C.O.
COMUNICAÇÕES ORAIS

CO1. TRAJETÓRIAS DE GANHO DE PESO NO INÍCIO DE VIDA ASSOCIAM-SE A COMPORTAMENTOS ALIMENTARES EM IDADE ESCOLAR: UM ESTUDO DE COORTE

Sarah Warkentin[1,2]; Ana Cristina Santos[1-3]; Andreia Oliveira[1-3]

[1] Unidade de Investigação em Epidemiologia - Instituto de Saúde Pública da Universidade do Porto

[2] Laboratório para a Investigação Integrativa e Translacional em Saúde Populacional

[3] Departamento de Epidemiologia Clínica, Medicina Preditiva e Saúde Pública, Faculdade de Medicina da Universidade do Porto

INTRODUÇÃO: Doenças crónicas não-transmissíveis na idade adulta são influenciadas por experiências de início da vida, nomeadamente as trajetórias de ganho de peso. Contudo, não é claro de que forma estas trajetórias podem influenciar o controlo do apetite da criança em idade escolar.

OBJETIVOS: Investigar a associação entre trajetórias de ganho de peso do nascimento aos 5 anos e comportamentos alimentares estabelecidos aos 7 anos de vida.

METODOLOGIA: Foram incluídos mães e crianças da coorte Geração XXI (n=3232). Trajetórias de crescimento foram previamente identificadas e categorizadas como "ganho de peso normal", "ganho de peso no início de vida", "ganho de peso na infância" e "ganho de peso persistente". Os comportamentos alimentares foram avaliados através do questionário validado Children`s Eating Behavior Questionnaire. As associações foram estimadas por modelos de regressão generalizada, ajustados para Índice de massa corporal (IMC), idade e escolaridade maternas, práticas parentais, sexo e z-score de IMC da criança.

RESULTADOS: Em comparação à trajetória de ganho de peso normal, aquelas crianças que apresentaram maior ganho de peso no início de vida tiveram pontuações mais altas em "Prazer em Comer" (β=0,22,IC95%:0,09;0,35), "Resposta à Comida" (β=0,29,IC95%:0,16;0,42) e pontuações mais baixas de "Ingestão Lenta" (β=-0,15,IC95%:-0,30;-0,01) aos 7 anos. O ganho de peso durante a infância e de forma persistente também tiveram efeito sobre o apetite aos 7, contudo estas associações não mantiveram a significância estatística após ajuste dos modelos.

CONCLUSÕES: A trajetória de ganho de peso no início de vida mostrou-se consistentemente associada ao desenvolvimento de comportamentos alimentares, sendo que estas crianças apresentaram maior prazer em comer, maior resposta à comida e uma ingestão mais rápida aos 7 anos. Intervenções podem ter como foco crianças que ganharam mais peso no início da vida dada a sua associação a comportamentos alimentares obesogénicos em idade escolar.

FINANCIAMENTO: FEDER através de COMPETE e FCT (POCI-01-0145-FEDER-030334;PTDC/SAU-EPI/30334/2017),(IF/01350/2015).

CO2. DESEMPENHO DE UM QUESTIONÁRIO DE FREQUÊNCIA ALIMENTAR BREVE NA ESTIMATIVA DO CONSUMO DE ALIMENTOS ULTRAPROCESSADOS EM DIFERENTES IDADES AO LONGO DA INFÂNCIA

Vânia Magalhães[1,2]; Sofia Vilela[1-3]; Milton Severo[1,2,4]; Carla Lopes[1,2,5]

[1] Unidade de Investigação em Epidemiologia - Instituto de Saúde Pública da Universidade do Porto

[2] Laboratório para a Investigação Integrativa e Translacional em Saúde Populacional

[3] Departamento de Ciências da Saúde Pública e Forenses e Educação Médica, Faculdade de Medicina da Universidade do Porto

[4] Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto

[5] Instituto de Ciências Biomédicas Abel Salazar da Universidade do Porto

INTRODUÇÃO: Os diários alimentares (DA) tem sido descritos como método de referência para avaliar o consumo de alimentos ultraprocessados (AUP). No entanto, os questionários de frequência alimentar (QFA) permitem captar alimentos consumidos menos frequentemente.

OBJETIVOS: Avaliar o desempenho de um QFA breve na estimativa do consumo de AUP em crianças.

METODOLOGIA: O estudo incluiu participantes da coorte de nascimento de base populacional Geração XXI, avaliados aos 4, 7 e 10 anos, com informação alimentar proveniente de DA de 3 dias e QFA - com 35, 38 e 41 itens, respetivamente - referente aos últimos 6 meses (n=2319, n=3351, n=2754, respetivamente). Todos os alimentos foram classificados segundo o grau de processamento usando a classificação NOVA. A relação entre o consumo de AUP, estimado pelos dois métodos foi estudada através de: coeficiente de correlação de Pearson, concordância entre quartis (coeficiente kappa), coeficiente de correlação intra-classe (ICC) e gráficos de Bland-Altman.

RESULTADOS: Os DA resultaram em estimativas superiores de consumo de AUP (4anos: 389g *vs*. 278g, 7anos: 466g *vs.* 331g, 10anos: 479g *vs.* 399g; p<0.001). A correlação entre as estimativas melhora à medida que a idade aumenta (ρ=0,273, ρ=0,387, ρ=0,414, respetivamente; p<0,001), observando-se a mesma tendência para a concordância (k=0,106, k=0,124, k=0,135; p<0.001). O ICC mostra que a variância explicada pelos métodos é superior aos 4 anos [0,226 (IC95%:0,112-0,326) vs. 7anos: 0,321 (IC95%:0,151-0,453) vs. 10anos: 0,391 (IC95%:0,322-0,453)], e através dos gráficos de Bland-Altman, observa-se que o erro na estimativa de AUP entre os dois métodos é superior aos 4 anos (-0,73 a 2,75) e inferior aos 10 anos (-0,70 a 2,35).

CONCLUSÕES: A relação entre as estimativas provenientes de DA e QFA mostrou-se globalmente moderada, concluindo-se que o QFA é útil para avaliar o consumo de AUP em crianças, particularmente em idades mais velhas, provavelmente porque o consumo de AUP é superior.

CO3. THE POTENTIAL OF A DIGITAL GAME TO PROMOTE VEGETABLE CONSUMPTION IN PRESCHOOL CHILDREN

Cátia Braga-Pontes[1-3]; Susana Custódio[1,2]; Pedro Graça[3]

[1] Center for Innovative Care and Health Technology, Polytechnic of Leiria

[2] School of Health Sciences, Polytechnic of Leiria

[3] Faculty of Nutrition and Food Science of the University of Porto

INTRODUCTION: Vegetable consumption at preschool age is lower than the recommendations for this age group, and it is necessary to find attractive strategies to promote their consumption. Serious games are increasingly used as resources to promote healthy living habits and in childhood these types of games can be very useful in nutrition education.

OBJECTIVES: The purpose of this study is to verify the perspective of the different

members of the Veggies4myHeart project on the potential of a digital game to promote the vegetable consumption in preschool age.

METHODOLOGY: This is a qualitative study, using thematic content analysis. The answers were analyzed using the WebQDA qualitative analysis software. The sample consisted of 26 participants who were involved in Veggies4myHeart project and answered an open-ended online questionnaire.

RESULTS: The thematic content analysis resulted in a SWOT analysis in which the participants found several strengths in this digital game, both for the technical quality and scientific rigor of the game and for its ability to entertain children and to convey the educational message. The weaknesses most pointed out by the participants relate to the fact that digital games promote sedentary behaviors. The opportunities of digital game most mentioned by the participants are related to their accessibility and to the possibility of integrating the game in school activities. Digital game threats most frequently mentioned in the participants' responses relate to the fact that a device is needed to access the game.

CONCLUSIONS: The members of the Veggies4myHeart project highlight the positive aspects (forces and opportunities) of the digital game related to the ability to entertain and transmit an educational message simultaneously, stating that it can be advantageous for the assimilation of knowledge. Some negative aspects pointed out by participants should be considered in future interventions using digital games with preschool children.

CO4. QUALIDADE NUTRICIONAL DOS LANCHES DE CRIANÇAS DO 1.º CICLO DO ENSINO BÁSICO: RESULTADOS PRELIMINARES DO PROJETO DE INTERVENÇÃO SINTRA CRESCE SAUDÁVEL

Telma Nogueira[1,2]; Raquel J Ferreira[3,4]; Sara Marques da Costa[1]; Vitória Dias da Silva[1]; Mariana Liñan Pinto[1]; Joana Sousa[1,2]

[1] Laboratório de Nutrição, Faculdade de Medicina da Universidade de Lisboa

[2] Instituto de Saúde Ambiental, Faculdade de Medicina da Universidade de Lisboa

[3] Câmara Municipal de Sintra, Departamento de Educação, Juventude e Desporto

[4] Escola Superior de Tecnologia da Saúde de Lisboa do Instituto Politécnico de Lisboa

INTRODUÇÃO: Os lanches, quando nutricionalmente adequados, acarretam benefícios para a saúde das crianças, incluindo regulação do apetite, melhoria da memória e concentração. Porém, quando nutricionalmente inadequados, podem promover o excesso de peso. O Sintra Cresce Saudável (SCS) é um projeto de intervenção para promoção de estilos de vida saudável, dirigido ao 1.º ciclo do ensino básico.

