielded F&V/bitter vegetable frequency scores, and average portions per day consumed. Spinach puree taste-tests in infants were videoed by mothers at the outset of weaning (mean 24.7 weeks) and the first ten spoons were observed by four independent assessors to score negative facial expressions, negative/positive behaviours, and overall disliking. Mothers' perception of liking was recorded on a Likert scale.

Results:

After adjusting for factors including BMI and breastfeeding status, higher habitual maternal consumption of bitter vegetables predicted more positive behaviours (β1.2 P=0.025), fewer negative behaviours (β-0.4 P=0.013) and expressions (β-0.9 P=0.002), lower overall disliking scores (β-0.05 P<0.001) and higher liking of spinach as perceived by the mothers (β0.1 P<0.001). Treatment group similarly predicted positive/negative behaviours, overall disliking, and mothers' liking scores (P<0.001-0.008). Taking habitual bitter vegetable consumption into account (interaction-term), mother-infant dyads in the treatment group had higher scores for positive behaviour (β-1.7 P=0.014) and liking as perceived by the mother (β-0.1 P=0.004), and lower scores for negative behaviours (β0.4 P=0.037), expressions (β0.8 P=0.025) and overall disliking (β0.05 P<0.001).

Conclusions:

Dietary intervention to improve consumption of bitter vegetables during late pregnancy in habitually low consumers can increase fetal exposure to these flavours in utero and infants' subsequent liking of them at weaning.

O023 / #141

Oral Presentations
ORAL PRESENTATIONS SESSION 03: INFANCY II
08-26-2021 11:00 - 12:00

HUMAN MILK NUTRIENTS ARE ASSOCIATED WITH COGNITION AND TEMPERAMENT DURING THE FIRST 6 MONTHS OF LIFE

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Background and Aims:

It is highly plausible that human milk (HM) nutrients jointly support cognitive and behavioral outcomes in early life. We aimed to discern the associations of a wide array of HM nutrients with cognition and temperament during early infancy.

Methods:

The Mullen Scales of Early Learning (MSEL) and Infant Behavior Questionnaires-Revised (IBQ-R) were used to assess cognition and temperament, respectively, in exclusively/predominantly breastfed infants (n=34; age: 141.3 +/- 27.5 days). HM samples were concurrently obtained from the mothers of the participants and analyzed for fatty acids (total MUFA, PUFA, SFA, ARA, DHA, ARA/DHA, N6/N3); phospholipids (phosphatidylcholine, phosphatidylethanolamine (PE), phosphatidylinositol (PI), sphingomyelin) and choline (free choline, phosphocholine (PCho), glycerophosphocholine). Age effects of all nutrients were removed, potential collinearity among nutrients was handled, and stabilized best subset selection approach was employed to select nutrients associated with cognition/temperament. Five-fold cross-validations were used to assess prediction performance.

Results:

Although most marginal associations between individual nutrients and cognition/temperament were not significant due to limited sample size, the joint effects of these nutrients were significant (Fig. 1). Specifically, positive PE, DHA and N6/N3 and negative TSFA were jointly associated with receptive language, positive N6/N3 and ARA/DHA and negative TMUFA were associated with gross motor, and positive DHA and negative TSFA were associated with MSEL composite scores. Furthermore, ARA, PCho, and PI were positively associated with Surgency, whereas ARA was positively associated with Regulation.

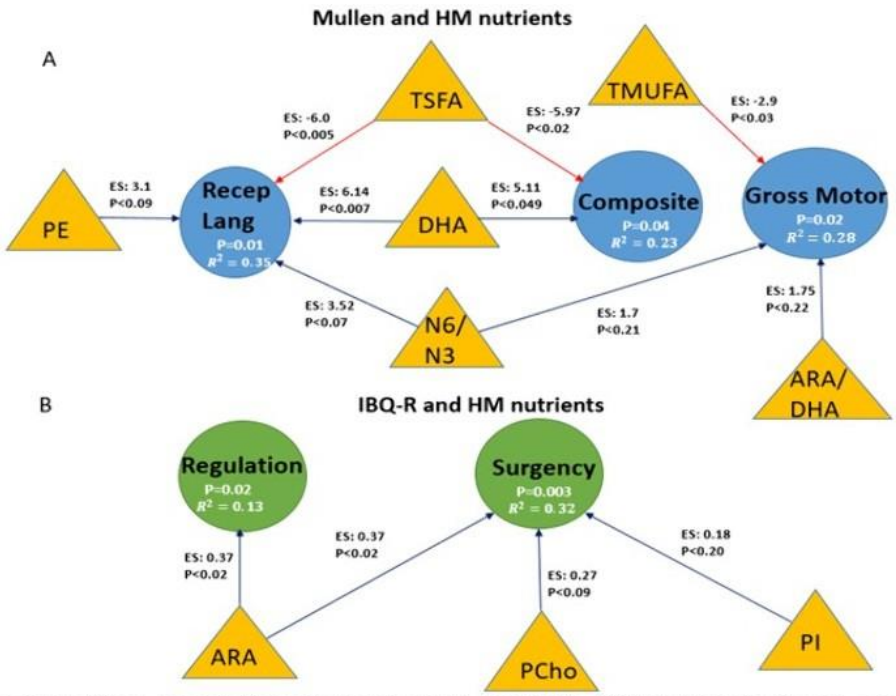

Fig. 1 The identified associations between HM nutrients (filled triangles) and cognition (A, filled blue circles) and temperament (B. filled green circles). The blue and red arrows represent positive and negative associations, respectively. The corresponding effect size (ES), p-value for each association, p-value and r-squared for each joint model are also provided. Recep Lang: receptive language; composite: Mullen Early Learning composite score. Surgency includes high intensity pleasure, smiling and laughter, perceptual sensitivity, vocal reactivity, activity level, cuddliness, approach and soothability; regulation includes low intensity pleasure, smiling and laughter, activity level, cuddliness, soothability, duration of orienting, distress to limitations.

Conclusions:

Our results indicated that various nutrients in HM work together to support the development of cognition and personality traits during early infancy.

O024 / #212

Oral Presentations
ORAL PRESENTATIONS SESSION 03: INFANCY II
08-26-2021 11:00 - 12:00

MOTHER AND LATE PRETERM/EARLY TERM LACTATION STUDY: A RANDOMISED CONTROLLED TRIAL TESTING THE USE OF RELAXATION ON MATERNAL STRESS AND INFANT BEHAVIOUR AND GROWTH

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Background and Aims:

Breastfeeding involves signalling between parent and offspring through biological (breast milk) and non-biological (behavioural) pathways. Previous research showed that relaxation in first-time mothers of full-term infants reduced maternal stress and improved infant behaviour and growth. The aim of this study was to test this in a more vulnerable population, i.e. late preterm and early term infants who are at higher risk of morbidity and breastfeeding complications.

Methods:

Participants were recruited from hospitals in London and randomised to the intervention group (n=35), where they were asked to listen to a meditation recording while breastfeeding from 3 weeks post-delivery, or the control group (n=37) where no intervention was given. Maternal stress, infant weight and length Z-scores and infant behaviour (crying, sleeping, appetite) were assessed at 2-3 (HV1) and 6-8 (HV2) weeks post-delivery. Independent samples t-test and Mann-Whitney U test were used to compare groups, as appropriate.

Results:

Change in weight z-score (HV2-HV1), was significantly ($p=0.01$) higher in the intervention group (0.772 ± 0.658) compared to the control group (0.372 ± 0.609). This might be mediated by the significantly ($p=0.02$) shorter crying duration in the intervention group [5.0 mins, 0.0-120.0] vs control group [30.0 mins, 15.0-142.5]. No significant differences in other measures were found.

Conclusions:

The findings demonstrate that a simple relaxation intervention could be beneficial in promoting growth of late preterm and early term infants. Reduced infant energy expenditure on crying is one potential mediator; further analyses of other potential biological and behavioural mediators are under investigation.

O025 / #233

Oral Presentations
ORAL PRESENTATIONS SESSION 03: INFANCY II
08-26-2021 11:00 - 12:00

NUTRITIONAL STATUS ASSESSMENT AND INTERVENTION WITH A RED PALM OIL BISCUIT ON THE NUTRITIONAL STATUS OF PRESCHOOL CHILDREN ATTENDING INFORMAL CRECHES, EASTERN CAPE, SOUTH AFRICA.

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Background and Aims:

The study aimed to determine the status of blood carotenoid, vitamin E, inflammatory markers and omega-3 fatty acids and the concomitant effect of a red palm oil (RPO) biscuit on these parameters in children attending crèches in the Eastern Cape, South Africa.

Methods:

Forty-seven (n=47) children were randomly assigned to a RPO (n=25) and non-RPO (n=22) group. The RPO group received biscuits providing carotenoids, and vitamin E while the non-RPO group biscuits provided only vitamin E. Biscuits were distributed daily during the school week. Blood samples were obtained at baseline, 3 months and 6 months during the feeding intervention and 6 months post intervention (month 12).

Results:

At baseline, vitamin A deficiency was moderate (10%), with severe vitamin E deficiency (69%) while 98% presented with omega-3 indexes below 8%. Significant increases ($p \leq 0.05$) in α-tocopherol levels were observed in both groups at 3, 6 and 12 months. Deficiency levels declined to 10% and 0% at 6 and 12 months, respectively. In group A, plasma α-carotene levels ($p \leq 0.05$) increased significantly from baseline (0.04 µmol/L; CI: 0.03 – 0.06) at 3 (0.36 µmol/L; CI: 0.29 – 0.45) and 6 months (0.48 µmol/L; CI: 0.39 – 0.60). Similar significant ($p \leq 0.05$) results were observed for plasma β-carotene levels (3 months (0.31 µmol/L; CI: 0.27 – 0.40) and 6 months (0.33 µmol/L; CI: 0.28 – 0.40).

Conclusions:

Consumption of the RPO biscuit played a significant role in alleviating vitamin E deficiency and significantly increased plasma α- and β-carotene levels in the children.

O026 / #60

Oral Presentations
ORAL PRESENTATIONS SESSION 03: INFANCY II
08-26-2021 11:00 - 12:00

TERM INFANT FORMULA SUPPLEMENTED WITH A UNIQUE BLEND OF FIVE HUMAN MILK OLIGOSACCHARIDES SUPPORTS INTESTINAL IMMUNITY AND GUT BARRIER FUNCTION

V. Bauer[1], M. Arciszewska[2], M. Tarneva[3], S. Dosev[4], S. Dimitrova[5], O. Nikolova[6], M. Nowak[7], M. Szuflinska-Sidorowicz[8], B. Korczowski[9], R. Karcheva-Beloeva[10], S. Banov[11], B. Cimoszko[12], W. Olechowski[13], I. Tokodi[14], R. Simko[15], A. Krasnow[16], Z. Tengelyi[17], P. Korbal[18], M. Zolnowska[19], A. Bilev[20], G. Vasilopoulos[21], S. Korzynska[22], M. Bosheva[23], I. Laki[24], M. Koleva-Syarova[25], T. Grigorov[26], S. Kraeva[27], É. Kovács[28], R. Markova[29], G. Jasieniak-Pinis[30], K. Fister[31], D. Grathwohl[32], B. Berger[33], N. Sprenger[33], C. Cercamondi[34], T. Stoeva[35]
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Background and Aims:

Human milk oligosaccharides (HMOs) have important and diverse biological functions in early life. Among those, HMOs are proposed to modulate immune cells and promote maturation of intestinal epithelial cells. We evaluated the effects of infant formula containing five HMOs (2'-fucosyllactose, 2',3-di-fucosyllactose, lacto-N-tetraose, 3'-sialyllactose, 6'-sialyllactose) on intestinal immunity and barrier function.

