



O001 / #326

**ORAL PRESENTATIONS SESSION 01: INFANCY**

**20-02-2025 14:25 - 15:25**

**ASSOCIATION BETWEEN EARLY-LIFE EXPOSURE TO ECONOMIC SHOCKS AND DOUBLE BURDEN OF MALNUTRITION IN CHILDHOOD: POOLED ANALYSIS OF 230 SURVEYS FROM 68 LOW- AND MIDDLE-INCOME COUNTRIES**

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**Background and Aims:** The relationship between economic growth and nutrition is not yet fully understood, especially in the context of the new nutrition reality, where most low- and middle-income countries (LMICs) face an increasing double burden of malnutrition (DBM). We aimed to investigate the association between exposure to economic shocks during the first 1,000 days of life (from conception to age two) and early childhood DBM in LMICs.

**Methods:** We pooled cross-sectional data on children aged 2-4 years from Demographic and Health Surveys (1990-2022) and longitudinal income data from the World Inequality Database. Economic shock was defined as any negative income growth in all years during the first 1,000 days of life and was tested at -1%, -5%, and -10% intensity levels. Outcomes included stunting, overweight/obesity, and DBM (child is both stunted and overweight). Associations between economic shocks and malnutrition outcomes were estimated using multivariable robust Poisson models.

**Results:** A total of 946,804 children across 230 surveys in 68 LMICs were included. Exposure to economic shocks during the first 1,000 days significantly increased the prevalence of DBM by 30% (prevalence ratio [PR]:1.30, 95%CI: 1.22-1.39) and overweight/obesity by 14% (1.14, 1.09-1.19). Economic shocks were also positively associated with stunting (1.02, 1.01-1.03) and severe stunting (1.05, 1.03-1.07). Dose-



response associations based on the intensity of economic shock were observed for DBM (-1%:1.22, 1.14-1.30; -5%:1.30, 1.19-1.42; -10%:1.35, 1.19-1.54) and severe stunting (-1%:1.03, 1.01-1.05; -5%:1.09, 1.06-1.13; -10%:1.13, 1.09-1.17).

**Conclusions:** Economic shocks during the first 1,000 days of life can significantly increase the risk of multiple forms of childhood malnutrition, particularly DBM.



**O002 / #173**

**ORAL PRESENTATIONS SESSION 01: INFANCY**

**20-02-2025 14:25 - 15:25**

**PREVALENCE AND RISK FACTORS OF FEEDING DIFFICULTIES IN CHILDREN WITH ESOPHAGEAL ATRESIA: A PARENT-REPORTED STUDY**

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**Background and Aims:** Feeding disorders are common in children with tracheoesophageal fistula (TEF) and esophageal atresia (EA), but the nature of these difficulties and their associated factors are not well understood. This study aimed to characterize parent-reported feeding difficulties in children born with EA and assess factors associated with their development

**Methods:** Parents of children operated on for EA or TEF in Israel (2005-2022) were recruited via social media and completed a structured questionnaire. Pediatric feeding disorder (PFD) was diagnosed based on the new unifying diagnostic definition

**Results:** The study included 75 children with TEF, with a median age of 40 months. Sixty-four percent were male, and the majority had atresia type C (63, 84%). Associated anomalies were present in 62.7% of patients, with 39.7% having a complete VACTERL association. The median age of the first oral feed was 14 days. Fifty-three percent of parents (39) reported feeding difficulties in the first months, and 76% (57) reported difficulties when introducing solids, leading to a PFD diagnosis. Lower gestational age and birth weight were significantly associated with PFD. Early oral feeding was protective against PFD- table 1. Feeding difficulties were attributed to feeding skill dysfunction (42%), nutritional dysfunction (28%), and medical dysfunction (17%). Only 53.3% of children received regular follow-up from speech therapists or dietitians.

**Conclusions:** Feeding difficulties are common in children with EA, especially when starting solid foods. Many affected children do not receive adequate follow-up, highlighting the need for better long-term management



O003 / #217

**ORAL PRESENTATIONS SESSION 01: INFANCY**

20-02-2025 14:25 - 15:25

**TRANSITION TO INFANT FORMULA FEEDING ON GASTROINTESTINAL  
REGURGITATION (TIGER) STUDY: A DOUBLE-BLIND RANDOMIZED CONTROLLED  
TRIAL WITH WHOLE GOAT AND COW FORMULA**

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**Background and Aims:** Infant regurgitation is common when transitioning from breastfeeding. We explored the differential effects of transitioning to a whole goat milk based (GMF) versus a cow milk protein based (CMF) infant formula on regurgitation.

**Methods:** Healthy term infants transitioned from predominant breastfeeding (PBF) were randomized to GMF or CMF within 7 days after starting any formula (>120mL) alongside breastfeeding. PBF infants were recruited as a reference. Regurgitation frequency was prospectively recorded for 4 weeks post-randomization. Salivary cortisol and C-reactive protein (CRP) were measured using ELISA at baseline and 2 weeks post-randomization.

**Results:** A total of 80 infants were randomized [40 GMF and 40 CMF, median age 6.3(4.6-7.6) and 7.7(4.9-11.1) weeks]. Fifty-nine infants completed as the PBF reference. Regurgitation frequency tended to reduce in the GMF compared to the CMF group [mean differences from baseline to 4 weeks: -6.1(95%CI; -10.7,-1.5) vs -1.82(-4.0,0.38) times/week, p 0.09]. Salivary cortisol and CRP decreased significantly from baseline in the GMF group and became similar to those of the PBF group of similar age [cortisol, 0.62(0.46-0.79) vs 0.43(0.33-0.52) µg/dL, p 0.01; CRP, 522.3(360.3-684.4) vs 393.5(258.5-528.6) pg/mL, p 0.045] whereas no significant changes were observed in the CMF group.

**Conclusions:** There was a greater reduction trend in the regurgitation frequency in infants receiving whole goat milk based compared to cow milk protein based infant formula. This was associated with a decrease in stress/inflammation occurring during the transition from breastfeeding. NCT05363553 **Funding:** DGC and New Zealand Ministry for Primary Industries under the Caprine Innovations NZ programme.



O004 / #282

## ORAL PRESENTATIONS SESSION 01: INFANCY

20-02-2025 14:25 - 15:25

### CLASSIFICATION OF WEIGHT STATUS IN INFANCY AND OBESITY PREDICTION ACCORDING TO WEIGHT-FOR-LENGTH AND BODY MASS INDEX

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**Background and Aims:** Current guidance recommends using weight-for-length (WFL) for the assessment of weight status in infancy (<2 years of age). However, recent findings suggest that body mass index (BMI) may be a better tool for this purpose. This study aims to assess differences and similarities in infant weight assessment according to WFL and BMI and to examine the ability of both tools to predict obesity.

**Methods:** This longitudinal analysis used data from the PHANTIM database for public health visits between 2000-2018 in Calgary Zone, Canada. Data on growth measures were obtained for full-term infants <2 years and at ~4.5 years. We examined statistical differences in weight classification during infancy based on WFL and BMI, and compared the predictive performance of infants' WFL and BMI z-scores to predict obesity at ~4.5 years.

**Results:** Of the included sample (N = 191,956), 51% were male. WFL and BMI had moderate to strong statistical agreement across infancy. The area under the receiver operator characteristic curve (AUROC) for BMI and WFL in predicting overweight and obesity in childhood based on BMI and WFL z-scores were similar, which ranged from 67.7% to 79.2% for BMI and 65.7% to 80.0% for WFL across infancy. Having an overweight/obese status (>2 z-score) by BMI or WFL in infancy poorly predicted overweight/obese status in later childhood.

**Conclusions:** Despite current guidance endorsing WFL to assess weight status in infancy, our findings indicate consistencies in weight status categorization between WFL and BMI. These results warrant an assessment of the potential benefits of using BMI to monitor infants' weights.



O005 / #377

## ORAL PRESENTATIONS SESSION 01: INFANCY

20-02-2025 14:25 - 15:25

### LOW-DOSE IRON SUPPLEMENTATION EARLY IN LIFE REDUCES BEHAVIORAL PROBLEMS IN HEALTHY BREASTFED INFANTS: RESULTS FROM A RANDOMIZED PLACEBO-CONTROLLED TRIAL

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**Background and Aims:** Breastfed infants are at risk of iron deficiency, which has been associated with impaired neurodevelopment. Although early iron supplementation has been shown to reduce behavioral problems in certain risk groups, its effects on behavior in otherwise healthy infants remains unclear. We investigated the effects of low-dose iron supplementation, given between 4 and 9 months of age, on behavioral outcomes in full-term, healthy breastfed infants at 3 years of age.

**Methods:** In a randomized, double-blinded placebo-controlled trial, full-term, healthy and non-anemic infants (n=221) who were exclusively or predominantly breastfed (>50% meals) at 4 months of age, were randomized to receive low-dose iron supplementation (approximately 1 mg/kg/day) or placebo between 4 and 9 months of age. At 3 years of age, primary caregivers of 133 participants (60%) filled out Child Behavior Checklist (CBCL).

**Results:** Iron supplementation significantly reduced CBCL total and externalizing T scores compared to placebo in intention-to-treat analysis (n = 133, mean [SD] 44.96 [8] vs 47.71 [8.16],  $p=0.014$  and 45.62 [8.52] vs 48.55 [8.85],  $p<0.001$ , respectively). Children receiving iron supplementation had significantly lower aggressive and withdrawn behavior scores and attention problems compared to placebo ( $p=0.003$ , 0.017 and 0.024, respectively).

**Conclusions:** Low dose iron supplementation in predominantly breastfed, and otherwise healthy infants between 4 to 9 months of age, significantly reduced prevalence of behavioral problems at 3 years of age. While the findings are promising, the limited number of participants suggests that cautious interpretation is warranted and additional studies are needed.



O006 / #588

**ORAL PRESENTATIONS SESSION 01: INFANCY**

**20-02-2025 14:25 - 15:25**

**IMPACT OF EARLY NUTRITION ON THE “MICROBIOTA-GUT-BRAIN AXIS” (MGBA) DEVELOPMENT IN HEALTHY CHILDREN UP TO 6 YEARS OLD: THE COGNIS STUDY**

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**Background and Aims:** Growing evidence suggest that early nutrition influences on later neurodevelopment through modulating the “*microbiota-gut-brain axis*” (MGBA) establishment. We analyzed the potential association between early gut microbiota and brain structure at 6 years old.

**Methods:** 57 healthy infants were randomized to receive, during their first 18 months of life, a standard (SF=30) or an infant formula supplemented with *milk fat globule membrane (MFGM) components, long-chain polyunsaturated fatty acids (LC-PUFAs), and synbiotics* (EF=27). Gut microbiome was analyzed at 18 months by 16S rRNA gene sequencing. At 6 years old, Magnetic Resonance Imaging (MRI) was performed.

**Results:** 20 bacterial genera were associated to SF intake, compared to other 27 that were associated with the EF intake. Although both SF- and EF-fed infants showed comparable species richness, the potential influence of bacterial genera during early life on brain structure development was more pronounced in EF infants. Thus, in terms of volume and cortex thickness, EF-fed infants exhibited a total of 10 genera simultaneously correlated with several brain regions, mainly in the left occipito-temporal sulcus, in contrast to the 3 genera observed in SF fed infants.