OBJETIVOS: Avaliar o impacto do projeto de intervenção SCS na qualidade nutricional dos lanches das crianças do 1.º ciclo do ensino básico.

METODOLOGIA: O projeto de intervenção SCS assenta numa metodologia de investigação participada de base comunitária. Foram recolhidos, no início e no final de do ano letivo 2018/2019, dados relativos aos lanches da manhã e da tarde de crianças do 1.º ciclo do ensino básico em 53 turmas de 5 escolas, e classificados segundo o esquema de semáforo: verde quando compostos por "alimentos a promover", amarelos nos casos em que surgem "alimentos a limitar" e vermelhos sempre que pelo menos um alimento corresponda aos "alimentos a não disponibilizar". Os alimentos que compõem essas categorias são estabelecidos de acordo com os compromissos presentes na política de lanches escolares de cada Agrupamento de Escolas, além de respeitarem as orientações relativas à oferta alimentar em meio escolar, emanadas pela Direção-Geral da Educação.

RESULTADOS: Entre o início e o final do ano letivo registou-se um aumento significativo de lanches verdes, correspondendo a mais 16,8% em lanches da manhã (p<0,001) e mais 17,4% em lanches da tarde (p<0,001). Simultaneamente, verificam-se decréscimos significativos de lanches vermelhos consumidos durante a manhã (-8,0%) (p=0,003) e durante a tarde (-11,9%) (p<0,001).

CONCLUSÕES: Da análise de dados preliminares conclui-se que o projeto de intervenção SCS contribui para a melhoria da qualidade nutricional dos lanches consumidos em contexto escolar.

CO5. CHANGES IN SCREEN TIME FROM 4 TO 7 YEARS OF AGE, FOOD CONSUMPTION AND OBESITY: FINDINGS FROM THE GENERATION XXI BIRTH COHORT

Marta Figueira[1]; Ana Cristina Santos[2-4]; Joana Araújo[2-5]

[1] Institute of Public Health of the University of Porto

[2] Epidemiology Research Unit - Institute of Public Health of the University of Porto

[3] Laboratory for Integrative and Translational Research in Population Health

[4] Department of Public Health and Forensic Sciences, and Medical Education - Faculty of Medicine of the University of Porto

[5] Faculty of Nutrition and Food Sciences of the University of Porto

INTRODUCTION: Increased exposure to screens has been linked with unhealthy eating behaviours and childhood obesity. However, it is not well known whether screen time changes from pre-school to school age.

OBJECTIVES: To analyse changes of screen time from 4 to 7 years of age and associated factors, and the relation with food consumption and obesity.

METHODOLOGY: The analysis included 4 966 children evaluated at 4 and 7 years of age, as part of the population-based birth cohort Generation XXI (Porto, Portugal). Screen time (television and electronic games) was assessed for weekdays and weekend and average daily time was estimated. Dietary intake was evaluated using a food frequency questionnaire. Weight and height were objectively measured and BMI was classified according to the WHO growth charts. Proportions were compared using the Chi-square test and means through analysis of variance (ANOVA).

RESULTS: At 4 years of age, 27.9% of children were exposed to screens more than 120min/day. Mean frequency of sweets and snacks consumption increased with increasing screen time, while the consumption of fruit and vegetables decreased (p<0.001). Screen time over 120 min/day was more frequent among children with obesity (p<0.001). From 4 to 7 years, 31.8% decreased their screen time, 21.9% increased, 16.5% maintained ≤60 min and 29.7% maintained >60min. Proportion of children increasing screen time from 4 to 7 years was lower among those with higher parental education (p<0.001) and higher income (p<0.001), and there was a higher proportion maintaining low screen time (≤60min) among normal weight children (p<0.001), those doing sports (p<0.001) and sleeping ≥10h/night at 4 years (p=0.008).

CONCLUSIONS: Children with higher screen time at 4 years presented unhealthier food consumption and higher obesity prevalence. Children maintaining the lowest screen exposure from pre-school to school age were more frequently from higher socioeconomic strata and presented healthier lifestyle behaviours.

CO6. NUTRITION EDUCATION INTERVENTIONS AT SCHOOL MAY CHANGE THE FOOD CHOICE REASONS IN ADOLESCENTS

Ana Lúcia V Rêgo[1]; Vitória Aparecida S dos Santos[1]; Camila CP Estima[2]; Natalia C da Silva[1]; Mariana L Marques[1]; Iuna A Alves[1]; Luciana G Cardoso[1]; Camila B Rodrigues[1]; Fernanda PS Rainho[1]; Luana S Blaudt[1]; Geisa G Rodrigues[1]; Gabriele L Rangel[1]; Tais de S Lopes[3]; Edna M Yokoo[4]; Rosely Sichieri[2]; Rosangela A Pereira[3]

[1] Graduate Program in Nutrition of the Federal University of Rio de Janeiro

[2] Departament of Epidemiology of the State University of Rio de Janeiro

[3] Departament of Social and Applied Nutrition of the Federal University of Rio de Janeiro

[4] Departament of Epidemiology and Biostatistics of the University Federal Fluminense

ACTA PORTUGUESA DE NUTRIÇÃO 26 (2021) 105-118 | LICENÇA: cc-by-nc
ASSOCIAÇÃO PORTUGUESA DE NUTRIÇÃO® | WWW.ACTAPORTUGUESADENUTRICAO.PT | ACTAPORTUGUESADENUTRICAO@APN.ORG.PT

INTRODUCTION: In Brazil, healthy eating promotion has been the focus of public policies to preventing obesity and chronic diseases. In the school environment, nutrition education initiatives may achieve positive results related to food behavior.
OBJECTIVES: To evaluate the influence of an intervention based on nutrition education on the reasons considered when choosing foods among adolescents.
METHODOLOGY: This study is a secondary analysis of the intervention study titled "Parents, Students, and Teachers for Healthy Eating", carried out in 2014 in two public schools of Niterói, Brazil, with 413 6th-and-7th graders (control group=228; intervention group=185). The adolescents filled out an auto-administered questionnaire and selected, out of 15 options, the 3 most important reasons guiding their food choices, which were categorized as (a) sensory; (b) socio-cultural; (c) accessibility and affordability; and (d) healthy eating. One-hour education sessions on healthy eating and lifestyle were offered monthly between April and October. The relative risk (and 95% confidence limits) of changing the reasons considered when making food choices after the intervention were estimated using log-binomial generalized estimation equation models for repeated measures (PROC GENMOD; SAS OnDemand) for crude and sex adjusted models.
RESULTS: The sensory aspects of food were the reasons most often picked by adolescents. In the baseline, concern with healthy eating was greater among girls than boys. After the educational actions, compared to the control group, the adolescents in the intervention group presented greater risk of citing "healthy eating" as a reason for choosing food, even after adjusting for the gender variable (RR = 1.510; 95% CI = 1.008, 2.262).
CONCLUSIONS: Educational actions in the school environment may motivate adolescents to choose foods based on healthy eating principles.

CO7. CHILDREN'S FOOD SECURITY STATUS AND ITS ASSOCIATION WITH DIETARY PATTERNS IN 10 YEARS OLD CHILDREN FROM THE GENERATION XXI COHORT

Isabel Maia[1,2]; Andreia Oliveira[1-3]; Milton Severo[1,2]; Ana Cristina Santos[1-3]
[1] Epidemiology Research Unit of Institute of Public Health of University of Porto
[2] Laboratory for Integrative and Translational Research in Population Health
[3] Department of Public Health and Forensic Sciences, and Medical Education - Faculty of Medicine of the University of Porto

INTRODUCTION: Evidence on the association between children's food security status and dietary patterns are still limited, particularly in European countries.
OBJECTIVES: To evaluate the association between children's food security status and a *priori* and a *posteriori*-defined dietary patterns in a Portuguese population-based cohort of children.
METHODOLOGY: A cross-sectional study was conducted, including 2800 children from the 10-year-old evaluation of the Generation XXI birth cohort. Information about socio-demographic characteristics, food security status, evaluated by the Self-administered Food Security Survey Module for children (SAFSSMC), and dietary intake were collected. A previously developed Healthy Eating Index composed of seven food groups (fruit and vegetables, dairy products, meat and meat products, fish and eggs, sweet snacks, salty snacks and soft drinks) was adapted for this study (a higher score, a higher diet quality). A *posteriori*-defined dietary patterns were derived using latent class analysis: "Healthier", "Low consumption", "Energy-dense foods", "Snacking" and "Intermediate consumption". Linear, logistic regression and multinomial logistic regression models were computed to evaluate the associations under study (β coefficients and odds ratios (OR) and the respective 95% confidence intervals (95%CI)).
RESULTS: A food insecurity prevalence of 9.4% was observed. Children's food insecurity was negatively associated with diet quality (β=-0.671;95%CI:-1.129;-0.213), regardless of maternal education, caregivers' unemployment and child's sex. A positive association between the SAFSSMC raw score and low fruit and vegetables consumption (OR=1.069;95%CI:1.002;1.139), high consumption of meat and meat products (OR=1.075;95%CI:1.011;1.144), and soft drinks (OR=1.074;95%CI:1.008;1.145) were observed, independently of maternal education, caregivers' unemployment, child's sex and the other food groups. Positive associations between the SAFSSMC raw score and the "Energy-dense foods" (OR=1.142;95%CI:1.016;1.283) and the "Low consumption" (OR=1.109;95%CI:1.007;1.221) dietary patterns were found, comparing with those following the "Healthier".
CONCLUSIONS: Food insecure children had worse dietary patterns. Intervention strategies targeting food insecure children should be developed to promote healthy dietary habits in vulnerable populations.