Methods:

In a multicenter study in Europe, healthy infants (7-21 days old) were randomly assigned to a standard cow's milk-based infant formula (Control); the same formula with 1.5 g/L HMOs (Test1); or with 2.5 g/L HMOs (Test2). Breastfed infants (BF) were enrolled as reference. Fecal samples (n~140/formula group;

BF n=63) collected at baseline and 3-month age were analyzed for markers of intestinal immune response (secretory immunoglobulin A (sIgA)), permeability (alpha-1-antitrypsin) and inflammation (calprotectin).

Results:

At 3-month age, LS-geometric mean (95%CI) sIgA in Test1 (12.2 (9.9-15.0) mg/g; p=0.002) and Test2 (11.1 (9.1-13.7) mg/g; p=0.011) were higher than in Control (7.6 (6.2-9.4) mg/g) by 60% and 47%, respectively. Alpha-1-antitrypsin in Test1 (2.1 (1.9-2.4) mg/g; p=0.020) and Test2 (2.0 (1.8-2.3) mg/g; p=0.005) were lower than in Control (2.5 (2.3-2.8) mg/g) and similar as in BF. Calprotectin tended to be lower in Test1 vs Control (p=0.074) while the levels in both Test1 and Test2 appeared to move closer to BF as compared with the Control. Levels of all three fecal markers were not significantly different between Test1 and Test2.

Conclusions:

Infant formula supplemented with a unique blend of five HMOs supports the development of the intestinal immune system and a healthy gut barrier.

O027 / #61

Oral Presentations
ORAL PRESENTATIONS SESSION 03: INFANCY II
08-26-2021 11:00 - 12:00

SUPPLEMENTATION OF TERM INFANT FORMULA WITH A UNIQUE BLEND OF FIVE HUMAN MILK OLIGOSACCHARIDES SHAPES THE GUT MICROBIOME CLOSER TO THAT OF BREASTFED INFANTS

V. Bauer[1], M. Arciszewska[2], M. Tarneva[3], S. Dosev[4], S. Dimitrova[5], O. Nikolova[6], M. Nowak[7], M. Szuflinska-Sidorowicz[8], B. Korczowski[9], R. Karcheva-Beloeva[10], S. Banov[11], B. Cimoszko[12], W. Olechowski[13], I. Tokodi[14], R. Simko[15], A. Krasnow[16], Z. Tengelyi[17], P. Korbal[18], M. Zolnowska[19], A. Bilev[20], G. Vasilopoulos[21], S. Korzynska[22], M. Bosheva[23], I. Laki[24], M. Koleva-Syarova[25], T. Grigorov[26], S. Kraeva[27], É. Kovács[28], R. Markova[29], G. Jasieniak-Pinis[30], K. Fister[31], S. Paoli[32], B. Berger[33], N. Sprenger[33], C. Cercamondi[34], T. Stoeva[35]
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Background and Aims:

Human milk oligosaccharides (HMOs) support the development of a balanced intestinal microbiome. We assessed the gut microbiome modulating effects of infant formula supplemented with five HMOs (2'-fucosyllactose, 2',3-di-fucosyllactose, lacto-N-tetraose, 3'-sialyllactose, 6'-sialyllactose).

Methods:

In a multicenter European sturdy, healthy infants (7-21 days old) were randomly assigned to a standard cow's milk-based infant formula (Control); the same formula with 1.5 g/L HMOs (Test1); or with 2.5 g/L

HMOs (Test2). Breastfed infants (BF) were enrolled as reference. Fecal samples (n~140/formula group; BF n=63) collected at baseline and 3-month age were analyzed for microbiota (via shotgun metagenomics), pH and organic acids.

Results:

At 3-month age, overall gut microbiota composition differed in Test1 ($p=0.004$) and Test2 ($p=0.006$) vs. Control and approached BF. Several major bacteria taxa (Bifidobacteria, Streptococcus, Lactobacillus, Clostridia, Peptostreptococcaceae) in Test1 and/or Test2 were significantly different from Control ($p<0.05$) and approaching BF. Relative abundance of Bifidobacterium longum ssp. infantis was >50% higher in Test1 ($p<0.001$) and Test2 ($p=0.029$) vs. Control and similar to BF. In Test1 and Test2 vs. Control, ~50% less infants had toxigenic Clostridioides difficile ($p=0.070$) and relative abundance was lower ($p=0.042$) while BF had none. Abundance of the opportunistic pathogen Enterococcus faecalis was also lower in Test groups vs. Control ($p<0.001$) and similar as in BF. Test groups (vs. Control) had lower fecal pH ($p<0.001$) and an organic acid profile approaching BF.

Conclusions:

Infant formula containing five HMOs decreases fecal pathogenic bacteria and shapes the gut microbiome closer to that of breastfed infants, leading to a more desired gut environment.

O028 / #327

Oral Presentations
ORAL PRESENTATIONS SESSION 03: INFANCY II
08-26-2021 11:00 - 12:00

A NEW PARTIALLY HYDROLYZED WHEY-BASED FOLLOW-UP FORMULA WITH AGE-ADAPTED PROTEIN CONTENT SUPPORTS HEALTHY GROWTH DURING THE FIRST YEAR OF LIFE

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Background and Aims:

Excess protein intake in early life may have a negative impact on long term health. This open-label interventional study evaluated the effect of a new partially hydrolyzed whey-based (pHF-W) follow-up formula (FUF) with age-adapted protein content on growth and protein biomarkers in healthy infants.

Methods:

Formula-fed (FF) infants were fed standard pHF-W starter formula (NAN HA1; 1.9g protein/100kcal) from enrollment (age≤30 days [d]) to 120d, followed by new pHF-W FUF (1.6g protein/100kcal) from age 120d to 360d (n=82). Breastfed infants (BF; n=75) served as a reference group. Primary outcome was weight gain velocity up to age 180d (reported separately). Here, we report growth z-scores from 120d to 360d vs. the WHO median (WHO-M) and BF. Protein biomarkers were assessed in FF infants at 180d.

Results:

Weight-for-age, length-for-age, and weight-for-length z-scores of FF infants were not significantly different from BF or WHO-M at any assessment timepoint (LS mean differences ranged from –0.15 to 0.19 vs. WHO-M and –0.02 to 0.24 vs. BF; upper & lower bounds of 95% CIs of mean differences were all within ±0.5SD). Head circumference-for-age z-scores were significantly higher in FF vs. WHO-M at all timepoints (differences ranged from 0.34 to 0.51), but not different from BF. Most FF infants had normal protein biomarker and amino acid concentrations at age 180d (Table).

Table. Protein biomarker and amino acid concentrations in formula-fed infants at age 180d

Parameter	n	Mean ± SD	Median	Min – Max
Biomarkers				
Albumin (g/L)	62	41.2 ± 3.6	41.4	20.6 – 46.3
Blood urea nitrogen (mmol/L)	62	2.4 ± 0.8	2.3	0.9 – 4.7
Prealbumin (g/L)	62	0.16 ± 0.03	0.16	0.10 – 0.30
Amino acids (µmol/L)				
Histidine	30	110.7 ± 21.4	110.4	71.3 – 144.4
Isoleucine	30	102.6 ± 29.0	103.6	60.2 – 169.5
Leucine	30	159.9 ± 39.7	162.3	97.1 – 238.1
Lysine	30	244.7 ± 58.3	239.0	138.3 – 356.5
Methionine	30	49.5 ± 15.6	45.6	28.9 – 83.8
Phenylalanine	30	99.5 ± 17.7	102.6	62.2 – 126.6
Threonine	30	186.9 ± 52.5	173.0	107.0 – 316.4
Tryptophan	30	234.0 ± 42.4	239.6	162.1 – 307.5
Valine	30	235.6 ± 72.5	222.7	133.9 – 445.9
Arginine	30	139.0 ± 32.7	131.2	87.1 – 228.4
Citrulline	30	29.1 ± 11.7	24.4	12.0 – 55.8

Conclusions:

The new pHF-W FUF with age-adapted protein content, fed sequentially after standard pHF-W starter formula, supports adequate protein and amino acid intake and promotes a healthy growth pattern consistent with WHO standards over the first year of life.

O029 / #268

Oral Presentations
ORAL PRESENTATIONS SESSION 03: INFANCY II
08-26-2021 11:00 - 12:00

PROBIOTICS IN INFANCY: NEEDS, RECOMMENDATIONS, AND PRACTICAL GUIDELINES FOR HEALTHCARE SETTINGS CANADIAN EXPERIENCE WITH THE CLINICAL GUIDE TO PROBIOTIC PRODUCTS

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Background and Aims:

Probiotic use is widespread and growing, especially when using probiotics to treat common ailments in the pediatric population. However, it is often difficult for healthcare providers to provide clear and evidence-based recommendations to their patients. Research has shown for the best results, the probiotic intervention must be strain-specific as well as disease-specific. AIMS: - outline the need for precise, evidence-based probiotic recommendations with strain-specificity

- describe the practical applications of probiotics in infancy and childhood diseases

- bring awareness to the Clinical Guide to Probiotic Products Available in Canada

Methods:

An annual review process of evidence for particular probiotic strains or combinations of strains for use in specific diseases. This review of published evidence is based on inclusion criteria and weight of evidence and evaluated by a team of expert reviewers.

Results:

There is strong evidence to support the use of probiotics for pediatric indications, however, strain specificity is essential. The findings are presented in chart format on various print and digital platforms in the Clinical Guide to Probiotic Products.

Conclusions:

Healthcare providers should consider only select probiotics in the pediatric population, specifying the particular strain needed. Lack of clinical guidelines for recommending probiotics for use in pediatric patients is why the Clinical Guide to Probiotic Products project started in 2008. We aim to close the gap between research and clinical practice. We plan to continue this initiative with annual updates and make the results easily accessible to clinical end-users in the format of a mobile app, interactive website, as well as print format.

O030 / #180

Oral Presentations
ORAL PRESENTATIONS SESSION 03: INFANCY II
08-26-2021 11:00 - 12:00

INFANT WEIGHT TRAJECTORIES FROM BIRTH TO 12 MONTHS AND RISKS OF CORONARY HEART DISEASE IN ADULTHOOD

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Background and Aims:

Rapid infant weight gain is associated with childhood obesity, yet, associations with coronary heart disease (CHD) are unknown. The aim was to investigate associations between infant weight trajectories and risks of CHD.

Methods:

We followed 3,645 Danish individuals born 1959-61 with information on weight at birth, and at 2 weeks, 1, 2, 3, 4, 6 or 12 months. Growth trajectories were modeled using latent class modelling. Cases of CHD were identified in national registers (n=279). Hazard ratios (HR) and confidence intervals (CI) were estimated by Cox regression with adjustment for 1) sex, 2) maternal factors, and 3) preterm birth.

Results:

We identified five weight trajectories from birth to 12 months: Stable-very-low (11.5%), Low-to-high (13.9%); Low-to-normal (32.4%); Average (29.8%); Stable-high (12.4%). Compared to the stable-very-low weight trajectory, having an average trajectory was associated with reduced risks of CHD in adulthood (HR=0.64; 95%CI 0.43-0.96). This reduced risk remained after adjustment for maternal factors (HR=0.65; 95%CI 0.43-0.98), but it was slightly attenuated after additional adjustment for preterm birth (HR=0.68; 95%CI 0.44-1.04). We found limited indications of associations between the other three trajectories and CHD risk compared with reference group of the stable-very-low trajectory.

Conclusions:

These results suggest that a pattern of average weight during infancy may have long-term beneficial effects for the risk of CHD at adult ages even when accounting for maternal and birth characteristics. These results should be confirmed in larger studies.

Funding: The Danish Heart Foundation

O031 / #280

Oral Presentations
ORAL PRESENTATIONS SESSION 04: CHILDHOOD & ADOLESCENCE I
08-26-2021 12:00 - 13:00

EATING BEHAVIORS DURING THE COVID-19 PANDEMIC: A CLOSER LOOK AT ADOLESCENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER

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Background and Aims:

Eating-related problems may develop during the COVID-19 pandemic as a result of coping strategies. Adolescents with attention-deficit/hyperactivity disorder (ADHD) are at risk, since obesity has been pointed out as a possible comorbidity of ADHD and weight loss is a frequent parental concern regarding treatment with psychostimulants.