**Conclusions:** Infant formula enriched with MFGM, LC-PUFAs and synbiotics seems to modulate the establishment of the MGBA differently than SF, with a stronger influence of later brain morphometry as a whole. **Funding:** *Laboratorios Ordesa, S.L. University of Granada General Foundation, No. 3349 and 4003; CDTI (Spanish Ministry of Science and Innovation-FEDER) SMARTFOODS project n° IDI-20141206). Spanish Ministry of Economy, Industry and Competitiveness (CIEN);EU DynaHEALTH Project HORIZON 2020 (GA No.633595).*



O007 / #364

**ORAL PRESENTATIONS SESSION 02: OBESITY**

**21-02-2025 10:30 - 11:30**

**INULIN SUPPLEMENTATION MODULATES THE MICROBIOTA-GUT-BRAIN AXIS IN CHILDREN WITH OBESITY: A RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED TRIAL**

Chonnikant Visuthranukul<sup>1</sup>, Tushar Andriyas<sup>2</sup>, Rossarin Tansawat<sup>2</sup>, Sira Sriswasdi<sup>3</sup>, Jaraspong Uaariyapanichkul<sup>4</sup>, Sirinuch Chomtho<sup>1</sup>

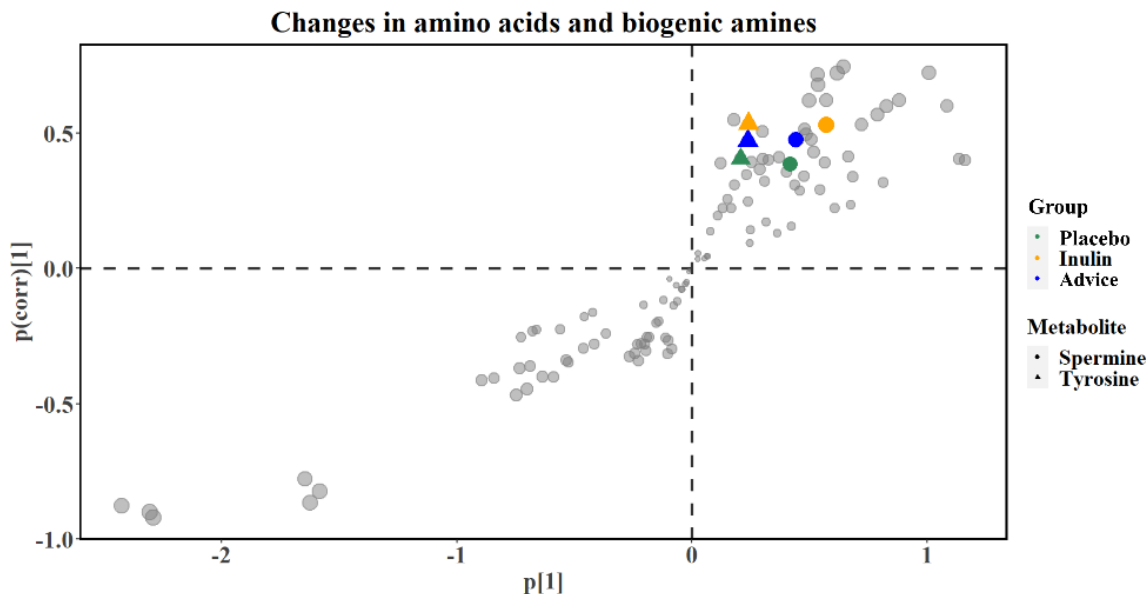
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**Background and Aims:** The gut microbiota plays a key role in regulating energy balance and appetite via the gut-brain axis (GBA). Dysbiosis can disrupt this communication, contributing to obesity. Inulin, a prebiotic, has the potential to modulate microbial-derived compounds that influence the GBA and improve obesity outcomes. This study aimed to assess the effects of inulin supplementation on GBA-related amino acids and bioactive molecules in children with obesity.

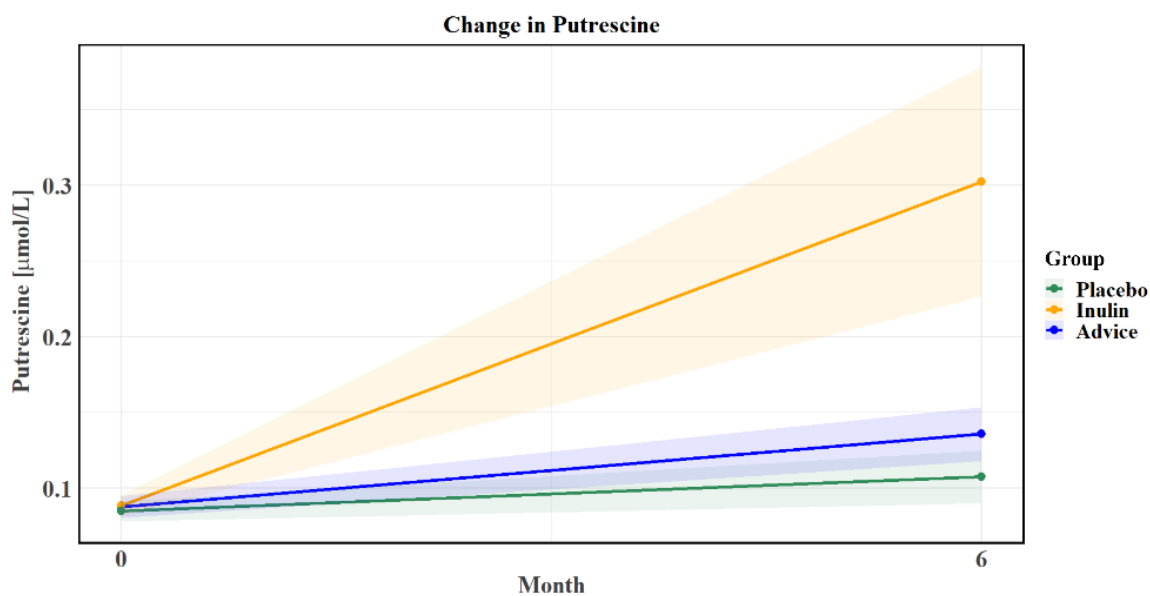
**Methods:** Children aged 7-15 with obesity (BMI > median+2SDs) were randomly assigned to one of three groups: inulin supplementation (intervention), maltodextrin (placebo), or dietary fiber advice. All participants received monthly lifestyle guidance and follow-ups for six months. Plasma amino acids and bioactive molecules were analyzed using LC-MS/MS at baseline and at the end of the study.

**Results:** By month 6, principal component analysis trajectories showed clustering across all groups, involving 154 children, but indicated potential metabolic shifts, particularly in the inulin group. S-plots identified significant changes over time in GBA-related amino acids and bioactive molecules, with the inulin group demonstrating a significant increase in tyrosine and spermine from baseline (both  $p < 0.0001$ ), while no such changes were observed in the other two groups (**Figure 1**). Inulin supplementation significantly upregulated putrescine levels over time compared to the other two groups ( $p = 0.012$ ) (**Figure 2**).





**Figure 1** Change in amino acids and biogenic amines in the placebo, inulin, and dietary fiber advice groups over time



**Figure 2** Change in putrescine in the placebo, inulin, and dietary fiber advice groups over time.

**Conclusions:** Inulin supplementation positively influenced the gut-brain axis by altering amino acids and biogenic amines, particularly putrescine, a marker of gut-brain communication. These findings suggest that inulin supplementation could be a



strategic intervention for managing childhood obesity through the modulation of microbial-derived bioactive molecules.



O008 / #245

**ORAL PRESENTATIONS SESSION 02: OBESITY**

**21-02-2025 10:30 - 11:30**

**ASSOCIATIONS OF EARLY CHILDHOOD EXPOSURE TO SEVERE ACUTE MALNUTRITION AND RECOVERY WITH CARDIOMETABOLIC RISK MARKERS IN LATER CHILDHOOD: 5-YEAR PROSPECTIVE MATCHED COHORT STUDY IN ETHIOPIA**

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**Background and Aims:** Impaired fetal and accelerated postnatal growth are associated with cardiometabolic disease. Few studies investigated how recovery from severe acute malnutrition (SAM) is associated with childhood cardiometabolic risk. We evaluated cardiometabolic risk in SAM children treated through community-based management, relative to controls, 5-year post-recovery. We identified distinct BMI-for-age (BAZ) trajectories of SAM children in the first-year post-recovery and examined their associations with cardiometabolic risk markers 5-years later.

**Methods:** A prospective cohort study in 2013 enrolled children aged 6-59 months, recovered from SAM (n=203), or non-wasted controls (n=202), in Ethiopia. Cardiometabolic markers were assessed five years after recovery. Multiple linear regression compared outcomes between SAM-recovered children and controls. We used latent class trajectory modelling to identify BAZ trajectories and compared these trajectory groups with controls.

**Results:** We traced 291 (71.9%) children at 5-year follow-up. Overall, compared to controls, SAM-recovered children did not differ in cardiometabolic risk. We identified 4 BAZ trajectories among SAM-recovered children: "Increase" (74.6%), "Decrease" (11.0%), "Decrease-increase" (5.0%), and "Increase-decrease" (9.4%). Compared to controls, all BAZ trajectories except "Decrease-increase" had lower weight, height and fat-free mass index. Compared to controls, the "Decrease-increase" trajectory had



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lower glucose (-15.8 mg/dL; 95%CI: -31.2, -0.4), while the “Increase-decrease” trajectory had higher glucose (8.1 mg/dL; CI: -0.8, 16.9). Compared to controls, the “Decrease-increase” and “Decrease” trajectories had higher total-cholesterol (24.3 mg/dL; CI: -9.4, 58.4) and LDL-cholesterol (10.4 mg/dL; CI: -3.8, 24.7), respectively.

**Conclusions:** Both rapid BAZ increase and decrease during early post-recovery from SAM were associated with greater cardiometabolic risk 5-years later. The findings indicate targeting post-recovery interventions.



O009 / #187

## ORAL PRESENTATIONS SESSION 02: OBESITY

21-02-2025 10:30 - 11:30

### NOVEL SCHOOL-BASED INTERVENTION SIGNIFICANTLY REDUCES CHILDHOOD OBESITY RATES: A RANDOMIZED CONTROLLED TRIAL

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**Background and Aims:** Childhood obesity remains a global health crisis, with long-term consequences for physical and mental well-being. This study aimed to evaluate the effectiveness of a comprehensive, school-based intervention program designed to reduce obesity rates among children aged 8-12 years.

**Methods:** We conducted a cluster-randomized controlled trial involving 40 primary schools (n=3,200 children) in urban and rural areas. The intervention group (20 schools) received a multi-component program including nutrition education, increased physical activity, parental involvement, and environmental modifications. The control group (20 schools) maintained their usual curricula. Body Mass Index (BMI), dietary habits, physical activity levels, and psychosocial factors were assessed at baseline, 12 months, and 24 months.

**Results:** After 24 months, the intervention group showed a significant reduction in obesity prevalence compared to the control group (32% vs. 5%,  $p < 0.001$ ). Mean BMI z-scores decreased by 0.42 (95% CI: 0.38-0.46) in the intervention group. Significant improvements were observed in fruit and vegetable consumption (+1.2 servings/day,  $p < 0.001$ ), sugar-sweetened beverage intake (-0.8 servings/day,  $p < 0.001$ ), and moderate-to-vigorous physical activity (+18 minutes/day,  $p < 0.001$ ). Notably, improvements in self-esteem and body image were also reported in the intervention group.

**Conclusions:** This novel, comprehensive school-based intervention demonstrates remarkable effectiveness in reducing childhood obesity rates and improving overall health behaviors. The multi-faceted approach addresses various aspects of the obesogenic environment, providing a promising model for large-scale implementation in diverse settings to combat the childhood obesity epidemic.



O010 / #154

**ORAL PRESENTATIONS SESSION 02: OBESITY**

**21-02-2025 10:30 - 11:30**

**VISCERAL ADIPOSE TISSUE DURING PREGNANCY IN WOMEN WITH OVERWEIGHT OR OBESITY AND OFFSPRING BIRTHWEIGHT**

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**Background and Aims:** Pre-pregnancy obesity is linked to an increased risk of adverse maternal and neonatal outcomes, and an increased likelihood of offspring obesity later in life. Accumulation of visceral adipose tissue (VAT) has been reported to be more detrimental to health outcomes than generalized obesity. Therefore, we investigated the changes in VAT during pregnancy and its association with offspring birthweight.

**Methods:** This study was a secondary analysis of a dietary randomized controlled trial. Magnetic resonance imaging was performed in gestational weeks (GW) 15, 32, and at birth in a cohort of 119 pregnant women with a pre-pregnancy body mass index ranging from 28-45 kg/m<sup>2</sup>. Linear mixed models and linear regression models were applied to evaluate the changes in VAT during pregnancy and its association with offspring birthweight.

**Results:** Among 119 women, VAT decreased from GW 15 to 32 and rebounded at birth, but final levels remained lower than at GW 15. Absolute maternal VAT during pregnancy was not associated with birthweight, however, women who experienced a reduction in VAT volume during pregnancy entered pregnancy with a higher VAT volume and gave birth to heavier infants by 212 grams (95% CI, 40;385, P=0.016) compared to those who experienced an increase in VAT during pregnancy.

**Conclusions:** This study demonstrates dynamic changes in VAT during pregnancy in women with overweight or obesity. Maternal VAT, and particularly its change during pregnancy, may influence fetal growth in healthy women with overweight or obesity.