CO8. SOCIOECONOMIC FACTORS AND INTERGENERATIONAL DIFFERENCES IN HEIGHT OF ADULTS BORN IN 1990 AND THEIR PARENTS: RESULTS FROM THE EPITEEN COHORT

Berta Valente[1,2]; Elisabete Ramos[3-5]; Joana Araújo[2-5]
[1] Institute of Public Health of the University of Porto
[2] Faculty of Nutrition and Food Sciences of the University of Porto
[3] Epidemiology Research Unit - Institute of Public Health of the University of Porto
[4] Laboratory for Integrative and Translational Research in Population Health
[5] Department of Public Health and Forensic Sciences, and Medical Education - Faculty of Medicine of the University of Porto

INTRODUCTION: Attained adult height is influenced by genetic and environmental factors. Socioeconomic factors influence growth conditions, such as nutrition, and may limit the achievement of the genetic potential of height.
OBJECTIVES: To evaluate the intergenerational differences in height of adults born in 1990 and their parents and the influence of socioeconomic factors.
METHODOLOGY: We used data from the EPITeen cohort – a population-based cohort of adolescents born in 1990, recruited at 13 years old in schools of Porto, and re-evaluated throughout adolescence and adulthood. We analyzed data of height of 862 females and 750 males, and their respective parents. Measured height of adults at 27 years was used, and when it was not available, height at 24 or 21 years was considered. Parents' height was self-reported. The difference in height between female adults and their mothers, and male adults and their fathers was calculated. Mean height difference and standard deviation (SD) according to socioeconomic variables were compared using the analysis of variance (ANOVA).
RESULTS: In adulthood, the average height of participants born in 1990 was 162.1cm for females and 175.5cm for males. Females were on average 1.57cm taller than their mothers, and males 3.08cm taller than their fathers. Mean height gain was superior in adults whose parents had a lower educational level: in males, 6.17cm difference for 0-6 years of parental education, 3.24cm 7-9 years, 2.50cm 10-12 years, and 1.86cm >12 years ($p<0.001$); in females, 2.87cm, 1.03cm, 0.58cm and 1.77cm ($p=0.172$), respectively. Mean height gain differed according to the skill level of parental occupation: low (2.25cm in females and 2.13cm in males) *vs.* high (1.56cm and 1.30cm, respectively).
CONCLUSIONS: Attained adult height increased over one generation, suggesting that recent generations might have recovered at least part of the social inequalities experienced by their parents.

CO9. FOOD INSECURITY AFTER THE FINANCIAL CRISIS: THE CASE OF PORTUGUESE VULNERABLE CHILDREN

Maria-Raquel G Silva[1-3]; Vítor Rosado-Marques[1,4]; Helena Nogueira[1]; Daniela Rodrigues[1,5]; Aristides M Machado-Rodrigues[1,6]; Augusta Gama[1,7]; Cristina Padez[1,5]
[1] Research Centre for Anthropology and Health – Human Biology, Health and Society of the University of Coimbra

[2] Faculty of Health Sciences of the University Fernando Pessoa
[3] Comprehensive Health Research Centre – Sleep, Chronobiology and Sleep Disorders, Nova Medical School of the Nova University of Lisbon
[4] Faculty of Human Kinetics of the University of Lisbon
[5] High School of Education of the Polytechnic Institute of Viseu
[6] Department of Life Sciences of the University of Coimbra
[7] Department of Animal Biology, Faculty of Sciences of the University of Lisbon

INTRODUCTION: During a financial crisis, children are the most affected increasing the risk of limited growth and development processes due to increased requirements of energy and nutrient intakes, which are not achieved on those most vulnerable (from families with low socio-economic status, unemployment or lower incomes). In addition, increased food prices affect households by reducing both dietary diversity and nutritious foods and increasing the risk of household food insecurity (HFI).

OBJECTIVES: This study aimed to evaluate HFI in Portuguese children after the global financial crisis, according to age and socio-economic status.

METHODOLOGY: A cross-sectional study (from November 2016 to April 2017) included 4737 Portuguese children with a mean age of 6.5±1.8 years from the three largest districts (Porto, Coimbra and Lisboa). The Food Insecurity Scale adapted and validated for the Portuguese population was applied to parents, among other instruments. The children's socio-economic status was categorized into low (<9 years of education), middle (10-12 years) and high socio-economic status (if the father had a university degree). Children were divided as preschool aged (3-6yrs.) and school-aged (7-11yrs.). Overweight and obesity were defined according to the WHO criteria (BMI z-score was>1 and>2, respectively). The significance level was 5% (P<0.05).

RESULTS: In preschool children, HFI was associated with: low (OR=4.4, p<0.01) and medium (OR=2.4, p<0.01) father's education; low (OR=2.2; p<0.01) and medium (OR=1.6; p<0.01) mother's education; living in Lisboa (OR=1.4;p<0.05) and; being overweight/obese (OR=1.1;p<0.05). In school children, HFI was associated with: low (OR=2.9; p<0.01) and medium (OR=1.7; p<0.05) father's education; low (OR=2.5;p<0.01) and medium (OR=2.3;p<0.01); living in Coimbra (OR=1.7;p<0.05) and being overweight/obese (OR=1.3;p<0.05). No significant differences were observed between children's gender, parents' age and HFI.

CONCLUSIONS: Children from low socio-economic families are at risk of experiencing HFI. Also, malnourished ones are vulnerable. Further investigation about HFI across different geographical areas of Portugal is needed.

CO10. BODY FAT ACCUMULATION WEAKENS THE ASSOCIATIONS BETWEEN BODY COMPOSITION AND ENERGY EXPENDITURE WITH ENERGY INTAKE IN HEALTHY WOMEN

Nuno Casanova[1]; Kristine Beaulieu[2]; Pauline Oustric[2]; Dominic O'Connor[2]; Catherine Gibbons[2]; John Blundell[2]; Graham Finlayson[2]; Mark Hopkins[1]

[1] School of Food Science and Nutrition, Faculty of Environment of the University of Leeds
[2] Appetite Control and Energy Balance Group, School of Psychology, Faculty of Medicine and Health of the University of Leeds

INTRODUCTION: Fat-free mass (FFM), resting metabolic rate (RMR) and total daily energy expenditure (TDEE) have been shown to be positively associated with energy intake (EI). While it has been suggested that fat mass (FM) exerts an inhibitory influence over EI, studies are contradictory and it has been postulated that the accumulation of body fatness may affect the coupling between EE and EI.

OBJECTIVES: To investigate how the associations between body composition, EE and EI change according to levels of body fatness.

METHODOLOGY: Body composition (BodPod), RMR (indirect calorimetry), TDEE (Sensewear Armband), laboratory-based ad libitum test meal and free-living self-reported 24-hour EI (7-day online food diary; myfood24) were assessed in 93 healthy women (age=35±10y; BMI=25.5±4.2kg/m^2) during two studies in lean participants (n=45; BMI=18.5-24.9kg/m^2) and those with overweight/obesity (n=48; BMI=25.0-34.9kg/m^2).

RESULTS: In the whole sample, FFM (r=0.45), RMR (r=0.41), TDEE (r=0.39) but not FM (r=0.17; p=0.11) were positively associated with 24-hour EI (all p<0.001). No associations were observed between body composition or EE with test meal EI in the whole sample (all p≥0.13). An interaction was found in which body fat percentage (β=-1.88; p=0.02) moderated the association between RMR [F(3, 89)=8.1, r^2=0.21, p<0.001] and TDEE [F(3, 88)=6.8, r2=0.19, p<0.001] with 24-hour EI. While FM and FFM failed to explain the variance in test meal EI [F(2,89)=0.29, r2=0.006, p=0.75], the addition of the quadratic term FM^2 (β=0.46; p<0.001) explained an additional 9% of the variance [F(3, 88)=3.0, r^2=0.092, p=0.04].

CONCLUSIONS: The associations between FFM, RMR and TDEE with 24-hour EI were moderated by body fatness, with stronger associations observed in leaner participants. A non-linear relationship was observed between FM and test meal EI, in which a negative association was observed in leaner, but not in those with overweight/obesity. These data suggest that body fat accumulation may weaken the coupling between EE and EI.

CO11. DOES FETAL GROWTH ADEQUACY AFFECT THE NUTRITIONAL COMPOSITION OF MOTHERS' MILK?: A HISTORICAL COHORT STUDY

Lia Correia[1]; Manuela Cardoso[1,2]; Ana Luísa Papoila[3]; Marta Alves[3]; Daniel Virella[3,4]; Renata Ramalho[1]; Paula Pereira[1]; Israel Macedo[5]; Teresa Tomé[5]; Álvaro Cohen[6]; Luís Pereira-da-Silva[4,7]

[1] Centro de Investigação Interdisciplinar Egas Moniz - Applied Nutrition Studies Group, Egas Moniz – Cooperativa de Ensino Superior
[2] Nutrition Unit, Maternidade Dr. Alfredo da Costa do Centro Hospitalar Universitário de Lisboa Central
[3] Research Unit do Centro Hospitalar Universitário de Lisboa Central
[4] Neonatal Intensive Care Unit, Hospital Dona Estefânia do Centro Hospitalar Universitário de Lisboa Central
[5] Neonatal Intensive Care Unit, Maternidade Dr. Alfredo da Costa do Centro Hospitalar Universitário de Lisboa Central
[6] Prenatal Diagnosis, Maternidade Dr. Alfredo da Costa do Centro Hospitalar Universitário de Lisboa Central
[7] Comprehensive Health Research Centre, Medicine of Woman, Children, and Adolescent, NOVA Medical School | Faculdade de Ciências Médicas da Universidade Nova de Lisboa

INTRODUCTION: It's unclear whether the mothers' milk composition of preterm infants with fetal growth restriction (FGR) differs from those with normal intrauterine growth.