Aims: 1) to assess Body Mass Index (BMI)-for-age at one-year of pandemic, in adolescents with ADHD and "normal weight" at the beginning of the pandemic in our country (March 2020); 2) to study the relationship between eating behaviors and Δ BMI z-score values (from March 2020 to March 2021).

Methods:

Adolescents aged 10–17 years, with ADHD and BMI-for-age classified as "normal weight" (5th percentile to less than the 85th percentile, CDC) on March 2020, were included. Child Eating Behavior Questionnaire (CEBQ) was used to collect data.

Results:

Fifty-nine patients included, 41 (69.5%) males, mean age 13±2,02 years. At one-year, five (8.6%) were "underweight", 42 (72.4%) maintained "normal weight", 11 (19%) were "overweight". Mean BMI z-scores were +0,04±0,72 in March 2020 and +0,12±1,01 at one-year (p=0,313). Significant positive correlations were obtained between Δ BMI z-score values and the following subscales: "enjoyment of food" (ρ=0,439; p<0,001), "food responsiveness" (ρ=0,334; p=0,01) and "emotional over-eating" (ρ=0,273; p=0,038). There was also a significant negative correlation with satiety responsiveness (ρ=–0,279; p=0,034).

Conclusions:

Enjoyment of food, self-regulation of energy intake and over-eating due to negative emotions were the main determinants of weight status during the first year of pandemic. Anthropometric measurements of adolescents with ADHD should be carefully monitored on the following years.

O032 / #188

Oral Presentations
ORAL PRESENTATIONS SESSION 04: CHILDHOOD & ADOLESCENCE I
08-26-2021 12:00 - 13:00

THE EFFECT OF WHEY AND SOY PROTEIN BASED DIETS ON THE EFFICIENCY OF LINEAR GROWTH

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Background and Aims:

The most effective environmental factor that affect longitudinal growth is nutrition, but the exact composition and the relative benefits of specific dietary proteins in supporting linear growth is unknown. The aim of this study was to check if the identity of dietary proteins affects the efficiency of linear growth.

Methods:

Young male Sprague Dawley rats fed ad libitum with either Whey (animal source) or Soy (vegetarian) based diets, matched for calories, macro- and micro-nutrients were followed for 11, 24 or 74 days. At sacrifice, humeri length and growth plate (GP) height and organization were measured.

Results:

In short-term experiments, the soy fed group consumed more food, and were heavier with longer humeri, while the EGP height was greater in the whey group. Interestingly, the effect on weight and humeri length after 74 days was diminished; however, the EGP height of the whey fed group was still greater and was better organized.

Conclusions:

The higher and better organized EGP in the whey group suggests a better growth potential with whey-based diets compared to the soy based diet, although in both cases the protein contains all amino acids required.

Studying the interaction between skeletal growth and nutritional factors may lead to the establishment of better nutritional and therapeutic regimens for more effective linear growth in children with malnutrition and growth abnormalities.

O033 / #119

Oral Presentations
ORAL PRESENTATIONS SESSION 04: CHILDHOOD & ADOLESCENCE I
08-26-2021 12:00 - 13:00

EARLY PREGNANCY AND NEONATAL CIRCULATING FOLATE, VITAMIN B12 AND HOMOCYSTEINE CONCENTRATIONS AND CARDIOMETABOLIC RISK FACTORS IN CHILDREN AT 10 YEARS OF AGE

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Background and Aims:

Folate, vitamin B12 (B12) and homocysteine concentrations during pregnancy seem to be associated with fetal development and may also be associated with cardiometabolic health. We examined associations of folate, B12 and homocysteine concentrations during fetal life with cardiometabolic outcomes in childhood.

Methods:

This study was embedded in the Generation R Study, a population-based prospective cohort study. We sampled blood in pregnancy and cord blood and measured cardiometabolic outcomes at school-age. Among 4449 children aged ten, we examined associations of folate, B12 and homocysteine concentrations with body mass index (BMI), body fat distribution, heart rate, blood pressure, and insulin, glucose and lipid concentrations. We also examined the associations of these micronutrients with risks of overweight/obesity and clustering of cardiovascular risk factors.

Results:

One standard deviation score (SDS) higher maternal folate concentrations was associated with lower BMI (-0.04 SDS; 95% CI: -0.08, -0.01), android-to-gynoid fat ratio (-0.04 SDS; 95% CI: -0.07, -0.01), systolic blood pressure (-0.06 SDS; 95% CI: -0.10, -0.03), risk of overweight (OR: 0.87; 95% CI: 0.78, 0.96) and clustering of cardiovascular risk factors (OR: 0.79; 95% CI: 0.68, 0.91). One SDS higher maternal total B12 concentrations was associated with lower glucose (-0.06 SDS; 95% CI: -0.10, -0.02) and higher high-density lipoprotein (HDL)-cholesterol concentrations (0.04 SDS; 95% CI: 0.00, 0.08). Cord blood folate, B12 and homocysteine concentrations were not consistently associated with cardiometabolic outcomes.

Conclusions:

Differences in folate and B12 concentrations in pregnancy may be associated with child cardiometabolic health at age ten. The causality and mechanisms underlying these associations need further study.

O034 / #207

Oral Presentations
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ANTHROPOMETRY AT DISCHARGE AND RISK OF RELAPSE IN CHILDREN TREATED FOR SEVERE ACUTE MALNUTRITION: A PROSPECTIVE COHORT STUDY IN RURAL NEPAL

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Background and Aims:

There is a dearth of evidence on what should be the optimal criteria for discharging children from severe acute malnutrition (SAM) treatment. Programs discharging children while they are still presenting varying levels of weight-for-height (WHZ) or mid-upper-arm circumference (MUAC) deficits, such as those implemented under the current national protocol in Nepal, are opportunities to fill this evidence gap.

Methods:

We followed a cohort of children discharged as cured from SAM treatment in Parasi district, Nepal. Relapse as SAM, defined as the occurrence of WHZ<-3 or MUAC<115 mm or nutritional edema, was investigated through repeated home visits, during six months after discharge. We assessed the contribution of remaining anthropometric deficits at discharge to relapse risk through Cox regressions.

Results:

Relapse as SAM during follow-up was observed in 33% of the cohort (35/108).Among all anthropometric indicators at discharge, WHZ<-2 led to a three-fold increase in relapse risk (HR=3.2; p=0.003), while MUAC<125 mm significantly raised it only in the older children. WHZ<-2 at discharge came up as the only significant predictor of relapse in multivariate analysis (HR=2.8, p=0.01), even among children with a MUAC≥125 mm.

Conclusions:

Our results suggest that the priority for SAM management programs should be to ensure that children reach a high level of WHZ at discharge. The validity of using a single MUAC cut-off such as 125 mm as a suitable discharge criterion for all age groups is questioned. Further follow-up studies are required to assess programs currently discounting or omitting WHZ for identification and management of SAM.

O035 / #295

Oral Presentations
ORAL PRESENTATIONS SESSION 04: CHILDHOOD & ADOLESCENCE I
08-26-2021 12:00 - 13:00

DIET QUALITY DURING PREGNANCY AND CHILD BRAIN VOLUMES: A PROSPECTIVE POPULATION-BASED STUDY

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Background and Aims:

Maternal dietary patterns during pregnancy have been associated with neurodevelopmental disorders and cognitive performance in children. However, little is known about the underlying neurobiological mechanisms. We aimed to examine associations of maternal diet quality during pregnancy with pre-adolescent brain morphology in a population-based cohort.

Methods:

We included 2278 mother-child dyads from Generation R, a population-based cohort in the Netherlands. Dietary intake during pregnancy was assessed with a 293-item food-frequency questionnaire and diet quality scores were calculated including 15 food components (total scores ranging from 0-15), reflecting adherence to national dietary guidelines. Child structural brain scans were collected using MRI at the age of 10 years. Brain measures were extracted using FreeSurfer.

Results:

After adjustment for child age, gender, socioeconomic factors, maternal prepregnancy BMI, smoking during pregnancy, and psychopathological symptoms in multiple regression models, we found that mothers' higher diet quality was associated with a larger total brain volume of children at age 10 years (B = 3.98, 95%CI:1.27, 6.68). Furthermore, this association was independent of children's diet quality at 8 years (B = 3.47, 95%CI: 0.70, 6.24). Likewise, higher diet quality was associated with larger cerebral white and gray matter volumes, however, these associations did not remain after accounting for the total brain volume.

Conclusions:

Our findings from a large population-based setting suggest long-term global effects of diet quality during pregnancy on child brain structural alterations. These findings indicate the importance of dietary intake

during pregnancy for children's brain development, which calls for more research and prevention strategies on overall diet during pregnancy.

O036 / #139

Oral Presentations
ORAL PRESENTATIONS SESSION 04: CHILDHOOD & ADOLESCENCE I
08-26-2021 12:00 - 13:00

IMPACT OF THE USE OF ANASTROZOLE IN PREDICTED FINAL HEIGHT OF MALE ADOLESCENTS: A RETROSPECTIVE COHORT.

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Background and Aims:

The aim of this study was to evaluate the prediction of final height (PFH) after using anastrozole (ANZ) alone or in association with Growth Hormone (GH).

Methods:

The data were obtained from medical records in a pediatric endocrinology service. A sample of 75 male patients, between 11 and 18 years old, presenting PFH below the family target height (TH) with regular use of ANZ has been for at least 12 months.

Results:

Among the adolescents, 29 used it regularly for 1 year, 30 used it for 2 years and 16 used it for 3 years of treatment. 57 boys used ANZ+GH, against 18 ANZ as isolated therapy. The correlation between TH, PFH at 1,2, and 3 years of treatment and NFH demonstrated $p < 0.001$, regardless of the use or not of GH. Regarding the initial PFH, in those who did not use GH, there was an average increase of 5.73 cm, 7.60 cm, and 7.15 cm in predicted height after 1, 2, and 3 years of ANZ respectively, and 2.67 cm when compared to NFH. In the ANZ+GH group, this increase was 6.82 cm, 10.27 cm, 7.44 cm, and 6.26 cm respectively. The outcome of increment in final height was 0.82 cm in the ANZ group and 5.55 cm in the ANZ+GH group. The total group of adolescents who reached NFH exceeded TH by 1.22 cm.

Conclusions:

Anastrozole was safe and effective in improving the PFH and NFH in boys with poor height prediction, either as monotherapy or in combination with growth hormone.

O037 / #308

Oral Presentations
ORAL PRESENTATIONS SESSION 04: CHILDHOOD & ADOLESCENCE I
08-26-2021 12:00 - 13:00

THE SAHARAN TOOLBOX: A COMPREHENSIVE ASSESSMENT OF SCHOOL-AGE CHILDREN'S GROWTH, COGNITIVE AND PHYSICAL FUNCTION IN RURAL ZIMBABWE

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Background and Aims:

Health, growth and development in mid-childhood is poorly characterised. We developed the School-Age Health, Activity, Resilience, Anthropometry and Neurocognitive (SAHARAN) toolbox to simultaneously measure school-age growth, body composition, cognitive and physical function in rural Zimbabwe.

Methods:

Physical function was assessed by handgrip strength, broad jump and shuttle run test to provide a standardized score. Cognitive function was evaluated using the Kaufmann Assessment Battery for Children, with additional tools measuring executive function, literacy, numeracy and fine motor skills. Socioemotional function was assessed using a direct child questionnaire and the caregiver-reported Strengths and Difficulties Questionnaire. Growth was assessed by anthropometry, body composition (using bioimpedance analysis) and skinfold thicknesses. A detailed caregiver questionnaire measured demographics, socioeconomic status, nurturing, child discipline and food and water insecurity.