O011 / #298

**ORAL PRESENTATIONS SESSION 02: OBESITY**

**21-02-2025 10:30 - 11:30**

**MACHINE LEARNING-DRIVEN IDENTIFICATION OF NUTRITION-GENE INTERACTION PROFILES PREDICTING STUNTED GROWTH AND OBESITY COEXISTENCE IN EARLY CHILDHOOD: A MULTI-OMICS INTEGRATION APPROACH**

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**Background and Aims:** The coexistence of stunted growth and obesity, known as the “double burden of malnutrition” (DBM), presents a complex pediatric health challenge with limited understanding of its underlying gene-nutrient interactions. This study aims to identify nutrition-gene interaction profiles predictive of DBM in children aged 0-6 years using a machine learning-based multi-omics integration approach to examine how early dietary patterns and genetic predispositions contribute to simultaneous stunting and obesity.

**Methods:** Data were sourced from the WHO Multicentre Growth Reference Study (MGRS, n=8,440) and the Avon Longitudinal Study of Parents and Children (ALSPAC, n=14,062). We integrated dietary intake (macronutrient distribution, micronutrient levels), anthropometric measures (height-for-age, BMI-for-age Z-scores), and whole-exome sequencing (WES) data. A machine learning pipeline combining Elastic Net, Extreme Gradient Boosting (XGBoost), and Graph Convolutional Neural Network (GCNN) models was developed to capture gene-diet interaction networks influencing DBM at ages 2, 4, and 6 years. Model performance was evaluated using the area under the precision-recall curve (AUPRC), Matthews correlation coefficient (MCC), and F1-score.

**Results:** The GCNN model achieved an AUPRC of 0.91 (95% CI: 0.88-0.94) and MCC of 0.79 (95% CI: 0.76-0.82) in predicting DBM at age 6. Children with high carbohydrate intake and low zinc levels carrying risk alleles in LEPR (rs1137101) were 3.8 times more likely to develop DBM (95% CI: 3.4-4.2). Early zinc supplementation and carbohydrate reduction reduced DBM risk by 24.8% (95% CI: 21.0-28.6).



**Conclusions:** This study identifies actionable nutrition-gene interaction profiles driving DBM in early childhood, offering a novel pathway for personalized nutritional interventions targeting pediatric health.





O012 / #688

**ORAL PRESENTATIONS SESSION 02: OBESITY**

**21-02-2025 10:30 - 11:30**

**ASSOCIATION BETWEEN PRECONCEPTION PATERNAL BODY MASS INDEX AND OFFSPRING WEIGHT DEVELOPMENT FROM BIRTH TO AGE FIVE: DATA FROM THE APPROACH STUDY**

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**Background and Aims:** Parental and childhood overweight/obesity are positively associated, with maternal pre-conceptual BMI well-established as a predictor of offspring overweight/obesity. The association between paternal pre-conceptual factors and offspring weight is less known. This study evaluated associations between paternal pre-conceptual BMI and offspring weight development during the first five years.

**Methods:** We included 163 offspring from the APPROACH (An optimized programming of healthy children) study and their biological parents. Fathers had a pre-conceptual age of 33.5±5.5 years and a BMI of 27.5±4.5 kg/m<sup>2</sup>, while mothers were 30.6±4.8 years and had a BMI of 33.9± 3.8kg/m<sup>2</sup>. Offspring were born at 40.2±1.1 weeks, with anthropometry measured at birth, 6, 18 months, and 3 and 5 years; and fat mass at age five. Linear mixed and regression models were adjusted for gestational age, offspring sex, intervention, gestational weight gain, parity, maternal pre-pregnancy BMI, parental education, and parental age.

**Results:** Paternal BMI was positively associated with offspring BMI- and weight z-scores ( $\beta=0.07$ ,  $p=0.001$ ;  $\beta=0.07$ ,  $p<0.001$ ), body fat percentage ( $\beta=0.30$ ,  $p=0.026$ ), and fat mass index ( $\beta=0.07$ ,  $p=0.004$ ) at age five. Paternal BMI correlated with offspring length/height z-scores from 6 months to 5 years.

**Conclusions:** Higher pre-conceptual paternal BMI was associated with increased offspring weight and fat mass at age five, highlighting the potential of improving paternal pre-conceptual factors to reduce the risk of childhood overweight/obesity. **Acknowledgements:** The authors thank all contributors, particularly participants, dietitians, especially Annette Vedelspang, lab technicians, and Lene Stevner for Good-clinical-practice coordination.



O013 / #241

## ORAL PRESENTATIONS SESSION 03: CHILDHOOD & ADOLESCENCE

21-02-2025 15:10 - 16:10

### MODIFIABLE LIFESTYLE FACTORS, GENETIC PREDISPOSITION, AND ADOLESCENT COGNITION: A POPULATION-BASED COHORT STUDY

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**Background and Aims:** Both lifestyle factors and genetics appear to shape childhood cognition, but their interplay on adolescent cognition remains unclear. We aimed to investigate the associations between lifestyle factors and adolescent cognition and assess whether genetic predispositions influence those associations.

**Methods:** We analyzed prospective data from 2,337 children in the Dutch Generation R Study cohort. Food intake was assessed at age 8 years using food-frequency questionnaires, and physical activity and screen time were estimated from questionnaires at age 10 years. Polygenic scores (PGS) were computed for educational attainment. Multivariable linear regression models were used to estimate prospective associations between individual lifestyle factors with academic achievement (12 years) and IQ (13 years).

**Results:** After multivariable adjustment, higher adherence to dietary guidelines was associated with higher academic achievement ( $\beta=0.46$ , 95% CI: 0.16, 0.76) and IQ ( $\beta=0.51$ , 95% CI: 0.07, 0.94), while more screen time was associated with lower academic achievement ( $\beta=-0.37$ , 95% CI: -0.65, -0.09). However, higher outdoor play hours were also associated with lower academic achievement ( $\beta=-0.23$ , 95% CI: -0.31, -0.16) and IQ ( $\beta=-0.37$ , 95% CI: -0.47, -0.27). By contrast, higher organized sports participation was associated with higher academic achievement ( $\beta=0.44$ , 95% CI: 0.10, 0.78) and IQ ( $\beta=0.51$ , 95% CI: 0.03, 0.98). The associations did not differ after adjusting for the PGS or when analyzed across different PGS levels.

**Conclusions:** Our findings suggest that higher adherence to dietary guidelines, limited



screen time and engagement in organized sports potentially benefit children's cognition over and above their genetic predispositions.



O014 / #251

## ORAL PRESENTATIONS SESSION 03: CHILDHOOD & ADOLESCENCE

21-02-2025 15:10 - 16:10

### NUTRITIONAL STATUS AND BONE HEALTH CONCERNS IN TREATMENT NAÏVE TRANSGENDER ADOLESCENTS

Ophir Borger<sup>1,2</sup>, Yael Issan<sup>1,2</sup>, Asaf Oren<sup>2,3</sup>, Eyal Cohen-Sela<sup>2,3</sup>, Tamar Sheppes<sup>2,4</sup>, Ravit Regev<sup>2,3</sup>, Anat Segev-Becker<sup>2,3</sup>, Yael Lebenthal<sup>2,3</sup>, Liat Perl<sup>2,3</sup>

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**Background and Aims:** Pubertal suppression with gonadotropin-releasing hormone analogues (GnRHa) is a key part of gender-affirming care for transgender adolescents by halting secondary sexual characteristics. Prolonged GnRHa treatment may negatively affect bone health. We assessed the nutritional status, body composition and bone health of transgender adolescents prior to initiating GnRHa-treatment.

**Methods:** This cross-sectional chart review included 101 treatment-naïve transgender youth (median age 15.3 years, 64 transmales) who attended The Israeli Children and Adolescents Gender Clinic. Registered dietitians conducted comprehensive nutritional assessments through structured medical interviews and clinical evaluations.

Anthropometrics and bone mineral density (BMD) z-scores were calculated by natal sex.

**Results:** Fifty-seven percent of the transgender adolescents consumed an inadequate diet. The median calcium intake was 400mg/day [IQR272.5, 582.5], fulfilling only 31% of the dietary reference intake. Seventy-two percent of the cohort did not meet physical activity guidelines. Median levels of serum folic acid (7ng/mL [IQR5.3, 10.7]) and calcifediol (52nmol/L [IQR37.7, 60.1]) were insufficient. The cohort had above-average BMI z-scores ( $0.24 \pm 1.26$ ), while the muscle-to-fat ratios ( $-0.56 \pm 1.01$ ) and BMD z-scores ( $-0.70$  [IQR-1.30, 0.10]) were below average. Transfemales exhibited lower median BMD z-scores compared to transmales ( $-1.00$  [IQR-1.40, -0.40] vs.  $-0.50$  [IQR-1.10, 0.65],  $p=0.005$ ). A linear regression analysis of the association between the DEXA z-score and contributing variables revealed that transmales had a 0.51 higher DEXA z-score ( $p=0.011$ ) and that the DEXA z-score increased by 0.49 for each 1-unit increase in BMI z-score ( $p<0.001$ ).

**Conclusions:** Our study highlights nutritional and bone health concerns in transgender



adolescents before GnRHa-treatment, emphasizing the need for early dietary interventions.



0015 / #329

**ORAL PRESENTATIONS SESSION 03: CHILDHOOD & ADOLESCENCE**

**21-02-2025 15:10 - 16:10**

**LONGITUDINAL RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND NUTRITIONAL STATUS WITH NATIONAL-BASED EXAMINATION RESULTS AMONG ADOLESCENTS IN AN UPPER-MIDDLE INCOME COUNTRY**

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**Background and Aims:** In growing children, regular physical activity is needed for growth and development, enhancing bone health, reducing obesity, helps in regulating metabolism and reducing incidences of non-communicable diseases. Physical activity (PA) has many health benefits. The World Health Organisation recommends 60 minutes of moderate-to-vigorous-intensity physical activity daily for children and adolescents aged 5-17 years. The study aims to investigate the longitudinal relationship of self-reported PA with national-based examinations. It also explores the progression of other factors such as anthropometric measurements, dietary intake and blood parameters over time.

**Methods:** This is a closed prospective cohort study involving 579 students, who were recruited at 13 years old in 2012 then followed up at 15 (2014) and 17 years old (2016) from the Malaysian Health and Adolescents Longitudinal Research Team (MyHeART) study carried out in three states of Peninsular Malaysia. The PA scores were assessed through the Physical Activity Questionnaire and the examination results were assessed from the National-Based Examinations conducted at 15 years old (Year 9) and 17 years old (Year 11) in Malaysia. Multivariate ordinal regression was used to determine the relationship between PA and the national-based examination results. Ethical approval was obtained from the Medical Ethics Committee.

**Results:** There are significant positive associations between PA and the exam performances in the Malay Language, English Language, Mathematics and History in Year 9 and Year 11 (p-value <0.001). There were no significant relationship between energy intake with exam performance.



**Conclusions:** Physically active students performed better in several subjects in the national-based examinations in this study.



O016 / #644

**ORAL PRESENTATIONS SESSION 03: CHILDHOOD & ADOLESCENCE**

**21-02-2025 15:10 - 16:10**

**THE USE OF SYMBIOTICS IN THE TREATMENT OF GASTROINTESTINAL DISEASES WITH ANTIBIOTICS AND ITS EFFECTIVENESS IN THE PEDIATRIC POPULATION**

Lasha Tchelidze<sup>1</sup>, Manana Kobakhidze<sup>2</sup>, Nino Adamia<sup>2</sup>, Maia Matoshvili<sup>2</sup>, Maia Kherkheulidze<sup>2</sup>, Dali Shonvadze<sup>3</sup>, Zaza Nakudashvili<sup>4</sup>, Darejan Khatchapuridze<sup>3</sup>, Shorena Tsiklauri<sup>5</sup>, Irine Kekelidze<sup>2</sup>, Marine Tsabadze<sup>2</sup>, Nato Nakudashvili<sup>2</sup>, Nino Totadze<sup>2</sup>, Irma Ubiria<sup>2</sup>, Maia Maghlaperidze<sup>2</sup>, Giorgi Khakhaleishvili<sup>6</sup>, Anzor Gogiberidze<sup>2</sup>, Elene Khurtsidze<sup>1</sup>, Dr Lakshya Sharma<sup>3</sup>, Davit Makhatadze<sup>7</sup>

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**Background and Aims:** The gastrointestinal diseases in the child population are still a relevant and global problem in the world today. Its prevalence is quite high, and many factors, including infections, antibacterial drugs, stress, physical activity and malnutrition, allergies, etc can disrupt normal microflora.