OBJECTIVES: To assess the association between intrauterine growth of preterm infants and energy and macronutrient content in their mothers' milk.

METHODOLOGY: A historical cohort of mothers of preterm infants was assessed according to offspring's intrauterine growth. FGR was defined as small-for-gestational-age (SGA) or appropriate-for-gestational-age (AGA) with fetal growth deceleration (FGD). During the first four postpartum weeks, the composition of daily pool samples of mothers' milk was measured using a mid-infrared human milk analyzer. Explanatory models for milk energy, true protein, total carbohydrate, and fat contents were obtained by generalized additive mixed effects regression models.

RESULTS: 127 milk samples were analyzed from 73 mothers who delivered 92 neonates. Energy content was significantly higher in mothers with chronic hypertension (average +6.28kcal/dL; 95% CI: 0.54, 12.01; p=0.034) and for extremely preterm compared to very preterm infants (average +5.95kcal/dL; 95% CI: 2.16, 9.73; p=0.003), and weakly associated with single pregnancies

(average +3.38kcal/dL; 95% CI: 0.07, 6.83; p=0.057). True protein content was higher in mothers with chronic hypertension (average +0.91g/dL; 95% CI: 0.63, 1.19; p<0.001) and gestational hypertension (average +0.25g/dL, 95% CI: 0.07; 0.44; p=0.007), and for extremely preterm compared to very and moderate preterm infants (average +0.19; 95% CI: 0.01, 0.38; p=0.043 and +0.28g/dL; 95% CI: 0.05, 0.51; p=0.017, respectively). Fat content was weakly and negatively associated to FGR, both in SGA infants and AGA infants with FGD (average -0.44g/dL; 95% CI -0.92, -0.05; p=0.079 and average -0.36g/dL; 95% CI -0.74, -0.02; p=0.066, respectively).

CONCLUSIONS: Energy and macronutrient content in mothers' milk of preterm infants was significantly and positively associated with the degree of prematurity and hypertension. The hypothesis that the composition of milk is associated with FGR was not demonstrated.

CO12. HANDGRIP STRENGTH PERCENTILES FOR PORTUGUESE OLDER ADULTS: USE AND VALIDITY FOR UNDERNUTRITION SCREENING IN HOSPITALIZED OLDER ADULTS

Vítor Carvalho[1]; Ana S Sousa[1,2]; Teresa F Amaral[3,4]; Rita S Guerra[1,4]

[1] Faculty of Health Science of University Fernando Pessoa

[2] Center for Innovative Care and Health Technology of the Polytechnic of Leiria

[3] Faculty of Nutrition and Food Sciences of the University of Porto

[4] Associate Laboratory of Energy, Transports and Aeronautics of Institute of Science and Innovation in Mechanical and Industrial Engineering

INTRODUCTION: Handgrip strength (HGS) is a valid and useful method for screening undernutrition, particularly among older adults.

OBJECTIVES: To study the adequacy and validity of HGS percentiles developed in Portuguese older adults for undernutrition screening of older adults at hospital admission.

METHODOLOGY: A cross-sectional study was conducted in a university hospital in a sample of older adults (age ≥65 years). The presence of undernutrition was identified with Nutritional Risk Screening 2002 (NRS-2002) and the presence and severity of undernutrition with Patient Generated Subjective Global Assessment (PG-SGA). The sensitivities and specificities of the HGS for undernutrition screening were calculated using PG-SGA and NRS-2002 as diagnostic methods. These calculations were conducted with the sample stratified for sex. The 15th, 25th and 50th percentiles of HGS developed in Portuguese older adults, stratified by sex, age and height were used.

RESULTS: This sample is composed of 233 participants (40.3% women), aged 65-91 years. According to PG-SGA, 46.8% of men and 37.2% of women presented moderate / suspected or severe undernutrition and 40.3% of men and 68.1% of women presented undernutrition according to NRS-2002. Using NRS-2002, the sensitivities of HGS varied between 37.0%-89.1% and specificities varied between 21.4%-77.0%. The highest values of sensitivity were obtained using the P50 of HGS (men: 80.4%; women: 89.1%), whereas for specificity, the highest value was obtained for the P25 in the case of women (54.0%) and for the P15 in the case of men (77.0%). Using PG-SGA, sensitivities varied between 37.3%-89.6% and specificities varied between 20.0% 80.0%. The best sensitivity values were obtained using the P50 of HGS (men: 78.9%; women: 89.6%), and for specificity using the P15 (men: 80.0%; women: 48.0%).

CONCLUSIONS: These data confirms that HGS is a promising method for undernutrition screening of Portuguese older adults at the hospital admission.

CO13. EATING IN OR OUT OF HOME IN THE PORTUGUESE POPULATION: ARE THERE DIFFERENCES IN DIETARY INTAKE?

Mariana Silva[1-3]; Sara Rodrigues[1,2,4]; Daniela Correia[1-3]; Milton Severo[1,2]; Duarte Torres[1,2,4]; Carla Lopes[1-3]

[1] Epidemiology Research Unit, Institute of Public Health of the University of Porto

[2] Laboratory for Integrative and Translational Research in Population Health

[3] Department of Public Health and Forensic Sciences, and Medical Education. Faculty of Medicine of the University of Porto

[4] Faculty of Nutrition and Food Sciences of the University of Porto

INTRODUCTION: Eating out of home (OH) has been increasing due to social and contextual changes. This phenomenon varies between age groups and eating locations and can contribute to a poor diet quality.

OBJECTIVES: Using data from the National Food, Nutrition and Physical Activity Survey (IAN-AF;2015–2016), this study aimed to describe and compare energy and nutrient intake and food groups consumption according to eating out patterns (EOP), by age groups.

METHODOLOGY: Dietary intake was estimated by non-consecutive 2*days of food diaries (children)/24-hrs recalls (other age groups). Four EOP apriori patterns were defined according to eating location: "Home" (at least 80% of meals at home), "Other homes", "School/Work" and "Restaurants/Other Places" (<80% of meals at home and the highest prevalence of meals consumption in the respective location).

RESULTS: Most meals were performed at home (69.1%), or at school in children and adolescents (26.3% and 18.7%) and at restaurants in adults and elderly (13,9% and 8,3%). "Restaurants/other places" was characterized by a significantly higher energy intake in adults, higher saturated fatty acids intake in children, adolescents and adults, higher sodium intake in children and adults, and higher free sugars intake in children and adolescents. It also presented the highest consumption of sweets/cakes/biscuits, significant in adolescents and adults, and non-alcoholic beverages, significant in all age groups except for elderly. "School/work" had the highest fruit/vegetables/pulses consumption, significant in children, adolescents and adults and higher dairy consumption, significant in adolescents and adults. "Home" EOP presented healthier dietary composition in all age groups.

When compared to "Home", adults in "Restaurants and other places" EOP had higher odds of drinking alcoholic beverages (OR=1.73;IC95%:1.17-2.56).

CONCLUSIONS: When consuming out of home, "School/work" seems to contribute to higher consumption of nutrient-dense foods and "Restaurants/other places" contributes to higher consumption of energy-dense foods, reflecting different nutrient profiles.

CO14. ENERGY AVAILABILITY OVER ONE ATHLETIC SEASON

Filipe Jesus[1,2]; Mónica Sousa[1,3]; Catarina L Nunes[2]; Luís B Sardinha[2]; Analiza M Silva[2]

[1] Nutrition & Metabolism, NOVA Medical School of NOVA University Lisbon

[2] Exercise and Health Laboratory, Interdisciplinary Center for the Study of Human Performance, Faculty of Human Kinetics of University of Lisbon

[3] Center for Health Technology and Services Research of NOVA University Lisbon

INTRODUCTION: Energy availability (EA) is the difference between energy intake (EI) and exercise energy expenditure (EEE) relative to fat-free mass (FFM). During the athletic season EA is expected to change; however, evidence is scarce. Additionally, clinical (<30kcal/kg FFM) and subclinical (30-40/30-45kcal/kg FFM for male and female athletes, respectively) low EA have health and performance implications.

OBJECTIVES: To estimate and compare EA during pre-season and competitive phase.

METHODOLOGY: Fifty-six athletes (10% females) from 5 sports [basketball (n=23); handball (n=6); volleyball (n=6); swimming (n=11); triathlon (n=10)] completed both assessments. Total and EEE were assessed by doubly labelled water

and metabolic equivalents of tasks, respectively. Fat mass (FM) and FFM were evaluated with a 4-compartment model.