Results:

80 rural Zimbabwean children aged 7-8 years were assessed. Physical function scores were highly associated with unit rises in HAZ (1.29, 95%CI 0.75,1.82, p<0.001) and Lean Mass Index (0.50, 95% CI 0.16,0.83, p=0.004). By contrast, there was a negative trend of increasing skinfold thickness with total physical function (-0.07, 95%CI -0.19,0.04, p=0.16). Cognition measurements demonstrated internal consistency but were not associated with growth or body composition. No child outcomes were associated with socioeconomic status, nurturing, discipline, food and water insecurity, or household adversity.

Conclusions:

The SAHARAN toolbox identified clear associations between growth, lean mass and physical function, but not cognitive function, in a cohort of Zimbabwean children. It holistically characterises school-age growth, development and function and may be applicable to other settings in sub-Saharan Africa.

O038 / #210

Oral Presentations
ORAL PRESENTATIONS SESSION 04: CHILDHOOD & ADOLESCENCE I
08-26-2021 12:00 - 13:00

DIETARY PATTERNS IN EARLY CHILDHOOD AND THE DEVELOPMENT OF CHILDHOOD OVERWEIGHT: THE GECKO DRENTHE BIRTH COHORT

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Background and Aims:

Limited and inconsistent evidence exists on the associations of dietary patterns and overweight during childhood. The present study describes dietary patterns among 3-year-old Dutch children and the associations with childhood overweight and body mass index (BMI) development between 3 and 10 years.

Methods:

In the GECKO Drenthe birth cohort (N=1306), body height and weight were measured by trained nurses around the ages 3,4,5 and 10 years. Diet was measured at age 3y through a validated food frequency questionnaire (FFQ). Principal components analysis (PCA) was used to derive dietary patterns. Using logistic regression analyses, pattern scores were related to overweight at ages 3 and 10 years. A linear mixed-effects model was used to estimate BMI-sds development between 3-10 years according to quartiles of adherence to the pattern scores.

Results:

Two dietary patterns were identified: 1)'minimally processed foods' pattern, characterized by a high intake of vegetables, sauces and savory dishes; and 2)'ultra-processed foods' pattern, indicating a high intake of white bread, crisps and sugary drinks. A 1 SD increase in 'ultra-processed foods' pattern score increased the odds of overweight at 10y (adjusted OR1.30; 95%CI:1.08,1.57;p=0.006). The 'minimally processed foods' pattern was not associated with overweight. Although a high adherence to both the 'minimally processed' and 'ultra-processed foods' patterns was associated with a higher BMI-sds up to 10y, a stronger association for the 'ultra-processed foods' pattern was observed (p<0.001).

Conclusions:

A dietary pattern high in energy-dense and low-fibre ultra-processed foods at 3 years is associated with overweight and high BMI-sds later in childhood.

O039 / #320

Oral Presentations
ORAL PRESENTATIONS SESSION 04: CHILDHOOD & ADOLESCENCE I
08-26-2021 12:00 - 13:00

EXPLORING MALNUTRITION IN PAKISTANI ADOLESCENTS LIVING IN SLUMS THROUGH PHOTO-DIARY AND INTERVIEWS

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Background and Aims:

Around 30% of the urban population of Southern Asia lives in a slum setting. People living in slums lack basic necessities like sanitation, education, employment, infrastructure and are more exposed to health problems. Children living in slums are at high risk of malnutrition. However, there is limited knowledge of adolescents living in slums. This research project aims to explore awareness of malnutrition as well as examine malnutrition risk factors among adolescents living in a slum in Karachi, Pakistan.

Methods:

This is a qualitative, exploratory study based on photo-diary and semi-structured interviews with 14 schooled adolescents. The qualitative approach will help us to explore awareness, attitudes, and experiences of adolescents towards malnutrition (under and over-nutrition). A polaroid camera, scrapbook, and stationaries will be provided to the participants (April 2021). Participants are expected to take photos of anything related to malnutrition and paste these pictures into the diary along with a written note explaining the content of the picture. Participants will have up to 2 weeks to produce their photo-diary. After the photo-diaries have been collected, scanned and returned to participants, the research assistant (SKSZ) will conduct semi-structured interviews focused on the concept and perspectives of malnutrition and how it affects the participants as well as the content of the photo-diaries.

Results:

This study will make a unique contribution to the evidence on adolescents living in slums by using photo-diaries to understand malnutrition and its potential causes.

Conclusions:

It will also inform interventions to improve health and nutrition outcomes in adolescents living in slums.

O040 / #53

Oral Presentations
ORAL PRESENTATIONS SESSION 05: CHILDHOOD & ADOLESCENCE II
08-26-2021 13:00 - 14:00

THE EFFECT OF MULTI-NUTRIENT FORTIFIED DAIRY-BASED DRINK ON GROWTH AND MICRONUTRIENT STATUS IN MALNOURISHED NIGERIAN TODDLERS: A DOSE-RESPONSE STUDY

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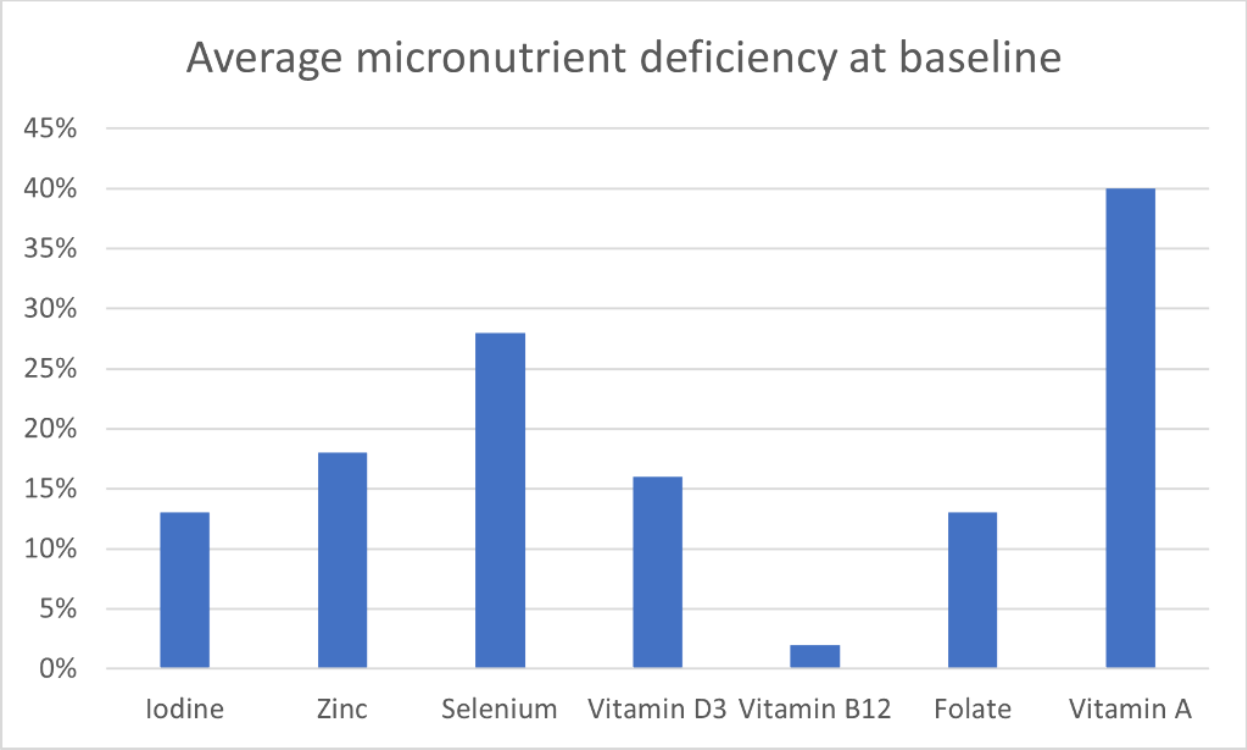
Background and Aims:

In Nigeria, malnutrition is a major problem, resulting in a high prevalence of stunting, underweight, and micronutrient deficiencies. This study investigated the effect of a multi-nutrient fortified dairy-based drink on growth and micronutrient status in malnourished Nigerian toddlers.

Methods:



A multi-nutrient-fortified dairy-based drink was provided (200, 400, or 600 ml) daily for 6 months to healthy Nigerian toddlers (n=184, 1-3 years), having mild to moderate acute malnutrition (HAZ and/or WAZ <-1 SD and > -3 SD). At baseline and endline, body weight, height, waist, and head circumference

and corresponding Z-scores were measured and calculated. Venous blood and urine samples were collected to determine micronutrient status. Dietary intake was recorded using 24h recalls.

Results:

Weight-for-age, weight-for-height, and BMI-for-age Z-scores improved in all groups, without differences between the groups. Only the 600 ml group showed significant improvement in height-for-age Z-score. At baseline, the prevalence of micronutrient deficiencies in this population was lower than expected. Baseline micronutrient deficiencies are shown in the Figure below. Consumption of 600 ml resulted in a higher 25OHD status compared to 200 ml. No differences between groups were found for iodine, zinc, vitamin B12, folate, vitamin A, and selenium at the endline. Compared to baseline, consumption of 600 ml increased vitamin A and selenium status. Both the 400 and 600 ml intervention improved 25OHD status in time.

Conclusions:

Daily consumption of a multi-nutrient fortified dairy-based drink improved weight (200-600 ml), height (600 ml only), 25OHD, vitamin A, and selenium (400 and 600 ml).

O041 / #144

Oral Presentations
ORAL PRESENTATIONS SESSION 05: CHILDHOOD & ADOLESCENCE II
08-26-2021 13:00 - 14:00

A NEW GROWING-UP MILK CONTAINING BOVINE MILK-DERIVED OLIGOSACCHARIDES AND MILK FAT PROMOTES DIGESTIVE COMFORT AMONG HEALTHY TODDLERS IN CHINA

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Background and Aims:

Effects of bovine milk-derived oligosaccharides (MOS)-supplemented formulas on stool characteristics and gut health among young infants have been previously reported. This open-label prospective study aimed to evaluate the effectiveness of a new growing-up milk (nGUM) containing MOS and milk fat (with a naturally high content of sn-2 palmitate) on gastrointestinal (GI) comfort and individual GI symptoms.

Methods:

Healthy toddlers 12-36 months old (n=98) were enrolled from a major metropolitan area in China to receive nGUM for 28 days. Changes in parent-reported digestive comfort (via the gut comfort composite score, GCCS) and individual GI symptoms on day 14 from baseline were assessed using the toddler gut comfort questionnaire. The GI outcomes were compared to those from an observational, age- and sex-matched cohort of toddlers (n=120) enrolled in a separate 14-day real-world effectiveness study in China where they received a variety of conventional milks, predominantly GUMs (cGUM) as part of their habitual diet (Meng 2019).

Results:

While the GCCS decreased in both groups from baseline to day 14, the reduction was significantly greater in nGUM vs. cGUM group (p=0.008, Table). In addition, parents reported significantly less stooling issues (p=0.003), constipation (p=0.047) and diarrhea (p=0.014) in those drinking nGUM vs. cGUM, while differences in other GI symptoms including gassiness, abdominal pain and bloating did not

differ significantly between the two groups.