**Methods:** The study included 897 children aged 6 months to 17 years with gastrointestinal diseases. The study was conducted on patients collected over 5 years at several referral clinics. Statistical processing of the data was carried out based on the SPSS/V12 software package, the study was conducted in dynamics. In 86% of the cases of the studied contingent, the course of diarrhea (enteritis, colitis, etc.) of moderate severity was confirmed, in 14% of patients a severe course was diagnosed.

**Results:** A microbial study of feces was conducted before and after treatment— distribution of patients by gender, age, hospitalization and outpatient indicators. The study contingent on inpatient conditions was predominantly infants who received antibiotics to prevent diarrhea. During diarrhea, the frequency of defecation was 4-6 times or 6-8 times a day, and in case of constipation, once every 3-4 days or bowel movements were noted after assistance. The consistency of feces was changed in the patients. Improvement occurred in 92%, and in 8% there was no improvement.

**Conclusions:** According to our research, we can say that the use of pre-and probiotics does not cause side effects, and the use of antibiotics in combination with them in severe cases gives a good result, as no side effects were observed during treatment.





O017 / #650

**ORAL PRESENTATIONS SESSION 03: CHILDHOOD & ADOLESCENCE**

**21-02-2025 15:10 - 16:10**

**ADHERENCE TO “HEALTHY DIETS” IN CHILDREN WITH INFLAMMATORY BOWEL DISEASE**

Julia Tincu, Larisa Duchi, Bianca Chenescu, Carina Calugar, Lucica Gales  
Clinical Children Hospital Dr. Victor Gomoiu, Pediatric Gastroenterology, Bucharest, Romania

**Background and Aims:** Inflammatory Bowel Disease (IBD) is a growing global health issue, with increasing incidence in the pediatric population. The diagnosis and management of pediatric IBD are challenging due to its impact on growth and development during crucial life stages. In recent years, the literature has increasingly emphasized the link between diet, lifestyle, and the progression of IBD. This study aimed to evaluate the nutritional aspects of pediatric IBD patients before and after diagnosis.

**Methods:** We conducted a single-center, retrospective and prospective, observational study that included 57 patients diagnosed with IBD. Data collected included age, gender, disease phenotype, malnutrition prevalence, vitamin D level, and KIDMED score for healthy eating. For evaluation, monitoring, and data collection, patients were followed up in four distinct visits. Statistical analysis of the study was performed using the SPSS program.

**Results:** Dietary modifications, such as eating regular meals ( $p < 0.05$ ) and reducing processed food intake, effectively managed IBD. Analysis of the KIDMED score showed positive progress between visits: at the initial visit, 65% had a KIDMED score  $\leq 3$ , and only 14% had a score  $\geq 8$ ; by the 4th visit, the number of children with a score  $\leq 3$  decreased to 2%, while 92% achieved a score of  $\geq 8$ , indicating the adoption of a healthy diet. Vitamin D deficiency (45.61%) and malnutrition (38.6%) were prevalent among patients with IBD.

**Conclusions:** Dietary adjustments, active lifestyles, and regular nutritional monitoring, including vitamin D levels, are crucial in pediatric IBD management. These findings emphasize the importance of a multidisciplinary approach to optimize patient outcomes.



O018 / #659

**ORAL PRESENTATIONS SESSION 03: CHILDHOOD & ADOLESCENCE**

**21-02-2025 15:10 - 16:10**

**SAFETY AND EFFICACY OF TURMERIC IN CHILDREN WITH ACUTE LYMPHOBLASTIC LEUKEMIA**

Yasmin Gamal Abdou El Gendy<sup>1</sup>, Fatma Ebied<sup>1</sup>, Ehab Khairy Emam<sup>2</sup>, Shaimaa Abdelziz<sup>1</sup>, Nayra Mehanna<sup>3</sup>, Nihal Hussein<sup>1</sup>

<sup>1</sup>Ain Shams University, Cairo, Egypt, <sup>2</sup>Ain Shams University faculty of medicine, Pediatrics, Cairo, Egypt, <sup>3</sup>National research center, Cairo, Egypt

**Background and Aims:** Alterations in the function and composition of the gut microbiome may play a key role in the development of various diseases, including tumors. It is still unclear whether intestinal dysbiosis is a cause or consequence of cancer. There is a suggested relationship between dysbiosis and carcinogenesis, Turmeric seems to have beneficial effects on gut microbiota, favoring the growth of beneficial bacteria strains objective is To assess the safety and efficacy of turmeric in children with acute lymphoblastic leukemia and whether gut microbiota can be used to predict therapy related complications

**Methods:** A single center open label prospective randomized clinical trial involved thirty patients with confirmed diagnosis of acute lymphoblastic leukemia where they are randomized (1:1) between curcumin (500mg) twice daily for 1 month starting at week 1 of continuation phase of chemotherapy plus the nutritional standard of care (SOC) and the nutritional standard of care only which consisted of a nutrition program through supplementation of a high caloric , high protein diet tailored according to patients age and sex for both groups. All patients underwent detailed clinical assessment, nutritional assessment using the Screening Tool for Assessment of Malnutrition in Pediatrics (STAMP) and laboratory assessments (including fecal microbiota quantity)

**Results:** Patients in the curcumin arm showed better STAMP scores, higher log count of microbiota including streptococcus and lactobacillus and significantly lower infection episodes necessitating hospital admission. Turmeric showed a safety profile and was tolerated by most of the patients.

**Conclusions:** A promising role for turmeric as a nutritional supplement in children with acute lymphoblastic leukemia



0019 / #693

**ORAL PRESENTATIONS SESSION 03: CHILDHOOD & ADOLESCENCE**

**21-02-2025 15:10 - 16:10**

**TEST AND VALIDATION OF THE COW'S MILK RELATED SYMPTOMS SCORE (COMISS) IN INDIAN SYMPTOMATIC AND HEALTHY INFANTS**

Mahesh Sulakshane

Jupiter Hospital Baner Pune, Pediatric And Neonatology, Pune, India

**Background and Aims:** The diagnosis of cow's milk protein allergy is challenging in infants with negative allergy test. Cow's milk free diet (CMFD) and extensively hydrolysed formulas are often started in infants with persistent gastrointestinal symptoms based on clinical severity, clinician's attitude and experience. The lack of specific symptoms and diagnostic tool may cause unnecessary CMFD in some patients. I aimed at assessing the accuracy of cow's milk related symptom score (CoMiss) in identifying infants who respond to CMFD.

**Methods:** Prospective study in all infants suspected of CMA because of persistent unexplained vomiting/regurgitation, constipation or diarrhoea, feeding problems and/or failure to thrive, crying, fussiness, sleep disturbances, continuous eczema even after reassurance, behavioural management, nutritional advice. CMFD was started blinded to CoMiss Score that was completed by independent clinician and parents at the first visit (T0), after 2-4 weeks of diet (T1) and eventually at oral challenge. I analysed the improvement and the response to CMFD calculation the median value of our population. Allergy Test and Open Food Challenge were performed in all infants improving on CMFD diet based on parental reports. Control group were healthy age-matched infants in our office.

**Results:** At T0 visit CoMiss was significantly higher in cases compared to controls. The Sensitivity and Specificity of CoMiss score more than 12 was 37% and 92% respectively. Positive Predictive Value 80% and Negative Predictive Value of 88% for the response of CMFD.

**Conclusions:** CoMiss is a helpful tool to know which infants with persistent GI Symptoms and suspected CMA would benefit from CMFD. Findings support use of CoMiss in both IgE positive, Negative infants.



O020 / #310

**ORAL PRESENTATIONS SESSION 04: OTHER (CLINICAL NUTRITION AND BIG DATA & AI)**

**21-02-2025 15:10 - 16:10**

**IMPROVING MACRONUTRIENT COMPOSITION IN DONOR HUMAN MILK POOLS BY USING MACHINE LEARNING AND OPTIMIZATION**

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<sup>1</sup>Amsterdam UMC, Paediatrics, Amsterdam, Netherlands, <sup>2</sup>University of Amsterdam, Business Analytics, Amsterdam, Netherlands, <sup>3</sup>University of Toronto, Mechanical And Industrial Engineering, Toronto, Canada, <sup>4</sup>Amsterdam UMC, Board Of Directors, Amsterdam, Netherlands, <sup>5</sup>Amsterdam UMC, Neonatology, Amsterdam, Netherlands

**Background and Aims:** The macronutrient composition of donor human milk (DHM) can vary significantly due to factors such as maternal age, diet, and lactation duration. However, preterm infants require consistent macronutrient levels in DHM to support optimal growth. This study aims to stabilize the macronutrient quality of DHM by pooling milk from different donors by utilizing machine learning and optimization techniques.

**Methods:** The current pooling strategy at the Dutch human milk bank, which combines milk from different batches from a single donor, is compared with a new theoretical approach that pools milk batches from up to 5 donors. In current practice, the macronutrient content of each single donor pool is measured using a human milk analyzer (MIRIS<sup>®</sup>) as a quality indicator. For the new prediction model, we used the following variables: body mass index, the donor's diet (vegetarian or non-vegetarian), maternal age, full-term or preterm delivery, lactation stage, and volume pumped. These predictions are then used within an optimization model to create milk pools that minimise the deviations from the target macronutrient levels (1.0 g protein/100mL and 70 kcal/100mL).

**Results:** The prediction model is based on 2236 created single-donor pools from 480 donors. Random forest regression models provided the most accurate predictions of macronutrient content. The new pooling strategy using multiple donors shows reduced deviations from target values compared to the current single-donor approach (average total absolute deviation 0.402 versus 0.664).

**Conclusions:** This study proves the potential of data-driven methods to improve operational efficiency in human milk banks, ultimately providing better nutritional support to preterm infants.



O021 / #283

**ORAL PRESENTATIONS SESSION 04: OTHER (CLINICAL NUTRITION AND BIG DATA & AI)**

**21-02-2025 15:10 - 16:10**

**INFANT FORMULA WITH AN ALPHALACTALBUMIN SOURCE OF POLAR LIPID COMBINED WITH PRO-MYELINATION BLEND OPTIMAL COMPARED TO MILK FAT GLOBULE MEMBRANE FOR BRAIN MYELINATION.**

Jonas Hauser<sup>1</sup>, Sean Deoni<sup>2</sup>, Viren D'Sa<sup>3</sup>

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**Background and Aims:** Brain development is a complex process involving multiple cells interacting among each other, both pre- and postnatally. One key process shaping brain maturation is myelination, which supports neuronal communication and plasticity. It requires key nutritional building blocks, including polar lipids (sphingomyelin and phospholipids) that impact and potentially promote myelination. Multiple sources of polar lipid exist, including alphasactalbumin as well as milk fat globule membrane.

**Methods:** A recent randomized clinical trial found that early life consumption of a pro-myelination blend in infant formula (IF, containing a unique alphasactalbumin with high polar lipids' levels) increased myelination. In another study, a retrospective observation analyses study of IF before and after the inclusion of MFGM has also shown that consumption of IF with MFGM increases myelination. To understand which IF provided the best support to myelination, we re-analyzed these datasets for their respective effect size as a maker of the efficiency of these IFs.

**Results:** We found that the effect size (Cohens D) of the IF containing the pro-myelination blend was 0.78, which was 47% larger than the effect size of the comparison of pre-/post- MFGM introduction (Cohens D = 0.53), suggesting the IF with pro-myelination blend of nutrients may have a greater impact on early brain myelination than IF with MFGM.

**Conclusions:** IF supplemented with the pro-myelination blend, including its polar lipids, are better utilized to increase myelination compared to IF supplemented with MFGM. The levels of myelin in the brain have been associated with the development of multiple cognitive functions, including learning, memory, executive function.



O022 / #284

**ORAL PRESENTATIONS SESSION 04: OTHER (CLINICAL NUTRITION AND BIG DATA & AI)**

**21-02-2025 15:10 - 16:10**

**MEASURING THE FUNDAMENTALS: SERUM AMINO ACID PROFILES OF VERY PRETERM INFANTS ON OPTIMAL PARENTERAL AND ENTERAL NUTRITION –A PROSPECTIVE OBSERVATIONAL STUDY**

Mohamed Muneer Varikkottil, Femitha Pournami, Zubair Ahmad Bhat, Ajai Kumar Prithvi, Naveen Jain  
KIMS Health, Neonatology, Trivandrum, India

**Background and Aims:** Literature on preterm nutrition adequacy has focused on evaluating growth and neurodevelopmental outcomes. These consequences can potentially be affected by several factors. Our study aimed at analyzing a proximal/direct parameter likely to be a precise reflection of protein intake: individual amino-acid profile(aaP) as biomarkers.