RESULTS: Body weight increased during the season (0.8±2.5kg, p=0.026) while FFM (0.6±2.8kg, p=0.096) and FM (0.1±2.2kg, p=0.637) did not change. Also, EA increased from pre-season (45.7±10.5kcal/kg FFM) to competition (54.0±9.0kcal/kg FFM, p<0.001). Both sexes and all sports increased EA between assessments (p<0.001 and p<0.05, respectively). During both moments, triathlon's EA (33.9±5.0 and 42.7±3.9kcal/kg FFM) was lower (p<0.05) than basketball (50.9±9.9 and 58.5±8.5kcal/kg FFM), volleyball (48.3±3.6 and 56.2±5.3kcal/kg FFM), and swimming (49.4±7.5 and 57.4±6.2kcal/kg FFM) while handball's EA (35.8±7.0 and 47.0±4.1kcal/kg FFM) was lower (p<0.05) than basketball and swimming. Clinical low EA was present in 2 athletes during pre-season (handball (n=1); triathlon (n=1)) and none during competition. Subclinical low EA was present in 18 athletes during pre-season (basketball (n=4); handball (n=3); swimming (n=3); triathlon (n=8)) and 11 during competition (basketball (n=2); handball (n=2); triathlon (n=7)).

CONCLUSIONS: Overall, EA increased over the season in both sexes and in all studied sports. Although athletes seem to be able to manage the physiological demands of the athletic season, low EA is still present. Thus, nutritionists should prevent and treat the evolution of low EA to prevent its negative outcomes.

CO15. PRETERM NEONATES' MICROBIOTA: INFLUENCE OF MATERNAL MICROBIAL TRANSMISSION AND FEEDING

Juliana Morais[1,2]; Cláudia Marques[1,3]; Ana Faria[1,2]; Diana Teixeira[1,2,4]; Inês Barreiros-Mota[1,2]; Catarina Durão[1,5]; João Araújo[1,3]; Shámila Ismael[1,2]; Sara Brito[6]; Manuela Cardoso[7]; Israel Macedo[6]; Teresa Tomé[6]; Conceição Calhau[1,3,4]

[1] Faculdade de Ciências Médicas | NOVA Medical School da Universidade NOVA de Lisboa

[2] Comprehensive Health Research Centre, Chronic Diseases Research Center, Faculdade de Ciências Médicas | NOVA Medical School da Universidade NOVA de Lisboa

[3] Center for Health Technology Services Research, Faculdade de Ciências Médicas | NOVA Medical School da Universidade NOVA de Lisboa

[4] NOVA Medical School, University Unit Lifestyle Medicine José de Mello Saúde

[5] Epidemiology Research Unit - Institute of Public Health of University of Porto

[6] Pediatrics Department, Maternidade Dr. Alfredo da Costa do Centro Hospitalar Universitário de Lisboa Central

[7] Nutrition and Dietetics Unit, Maternidade Dr. Alfredo da Costa do Centro Hospitalar Universitário de Lisboa Central

INTRODUCTION: Preterm infants are especially vulnerable to infections and disease. Vertical microbiota transmission and infant feeding are known to be major determinants of neonate's microbiota. Recently, fecal alkaline phosphatase (ALP) was suggested as a specific biomarker of Necrotizing Enterocolitis.

OBJECTIVES: The FEEDMI Study aimed to evaluate the link between the maternal gut – meconium's microbiota and the influence of infant-feeding (mother's own milk (MOM), donor human milk (DHM) and formula) on the fecal microbiota composition and ALP activity in preterm infants.

METHODOLOGY: This is an observational study that included preterm infants in the neonatal intensive care unit of Maternidade Dr. Alfredo da Costa (NCT03663556). Meconium and fecal samples were collected at four time points (between 2nd - 26th postnatal days). Fecal microbiota was analyzed by RT-PCR and by 16S rRNA sequencing. Fecal ALP activity was evaluated by spectrophotometry at the 26th postnatal day.

RESULTS: A total of 389 fecal samples were analyzed from 117 preterm neonates. Meconium microbiota of neonates born after 28 gestational weeks (very preterm neonates) showed stronger correlations with their mothers' fecal microbiota. However, neonates born before 28 gestational weeks (extremely preterm neonates) had more Lactobacillus – genus that dominate the vaginal microbiota – than very preterm neonates, regardless of the mode of delivery.

Human milk feeding was positively associated with bacterial richness. Neonates fed with human milk during the first week of life had increased Bifidobacterium content and fecal ALP activity on the 26th postnatal day.

CONCLUSIONS: Collectively, these findings support the hypothesis that mother-to-infant bacterial transmission is a controlled and time-specific process and point out the importance of MOM and DHM in the establishment of fecal microbiota on neonates prematurely delivered. Moreover, these results suggest an ALP-mediated pathway by which human milk may protect against NEC. Thus, the implementation of more human milk banks should be encouraged.

This study is supported by Milupa DN-ELN 2017 grant awarded by the Portuguese Neonatal Society and by ERDF through the operation POCI-01-0145-ERDF-007746 funded by the Programa Operacional Competitividade e Internacionalização – COMPETE2020 and by National Funds through FCT - Fundação para a Ciência e a Tecnologia within CINTESIS, R&D Unit (reference UID/IC/4255/2013).

CO16. BODY COMPOSITION AND NUTRITIONAL STATUS OF COVID-19 PATIENTS ADMITTED TO A HOSPITAL

Mónica Azevedo[1]; Fábio Cardoso[2]; Bruno Oliveira[1,3]; Rui Poínhos[1]; Cristina Teixeira[2]; Flora Correia[1,2,4]

[1] Faculty of Nutrition and Food Sciences of the University of Porto

[2] Hospital and University Center of São João

[3] Laboratory of Artificial Intelligence and Decision Support, Institute for Systems and Computer Engineering, Technology and Science

[4] Nephrology Research and Development Unit of Faculty of Medicine of the University of Porto

INTRODUCTION: Little is known about the body composition and nutritional status of patients infected with COVID-19. However, these parameters can be closely related to the disease outcomes and complications.

OBJETIVES: To assess and characterise the body composition and nutritional status of COVID-19 patients admitted to a hospital and relate to disease severity.

METHODOLOGY: Patients hospitalised with Covid-19 in the Infectious Diseases Department of the *Centro Hospitalar Universitário de São João*, between 12/2020 and 04/2021 had, in the first 48h, nutritional assessment. Weight, height, BMI, biochemical and body composition data through bioimpedance [Fat Mass (FM), Skeletal Muscle Mass (SMM) and Total Body Water (TBW)] were collected. Both SMM and FM were normalized for height by dividing by height^2 [SMM index (SMMI) and FM index (FMI)] and compared to population reference values. Data on comorbidities and Covid-19 severity was also collected in clinical process.

RESULTS: The 145 participants (62.0% males), had a mean age of 69 years (sd = 16). The majority (37.2%) had overweight, 26.8% obesity and 7,6% underweight (minimum BMI = 11.6 kg/m^2; maximum = 53.4; mean = 27.1; SD = 6.8).

About three-quarters of patients (73.8%) developed severe COVID-19, with males having significantly lower SMM (p = 0.015) and TBW (p = 0.012), and females higher CPR (p = 0.025), but with no significant differences in terms of the remaining body composition and clinical characteristics (analytical profile and comorbidities). When comparing our TBW, IMG and IMME values with the reference ones, we found that, 87.6%, 41.4%, 13.1% participants, respectively, had a lower value than the standardized reference one for sex and age.

CONCLUSIONS: Excessive weight was dominant in our sample. A large percentage of participants had discrepancies between their body composition values and the reference values. Severe COVID-19 was related to lower SMM and TBW in males.

CO17. ASSOCIATIONS BETWEEN HIGH-METABOLIC RATE ORGANS AND FASTING HUNGER: AN EXPLORATORY STUDY USING MAGNETIC RESONANCE IMAGING IN HEALTHY MEN

Nuno Casanova[1]; Anja Bosy-Westphal[2]; Manfred J Müller[2]; Kristine Beaulieu[3]; John Blundell[3]; Graham Finlayson[3]; Mark Hopkins[1]

[1] School of Food Science and Nutrition, Faculty of Environment of the University of Leeds

[2] Institute of Human Nutrition and Food Science of the Christian-Albrechts University

[3] Appetite Control and Energy Balance Group, School of Psychology, Faculty of Medicine and Health of the University of Leeds

INTRODUCTION: Fat-free mass (FFM) has been shown to be positively associated with hunger and energy intake, an action mediated by resting metabolic rate (RMR). However, although it has been recognised that FFM comprises a heterogeneous group of tissues with distinct metabolic rates, it remains unknown how specific organs contribute to the perception of hunger.

OBJECTIVES: To examine whether the between-subject variance in fasting hunger is better explained when FFM is assessed at the tissue-organ level as compared to a single uniform body component.

METHODOLOGY: Whole-body (quantitative magnetic resonance) and tissue-organ body composition (magnetic resonance imaging), RMR (indirect calorimetry) and fasting hunger (100-mm visual analogue scales) were assessed in 23 healthy men (age=25±3y; BMI=23.4±2.1kg/m^2). Spearman correlations were calculated to assess the strength of association between body composition and fasting hunger, with Bonferroni corrections applied to adjust for multiple comparisons.

RESULTS: FFM (r_s=0.41; p=0.05) and RMR (r_s=0.41; p=0.05), but not fat mass (r_s=0.15; p=0.51), were positively associated with fasting hunger, but these became statistically non-significant after Bonferroni corrections. However, the association between the combined mass of high-metabolic rate organs (r_s=0.56; p=0.005) and fasting hunger were stronger than with FFM as a single uniform body component. The strongest individual association was observed between liver mass and fasting hunger (r_s=0.57; p=0.005).