Table: Overall digestive comfort and individual GI symptoms among toddlers

		nGUM group		cGUM group	Treatment effect[1] [cGUM-nGUM]	
	n	mean±SD	n	mean±SD	(95% CI)	P-value
Gut comfort composite score (range 10-60, lower scores indicating less GI distress)						
Day 14 – Baseline	98	-2.22±4.52	120	-0.91±3.70	1.31 (0.21, 2.41)	**0.008**
Individual GI symptoms (range 1-6 for each symptom)						
		nGUM group		cGUM group	Treatment effect[1] [cGUM-nGUM]	
Day14 – Baseline		mean±SD	n	mean±SD	(95% CI)	P-value
Did your child have stooling issues?	98	-0.44±1.14	120	-0.07±0.70	0.37 (0.62, 0.12)	**0.003**
Did your child have constipation?	98	-0.28±1.07	120	-0.03±0.67	0.25 (0.48 0.01)	**0.047**
Did your child have diarrhea?	98	-0.40±1.05	120	-0.06±0.56	0.34 (0.56, 0.12)	**0.014**
Did your child experience gassiness?	98	-0.23±0.75	120	-0.13±0.67	0.11 (0.30, -0.09)	0.134
Did your child have abdominal pain?	98	-0.15±0.83	120	0.01±0.49	0.16 (0.33, -0.02)	0.258
Did your child feel bloated?	98	-0.14±0.68	120	-0.05±0.50	0.09 (0.25, -0.07)	0.22

[1]Treatment differences derived from Mann Whitney U Test

Conclusions:

Consumption of new GUM containing MOS and milk fat (vs. other GUMs and conventional milks) was shown to promote overall digestive comfort and alleviate several GI symptoms among Chinese toddlers.

O042 / #168

Oral Presentations
ORAL PRESENTATIONS SESSION 05: CHILDHOOD & ADOLESCENCE II
08-26-2021 13:00 - 14:00

EFFECT OF WALNUTS ON BRAIN DEVELOPMENT IN HEALTHY ADOLESCENTS: A MULTISCHOOL RANDOMIZED CONTROLLED TRIAL

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Background and Aims:

While there is accruing evidence on neuropsychological improvements in the young developing brain associated with omega-3 PUFA intake, few studies have examined whether consuming walnuts during adolescence entails similar beneficial effects. There is a need to further explore the ways in which walnuts influence youth brain function, particularly on the long-term.

Methods:

We conducted a 6-month population-based randomized controlled trial in teenagers (n=750) and determine the effectiveness of the intervention (30 kernel g, ~1.5g of ALA) in enhancing brain neuropsychological and socio-emotional development compared to a control group with no walnut intervention. Before randomization, different neuropsychological tests were recorded for all participants, and blood samples (in a subsample of participants) were collected to measure omega-3 PUFA levels at baseline, and all again, after randomization and the intervention. We conducted linear regression models to assess the effect of the intervention.

Results:

There were no significant changes detected after six months intervention between the walnut and control groups for all primary endpoints of this study. We found a significant 0.05% (95% confidence interval (0.03%, 0.06%)) higher mean of ALA in the walnut group compared to the control group.

Conclusions:

We found that eating walnuts for 6 months do no have important effects in neurodevelopment in healthy adolescents, but ALA concentrations are slightly higher in adolescents following a walnut diet compared to those in the control group.

O043 / #254

Oral Presentations
ORAL PRESENTATIONS SESSION 05: CHILDHOOD & ADOLESCENCE II
08-26-2021 13:00 - 14:00

RELATIONSHIPS AMONG SUGAR INTAKE, SUGARY DRINK LIKING, AND AVOIDANCE PARENTING PRACTICE IN PARENT-ADOLESCENT DYADS

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Background and Aims:

Dietary intake in families is correlated but effects of food liking are not well studied. Study aims were to determine if interdependence relationships between sugar from sugar-sweetened beverage (SSB) intake and sugary drink liking existed in parent-adolescent dyads and if the relationship between intake and avoidance parenting practice was moderated by sugary drink liking.

Methods:

Dyadic survey data from a cross-sectional, Internet-based study, conducted in 2014 were analyzed. Parents and adolescents (12-17 years) completed demographic, diet and physical activity surveys. Actor-partner interdependence model explanatory variables included: fruit drink liking and soda liking measured separately for actor (self) and partner; parent modeling of junk food and sugary drink avoidance; and 2-way interactions between variables.

Results:

Interdependence effects were present for fruit drink liking with higher liking associated with greater sugar from SSB intake for actor and partner effects. Only actor effects were present for soda liking; higher liking was associated with greater sugar from SSB intake. Stronger actor liking effects were observed for parents' intake while stronger partner liking effect was observed for adolescents' intake. The relationship between sugar from SSB intake and avoidance parenting practice was moderated by all three liking effects. Decreasing intake with increasing avoidance agreement was observed for all liking groups except strongly like.

Conclusions:

: The impact of parents' liking on their own and their adolescents' beverage choices may be stronger than adolescents' liking impact on their parents' choices. Moderation of liking on relationships between sugar intake and avoidance parenting practice deserves further study.

O044 / #87

Oral Presentations
ORAL PRESENTATIONS SESSION 05: CHILDHOOD & ADOLESCENCE II
08-26-2021 13:00 - 14:00

DECREASING CONSUMPTION OF SUGAR-SWEETENED BEVERAGES AND RAISING TAP WATER CONSUMPTION THROUGH INTERVENTIONS BASED ON NUTRITION AND SUSTAINABILITY FOR KIDS (DRINK STUDY): FIRST ASSESSMENT RESULTS

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Background and Aims:

The effectiveness of actions to reduce sugar-sweetened beverage (SB) consumption in children still needs to be improved. Furthermore, the growing concern about sustainable food systems encourages to develop sustainability-focused interventions. The objective of this cluster randomized controlled trial is to evaluate the long-term effectiveness of nutrition- and sustainability-based interventions on the reduction in SB intake and on the increase in tap water consumption in primary grade children.

Methods:

French-speaking Belgian primary schools are randomized using a factorial plan: (i) control; (ii) nutrition-based intervention; (iii) sustainability-based intervention; and (iv) both. The estimated sample size needed is 48 schools, with 3.500 pupils followed-up over two years (3rd-5th grades at the 1st assessment). Interventions (meetings, water breaks, provision of posters, flyers, reusable cups and glass bottles…) will take place from September 2021 to June 2023. Children and schools will be evaluated in Spring 2021, 2022 and 2023. Daily mean beverage consumption will be estimated through a 4-day diary. Questionnaires will be given to children and parents.

Results:

Following the first assessment held in May-June 2021, main characteristics of schools and children included in the trial will be described along with information about participation rate and randomization balance. A focus will be made on SB and water consumption, since they are the first criteria for effectiveness assessment: daily intake, types of beverages, and related behaviours and perception.

Conclusions:

The originality of this three-year project lies in studying the potential interacting effectiveness of interventions including levers in both nutrition and sustainability domains.

O045 / #261

Oral Presentations
ORAL PRESENTATIONS SESSION 05: CHILDHOOD & ADOLESCENCE II
08-26-2021 13:00 - 14:00

EFFECT OF BACKGROUND MUSIC DURING SCHOOL LUNCH ON MASTICATION AND SWALLOWING EDUCATION

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Background and Aims:

Infant Nutrition Survey in 2015 has reported that approximately 30% of children could not masticate and swallow well, and mastication improvement education for children with large individual differences is desired. In this study, we proposed an educational method to improve mastication and swallowing in a group using the original Background Music (BGM) played on the school lunch, and evaluated the educational effect.

Methods:

The experiment of a total of 100 first grade students of elementary school was done in school lunch hour for three weeks. Following three experimental conditions were designed: class A (playing BGM), B (BGM and eating educations by the homeroom teacher), and C (none). The BGM was composed of 10 minutes in length with educational lyrics. The BGM tempo was determined at 120 beats per minute based on the mastication speed (mastication frequency per minute) as the baseline data by measuring the eating situation of targeting the same children in our former study. After the experiment, the masticatory situation was recorded, and the mastication speed was calculated and compared with that before education.

Results:

A significant increase in the mastication speed between before and after was found only in class B ($p<0.05$). The mastication speed of class B was very similar to the BGM tempo. Also, we found that all the children of the bottom 25percentile mastication speed increased significantly ($p<0.05$).

Conclusions:

This study revealed that playing BGM during school lunch with mastication lectures would enhance the mastication speed, and it is especially effective for children with slow mastication speeds.

O046 / #171

Oral Presentations
ORAL PRESENTATIONS SESSION 05: CHILDHOOD & ADOLESCENCE II
08-26-2021 13:00 - 14:00

EFFECT OF VITAMIN-D SUPPLEMENTATION IN CHILDREN WITH MODERATE-SEVERE PERSISTENT ALLERGIC RHINITIS

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Background and Aims:

To compare serum vitamin D level in pediatric cases of persistent moderate-severe allergic rhinitis with healthy children and to assess efficacy of vitamin D supplementation on treatment of allergic rhinitis

Methods:

120 pediatric cases (5 -15 years) of moderate-severe persistent allergic rhinitis selected and their serum 25(OH)D levels were compared with 120 healthy children of same age.symptoms of cases were assessed,recorded and assigned scores.Group A cases were daily vitamin D (800IU) in addition to allergic rhinitis treatment. Group B children was treated for allergic rhinitis only. After four weeks they were assessed in terms of improvements of symptoms and compared. All data was analyzed with help of SPSS 21.

Results:

Among 120 cases of allergic rhinitis Group A 42.5% were Vitamin D deficient, 38.3% were Vitamin D insufficient and19.2%had sufficient serum Vitamin D levels. Among 120 healthy children GroupB there were 30.8% cases of vitamin D deficiency and 32.5% cases of vitamin D insufficiency and 36.7% children had normal serum vitamin D.Group A children receiving additional daily Vitamin D (800IU) had significant improvement in symptoms of allergic rhinitis as compared to the Group B. Symptom of nasal rubbing also alleviated after 04 weeks but the improvement was insignificant (p=0.092).

Conclusions:

Children with persistent moderate-severe allergic rhinitis had significantly lower serum levels vitamin D as compared to healthy children of same age and daily supplementation of vitamin d (800IU) helps alleviating the symptoms of allergic rhinitis in addition to standard therapy of allergic rhinitis.

O047 / #272

Oral Presentations
ORAL PRESENTATIONS SESSION 05: CHILDHOOD & ADOLESCENCE II
08-26-2021 13:00 - 14:00

MICRONUTRIENT INTAKES IN CHILDREN 4-13 YEARS OLD IN IBADAN, NIGERIA

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Background and Aims:

Paucity of adequate data on food and nutrient intakes of school aged children is a barrier to address malnutrition and its associated risks in Nigeria. This study was designed to fill the knowledge gap on nutrient intakes among school-age children in Ibadan, Nigeria.

Methods:

The study included 955 children aged 4-13 years identified using a stratified random sampling design. Information on household socio-demographic characteristics and child anthropometrics were also recorded. Dietary intake data were collected using a multi-pass 24-h dietary recall method; 20% of participants completed a second 24-h recall to estimate usual nutrient intakes. Means and distributions of usual intakes of micronutrients as well as prevalence of inadequacy were estimated.

Results:

Children were divided in two age-groups: 4-8 years (n=510) and 9-13 years (n=434). Compared to dietary recommendations, 99%, 99%, 62%, 74%, 67%, 99% and 97% of 4-8 year old children had inadequate intakes of calcium, copper, iron, folate and vitamins A, D and E, respectively. Mean usual intakes of iron were 9.4 mg/day whereas the EAR for iron in a low-bioavailability diet was set at 11.2 mg/day. Older children 9-13 years of age had higher inadequacies of micronutrients than younger children. Socio-economic status played little role in nutrient inadequacy, as no significant differences were observed across SES categories for either age category.

Conclusions:

This study provides a framework for future public health priorities and nutrition research in Nigeria.

O048 / #13

Oral Presentations
ORAL PRESENTATIONS SESSION 06: OBESITY
08-26-2021 16:00 - 17:00

A CHILD-CENTRED HEALTH DIALOGUE FOR THE PREVENTION OF OBESITY– A RANDOMISED CONTROLLED TRIAL INCLUDING AN ECONOMIC EVALUATION IN CHILD HEALTH SERVICES IN SWEDEN

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Background and Aims:

Prevention of child obesity is an international public health priority. This study aims to evaluate the effects and cost-effectiveness of a child-centred health dialogue within the child health services in Sweden on 4-year old children with overweight.