**Methods:** This prospective study included preterm <30 weeks gestation at birth between December-2022 and May-2024. Measurement of aaP was done after they received aggressive parenteral nutrition, minimum 1 week full enteral nutrition(>100 ml/kg) supplemented with milk-fortifier(initiated early). Term breastfed neonatal aaP were used as controls; we also contrasted with preterm(31-32 weeks) who received no PN, but presumed comparable metabolism.

**Results:** Of the 84 included neonates,essential amino acid: phenylalanine was inadequate in 21 (25%),methionine in 11.9% and histidine in 11.9% neonates. Among semi-essential amino acids, glycine was inadequate most often (19%).Glycine, phenylalanine, methionine, leucine/isoleucine, serine and alanine were found to be severely deficient. Those with inadequate aaP were more likely to have short term morbidities. The following aminoacids were more frequently low:methionine, histidine, phenylalanine, leucine+isoleucine, glutamine and serine. In those with Periventricular leukomalacia(PVL) and/or Metabolic bone disease(MBD): tyrosine, leucine, glutamic acid, glutamine and valine were frequently low. Serine was found low in infants with Retinopathy(ROP) requiring treatment.

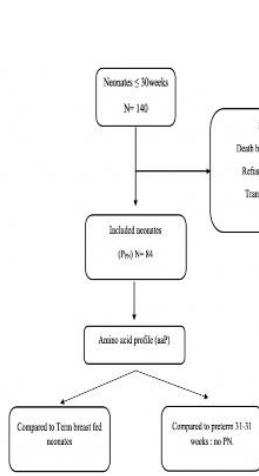


Figure 1: Study flow diagram

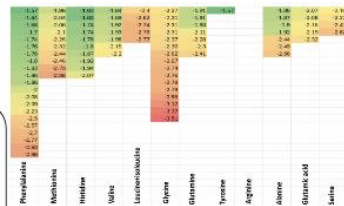


Figure 2: Severity of inadequate AA levels. Only babies who had any AA level below the term (healthy) babies are included in the picture. Each cell represents one baby. The colors represent the severity of inadequate AA level. Green color is given if the AA level was between 1 to 2 SD below the values in term healthy breast-fed babies. Color changes from yellow in and in proportion to severity of inadequate AA level (Red being >3SD). Example: few babies had very severe Glycine deficiency (3 cells are red), most babies had mild histidine deficiency – only green cells.

Table : Neonatal growth outcomes in P<sub>IN</sub> babies.

Birth weight*	965 (772, 1125)
Z score of birth weight for gestational age*	-0.27 (-0.90, 0.45)
Weight at discharge (grams)*	2082 (1802-2445)
Z score of weight for age at discharge*	-1.51 (-2.22, -0.72)
ELUGR	53 (63.1%)
Initial HC (cm)*	25 (23, 26)
Z score of initial HC*	-0.15 (-0.91, 0.53)
HC at discharge (cm)*	31.5 (31, 32.5)
Z score of HC at discharge*	-0.66 (-1.50, -0.17)
Head growth failure (HGF)	27 (32.1%)

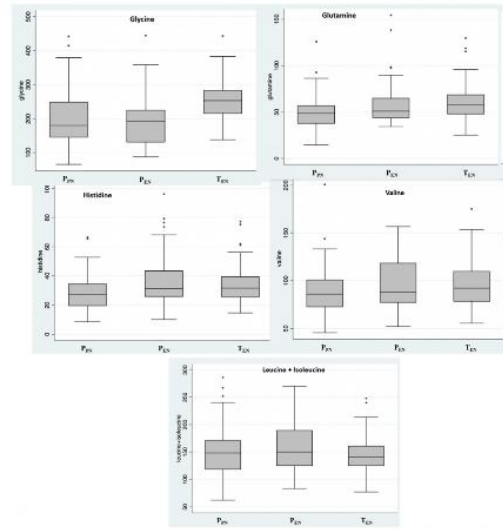


Figure 3: Box whisker plots of median (IQR) levels of essential amino acids in μmol/L: comparisons among P<sub>IN</sub>, P<sub>EN</sub> and T<sub>EN</sub> babies.

**Conclusions:** A crucial, immediate quantitative & qualitative effect of nutrition (protein) adequacy was measured in very preterm on “optimal” nutrition strategies. Essential amino acids phenylalanine, methionine, histidine; and semi-essential glycine were most frequently inadequate. Inadequate levels were associated with morbidities: PVL, MBD and ROP requiring treatment. IHEC: KIMS/IHEC/TP035/2022; CTRI/2023/06/054310.



O023 / #515

**ORAL PRESENTATIONS SESSION 04: OTHER (CLINICAL NUTRITION AND BIG DATA & AI)**

**21-02-2025 15:10 - 16:10**

**THE EFFECT OF CARNITINE SUPPLEMENTATION ON KETOGENIC DIET EFFECTIVENESS IN PATIENTS WITH DRUG RESISTANT EPILEPSY**

Maha Zakariya Mohammed<sup>1</sup>, May Fouad Nassar<sup>2</sup>, Marwa Waheed Nasef<sup>1</sup>, Esraa Abdelmohsen Kamal<sup>1</sup>, Omnia Fathy El-Rashidy<sup>1</sup>

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**Background and Aims:** Ketogenic Diet (KD) is a recommended line of therapy for DRE in children. KD is a strict diet that contains minimal carbohydrate, high fat content and adequate protein intake. Carnitine is needed to transport long-chain fatty acids into the mitochondrion. Due to the high fat intake, children following KD may have an increased demand for carnitine. Therefore, carnitine supplementation is thought to enhance ketone production to maintain ketosis and reduce seizure frequency. Our objective was to highlight the effect of carnitine supplementation on efficacy of KD in seizure control in patients with DRE.

**Methods:** This study is a clinical trial (NCT06198803) that included patients with DRE on KD following up at Pediatric Neurology and Clinical Nutrition Clinics at Ain shams University children`s Hospital over a period of 6 months. The study population was randomly divided into 2 groups, 1 group received oral Carnitine supplementation in a dose of 100 mg/kg/day and the other group was kept on the standard KD protocol. Frequency of seizure, its duration, and the Chalfont seizure severity scale (CSSS) were recorded for both groups at baseline and after 6 months.

**Results:** The study included 52 patients. At baseline, there was no significant difference in seizure frequency, duration, and CSSS between both groups. We found a statistically significant decrease in the median of seizures frequency, duration, and CSSS at L-carnitine supplemented compared to non-supplemented group after 6 months (P-values=0.018,<0.01,and 0.045 respectively).

**Conclusions:** L-carnitine supplementation might have a role in enhancing the effectiveness of KD in seizure control among patients with DRE.





O024 / #686

**ORAL PRESENTATIONS SESSION 04: OTHER (CLINICAL NUTRITION AND BIG DATA & AI)**

**21-02-2025 15:10 - 16:10**

**BREASTFEEDING IN FOCUS: A DIGITAL HOME DEVICE TO TRACK MILK MATURATION AND UNLOCK LACTATION SUCCESS**

Daniela Abigail Navarro

Ariel University, Ariel, Israel

**Background and Aims:** Delayed secretory activation and breastfeeding challenges often impact exclusive breastfeeding rates. Sodium concentration in breast milk, reflected through milk conductivity, is a known marker of lactogenesis. This study aims to validate a novel, at-home human milk conductivity sensing technology, enabling real-time, non-invasive tracking of secretory activation progress. By providing objective lactation data, this tool supports timely interventions to address breastfeeding difficulties

**Methods:** A retrospective study which utilized a novel handheld milk conductivity sensing device to measure sodium-linked milk maturation progress. Device precision and accuracy were validated using standard KCl solutions and breast milk samples. User testing involved 555 lactating mothers, collecting 0.3–0.5 ml milk samples from each breast. Milk Maturation Percentage (MM%) was calculated using a defined algorithm based on measured conductivity values. Retrospective analysis correlated milk conductivity with sodium and other milk components. Preliminary predictive analysis assessed the MM% threshold's sensitivity in identifying low milk supply cases between days 6–20 postpartum.

**Results:** The study demonstrated the device's precision and accuracy in measuring milk conductivity, correlating strongly with sodium levels ( $r=0.93$ ,  $p<0.001$ ). Milk Maturation Percentage (MM%) followed a dynamic pattern during lactogenesis, with lower MM% values observed in mothers reporting low milk supply or breastfeeding difficulties. Preliminary analysis revealed the MM% threshold (15th percentile) had 81% sensitivity and 79% positive predictive value for identifying low milk supply cases between days 6–20 postpartum. The device provided objective, real-time feedback, supporting early identification of delayed lactogenesis and breastfeeding challenges.

**Conclusions:** The device enables early detection of lactation challenges, supporting breastfeeding success and confidence.



O025 / #690

**ORAL PRESENTATIONS SESSION 04: OTHER (CLINICAL NUTRITION AND BIG DATA & AI)**

**21-02-2025 15:10 - 16:10**

**THE EFFECT OF ORAL NUTRITIONAL SUPPLEMENTATION ON IMPROVING NUTRITIONAL ADEQUACY AND PROMOTING GROWTH RECOVERY IN CHILDREN WITH OR AT RISK OF UNDERNUTRITION**

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**Background and Aims:** Improving nutritional intake is crucial for reversing growth deficits. This study aims to evaluate the use of an oral nutritional supplement (ONS) alongside dietary counselling (DC) for 240 days on nutritional adequacy and growth recovery in children with or at risk of undernutrition.

**Methods:** In this multi-site intervention study, 330 children aged 24-60 months at nutritional risk (z-scores for weight-for-age (WAZ) <-1, height-for-age (HAZ) <-1, and weight-for-height (WHZ) < 0) were randomized to receive either 2 servings of ONS daily with DC (ONS+DC) or DC-only allowing for usual milk consumption. Outcomes assessed included dietary intake (24-hour recall), nutrient adequacy ( $\geq 77\%$  of Vietnam's recommended nutrient intakes), and change in nutritional status.

**Results:** Most children had inadequate intakes of energy and multiple nutrients at baseline. Approximately 1.5 times as many children in the ONS+DC group met energy requirements (88.2% vs. 56.2%,  $p < 0.001$ ) compared to DC-only at day 240. More children also achieved adequacy for key nutrients including zinc (96.7% vs. 71.0%), calcium (90.2% vs. 19.8%), and iron (98.0% vs 70.4%) (all  $p < 0.001$ ). In subgroups with baseline moderate-to-severe undernutrition [HAZ < -2 (n=105) or WAZ < -2 (n=99)], ONS+DC was more likely to recover to HAZ or WAZ  $\geq -2$  at day 240 (both  $p < 0.05$ ), with 1.8 times as many children no longer stunted compared to DC-only (40.4% vs. 22.4%; OR [95% CI]: 6.08 [1.24 – 29.90];  $p = 0.016$ ).

**Conclusions:** Adding ONS to dietary counselling was more effective than dietary counselling with usual milk intake in closing nutritional gaps and promoting the reversal of stunting and underweight.



O026 / #466

**ORAL PRESENTATIONS SESSION 05: MALNUTRITION**

**21-02-2025 16:40 - 17:55**

**THE MAMI (MANAGEMENT OF SMALL, NUTRITIONALLY AT-RISK INFANTS AGED UNDER 6 MONTHS) CLINICAL CARE PATHWAY: A CLUSTER RANDOMISED CONTROLLED TRIAL.**

Melkamu Berhane Arefayine<sup>1</sup>, Emma Beaumont<sup>2</sup>, Mubarek Abera Mengistie<sup>1</sup>, Carlos Grijalva-Eternod<sup>2</sup>, Marie Mcgrath<sup>2</sup>, Hatty Barthorp<sup>3</sup>, Endashaw Hailu<sup>4</sup>, Gemechu Ameya<sup>5</sup>, Alemseged Abdisa<sup>6</sup>, Tsinuel Girma<sup>7</sup>, Marko Kerac<sup>2</sup>

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**Background and Aims:** Small, nutritionally at-risk infants aged  $\leq 6$ m (henceforth 'at-risk infants  $\leq 6$ ) are at high risk of mortality and morbidity. We developed a new clinical care pathway (CP) to improve their management. Our aim was to assess the impact of the MAMI CP on the growth/health at-risk infants  $\leq 6$ m.