CONCLUSIONS: The capacity to explain the between-subject variance in fasting hunger improved when individual organs of body composition were measured separately. Notably, the only individual organ to show an association with fasting hunger was the liver. While it remains unknown whether high-metabolic rate organs present specific metabolic or molecular characteristics that influence appetite, these findings suggest a potential role in the drive to eat, highlighting the importance of including detailed assessments of body composition at the tissue-organ level in appetite models to improve our understanding of the mechanisms influencing the motivation to eat.

CO18. NUTRITIONAL STATUS AND DIETARY HABITS AT PREGNANCY: IMPACT ON THE PREGNANCY AND BIRTH OUTCOMES

Beatriz Soares Ferreira[1]; Joana Sousa[1,2]; Inês Aparício[1]; Luísa Pinto[3]; Diogo Ayres de Campos[3]

[1] Laboratory of Nutrition, Faculty of Medicine of the University of Lisbon

[2] Institute of Environmental Health, Faculty of Medicine of the University of Lisbon

[3] Obstetrics Service, Santa Maria Hospital of the Lisboa Norte Hospital Center

INTRODUCTION: Preconception and pregnancy nutritional status and dietary habits play a major role in pregnancy, delivery, newborn outcomes and in long-term health. A healthy diet can be evaluated by Diet Quality Index (DQI) and adherence to the Mediterranean Dietary Pattern (MDP) that accompanied by a good nutritional status can be determinants for a successful pregnancy.

OBJECTIVES: The aim is to evaluate the association between the nutritional status and the dietary habits on the pregnancy and birth outcomes of pregnant women followed at the obstetrics consultation of the Portuguese Central Hospital.

METHODOLOGY: Prospective observational study based with data collected from pregnant women (n=217). Nutritional status (preconception BMI and GWG) and dietary habits (food frequency questionnaire to evaluate the DQI and PREDIMED questionnaire) were assessed.

RESULTS: 49% (n=107) were preconception overweight (≥25kg/m^2). 62% had a GWG above recommended and women with overweight preconception exceed the maximum recommendation (11.5kg) by 38% and obese (9kg) by 48%. Overweight preconception presents a higher risk to a GWG above recommended (OR:3.2; 95% CI:1.6, 6.4), a cesarean delivery (OR:2.2; 95% CI:1.0, 4.1) and a not recommended birth weight (OR:2.6; 95% CI:1.2, 5.4). An association was found between overweight preconception BMI and increased bleeding in delivery and between a GWG above recommended and the newborn reanimation (p<0.05). Only ¼ (n=54) have good adherence to MDP and women with preconception overweight have a lower DQI score (p<0.05). The lower MDP adherence were associated with a GWG above recommended and a lower DQI score with a not recommended birth weight (p<0.05).

CONCLUSIONS: A higher preconception BMI appears to be associated with a higher GWG and a poorer dietary habit and can result in complications in delivery and newborn. Nutritional intervention in this period, especially for women at risk, is therefore central to a better health status.

CO19. ASSOCIATION BETWEEN CHRONO-NUTRITION, DIET QUALITY AND CHRONOTYPE IN PORTUGUESE YOUTH

Sofia Cardoso[1,2]; Inês Sanches[1,2]; Daniela Correia[1-3]; Carla Lopes[1-3]; Sofia Vilela[1,2]

[1] Epidemiology Research Unit - Institute of Public Health of the University of Porto

[2] Laboratory for Integrative and Translational Research in Population Health

[3] Public Health and Forensic Sciences, and Medical Education Department, Faculty of Medicine of the University of Porto

INTRODUCTION: Chronotype is the individual's circadian preference for morningness/eveningness. Chrono-nutrition encompasses the relationship between food intake and circadian rhythms. Later chronotypes might be associated with later energy intake, poorer diet quality and worse cardiometabolic health.

OBJECTIVES: To assess the association between chronotype, diet quality and chrono-nutrition in a representative sample of Portuguese children and adolescents.

METHODOLOGY: A sample of 589 Portuguese youth (6-14 years) was evaluated as part of National Food, Nutrition and Physical Activity Survey, 2015-2016. Dietary intake and chrono-nutrition behaviours (timing of energy intake and breakfast-skipping) were assessed by 2 non-consecutive days of food diaries/24-hour recalls. Diet quality scores (7-28 points) were calculated using a previously tested 'Healthy Eating Index (HEI)'. Higher scores reflect better diet quality. To evaluate chronotype, the midpoint of sleep (MPS) on weekends was calculated using 4-day physical activity diaries (bedtime – waking-up time/2). Greater MPS reflects later chronotypes. The median was used to classify "Early" (< 3h39m) and "Late" (≥ 3h39m) chronotypes. Differences between chronotypes regarding categorical/continuous variables were assessed by X^2 and T-test, respectively. Linear regression was conducted to assess the relationship between chronotype (as a continuous variable) and intake behaviours.

RESULTS: Compared to early chronotype, late chronotype participants were older (9.6 *vs*. 10.6,p<0.001), had higher proportion of breakfast-skipping (2.4% *vs*. 13%, p<0.001), achieved 25% of energy intake (11h35m *vs*. 12h04m p<0.001), 75% energy intake (18h44m *vs*. 19h03m p=0.010) and the midpoint of energy intake (MPEI) later in the day (14h39m *vs*. 15h02m, p<0.001), had shorter sleep duration on the weekends (p<0.001), and higher on weekdays (p<0.001).

Independently of sociodemographic variables and sleep duration, MPS was inversely associated with HEI [β=–0.413, 95%CI (–0.687, –0.138)], and positively associated with MPEI [β=0.283, 95%CI (0.213,0.353)].

CONCLUSIONS: A later chronotype was associated with skipping breakfast, poorer diet quality and MPEI, possibly implicated in cardiometabolic health.

CO20. A NEW HEIGHT-FOR-AGE GROWTH REFERENCE AND ITS EFFICIENCY IN THE CLASSIFICATION OF THE NUTRITIONAL STATUS OF MULTI-ETHNIC CHILDREN AND ADOLESCENTS

Mariane Helen de Oliveira[1]; Joana Araújo[2-4]; Elisabete Ramos[2-4]; Wolney Lisboa Conde[1]

[1] Nutrition Department – School of Public Health of the University of São Paulo

[2] Epidemiology Research Unit - Institute of Public Health of the University of Porto

[3] Laboratory for Integrative and Translational Research in Population Health

[4] Department of Public Health and Forensic Sciences, and Medical Education - Faculty of Medicine of the University of Porto

INTRODUCTION: The height-for-age growth reference shows the linear growth trajectory, which is the best overall indicator of children's wellbeing and a crucial tool to detect nutritional risks. The CDC and the WHO have proposed international height-for-age growth references. However, several countries have found divergences when comparing their population growth parameters to these international references.

OBJECTIVES: To develop a new height-for-age growth reference (MULT growth reference) based on longitudinal data of multi-ethnic populations and to compare its efficiency with international growth references.

METHODOLOGY: MULT growth reference was developed through the Cole's LMS method and GAMLSS. It was constructed based on 15,292 measurements of 2,611 subjects that represents the richest quintile of the longitudinal studies: Young Lives (Ethiopia, India, Peru, Vietnam) Millennium Cohort Study (United Kingdom), Adolescent Nutritional Assessment Longitudinal Study Cohort (Brazil), and Epidemiological Health Investigation of Teenagers in Porto (Portugal). For the comparison analysis, we used 91,063 data from 17,641 subjects from all the surveys. The M and S curves of the WHO, CDC and MULT growth references were described and the Lin's concordance correlation coefficient (CCC) was applied to verify the agreement among the height-for-age z-scores.

RESULTS: The MULT growth reference showed taller boys between the ages 5-14y and 16.5-20y and taller girls between the ages 5-12y and 15-20y when compared to CDC and WHO growth references. The age group from 2-5y presented the closest stunting prevalence across the growth references, ranging from 7.07% to 7.97% and there was an almost perfect agreement between WHO and MULT (CCC>0.99) for this age group.

CONCLUSIONS: MULT growth reference presented a taller population, indicating a secular trend in height. It presented a higher agreement with WHO growth reference, especially for children under 5y, indicating that MULT growth reference could be an option to assess nutritional status of multi-ethnic children and adolescents.

CO21. FOOD PARENTING PRACTICES AND EATING BEHAVIORS IN CHILDHOOD: A CROSS-LAGGED APPROACH WITHIN THE GENERATION XXI COHORT

Alexandra Costa[1,2]; Milton Severo[1-3]; Andreia Oliveira[1-3]

[1] Epidemiology Research Unit – Institute of Public Health of the University of Porto

[2] Laboratory for Integrative and Translational Research in Population Health

[3] Department of Public Health and Forensic Sciences, and Medical Education, Faculty of Medicine of the University of Porto

INTRODUCTION: Food parenting practices may influence children's eating behaviors, but longitudinal analyses are limited, and the direction of the associations is still unclear.

OBJECTIVES: We aimed to examine the bidirectional relationships between food parenting practices and children's eating behavior from 4 to 7 years old.

METHODOLOGY: Participants are from the Generation XXI birth cohort, assessed at both 4 and 7 years of age (n=3698 singletons). A validated version of the Child Feeding Questionnaire and the Overt/Covert Control scale were used. Three patterns of food parenting practices (Perceived Monitoring; Restriction and Pressure to eat) were studied. Children's eating behaviors (eating large amounts of food, eating very slowly and food refusal) were self-reported by parents (measured using dichotomous questions). Cross-lagged analyses were performed to evaluate the direction of the associations (food parenting practices at 4y to behaviors at 7y and the reverse) (covariates: child sex, and BMI at 4 years of age and maternal education).