Methods:

A number of 37 Child Health Centres were randomly assigned to deliver the intervention or usual care. The primary outcome was zBMI-change.

Results:

A total of 475 children (mean age: 4.1 years [SD=0.1]; zBMI: 1.6 [SD=0.3], 54% girls) were included in an intervention group (n=238) and a control group (n=237). After 12 months, the intervention effect on zBMI-change was -0.11, with a 95% confidence interval of -0.24 to 0.01 (p=0.07). Children in the control group increased zBMI with 0.01± 0.50, while children in the intervention group decreased zBMI with 0.08±0.52. From the societal perspective, the incremental cost-effectiveness ratio was 183 Euro per 0.1 zBMI unit prevented and the estimated additional costs of the intervention were 167 Euro per child.

Conclusions:

This low-intensive multicomponent child-centred intervention obesity prevention is cost effective with a decreasing effect on zBMI, however statistically uncertain (p=0.07). The child-centred health dialogue can be implemented universally within the child health services after a one-day training and four tutorial sessions in small groups. Nurses trained in the intervention felt more knowledgeable in child overweight and more competent in the communication method. Futures studies should investigate the impact of socio-economic factors in universally implemented obesity prevention programmes.

O049 / #120

Oral Presentations
ORAL PRESENTATIONS SESSION 06: OBESITY
08-26-2021 16:00 - 17:00

MATERNAL VITAMIN D STATUS DURING PREGNANCY AND RISK OF CHILDHOOD OVERWEIGHT AT 5 YEARS OF AGE

A. Amberntsson[1], L. Bärebring[1], A. Winkvist[1], L. Lissner[1], H.M. Meltzer[2], A.L. Brantsaeter[2], E. Papadopoulou[2], H. Augustin[1]
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Background and Aims:

Low maternal 25-hydroxyvitamin D (25OHD) during pregnancy has been associated with overweight in childhood, but studies are inconclusive. Our objective was to assess the association between maternal 25OHD and risk of childhood overweight at 5 years of age.

Methods:

This study is based on a pooled subset of 3517 mother-child pairs from the Norwegian Mother, Father and Child Cohort Study (MoBa) (N=2654) and the Swedish GraviD study (N=863). Blood was drawn during first half of pregnancy (gestational weeks 10.7-18.5) for analysis of 25OHD. Children´s weights and heights were reported by the parents in MoBa and obtained from medical records in GraviD. Childhood overweight (including obesity) at 5 years of age was defined according to the International Obesity Task Force. We studied the association using logistic regression, adjusted for e.g. maternal BMI and cohort.

Results:

Mean (SD) maternal 25OHD was 56.7 (21.5) nmol/L. Mother's mean age was 30.7 (4.3) years, BMI was 24.0 (4.0) kg/m^2 and 92% of the women were born in Norway or Sweden. The prevalence of childhood overweight was 7.4%. Maternal 25OHD was negatively associated with childhood overweight, with 1% higher odds for every 1 nmol/L decrease in 25OHD (OR 0.99, p=0.015). A maternal 25OHD of <30 nmol/L, 30-49.9 nmol/L and 50-74.9 nmol/L was associated with an OR of childhood overweight at 1.69 (p=0.157), 1.96 (p=0.020) and 1.38 (p=0.239) respectively, compared to 25OHD >75 nmol/L.

Conclusions:

Lower maternal vitamin D status is associated with a higher risk of childhood overweight at 5 years of age.

O050 / #289

Oral Presentations
ORAL PRESENTATIONS SESSION 06: OBESITY
08-26-2021 16:00 - 17:00

CONSUMPTION OF SUGAR-SWEETENED BEVERAGES AND METABOLIC MARKERS IN CHILDREN

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Background and Aims:

Insulin resistance may be linked to development of obesity, especially to visceral fat accumulation. Consumption of Sugar-Sweetened Beverages (SSB) stimulates rapid increases in insulin and may cause insulin resistance, because of decreased insulin sensitivity induced by frequent postprandial hyperglycemia.

This study aims to review the literature on SSB consumption in relation to adverse markers of glucose metabolism in children.

Methods:

Literature searches were conducted in Medline and Embase via Ovid® in June 2020.

From 8.892 titles, abstracts were screened in 76 publications.

This screening resulted in inclusion of 13 publications, while reference screening of the 13 publications resulted in inclusion of an additional 6 publications.

Results:

A total of 11 cross-sectional studies, 2 prospective studies, 5 experimental studies, and 1 Randomized Controlled Trial (RCT) were reviewed. The majority of the reviewed studies reported significant associations between SSB consumption and a broad range of adverse markers of glucose metabolism. Observed associations did not seem to depend on the sample fraction of children with healthy weight or overweight, suggesting that adverse effects of SSB consumption on metabolic health do not seem limited to children with overweight.

Profound heterogeneity in definitions of exposures and outcomes challenged the ability to extract and summarize effect sizes.

Conclusions:

Results suggested that a higher consumption of SSBs is associated with adverse markers of glucose metabolic health among children. The evidence was limited by paucity of prospective studies and RCTs, as well as by a profound heterogeneity in definitions of exposures and outcomes.

O051 / #325

Oral Presentations
ORAL PRESENTATIONS SESSION 06: OBESITY
08-26-2021 16:00 - 17:00

ASSESSMENT OF BODY COMPOSITION IN VERY PRETERM AND TERM-BORN CHILDREN BETWEEN 3 AND 5 YEARS OF AGE USING ADP AND DXA: A COMPARISON BETWEEN TECHNIQUES

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Background and Aims:

Childhood obesity is a global health threat, with long-term consequences. It is important to prevent excess adiposity in childhood and identify children at risk. Tools that determine detailed body composition longitudinally throughout childhood are lacking. We investigated if body composition outcome measured by Air displacement plethysmography(ADP) and Dual-energy-X-ray absorptiometry(DXA) are comparable in a large group of preterm(<30 weeks of gestation) and term born children aged 3-5 years.

Methods:

In 127 healthy term and 42 preterm-born children aged 3-5 years, we determined Fat mass(FM), Fat mass percentage(FM%) and Fat free mass(FFM) by ADP(BODPOD, COSMED) and DXA(Lunar Prodigy), within one hour. Bland-Altman-plots were used to determine if measures were comparable.

Results:

In term-born children, mean differences and limits-of-agreement between ADP and DXA for FM, FM% and FFM were -0.78kg [-2.43 ; 0.87], -4.05% [-13.14 ; 5.04] and 0.60kg [-1.14 : 2.34], resp.In preterm-born children mean differences and limits-of-agreement between ADP and DXA for FM, FM% and FFM were -1.40kg [-3.54 ; 0.73], -7.53% [-18.78 ; 3.72] and 1.17kg [-1.13 ; 3.47]. Differences in all measurements between ADP and DXA were significantly larger in preterm than in term-born children. We found proportional bias for FM% and FFM measurements. Preterm-born children had lower FM and FM% compared to term-born children with both tools.

Conclusions:

In healthy term and very preterm born children aged 3-5 years, results of DXA and ADP for FM, FM% and FFM are not comparable. Differences in measurements are even larger in preterm compared to term-born children.

O052 / #169

Oral Presentations
ORAL PRESENTATIONS SESSION 06: OBESITY
08-26-2021 16:00 - 17:00

METABOLOMICS IN EARLY LIFE AND THE ASSOCIATION WITH BODY COMPOSITION AT AGE 2 YEARS

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Background and Aims:

Early life might be a critical window for adiposity programming. Metabolic profile in early life is potentially important for adiposity programming later in life. We investigated if metabolic profile at 3 months of age is predictive for body composition at 2 years and if there are differences between boys and girls and between infant-feeding-modes.

Methods:

In 318 healthy term-born children, we determined body composition with skinfold measurements and subcutaneous and visceral fat by abdominal ultrasound at 3 months and 2 years and collected blood samples at 3 months. We determined detailed metabolic profile with high-throughput-metabolic-profiling. Using random forest machine learning models, we studied if metabolic profile at 3 months can predict body composition outcomes at 2 years of age.

Results:

Metabolite profile at 3 months of age can modestly predict body composition at 2 years of age, based on truncal:peripheral-fat-skinfold-ratio (T:P-ratio), with a predictive value of 75.8%, sensitivity of 100% and specificity of 50%. Predictive value was better in boys than in girls. Of the 15 metabolite variables most strongly associated with the T:P-ratio at 2 years, 11 were also associated with abdominal visceral fat at 2 years of age.

Conclusions:

Fifteen metabolite variables at 3 months were modestly predictive of body composition outcome at 2 years. Five of these are known to be involved in inflammation. Our data show that the metabolic profile in the first months of life contribute to adiposity programming later in life, potentially due to low grade inflammation.

O053 / #343

Oral Presentations
ORAL PRESENTATIONS SESSION 06: OBESITY
08-26-2021 16:00 - 17:00

PROSPECTIVE ANALYSES OF THE ASSOCIATION BETWEEN INTAKE OF SUGAR SWEETENED BEVERAGES IN CHILDHOOD AND ADIPOSITY MARKERS

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Background and Aims:

Intake of sugar-sweetened beverages (SSB) has been suggested to be one single, easily targeted factor contributing to the obesity epidemic. Concurrently, the increased prevalence of gestational diabetes mellitus (GDM), has been suggested to contribute, by 'foetal programming' mechanisms, to maintaining the high obesity prevalence. The aim of this study was to investigate whether high intake of SSB during childhood is a risk factor for adiposity during adolescence among children born to women free from (n=608) or diagnosed with gestational diabetes (n=626) during pregnancy.

Methods:

A nested case-control study within the Danish National Birth Cohort (1996-2003) with questionnaires regarding offspring health including use of SSB at ages 7, 11, and 14 years. During 2012-14, adiposity measures (fat and muscle mass, fat percentage, waist circumference, BMI, overweight/obesity) from children aged 9-16 years born to mothers with and without GDM were examined. Children's SSB consumption at 7-years were examined in relation to adiposity measures at follow-up.

Results:

Among non-GDM children (n=413), 26%, 33% and 22% reported no/rarely (<3 times/month), low (1 time/week) and high (>4 times/week) SSB consumption at age 7 years, respectively. Among GDM children (n=369), this was 27%, 26% and 22%, respectively. Among non-GDM children with low SSB intake at age 7, there was an increased adjusted RR(95%CI): 2.52 (1.05, 6.04) of overweight/obesity (BMI>25kg/m2). No other significant associations were observed.

Conclusions:

The results do not support high use of SSB during childhood being a strong risk factor for adiposity propensity during adolescence nor that the association are modified by maternal GDM.

O054 / #49

Oral Presentations
ORAL PRESENTATIONS SESSION 06: OBESITY
08-26-2021 16:00 - 17:00

EFFECT OF THE COVID-19 PANDEMIC ON THE STATUS OF OVERWEIGHT AND OBESITY AMONG CHILDREN AND ADOLESCENTS: A RETROSPECTIVE STUDY IN CHENGDU, CHINA

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Background and Aims:

The prevalence of overweight and obesity among children and adolescents is steadily increasing and has become a public health concern. Lifestyle changes due to the COVID-19 pandemic may have an impact on the status of overweight and obesity among children and adolescents. This study aimed to analyze the effect of the COVID-19 pandemic on the status of overweight and obesity among children and adolescents.

Methods:

We retrospectively analyzed the children and adolescents who visited the West China Second University Hospital, Sichuan University from January 1st, 2018 to June 30st, 2020. We included obese children who met the criteria and divided them into 5 groups with 6 months as the unit according to the time of their visit. The national lockdown time was used as a segmentation point to study the changes of obesity status in the same children before and after lockdown.