**Methods:** A two-arm, parallel group, cluster randomised trial in Ethiopia. Clusters were health centres. Our target population were defined by: underweight *and/or* low birth weight/preterm, *and/or* wasting *and/or* stunting *and/or* growth faltering *and/or* maternal health/mental health problem affecting care. Intervention centres used the new MAMI CP to identify and manage infants; controls used standard nutrition/health protocols. Outcomes were assessed at age 6 months.

**Results:** We recruited 1060 infants  $\leq 6$ m in 19 intervention health centres; 1148 in 19 control health centres. Preliminary baseline results suggest more cases of complicated malnutrition in interventional clinics as well as lower mean weight-for-age Z-score in intervention clinics vs controls (-1.92 vs -1.74) at baseline. Baseline weight-for-length was -1.17 vs -1.07. At 6 months endline, exclusive breastfeeding was markedly higher among MAMI clinic infants (65.0%) than in controls (22.2%), adjusted OR 3.04 (95% CI 2.12-4.17,  $p < 0.001$ ). We are currently examining anthropometric and clinical differences and will be reporting on those at the meeting.

**Conclusions:** The MAMI CP has a marked effect on breastfeeding despite evidence of intervention clinic infants being smaller/more vulnerable at baseline. There is clear potential of benefit but other outcomes also need to be explored and reasons behind the baseline imbalances understood.



O027 / #447

## ORAL PRESENTATIONS SESSION 05: MALNUTRITION

21-02-2025 16:40 - 17:55

### LONG-TERM HEALTH CONSEQUENCES OF THE 1980S ETHIOPIAN GREAT FAMINE

Mubarek Abera Mengistie<sup>1</sup>, Gemechu Ameya<sup>2</sup>, Melkamu Arefyine<sup>3</sup>, Emma Beaumont<sup>4</sup>, Albert Coulman<sup>5</sup>, Jonathan Swann<sup>6</sup>, Debbie Thompson<sup>7</sup>, Carlos Grijalva-Eternod<sup>8</sup>, Grace O'Donovan<sup>8</sup>, Alemseged Abdisa<sup>9</sup>, Tsinuel Girma<sup>10</sup>, Marko Kerac<sup>11</sup>

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**Background and Aims:** While the long-term health and disease consequences of early life exposure to malnutrition or famine are well documented, most current evidence inadequately controls age and exposure status. Our study fills this gap.

**Methods:** We recruited and followed a cohort of individuals who experienced the Ethiopian Great famine in the 1980s during early life but later re-settled to famine unaffected area. We used age and sex-matched controls, and age unmatched controls who had not been exposed to the famine. We compared data between exposed and controls on anthropometric and body composition indicators, and substance use, episodes of NCDs, and serum bio-sample for a planned lipidomic and metabolomic analysis.

**Results:** We enrolled 545 exposed, 283 age-matched controls and 158 individuals born after famine. Those exposed to famine were significantly shorter compared to matched control [ $\beta$ :95%CI;p-value: -1.5:-2.4,-0.6;0.001] and born after famine controls [ $\beta$ :95%CI;p-value: -2.2:-3.8,-0.6;0.008]. The odds of hypertension was lower in the exposed compared to matched controls [ $\beta$ :95%CI;p-value: 0.5:0.3,0.8;0.004] but higher in the exposed when compared to born after famine controls. Waist to height ratio was higher in exposed compared to matched [ $\beta$ :95%CI;p-value: 0.01:0.003,0.02;0.006] and born after famine [ $\beta$ :95%CI;p-value: -0.03:-0.05,-0.004;0.021] controls. Triceps skinfold was higher in exposed compared to born after famine [ $\beta$ :95%CI; p-value:1.2:0.1,2.2;0.026] but not with the matched controls.

**Conclusions:** In a robustly controlled study design, early-life exposure to famine results



in shorter adult stature and greater markers of NCDs compared to controls. Laboratory analysis is needed (and is underway) to establish mechanisms linking early life exposure to famine/malnutrition with adult NCDs.



O028 / #281

**ORAL PRESENTATIONS SESSION 05: MALNUTRITION**

**21-02-2025 16:40 - 17:55**

**EFFECTS OF ORAL NUTRITIONAL SUPPLEMENT ON ANTHROPOMETRY AND BODY COMPOSITION IN MALNUTRITION AT RISK AND MALNOURISHED CHILDREN: MARVEL STUDY, A RANDOMIZED CONTROLLED TRIAL**

Orapa Suteerointrakool<sup>1</sup>, Patcharapa Thaweekul<sup>2</sup>, Suchaorn Saengnipanthkul<sup>3</sup>, Kamolmart Wannaphahoon<sup>2</sup>, Nathawan Khunsri<sup>1</sup>, Eakkarin Mekangkul<sup>4</sup>, Sirinuch Chomtho<sup>1</sup>

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**Background and Aims:** Undernutrition in young children leads to unfavorable long-term consequences; therefore, feasible and effective strategy to resolve this problem is warranted. . This study compared the effects of nutritional counselling versus its combination with oral nutritional supplements (ONS) on anthropometry and body composition.

**Methods:** Children aged 1-6 years with weight-for-height (WFH) z-score between -1SD and -3SD, based on WHO growth standards, were randomized into two groups: control group receiving nutritional counselling and intervention group receiving the same advice plus ONS (1 kcal/ml, 420 ml/day) for 3 months. Weight, height and body composition (via bioelectrical impedance) were measured at baseline, 1, and 3 months. Appetite was evaluated using the Visual Analogue Scale.

**Results:** A total of 159 children (78 control and 81 ONS, 59% and 58% boys) with median ages(IQR) of 3.5(2.1-4.9) and 3.3(2-4.8) years were included. After 3 months, the ONS group demonstrated higher gains in weight, height, weight-for-age (WFA) and WFH z-score compared to the control group [mean difference(95%CI):weight 0.16(0.04-0.28)kg; height: 0.42 (0.05-0.79)cm; WFA z-score: 0.42 (0.05 to 0.79); WFH z-score: 0.13(-0.02-0.27)]. Fat-free mass (FFM) increased more in the ONS group at 1 and 3 months [mean difference(95%CI) 0.26 (0.01-0.5) and 0.36 (0.1-0.63)kg]. Soft lean mass gain was also higher in the ONS group[0.39 (0.11 to 0.68)kg]. Appetite improved in both groups without significant between-group differences.

**Conclusions:** ONS in addition to nutritional counselling improved growth and fat-free mass in undernourished children. Changes in growth hormone regulation after the intervention deserve further research. TCTR20220908004 **Funding:** Danone Specialized



Nutrition and Ratchadapiseksompotch Fund, Faculty of Medicine, Chulalongkorn University



O029 / #139

**ORAL PRESENTATIONS SESSION 05: MALNUTRITION**

**21-02-2025 16:40 - 17:55**

**CHRONIC INFLAMMATION DRIVEN BY GUT DAMAGE ASSOCIATED MICROBIAL TRANSLOCATION IMPAIRS LINEAR GROWTH POST DISCHARGE AMONG KENYAN CHILDREN TREATED FOR COMPLICATED SEVERE MALNUTRITION**

Lina Akinyi Ochieng<sup>1</sup>, Evans Oketch Mudibo<sup>1</sup>, Justine Getonto<sup>2</sup>, Elisha Omer<sup>2</sup>, Johnstone Thitiri<sup>2</sup>, Moses Ngari<sup>2</sup>, James Berkley<sup>2</sup>, James Mwangi Njunge<sup>2</sup>, Cheryl Andisi<sup>1</sup>

<sup>1</sup>Pwani University, Biological Sciences, Kilifi, Kenya, <sup>2</sup>KEMRI Wellcome Trust Research Programme, Biosciences, Kilifi, Kenya

**Background and Aims:** Childhood nutritional status is directly impacted by episodes of acute illness. In low-resource settings, children often experience poor growth following illness, but the mechanisms driving these impacts are poorly understood. We aimed to understand the role of gut damage and microbial translocation in driving chronic systemic inflammation and its impact on growth over one year post-discharge among children treated for complicated severe malnutrition.

**Methods:** We measured IFABP, AGP, soluble CD14, ferritin, sTfR, and IGF1 in a cohort of 177 Kenyan children enrolled in a randomized control trial (NCT00934492). We also included 100 children without undernutrition recruited within the Childhood Acute Illness and Nutrition Network study at a single timepoint as controls.

**Results:** After one year, 87% of the children were wasted, while 69% were stunted. Compared to controls, children treated for complicated malnutrition displayed elevated levels of markers of gut damage (IFABP), microbial translocation (sCD14) and chronic systemic inflammation (AGP), which were inversely correlated with linear growth mediators (IGF-1). Additionally, we observed elevated levels of sTfR and reduced levels of ferritin with a sTfR/log(ferritin) index of 8.2, indicating iron deficiency anemia among the children treated for complicated severe malnutrition.

**Conclusions:** Our findings suggest that chronic systemic inflammation driven by gut damage-associated microbial translocation impairs IGF-1 signaling, thereby impacting linear growth recovery. Targeting gut damage and inflammatory pathways could be crucial in improving growth recovery. Future planned work will analyze additional biomarkers of inflammation, linear and ponderal growth, and microbial translocation to have an understanding of mechanisms underlying both linear and ponderal growth.





O030 / #207

**ORAL PRESENTATIONS SESSION 05: MALNUTRITION**

**21-02-2025 16:40 - 17:55**

**SYSTEMIC BIOLOGICAL MECHANISMS UNDERPIN POOR POST-DISCHARGE GROWTH AMONG SEVERELY WASTED CHILDREN WITH HIV**

Evans Oketch Mudibo<sup>1,2</sup>, Jasper Bogaert<sup>3</sup>, Caroline Tigoi<sup>1</sup>, Robert Bandsma<sup>4</sup>, Kirkby Tickell<sup>5</sup>, Judd Walson<sup>6</sup>, James Berkley<sup>1,7,8</sup>, James Mwangi Njunge<sup>1</sup>, Gerard Bryan Gonzales<sup>9</sup>

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**Background and Aims:** In sub-Saharan Africa, children with severe malnutrition (SM) and HIV (HIV-SM) have substantially worse outcomes than children with SM alone, facing higher mortality risk and impaired nutritional recovery post-hospitalisation. The biological mechanisms underpinning this risk remain incompletely understood. This case-control study nested within the Childhood Acute Illness and Nutrition (CHAIN) cohort in Kenya, Uganda, Malawi and Burkina Faso examined the effect of HIV on six months post-discharge growth among under 2 years old children with severe malnutrition and those at risk of malnutrition, assessed proteomic signatures associated with HIV in these children, and investigated how these systemic processes impact post-discharge growth in children with severe malnutrition.

**Methods:** Using the SomaScan™ assay, 7335 human plasma proteins were quantified. Linear mixed models identified HIV-associated biological processes and their associations with post-discharge growth. Using structural equation modelling, we examined directed paths explaining how HIV influences post-discharge growth.

**Results:** Here, we show that at baseline, HIV is associated with lower anthropometry. Additionally, HIV is associated with protein profiles indicating increased complement activation and decreased insulin-like growth factor receptor signalling and bone mineralization. HIV indirectly affects post-discharge growth by influencing baseline



anthropometry and also modulating proteins involved in bone mineralization and humoral immune responses.

**Conclusions:** These findings suggest specific biological pathways linking HIV to poor growth, offering insights for targeted interventions in this vulnerable population.



O031 / #463

## ORAL PRESENTATIONS SESSION 05: MALNUTRITION

21-02-2025 16:40 - 17:55

### EXPLORING THE ASSOCIATIONS BETWEEN SEVERE MALNUTRITION IN CHILDHOOD, REHABILITATION WEIGHT GAIN AND ADULT ADIPOSITY: A PROSPECTIVE COHORT STUDY

Kimberley S Mckenzie<sup>1</sup>, Debbie Thompson<sup>1</sup>, Asha Badaloo<sup>1</sup>, Charles Opondo<sup>2</sup>, Jonathan Ck Wells<sup>3</sup>, Mubarek Abera Mengistie<sup>4</sup>, Albert Koulman<sup>5</sup>, Amir Kirolos<sup>6</sup>, Marko Kerac<sup>7</sup>, Michael Boyne<sup>8</sup>

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**Background and Aims:** The relationships between severe malnutrition (SM), rehabilitation weight gain and cardiometabolic risk in adult survivors have not been fully elucidated. This study explored these associations in a cohort of adult who were hospitalized for SM as children.