RESULTS: In cross-lagged models, eating large amounts of food at age 4 was unidirectionally associated with higher Restriction three years later (β standardized= 0.047;95%CI:0.019,0.075). Apart from Restriction, all associations had a bidirectional effect of similar magnitude; eating large amounts of food and food refusal at age 4 influenced feeding practices, such as Perceived Monitoring and Pressure to eat at age 7, but these practices prospectively influence the development of these eating behaviors too (e.g., β standardized=0.033;95%CI:0.022,0.064 for food refusal at age 4 and Pressure to eat at age 7 and β standardized=0.060; 95%CI:0.034, 0.086, in the reverse direction).

CONCLUSIONS: Parents and children mutually influence each other's behavior in the context of feeding. Eating large amounts of food, eating slowly, and food refusal may influence parents to adopt certain food parenting practices, but these practices also seem to influence children's behaviors after a few years.

CO22. DIETARY PATTERNS OF PORTUGUESE CHILDREN AND ADOLESCENT POPULATION AND ITS SOCIODEMOGRAPHIC FACTORS: THE UPPER PROJECT

Milena Moraes[1,2]; Bruno Oliveira[1,3]; Cláudia Afonso[1,2]; Cristina Santos[1,4]; Duarte Torres[1,2]; Carla Lopes[2,5]; Renata Miranda[6]; Fernanda Rauber[6,7]; Luiza Antoniazzi[6]; Renata Levy[6]; Sara Rodrigues[1,2]

[1] Faculty of Nutrition and Food Sciences of the University of Porto

[2] Epidemiology Research Unit - Institute of Public Health of the University of Porto / Associated Laboratory - Laboratory for Integrative and Translational Research in Population Health

[3] Artificial Intelligence and Decision Support - Institute for Systems and Computer Engineering, Technology and Science

[4] Center for Health Technology and Services Research of the University of Porto/ Associate Laboratory RISE - Health Research Network

[5] Faculty of Medicine of the University of Porto

[6] Department of Preventative Medicine, Faculty of Medicine of the University of São Paulo

[7] Department of Nutrition, School of Public Health of the University of São Paulo

INTRODUCTION: It is important to identify unhealthy dietary patterns in order to prevent health, recognize axes of action for public policies and improve the development of shaped interventions. The increase of ultra-processed food (UPF) consumption in children and adolescents and the health risks they pose justify the relevance of observing these particular products.

OBJECTIVES: To identify dietary patterns (DPs) and its associated factors in Portuguese children and adolescents.

METHODOLOGY: Sample from the 2015-2016 National Food, Nutrition and Physical Activity Survey (n=1153;3-17y). CAPI face-to-face interviews including dietary intake of 2 non-consecutive days. Foods classified according to NOVA

system into 42 subgroups from 4 main groups: unprocessed or minimally processed (1), processed culinary ingredients (2), processed (3) and UPF (4). Percentage of grams related to total grams consumed were considered to identify DPs by latent class analysis. Adjusted multinomial logistic regressions were performed to test associations of DPs with sociodemographic factors and body mass index (BMI).

RESULTS: Subjects followed 3 DPs: "Unhealthy" (51.1%), "Traditional" (36.2%), and "Dairy" (12.7%). Consumption of NOVA groups and subgroups differentiated them: "Unhealthy", high in (4) and low in (1); "Traditional", high in (1), (2) and (3), but also some subgroups from (4); and "Dairy", high in milk, yogurt and milk-based beverages from (1) or (4) and low in most (3) subgroups. "Unhealthy" had the highest energy contribution from UPF (39%), but "Traditional" and "Dairy" also presented high values (34% and 35%). Older individuals and those living in Lisbon region were more likely to follow "Unhealthy" DP, while "Dairy" was associated with younger ones and those living in Azores. There was no association with sex, parental education or BMI.

CONCLUSIONS: All DPs showed high consumption of UPF. Age and region were the factors significantly associated with DPs. This should be considered in food-based interventions or school-feeding national policies.

CO23. ADHERENCE TO THE PLANETARY HEALTH DIET INDEX AND LOWER BLOOD PRESSURE VALUES: A CROSS-SECTIONAL ANALYSIS OF ELSA-BRASIL

Leandro Teixeira Cacau[1,2]; Isabela Martins Bensenor[3]; Alessandra Carvalho Goulart[3]; Paulo Andrade Lotufo[3]; Luis Moreno[2]; Dirce Maria Marchioni[1]

[1] Department of Nutrition, School of Public Health of the University of São Paulo

[2] Growth, Exercise, Nutrition and Development Research Group, Faculty of Health Sciences of the University of Zaragoza

[3] Clinical and Epidemiological Research Center, University Hospital of the University of São Paulo

INTRODUCTION: The EAT-Lancet Commission has proposed a healthy and sustainable diet model to promote human and planetary health. The Planetary Health Diet Index (PHDI) was recently developed and validated based on these recommendations. However, associations with adherence to PHDI with health outcomes have not been evaluated already.

OBJECTIVES: To assess whether higher adherence to PHDI is associated with blood pressure in participants in the Longitudinal Study on Adult Health (ELSA-Brasil).

METHODOLOGY: Cross-sectional analysis with data from 14,515 participants in the baseline of the ELSA-Brasil. Food intake was obtained through a 114-item food frequency questionnaire. Then, the PHDI was applied to assess the participants' adherence to the EAT-Lancet recommendations. Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured after five minutes of rest, using an oscillometer (Omron HEM 705CPINT) in a quiet room with controlled temperature (20–24 °C). Multiple linear regression models were used to assess the association between adherence to PHDI with these outcomes.

RESULTS: The PHDI mean was 60.3 (95% CI 60.1: 60.5). The mean SBP was 121.7 (95% CI 121.4: 122.0) mmHg, while the DBP was 76.6 (95% CI 76.4: 76.8) mmHg. Participants in the 5th quintile of adherence to PHDI have lower values of SBP (β -0.86 95% CI -1.57: -0.15) and DBP (β -0.56 95% CI -1.02: -0.09) when compared with those in the 1th quintile, after adjustment for age, sex, self-reported race, *per capita* income, smoking, alcohol consumption, BMI, physical activity, presence of diabetes, hypertension and dyslipidemia and energy intake.

CONCLUSIONS: The results demonstrate that higher adherence to PHDI was associated with lower values of SBP and DBP, indicating that the recommendations of the EAT-Lancet seem to have an effect on human health.

CO24. ENVIRONMENTAL IMPACT OF THE PORTUGUESE DIET: GREENHOUSE GAS EMISSIONS

Catarina Carvalho[1-3]; Carla Lopes[1-3]; Duarte Torres[1,2,4]

[1] Epidemiology Research Unit - Institute of Public Health of the University of Porto

[2] Laboratory for Integrative and Translational Research in Population Health

[3] Department of Public Health and Forensic Sciences, and Medical Education, Faculty of Medicine of University of Porto

[4] Faculty of Nutrition and Food Sciences of the University of Porto

INTRODUCTION: Current dietary patterns, high in meat and other animal-based products, are negatively affecting the environment.

OBJECTIVES: To estimate the average daily dietary Greenhouse Gas Emissions (GHGE) in the Portuguese population, to describe the main food contributors to individual GHGE and to identify possible associations between GHGE and individuals' characteristics.

METHODOLOGY: Dietary data from the National Food, Nutrition, and Physical Activity Survey (IAN-AF 2015-2016) (n=5811), assessed through two food-diaries/24-hour-recalls, was used. Food-specific GHGE, based on life-cycle assessments, were retrieved from a European database for indicators of dietary environmental sustainability, the SHARP-ID, and matched with individual's food consumption. Besides total individual GHGE (in kg CO_2 equivalents/day), for comparison across population groups, adjusted GHGE (kg CO_2 equivalents/1kg of food/day) was also estimated.

RESULTS: In average, through dietary choices only, each Portuguese releases 5.3 (95%CI:5.2; 5.4) kg CO_2 equivalents per day (Men: 6.3 (95%CI:6.1; 6.5); Women: 4.4 (95%CI:4.2; 4.5)), corresponding to 2.2 (95%CI:2.1; 2.2) kg CO2 equivalents/kg of food consumed (Men: 2.4; 95%CI:2.3; 2.4; Women: 2.0; 95%CI:1.9; 2.0). The main food group contributing to dietary GHGE is red meat, for the general population (19.8% of total GHGE) as well as for both sexes (Men:22.9%; Women:16.9%) and all age groups (Children:14.6%; Adolescents:21.7%; Adults:20.9%; Elderly:17.0%). The second main food contributor varied across population groups. Among men and women, adjusting for the amount of food consumed, the elderly presented the lowest GHGE. Also, for both sexes, after adjusting for age group, educational level and amount of food consumed, individuals from rural areas presented lower GHGE when compared to individuals living in urban areas (Men: RD=0.92; 95%CI:0.86; 0.98; Women: RD=0.92; 95%CI: 0.85; 1.00).

CONCLUSIONS: Our results suggest that dietary strategies to replace meat consumption by environmentally friendly alternatives, decreasing GHGE, should target specific population groups.

FUNDING: PhD grant co-funded by FCT and FSE/NORTE2020 (SFRH/BD/146078/2019) (CC).