Results:

A total of 140,526 children and adolescents visited the outpatient department from January 1st, 2018 to June 30st, 2020, and 1,740 of them were diagnosed as overweight or obese at the time of their first visit. The study found that there was a significant difference in the obesity rate among the groups ($P < 0.01$). However, there was no difference between January to June, 2020 and the previous period. Except for the increased incidence of VD deficiency ($P < 0.01$), the severity of obesity, insulin resistance and dyslipidemia of obese children did not change before and after COVID-19 ($P=0.303$, 0.663, 0.106, respectively). A total of 65 obese children were followed up in the outpatient departmentbefore and after COVID-19 lockdown. There were no significant differences in BMI-SDS, HOMA-IR and 25(OH)VD among obese children before and after lockdown ($p = 0.626$, 0.386, 0.251, respectively).

Conclusions:

The available evidence cannot prove that the COVID-19 pandemic affects the status of overweight and obesity among children and adolescents who visited hospitals.

O055 / #8

Oral Presentations
ORAL PRESENTATIONS SESSION 07: OTHER
08-26-2021 17:00 - 18:00

IMPLEMENTATION STRENGTH ASSESSMENT OF A MATERNAL, INFANT, AND YOUNG CHILD NUTRITION COMMUNITY COUNSELING PROGRAM IN INHAMBANE, MOZAMBIQUE

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Background and Aims:

In Mozambique, a Southern African Nutrition Initiative (SANI) program which aims to improve the nutritional status of women in reproductive age and children under 5 years of age is being implemented in the province of Inhambane. These province is in a food insecurity crisis that may increase the risk of malnutrition in women and children. This study aimed to assess the implementation strength of maternal, and child nutrition counseling conducted as part of the SANI program.

Methods:

In September 2019 a cross-sectional study using Real Accountability: Data Analysis for Results (RADAR) implementation strength assessment tools was carried out in Homoine and Funhalouro districts. A total of 123 community health volunteers (CHVs) were interviewed on topics such as training received, supervision, household counseling sessions and community peer support groups and supplies.

Results:

Though SANI program, 86.2%(106/123) reported receiving training, that included mostly promotion of breastfeeding (83.7%;103/123) and women's nutrition education (83.7%,103/123). There was a median of 5 beneficiaries per CHVs with a general trend of more post-partum beneficiaries. More than 50% of peer support group topics, included pregnant woman diet (62/74) and breastfeeding (52.9%). Most of the topics during counseling sessions were on antenatal care (89.5%, 34/38) and father's support (79.0%, 30/38). The most mentioned topics to pregnant women were about antenatal care (82.0%) and food (81.6%), to women 0-6months post-partum, was exclusive breastfeeding (over 50%) and the details about how nutritive a meal should be wasn't mentioned.

Conclusions:

The CHVs can deliver main messages from the program, that can help prevent malnutrition.

O056 / #447

Oral Presentations
ORAL PRESENTATIONS SESSION 07: OTHER
08-26-2021 17:00 - 18:00

FATTY ACID INTAKE PATTERNS IN US INFANTS AND TODDLERS: DATA FROM THE FEEDING INFANTS AND TODDLERS STUDY 2016 (FITS)

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Background and Aims:

Background: Fatty acid intake among young children may be an important factor in cognitive health as certain fatty acids are integral to brain structure and function.

Methods:

Methods: Using 24-hour recall data from FITS 2016, the largest nationwide dietary survey of children under four years, fat and fatty acid intakes were determined. Mean intake (food and supplements) of linoleic (LA), α-linolenic (ALA), docosahexanoic (DHA), eicosapentanoic (EPA), arachidonic (ARA), and oleic acids were calculated. Comparisons were made to the Dietary Reference Intakes (DRIs) when available (fat, ALA, LA). Although no DRI for EPA and DHA exist, ~10% of the Adequate Intake (AI) for ALA could be consumed as EPA and/or DHA.

Results:

Results: Daily fat, ALA, and LA intakes were aligned with the DRIs for the Acceptable Macronutrient Distribution Range (AMDR). However, DHA+EPA intake was below 10% of ALA intake, with DHA intake decreasing from 51 mg/day in 6-11.9 month-olds to 0. g/day in 36-47.9 month-olds, and EPA increasing from 0 to 0.02 g/day in the same respective age groups. ARA intake decreased from 0.16 g/day to 0.05 g/day, and oleic acid intake increased from 13 to 16 g/day from 6-11.9 to 36-47.9 months, respectively.

Conclusions:

Conclusion: Infants and children from FITS 2016 meet recommendations for overall fat and fatty acid intake where DRIs exist, although DHA+EPA intake was below 10% of the ALA AI for all ages. Observed decreased DHA and ARA intake with increasing age and overall low EPA intake should be investigated to determine how food sources contribute to this pattern

O057 / #185

Oral Presentations
ORAL PRESENTATIONS SESSION 07: OTHER
08-26-2021 17:00 - 18:00

THE EVOLUTION OF SARS-COV-2 SPECIFIC ANTIBODIES IN HUMAN MILK FOLLOWING VACCINATION

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Background and Aims:

COVID-19 vaccines are administered rapidly around the world. Lactating women were excluded from COVID-19 vaccine trials, therefore, knowledge on the effect of vaccination in this specific group is limited. This information is essential in order to empower lactating women to make a well informed decision upon vaccination. After natural infection, SARS-CoV-2 specific antibodies are present in human milk, which serve as protection for infants. The evolution of these antibodies following vaccination remains to be elucidated. This study aims to determine the effect of vaccination with BNT162b2 on the evolution of SARS-CoV-2 specific sIgA in human milk.

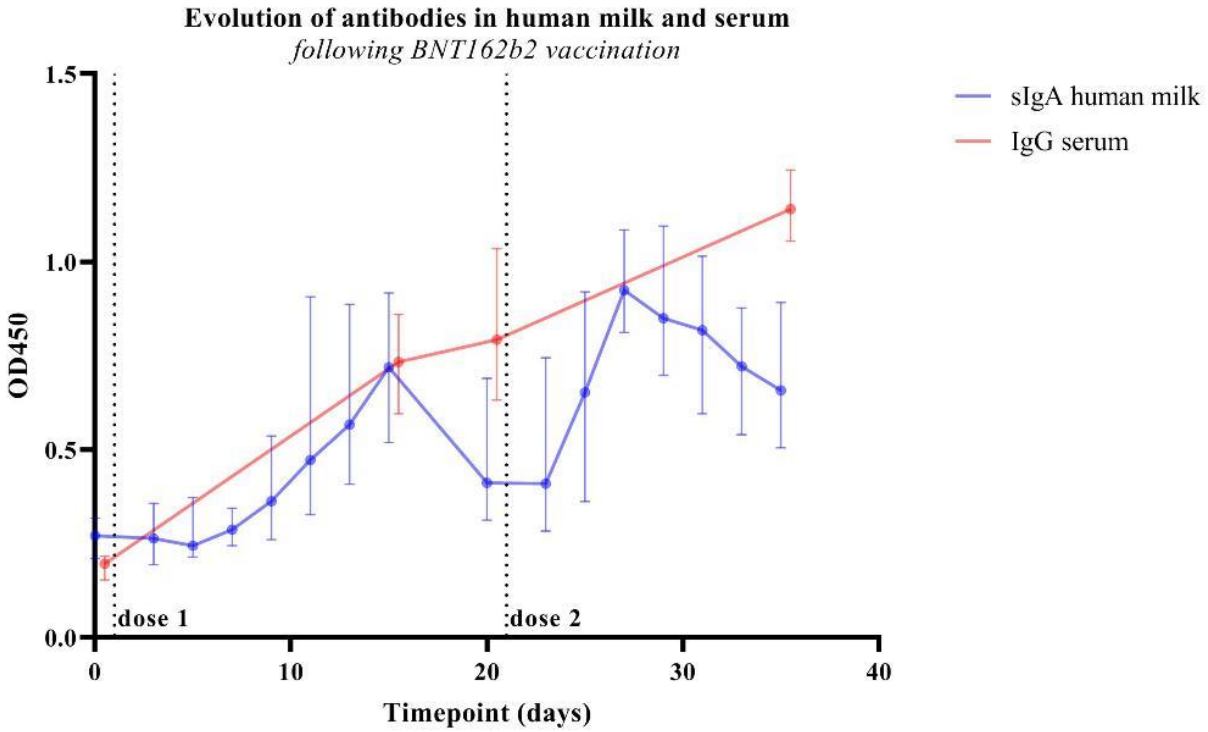
Methods:

In this longitudinal study, we included 26 lactating women who recieved the BNT162b2 vaccine. Human milk samples were collected prior to vaccination and 3, 5, 7, 9, 11, 13, and 15 days after vaccination for both doses. Samples were analyzed using Enzyme-Linked ImmunoSorbent Assay in order to determine SARS-CoV-2 specific antibodies directed against the spike protein of SARS-CoV-2.

Results:

In total, 366 human milk samples were analyzed. A biphasic response was observed, with SARS-CoV-2 specific sIgA started to increase between day five and seven after the first dose of the vaccine. After the

second dose, an accelerated immune reaction was observed.



Conclusions:

After vaccination with the mRNA based BNT162b2 vaccine, a SARS-CoV-2 specific antibody response is observed. The presence of SARS-CoV-2 specific sIgA in human milk after vaccination is important as antibodies are transferred via human milk and may serve as protection for infants against COVID-19.

O058 / #283

Oral Presentations
ORAL PRESENTATIONS SESSION 07: OTHER
08-26-2021 17:00 - 18:00

MATERNAL EARLY-PREGNANCY GLUCOSE CONCENTRATIONS AND LIVER FAT AMONG SCHOOL AGE CHILDREN

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Background and Aims:

Gestational diabetes is shown to be associated with offspring non-alcoholic fatty liver disease (NAFLD). We hypothesized that maternal glucose concentrations in pregnancy across the full range may be associated with offspring liver fat accumulation.

Methods:

In a multi-ethnic population-based prospective cohort study among 2,168 women and their offspring, maternal early-pregnancy glucose concentrations were measured at a median of 13.1 weeks' gestation (95% range 9.6-17.2 weeks). Liver fat fraction was measured at 10 years by magnetic resonance imaging. NAFLD was defined as liver fat fraction ≥5.0%. We performed analyses among the full group of mothers with different ethnic backgrounds and those of European ancestry only.

Results:

The multi-ethnic group had a median maternal early-pregnancy glucose concentration of 4.3 mmol/l (IQR 3.9-4.9) and a 2.8% (n = 60) prevalence of NAFLD. The models adjusted for child age and sex only showed that higher maternal early-pregnancy glucose concentrations were associated with higher liver fat accumulation and higher odds of NAFLD, but these associations attenuated into non-significance after adjustment for potential confounders. Among mothers of European ancestry only, maternal early-pregnancy glucose concentrations were associated with increased odds of NAFLD (OR 1.95 (95% CI: 1.32; 2.88 after adjustment for confounders) per 1 mmol/l increase in maternal early-pregnancy glucose concentration). These associations were not explained by maternal pre-pregnancy and childhood BMI, organ fat and metabolic markers.

Conclusions:

Maternal early-pregnancy glucose concentrations were associated with offspring NAFLD among mothers of European ancestry only. The associations of higher maternal early-pregnancy glucose concentrations with offspring NAFLD may differ between ethnic groups.