**Methods:** Minimum weight-for-age z-scores (minWAZ) were analysed against adult adiposity (D-EXA) in sex-disaggregated regression models.

**Results:** 278 adult SM survivors were studied (60% male, mean age (SD) 28.2 (7.7) years, mean BMI (SD) 23.6 (5.2) kg/m<sup>2</sup>. Higher minWAZ was associated with increased adult waist circumference (difference:1.8 cm, 95% CI 0.7, 2.9,  $p=0.001$ ), fat mass (difference:2.4 kg, 95% CI 0.17, 1.06,  $p=0.007$ ) and android fat mass (difference:0.19 kg, 95% CI 0.09, 0.29,  $p<0.001$ ) in univariate analyses. Approximately 13% of this effect of minWAZ on adult fat mass was mediated by rehabilitation weight gain in g/kg/day (Sobel's  $p=0.053$ ). In male adult survivors, rehabilitation weight gain  $>12.9$  g/kg/day was associated with increased adult fat mass (difference:5 kg, 95% CI 2, 9,  $p=0.006$ ) and android fat (difference:0.5 kg, 95% CI 0.1, 0.8,  $p=0.006$ ). Female sex was the strongest predictor of increased adult fat mass (difference:12.7 kg, 95% CI 9.6, 15.7,  $p<0.001$ ) and android fat mass (difference:0.9 kg, 95% CI 0.6, 1.2  $p<0.001$ ) and adult age the



strongest predictor of increased adult waist circumference (difference:0.67 cm, 95% CI 0.39, 0.94,  $p<0.001$ ).

**Conclusions:** Faster rehabilitation weight gain as an independent risk factor for adiposity in male SM survivors requires further exploration but may be the target of future early-life interventions to reduce the risk of adult cardiometabolic disease.



O032 / #657

## ORAL PRESENTATIONS SESSION 05: MALNUTRITION

21-02-2025 16:40 - 17:55

### ORAL NUTRITIONAL SUPPLEMENT IMPROVES INDICATORS OF PEDIATRIC UNDERNUTRITION OVER 120 DAYS

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**Background and Aims:** Recent data suggests that 1 in 8 children in the United States have childhood undernutrition, indicated by mid-upper arm circumference (MUAC)-for-age Z-score (MUACAZ) or BMI-for-age Z-score (BMIAZ) <-1. Dietary counseling (DC) and Oral Nutrition Supplements (ONS) are both recommended to treat childhood undernutrition, but the effect of ONS+DC has not been evaluated recently in the US.

**Methods:** 279 undernourished children (BMIAZ or MUACAZ between -3 and -1) from 17 study centers across the US were assigned to either the DC group (2 dietary counseling sessions) or ONS+DC group (2 servings (480 kcal) of a commercially available ONS [PediaSure] daily and 2 dietary counseling sessions). Participants came in at baseline, day 30, day 60, and 120 days/exit. Dietary counseling sessions were completed by a registered dietitian. Outcomes included changes in MUACAZ and BMIAZ over 30, 60, and 120 days compared to baseline, and analyzed by AN(C)OVA (SAS Version 9.4).

**Results:** The change in BMIAZ was significantly higher in ONS+DC vs. DC group over 30, 60, and 120 days, and change in MUACAZ was significantly higher at 30 and 120 days (all  $P$ 's<0.05 with a trend for higher change in MUACAZ over 60 days in the ONS+DC vs DC ( $P=0.0673$ )).

**Conclusions:** In summary, this clinical study showed that 2 ONS per day, with 2 dietary counseling sessions, significantly improved changes in MUACAZ and BMIAZ compared to dietary counseling alone over 120 days. These clinical data support the benefits of ONS in addition to DC vs. DC alone for improving undernutrition in US children.



O033 / #711

## ORAL PRESENTATIONS SESSION 05: MALNUTRITION

21-02-2025 16:40 - 17:55

### CONCURRENCE OF STUNTING AND OVERWEIGHT/OBESITY (CSO) AND THE POTENTIAL DETERMINANTS OF CSO IN INDONESIA

Rahma Labatjo<sup>1</sup>, Amanda Avery<sup>1</sup>, Simon Welham<sup>1</sup>, Muthia Paramita<sup>2</sup>, Raden Ayu Cahyaning Alam<sup>3</sup>

<sup>1</sup>University of Nottingham, Nutrition And Dietetics, Division Of Food Science, School Of Biosciences, Sutton Bonington, United Kingdom, <sup>2</sup>Universitas Gadjah Mada, Department Of Nutrition And Health, Faculty Of Medicine, Public Health, And Nursing, Yogyakarta, Indonesia, <sup>3</sup>Gorontalo Health Polytechnic, Nutrition Department, Gorontalo, Indonesia

**Background and Aims:** Indonesia faces a double burden of malnutrition, with a high prevalence of underweight children (17.7%) alongside stunting (21.6%) and overweight (3.5%) in children under five. Children with concurrent stunting and overweight are at even higher risk of chronic diseases later in life, potentially due to visceral fat deposition. This study aims to address the knowledge gap regarding the prevalence and determinants of concurrent stunting and overweight/obesity in Indonesian children, investigating both maternal and child-related factors.

**Methods:** The study uses a retrospective cohort design, employing data from the 2022 Indonesian Nutritional Status Survey. A total of 38,634 under-five children in five chosen provinces (Aceh, Special Capital Region of Jakarta, Gorontalo, West Sulawesi, and Papua) were included in this study. A hierarchical binary logistic regression was employed to investigate the association between proximal, intermediate and distal determinants and the concurrence of stunting and overweight/obesity in every province. Odds ratios with 95% confidence intervals were calculated to assess the strength of associations.

**Results:** The prevalences of concurrent stunting and overweight/obesity in the five chosen provinces were 4.4% (Papua), 0.9% (Aceh), 0.8% (Sulawesi Barat), 0.7% (Gorontalo), and 0.6% (Special Capital Region of Jakarta). The hierarchical binary logistic regression revealed that in Aceh, child sex (male) [(AOR = 1.572, 95% CI: (1.056-2.340)], access to healthcare (not every time children were sick) [(AOR = 0.623, 95% CI: (0.389-0.996)], and ANC visits (less than four) [(AOR = 2.084, 95% CI: (1.101-3.943)], while in Gorontalo, immunisation status (not fully immunized) [(AOR = 3.273, 95% CI: (1.250-8.570)], were significantly associated with the concurrence of stunting and overweight/obesity.



**Conclusions:** This study showed that the prevalences of concurrence of stunting and overweight/obesity in five provinces in Indonesia were varied. Even though this study revealed that only two provinces have some significant determinants of concurrence stunting and overweight/obesity, it is important to formulate tailored nutrition-specific and sensitive programs in each province to prevent the double burden of malnutrition.



O034 / #550

**ORAL PRESENTATIONS SESSION 06: NEONATAL & PREMATUREITY**

**22-02-2025 11:20 - 12:20**

**EXAMINING THE IMPACT OF MATERNAL INSULIN THERAPY ON PROINFLAMMATORY CYTOKINES, CHEMOKINES, AND REGULATORY T CELLS IN INFANTS BORN TO MOTHERS WITH GESTATIONAL DIABETES**

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**Background and Aims:** To investigate the hypothesis that exposure to maternal insulin therapy during gestation induces regulatory mechanisms in utero, we aimed to compare the levels of CD4+CD25+FOXP3+ regulatory T cells, along with proinflammatory cytokines, chemokines, and autoantibodies, in cord blood (CB) of infants born to mothers with or without gestational diabetes mellitus (GDM)

**Methods:** Cord blood mononuclear cells (CBMCs) were collected from 48 infants born to mothers with GDM and 48 infants born to unaffected mothers.

These samples were then analyzed for the presence of CD4+CD25+FOXP3+ cells both ex vivo and after in vitro stimulation with human insulin using flow cytometry.

**Results:** The percentage of FOXP3+ cells within CD4+CD25(high) cells was found to be higher in the cord blood of infants born to mothers with GDM compared to those born to unaffected mothers. Following in vitro insulin stimulation, there was an increase in the percentage of FOXP3+ cells within CD4+CD25 cells, as well as upregulation of FOXP3, NFATc2, STIM1, IL-10, and TGF- $\beta$  transcripts in CBMCs, observed exclusively in offspring of mothers with GDM. Furthermore, in these infants, levels of TNF- $\alpha$  and IL-10, along with the frequency of CD4(+) CD25(+) T cells, were significantly elevated, and these increased levels positively correlated with anti-GAD65 autoantibody levels.

**Conclusions:** These findings suggest that maternal insulin treatment during pregnancy leads to an expansion of regulatory T cells and proinflammatory cytokines in the fetus, potentially contributing to the decreased risk of diabetes observed in children born to mothers with GDM compared to those with paternal diabetes.





O035 / #225

**ORAL PRESENTATIONS SESSION 06: NEONATAL & PREMATUREITY**

**22-02-2025 11:20 - 12:20**

**FULL-VOLUME VERSUS SMALL-VOLUME FEEDING IN VERY LOW BIRTH WEIGHT NEWBORNS: A RANDOMIZED CONTROLLED TRIAL**

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**Background and Aims:** It is unknown whether infants with very low birth weight (VLBW) should be fed full-volume or small-volume feeding soon after birth. The study aimed to find out the incidence of extrauterine growth restriction (EUGR) in VLBW infants at hospital discharge using a full-volume or a small-volume feeding after birth.

**Methods:** The open-label trial included VLBW infants weighing between 1000-1499 g. Exclusion criteria were hemodynamic instability, delivery room resuscitation >1 minute, inability to feed orally, reversed end-diastolic flow in the umbilical artery, major congenital malformation, and failure to obtain consent. The primary outcome was the incidence of EUGR at hospital discharge. Infants received breast milk or preterm formula at a rate of 80 ml/kg/day (full volume) or 20 ml/kg/day (small volume). Feeds were advanced at a rate of 20-30 ml/kg/day till 180-200 ml/kg/day by one week of age.

**Results:** Forty-four newborns were randomized to full-volume and 45 to small-volume feeding. We used the Intergrowth 21<sup>st</sup> charts to interpret growth. Baseline maternal and neonatal characteristics were comparable. The incidence of EUGR at discharge was similar between the two groups. We observed higher mortality in the full volume group (12(27.3%) than in the small volume group (4(8.9%) [RR (95% CI) 0.33(0.11 – 0.93) (p-value 0.04)]. Other secondary outcome variables showed no difference. Because of increased mortality in the full-volume group, the trial was terminated prematurely before meeting the estimated sample size of 232 infants.

**Conclusions:** We observed no difference in the incidence of EUGR between full-volume and small-volume feeding in VLBW infants.



O036 / #202

**ORAL PRESENTATIONS SESSION 06: NEONATAL & PREMATUREITY**

**22-02-2025 11:20 - 12:20**

**UMBILICAL CORD PLASMA ALPHA-TOCOPHEROL CONCENTRATION INVERSELY CORRELATES WITH ULTRASOUND AND ANTHROPOMETRIC MEASURES OF FETAL GROWTH IN THE CAMDEN COHORT**

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**Background and Aims:**  $\alpha$ -Tocopherol ( $\alpha$ T) from the maternal circulation is essential for fetal development. Paradoxically, higher fetal plasma  $\alpha$ T was associated with lower birth weight in a mostly Caucasian cohort (n=189). We aimed to extend the literature by determining if maternal or neonatal plasma  $\alpha$ T adversely affects fetal growth in a large, low SES and racially diverse subset of the Camden Study.

**Methods:** We measured  $\alpha$ T in 423 maternal-fetal dyads; we collected maternal plasma at study entry (week-16 gestation) (n=388) and at week-28 of gestation (n=260) and cord plasma (CP) at birth (n=423). Fetal growth was assessed by ultrasound at week 14 (n=296) and 20 (n=243) of gestation and by anthropometrics at birth (n=423). Plasma  $\alpha$ T was stratified into quartiles (Q1-Q4) to determine associations with fetal growth after accounting for confounding factors.

**Results:** Fetal growth measures were not associated with maternal plasma  $\alpha$ T. In contrast, CP  $\alpha$ TQ3 (-139g,  $P<0.05$ ) and Q4 (-171g,  $P<0.01$ ) had lower mean birthweights compared to Q1. CP  $\alpha$ TQ2 (-1.42cm,  $P<0.01$ ), Q3 (-1.47cm,  $P<0.01$ ) and Q4 (-1.50cm,  $P<0.01$ ) also had lower mean birth chest circumferences compared to Q1. CP  $\alpha$ TQ3 and Q4 had lower mean in utero circumferences for head (-26mm,  $P<0.05$ ; -25mm,  $P<0.05$ ) and abdomen (-31mm,  $P<0.05$ ; -26mm,  $P<0.05$ ) compared to Q1. Femur length was lower for Q3 (-5.6mm,  $P<0.05$ ) than for Q1.

**Conclusions:** Maternal plasma  $\alpha$ T status was not associated, but CP  $\alpha$ T status was inversely associated with fetal growth. This supports investigation into the potential differential impact of maternal and neonatal  $\alpha$ T status on neonatal development.



O037 / #237

**ORAL PRESENTATIONS SESSION 06: NEONATAL & PREMATURITY**

**22-02-2025 11:20 - 12:20**

**DOCOSAHEXAENOIC ACID (DHA) SUPPLEMENTATION: UNCOVERING ITS IMPACT ON GROWTH AND NEURODEVELOPMENT IN PRETERM INFANTS: A SYSTEMATIC REVIEW AND META-ANALYSIS**

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**Background and Aims:** Preterm infants are at risk of DHA deficiency due to interrupted transfer during the third trimester, potentially affecting growth and development. This study aims to evaluate DHA supplementation's effects on growth and neurodevelopmental outcomes in preterm infants, considering inconclusive results from previous studies caused by variability in DHA delivery and underpowered sample sizes.

**Methods:** Systematic search was conducted across PubMed, EBSCO, Cochrane, ProQuest, Wiley, Medline, and Scopus databases from 2000–2024 using PRISMA Guideline. Cochrane RoB 2.0 was used to qualitatively assess included studies. Fixed-effects meta-analyses were performed on neurodevelopmental and growth outcomes with inverse variance method. Sensitivity analyses are also done to determine outlier studies.

**Results:** Twenty-three studies, yielding 3695 participants from 9 countries, were included. DHA has statistically significant effect on growth, particularly in increasing length (MD = 0.85 [95% CI: 0.75–0.95],  $p < 0.00001$ ;  $I^2 = 88\%$ ) and head circumference (MD = 0.13 [95% CI: 0.06–0.21],  $p = 0.0007$ ;  $I^2 = 53\%$ ), with minimal clinical increment in weight. Moreover, DHA was statistically significant in improving mental development (MD = 8.22 [95% CI: 7.19–9.25],  $p < 0.00001$ ;  $I^2 = 93\%$ ), while motor, language, and cognitive aspects showed minimal effects. Furthermore, DHA supplementation combined with arachidonic acid proved to be more effective and protective for preterm morbidity, as both are essential.

**Conclusions:** DHA supplementation in preterm infants enhanced growth in weight, length, and head circumference. Despite improvements in mental aspect, the effects on cognitive, language, and motor development were not statistically significant. Further studies involving longer durations or higher DHA supplementation are recommended.



O038 / #324

**ORAL PRESENTATIONS SESSION 06: NEONATAL & PREMATUREITY**

**22-02-2025 11:20 - 12:20**

**VITAMIN B12 DEFICIENCY AT NEWBORN SCREENING SECONDARY TO MATERNAL DEPLETION: PROPOSAL OF A DIAGNOSTIC THERAPEUTIC MODEL**

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**Background and Aims:** This prospective study evaluates infant-mother dyads with early diagnosis of B12 deficiency through extensive newborn screening in order to characterise a model for diagnostic-therapeutic management.

**Methods:** From November 2021, 91 infant-mother dyads have been identified thanks to newborn screening. After exclusion of inborn errors of metabolism, plasma B12, plasma and urine methylmalonic acid and homocysteine were tested and B12 deficiency due to maternal cause was confirmed. Treatment consisted of intramuscular hydroxocobalamin and oral folic acid. All mothers underwent dietary evaluation and nutritional counselling.

**Results:** Among the 91 dyads, the most represented nationality was Indian (37,4%), followed by Italian (31,9%). The main cause of B12 deficit was poor dietary intake. The estimated median intake during pregnancy was 2.6 mcg/day: for the 90.1% of mothers, the intake was lower than EFSA Dietary Reference Values for pregnancy (4.5 mcg/die). During pregnancy, 69.2% of mothers were omnivorous, 16.6% lacto-vegetarian (LV), 13.1% lacto-ovo-vegetarian (LOV), and 1.1% vegan. Indian mothers followed LV and LOV diets the most. Only 15.4% took B12 supplementation: 92% were omnivorous, 8% lacto-vegetarian. Moreover, among B12-supplemented mothers, 43% were Italian, 14% Indian and 43% of other nationalities.

**Conclusions:** Thanks to the newborn screening, many cases of B12 deficiency due to maternal causes have come to light. Early treatment normalised B12 values and related biomarkers, preventing short-term neurological consequences. The increase in exclusion dietary patterns (e.g. vegans/vegetarians) has highlighted an increasing need to raise awareness to dietary habits during pregnancy among professionals in the



obstetric-gynaecological area, also to assess the cost-benefit impact of nutritional intervention.



O039 / #338

**ORAL PRESENTATIONS SESSION 06: NEONATAL & PREMATUREITY**

**22-02-2025 11:20 - 12:20**

**AN UPDATED SYSTEMATIC REVIEW TO PRODUCE FENTON 3RD-GENERATION FENTON PRETERM INFANTS' GROWTH CHARTS USING AN OSTENSIVE HEALTHY COHORT**

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**Background and Aims:** Experts recommend preterm infant growth assessments be based on healthy growing fetuses. This study's objective was to produce Fenton 3<sup>rd</sup>-generation sex-specific preterm growth charts based on healthy fetal population distributions and to evaluate the consistency of the growth velocity patterns.

**Methods:** We conducted a literature search in MEDLINE and EMBASE databases from January 1, 2012 to July 4, 2024 for recent population-based databases of newborn infants of various gestational ages. We used systematic review techniques for recent international data to identify ostensibly healthy fetal estimates of weight, length and head circumference. We harmonized the weight, length, and head circumference meta-analyses with the World Health Organization growth standard and re-scaled the charts' x-axis from completed weeks to actual age.

**Results:** The ostensibly healthy preterm data was from 15 countries (Australia, Brazil, Canada, China, Finland, Israel, Italy, Japan, Netherlands, New Zealand, Sweden, Switzerland, Spain, UK, US). The meta-analysis included data from studies that either excluded prenatal morbidities known to reduce fetal growth and/or excluded provider-initiated births, resulting in a sample size of 4.8 million with 174,184 births <30 weeks gestational age. The Fenton 3<sup>rd</sup>-generation preterm growth charts growth velocity for weight, head circumference and length more appropriately showed a consistent decline with increasing post-menstrual age. The birthweight meta-analyses showed curves with similar shapes to ultrasound estimates.

**Conclusions:** These 3<sup>rd</sup>-generation growth chart curves demonstrate more uniform slopes across percentiles and a closer alignment with ultrasound estimates offering a more accurate representation of fetal growth and how preterm infants should grow, offering a preterm infant growth standard.



O040 / #340

**ORAL PRESENTATIONS SESSION 06: NEONATAL & PREMATURETY**

**22-02-2025 11:20 - 12:20**

**ASSESSING THE FEASIBILITY AND RELIABILITY OF ULTRASOUND MEASUREMENTS OF SUBCUTANEOUS FAT IN VERY PRETERM INFANTS**

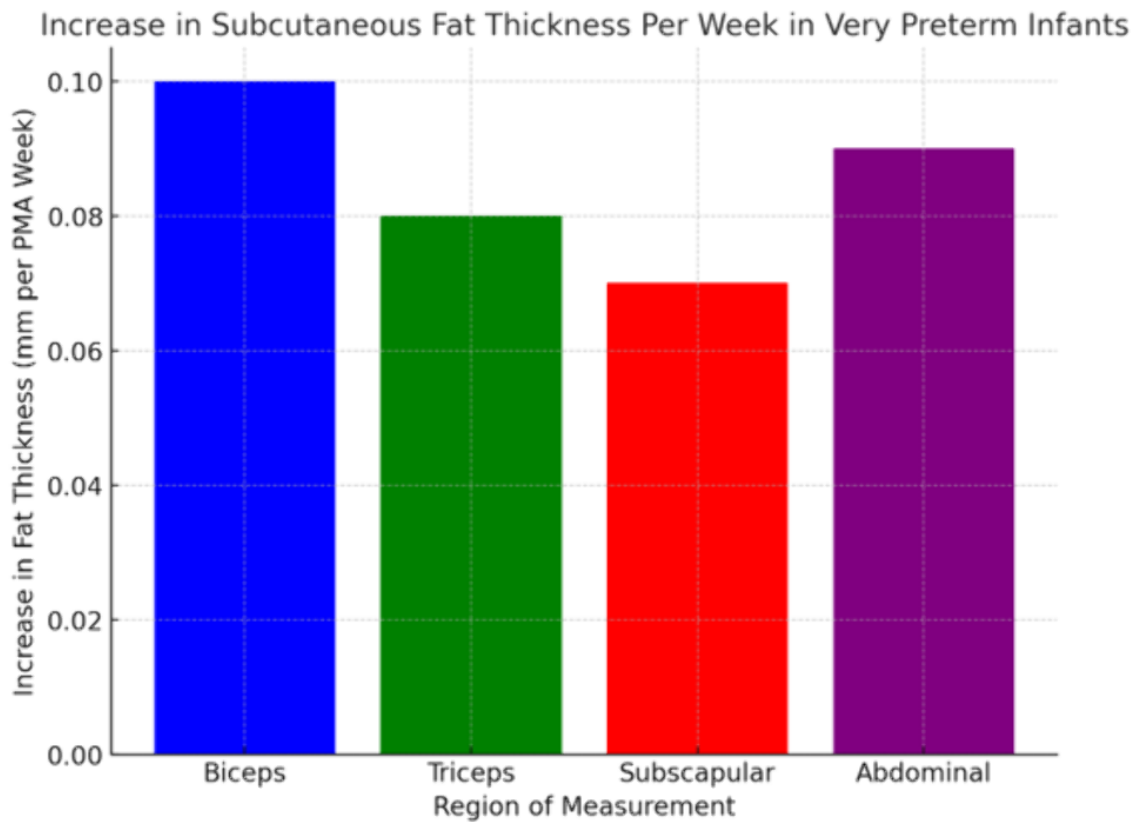
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**Background and Aims:** The distribution of regional fat may indicate metabolic health and brain development in preterm infants. While point-of-care ultrasound has been successfully used to evaluate regional fat in term infants, its application in preterm infants remains limited. This study aimed to longitudinally assess changes in body composition metrics through bedside ultrasound in moderate and very preterm infants.

**Methods:** A total of 77 very preterm infants were enrolled at birth, with body composition assessments performed until they reached 37 completed weeks of corrected gestational age (CGA). Linear mixed-effects regression analysis was used to model the changes in body composition over time.

**Results:**



: Body composition metrics displayed a steady increase throughout the PMA period. Specifically, biceps ultrasound subcutaneous fat (SQF) thickness increased by 0.10 mm (95% CI: 0.07, 0.14) for each postmenstrual week. Triceps, subscapular, vastas lateralis, gluteaus major and abdominal ultrasound SQF measurements remained stable until 28 weeks PMA and then showed weekly increases until 36 weeks. The inter-rater and intra-rater intraclass correlation coefficients for ultrasound SQF measurements ranged from 82.8 to 94.9.

**Conclusions:** Bedside ultrasound is both a feasible and reliable method for assessing regional fat distribution in very preterm infants. Gaining insights into regional fat distribution may enhance our understanding of metabolic health and brain growth in preterm infants. Conventional body composition assessments may not be suitable for medically fragile very preterm infants. This study illustrates the effectiveness of bedside ultrasound techniques in monitoring longitudinal changes in this cohort, confirming the method's reliability and feasibility for evaluating subcutaneous fat distribution.