O059 / #190

Oral Presentations
ORAL PRESENTATIONS SESSION 07: OTHER
08-26-2021 17:00 - 18:00

HUMAN MILK ANTIBODIES AGAINST SARS-COV-2: A LONGITUDINAL FOLLOW-UP STUDY

H. Juncker[1], M. Romijn[1], V. Loth[1], T. Caniels[2], C. De Groot[3], D. Pajkrt[1], M. Van Gils[2], J. Van Goudoever[1], B. Van Keulen[1]
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Background and Aims:

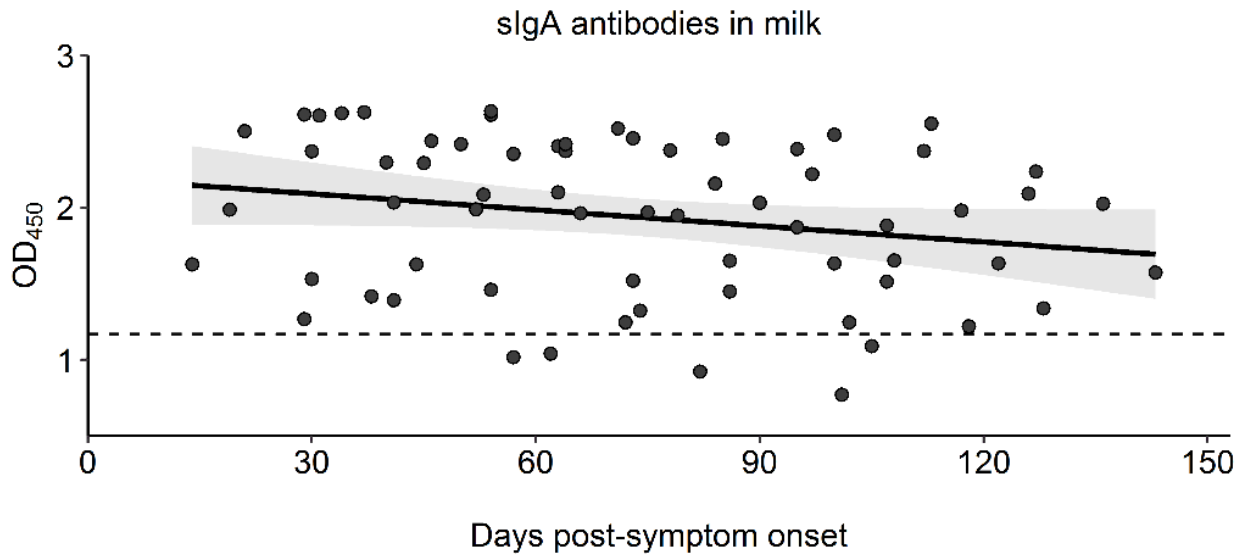
Human milk contains antibodies against Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) following Coronavirus Disease 2019 (COVID-19). These antibodies may serve as protection against COVID-19 in infants. However, the evolution of these human milk antibodies over time is unclear. This study aims to elucidate the evolution of secretory immunoglobulin A (sIgA) against SARS-CoV-2 in human milk after COVID-19.

Methods:

This longitudinal follow-up study included lactating mothers who had participated in the COVID MILK study. In order to assess the evolution of SARS-CoV-2 antibodies, serum and human milk samples were collected between 14 and 143 days after the onset of clinical symptoms related to COVID-19. Enzyme-Linked ImmunoSorbent Assay was used to detect antibodies against the ectodomain of the SARS-CoV-2 spike protein.

Results:

In this follow-up study 24 lactating mothers were included of whom 19 lactating mothers participated until the last sample collection. SARS-CoV-2 antibodies remain present up to 5 months (143 days) in human milk after onset of COVID-19 symptoms. Overall, SARS-CoV-2 sIgA in human milk seems to gradually decrease over time.



Conclusions:

Human milk from SARS-CoV-2 convalescent lactating mothers contains specific sIgA antibodies against SARS-CoV-2 spike protein up to at least 5 months post-infection. Passive viral immunity can be transferred via human milk and may serve as protection for infants against COVID-19.

O060 / #288

Oral Presentations
ORAL PRESENTATIONS SESSION 07: OTHER
08-26-2021 17:00 - 18:00

THE IMPACT OF THE COVID-19 PANDEMIC ON CHILDREN'S EATING HABITS

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Background and Aims:

The COVID-19 Pandemic brought the need for restrictive measures to curb the spread of the disease. The increase in infants' time in their homes results in the emergence of emotional and possible health issues.

We aim to assess the impact of the quarantine imposed by the COVID-19 Pandemic on children's eating behavior.

Methods:

Bibliographic review carried out PubMed, Medline, and Lilacs using the descriptors: ("child" OR "infant") AND ("feeding" OR "eating") AND ("behavior OR" habit") AND ("Pandemics" OR "covid"). Inclusion criteria: original articles written in Portuguese or English.

Results:

The percentage of families with children who reported low food security increased by 20% compared to the pre-pandemic period, among low-income families, the more significant concern was about children's excessive weight gain. Food surveys showed that the consumption of red meats, processed snacks, and sugary drinks by children increased during the lockdown, in contrast to the consumption of fruits and vegetables. In addition to the worsening of eating habits, studies also observed an increase in sedentary habits, increased time spent on electronics, and impaired sleep regularity.

Conclusions:

The restrictive measures to control the COVID-19 Pandemic associated with the deregulation of children's eating behaviors, causing an increase in the consumption of processed and hypercaloric foods. This dietary change, associated with worsening of other habits compromises the children's health, mainly because they induce obesity and its complications. It is urgent to consider the concomitance of food insecurity and the excessive consumption of ultra-processed foods when proposing preventive measures for children's health in this pandemic moment.

O061 / #197

Oral Presentations
ORAL PRESENTATIONS SESSION 07: OTHER
08-26-2021 17:00 - 18:00

THE INFLUENCE OF MATERNAL NUTRITION PRIOR TO AND DURING PREGNANCY ON ADVERSE BIRTH OUTCOMES: A PROSPECTIVE STUDY IN TIGRAI REGION, NORTHERN ETHIOPIA

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Background and Aims:

There is limited data on the relative influence of maternal nutrition prior to and during pregnancy and which direct and indirect effects pre-pregnancy maternal nutrition has on adverse birth outcomes in low-income settings. Also, the influence of maternal short stature among women with adequate nutrition prior to and during pregnancy is not clear. Hence, this study was aimed to address these gaps.

Methods:

A prospective dataset of 934 pregnant women from northern Ethiopia was used. Maternal stature, pre-pregnancy body mass index (BMI) and gestational weight gain (GWG) were used as proxies for maternal nutrition prior to and during pregnancy. Herein adverse birth outcomes refer to preterm birth (< 37 completed weeks of gestation), low birth weight (< 2,500 g), and small for gestational age (birth weight < 10th percentile for gestational age and sex).

Results:

Higher pre-pregnancy BMI associated with lower risk of preterm birth only indirectly through GWG. Higher GWG was associated with lower risk of preterm birth (RR=0.69, 95% CI [0.64, 0.74]) and small for gestational age (RR=0.70, 95% CI [0.65, 0.75]). Moreover, higher pre-pregnancy BMI (coefficient=43.5 g, 95% CI [28.9, 58.2]) and GWG (coefficient=91.5 g, 95% CI [79.2, 103.8]) were associated with higher birth weight. Maternal stature did not have a direct influence on adverse birth outcomes but indirectly through pre-pregnancy weight and/or GWG.

Conclusions:

Evidence-based interventions addressing maternal nutrition prior to and during pregnancy are required to prevent adverse birth outcomes, and their irreversible consequences later in life and future generations.

O062 / #44

Oral Presentations
ORAL PRESENTATIONS SESSION 07: OTHER
08-26-2021 17:00 - 18:00

ANXIETY, COGNITION AND CIRCADIAN RHYTHM IN CRE- COLLAGEN TYPE II SIRT1 K/O MICE

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Background and Aims:

Children with idiopathic short stature are more likely to have lower IQ, with substantial deficits in working memory than healthy controls. Using transgenic collagen type II-specific Sirt1 knockout (CKO) mice we found a close connection between linear growth and brain function. These mice have less organized growth plate, and weigh more than control (CTL) mice. To identify the reason for the increased weight we measured differences in activity.

Methods:

Mice were subjected to several behavioral tests; Glu-Osteocalcin and SIRT1 were determined by ELISA and Western blot, respectively.

Results:

In the open field test, the CKO mice walked considerably more than the CTL mice ($P<0.001$) and preferred the periphery of the arena. In the elevated plus maze, the CKO mice covered greater total distance than the CTL mice ($P<0.001$); the number of entries to all compartments was greater, and the time spent in the open arms was less. In contrast, in home cage free running wheels, CKO mice showed reduced activity. CKO mice demonstrated less spatial memory and learning capabilities than the CTL mice on the Morris water maze ($P<0.05$). No significant differences were found between CKO and CTL mice in Glu-osteocalcin levels; known to connect bone and brain function; nor in the level of brain SIRT1

Conclusions:

These results indicate that using a specific collagen type II derived system we affected a central regulatory mechanism driven by SIRT1. This led to hypo activity, increased anxiety, slower learning, suggesting an interesting connection between EGP and brain.

O063 / #323

Oral Presentations
ORAL PRESENTATIONS SESSION 07: OTHER
08-26-2021 17:00 - 18:00

SOCIODEMOGRAPHIC INDICATORS, HOUSEHOLD FOOD SECURITY AND ASSOCIATIONS WITH CHOLINE INTAKE IN PREGNANT WOMEN IN BLOEMFONTEIN, SOUTH AFRICA

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Background and Aims:

Higher sociodemographic status is associated with adequate nutrient intake and food security. Adequate choline intake is vital during pregnancy to support foetal development.

Methods:

A cross sectional study was conducted. Pregnant women attending an antenatal clinic at a regional hospital in Bloemfontein, South Africa, comprised the sample. Trained fieldworkers obtained sociodemographic and household food security information during structured interviews. Dietary intake was determined using a quantified food frequency questionnaire.

Results:

Median age and gestation in the sample (N = 682) was 31.8 years and 32.0 weeks, respectively. Most participants (84.7%) consumed less than the adequate intake (AI) of 450 mg per day for choline. Sociodemographic indicators that were significantly associated with an inadequate choline intake included a higher household density ratio (p=0.0485), no access to own flush toilets at home (p=0.0059), not owning a refrigerator (p=0.0483) or microwave (p=0.0225), as well as a lower level of education (p=0.0449). One-third of participants were severely food-insecure (29.9%). Logistic regression analysis showed that owning a microwave decreased the odds of an inadequate choline intake (odds ratio 0.55) and having a primary school education versus tertiary education had a higher odds of an inadequate choline intake (odds ratio 4.09).

Conclusions:

Household food security and various socio-demographic factors may be associated with inadequate choline intake in pregnant South African women. In view of the important role that choline plays in the health and development of the foetus and infant, the promotion of affordable choline rich foods among pregnant women should be encouraged.

O064 / #104

Oral Presentations
ORAL PRESENTATIONS SESSION 07: OTHER
08-26-2021 17:00 - 18:00

NUTRITIONAL STATUS IN CHILDREN WITH COVID-19

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Background and Aims:

Obesity and pre-obesity are associated with severe forms of COVID-19, however, COVID-19 infection itself can increase risk for future malnutrition. The research aims are to assess body composition indicators in children with COVID-19 and analyze their impact on disease severity of COVID-19 patients.

Methods:

Our study includes 154 children (59% boys, 41% girls) with COVID-19 who were admitted between May-October 2020 after a mean hospitalized period of 10±4 days. Patient demographics: 0-1 years 28%, 1-3 years 20%, 3-7 years 16%, 8-14 years 18% and >14 years 18%. The severity of the disease was evaluated with CT visual quantitative evaluation: 44% had none lung damage, 25% had minimal, 17% - mild, 13% - moderate, and 1% had severe. Weight, height, and BMI were normalized using WHO Anthro/AnthroPlus software.

Results:

The anthropometric measurements indicated that 55% of children have normal nutritional status; malnutrition was determined in ¼ of patients (mild malnutrition in 26 patients, moderate in 4 subjects and severe in 10 cases);19% were overweight. Obesity and pre-obesity were associated with more severe disease (p=0.009), but the duration of hospitalization did not increase. The half of cases with malnutrition were children in the first year of life. Newborns and infants had a significantly higher degree of lung damage than older children (p=0.001). We were unable to conclusively determine whether both obesity and malnutrition in children significantly affected the course of COVID-19 (p=0.2).

Conclusions:

This study shows that obesity affects the severity of COVID-19, but malnutrition is not. Therefore, it has to be considered during treatment.