CO25. HOW DID THE GREAT RECESSION WEIGHTED ON PORTUGUESE CHILDREN BY IMPACTING THEIR EATING BEHAVIORS?

Daniela Rodrigues[1,2]; Ariene Carmo[3]; Augusta Gama[1,4]; Aristides M Machado-Rodrigues[1,5]; Helena Nogueira[1]; Vítor Rosado-Marques[1,6]; Maria-Raquel Silva[1,7]; Cristina Padez[1,2]

[1] Research Centre for Anthropology and Health of the University of Coimbra

[2] Department of Life Sciences of the University of Coimbra

[3] Department of Nutrition of the Federal University of Minas Gerais

[4] Department of Animal Biology, Faculty of Sciences of the University of Lisbon

[5] High School of Education of the Polytechnic Institute of Viseu

[6] Faculty of Human Kinetics of the University of Lisbon

[7] Faculty of Health Sciences of the University Fernando Pessoa

INTRODUCTION: Further evidence of the impact of the economic crisis on diet behaviours and its association with children's weight is needed in order to understand the (un)healthy patterns of consumption and health outcomes in times of crisis. This is of particular importance given that a new, severe and global economic crisis is taking place due to the economic impact of the ongoing covid-19 pandemic.

OBJECTIVES: To explore the direct and indirect relationship of the 2008's economic recession with children's food patterns and body mass index (BMI), using food patterns as mediators.

METHODOLOGY: A total of 8,472 Portuguese children aged 3-10-year-old participated in this cross-sectional analysis. We collected data on children's consumption frequency of unhealthy foods, healthy foods, and parents self-reported effects of the economic crisis on the family, which were used to create an economic crisis impact score (ECIS). Children's height and weight were objectively measured and used to calculate the BMI. Structural equation modelling was used to estimate the associations between the ECIS, food consumption and child's BMI.

RESULTS: Families more affected by the crisis had higher consumption of unhealthy food items and a decreased in the consumption of healthy foods. Also, children whose parents scored higher in ECIS had higher BMI and the diet patterns (higher consumption of cakes, cookies and chocolates and lower intake of vegetable soup and salads) were a significant mediator of that relationship. The study shows that the 2008 economic crisis directly and indirectly impacted children's BMI, by influencing diet quality.

CONCLUSIONS: The importance of the study increases given that the world is facing a new economic crisis caused by the Covid-19 pandemic. We highlight that disparities in food intake are influenced by economic crisis, even after controlling for family socioeconomic status which is likely to pose important threats to the general commitment to ensure equal access to the health advantages associated with healthy dietary behaviours.

CO26. WHICH FOOD GROUPS SHOULD BE PROMOTED TO INCREASE ADHERENCE TO THE MEDITERRANEAN DIET? A CONTRIBUTION TOWARDS TARGETING INTERVENTIONS FOR SPECIFIC GROUPS IN THE PORTUGUESE POPULATION

Beatriz Teixeira[1,2]; Rui Poínhos[1]; Sara Rodrigues[1,2]; Bruno MPM Oliveira[1,3]; Cláudia Afonso[1,2]

[1] Faculty of Nutrition and Food Sciences of the University of Porto

[2] Epidemiology Research Unit - Institute of Public Health of the University of Porto

[3] Laboratory of Artificial Intelligence and Decision Support - Institute for Systems and Computer Engineering, Technology and Science

INTRODUCTION: Adherence to the Mediterranean Diet (MD) is positively related to life quality and health outcomes.

OBJECTIVES: To assess the adherence to MD and its relationships with sex, age and educational level.

METHODOLOGY: This cross-sectional observational study had 313 participants (12 to 86 years). Besides sociodemographic data, the adherence to MD was assessed with the Portuguese version of the Prevention with Mediterranean Diet tool (PREDIMED). The relationships between sociodemographic characteristics and MD adherence were analyzed through logistic regression analysis.

RESULTS: The adherence to MD was 31%, and increased with age ($p<0.001$). Women had lower odds of fulfilling the MDP criteria related to wine (Expβ = 0.26; 95%CI: 0.13 to 0.54) but more likely to comply regarding fruit (1.74; 1.07 to 2.84), vegetables, (2.14; 1.32 to 3.47), white meat (1.99; 1.17 to 3.40) and olive oil as main fat (2.54; 1.07 to 6.07). Compliance with the MDP criteria for wine (1.04; 1.03 to 1.06), fruit (1.02; 1.00 to 1.03) and sweet beverages (1.02; 1.00 to 1.03) tends to increase with age. Furthermore, compliance with the MDP criteria for nuts and sweet beverages were higher among participants with higher education when compared to those with those with less than 9 years of education (3.79; 1.76 to 8.18 and 2.63; 1.23 to 5.62, respectively). The preference for white over red meat was lower for those with secondary education (0.43; 0.19 to 0.98).

CONCLUSIONS: More than two thirds of the sample did not adhere to MD. This study identified which food groups should be promoted according to sex, age and education level, and intends to contribute towards targeting interventions to increase the adherence to MD in Portugal.

CO27. ADHERENCE TO THE PLANETARY HEALTH DIET INDEX AND LOWER ODDS FOR OVERWEIGHT: A CROSS-SECTIONAL ANALYSIS OF ELSA-BRASIL

Leandro Teixeira Cacau[1,2]; Isabela Martins Bensenor[3]; Alessandra Carvalho Goulart[3]; Paulo Andrade Lotufo[3]; Luis Moreno[2]; Dirce Maria Marchioni[1]

[1] Department of Nutrition, School of Public Health of the University of São Paulo

[2] Growth, Exercise, Nutrition and Development Research Group, Faculty of Health Sciences of the University of Zaragoza

[3] Clinical and Epidemiological Research Cente, University Hospital of the University of São Paulo

INTRODUCTION: The EAT-Lancet Commission has proposed a healthy and sustainable diet model to promote human and planetary health. The Planetary Health Diet Index (PHDI) was recently developed and validated based on these recommendations. However, associations with adherence to PHDI with health outcomes have not been evaluated already.

OBJECTIVES: To assess whether higher adherence to the PHDI is associated with a lower odds for overweight in participants in the Longitudinal Study on Adult Health (ELSA-Brasil).

METHODOLOGY: Cross-sectional study that used data from 14,516 participants from ELSA-Brasil. Food intake was obtained using a 114-item food frequency questionnaire and, based on these data, the PHDI was applied. PHDI has 16 components and a gradual score that can reach an overall score ranging from 0 to 150 points. Weight and height data were used to calculate BMI, which was categorized as adequate (<25kg/m^2) and overweight (>25kg/m^2). Multiple logistic regression models were used to investigate the associations between exposure and outcome, with adjustment for age, sex, self-reported race, *per capita* income, smoking, alcohol consumption, physical activity, chronic diseases (diabetes, hypertension and dyslipidemia) and total energy intake. Statistical analyses were evaluated using the Stata software version 14.0.

RESULTS: The PHDI mean was 60.3 (95% CI 60.1: 60.5). Among the participants, 63% were overweight. After adjustments, higher adherence (5th quintile) to PHDI decreased the odds of overweight by 23% (OR 0.77 95% CI 0.69: 0.86; $p<0.001$) when compared to those in the 1th quintile.

CONCLUSIONS: The results showed that higher adherence to PHDI was responsible for decreasing the odds of overweight.

CO28. INCREASES IN PHYSICAL ACTIVITY AND REDUCTIONS IN SEDENTARY TIME ARE ASSOCIATED WITH A FASTER RATE OF WEIGHT LOSS DURING DIETARY ENERGY RESTRICTION IN WOMEN WITH OVERWEIGHT AND OBESITY

Nuno Casanova[1]; Kristine Beaulieu[2]; Pauline Oustric[2]; Dominic O'Connor[2]; Catherine Gibbons[2]; John Blundell[2]; Graham Finlayson[2]; Mark Hopkins[1]

[1] School of Food Science and Nutrition, Faculty of Environment of the University of Leeds

[2] Appetite Control and Energy Balance Group, School of Psychology, Faculty of Medicine and Health of the University of Leeds

INTRODUCTION: While physical activity (PA) has been found to be a strong predictor of successful weight loss (WL) maintenance, whether compensatory changes in PA during dietary energy restriction influences body weight outcomes such as the rate of WL is unclear.

OBJECTIVES: To examine the influence of baseline and changes in PA and sedentary time on the rate of WL during dietary energy restriction and weight regain 1-year post-intervention.

METHODOLOGY: Body weight and body composition (BodPod), PA and sedentary time (SenseWear Armband) were measured at baseline, week 2 and after ≥5% WL or 12 weeks of continuous (25% daily energy deficit) or intermittent (75% energy deficit + ad libitum day) energy restrition. Measures were repeated 1-year post-WL (no contact or dietary intervention). Rate of WL was calculated as %WL / number of dieting weeks. As no differences were observed between groups, data was combined for analyses, but partial correlations were calculated adjusting for WL group.

RESULTS: Thirty-six women (age=35±10y; BMI=29.1±2.3kg/m^2) completed the WL phase (WL=-6.0±1.2%) and 18 returned after 1-year (weight change from post-WL to 1-year follow-up = +4.5±5.2%). Baseline charateristics were not associated with the rate of WL. Changes in sedentary time (r=-0.38; p=0.03) after 2 weeks were associated with the rate of WL during the intervention. Changes in total PA (r=0.55; p=0.001), moderate-to-vigorous PA (r=0.52; p=0.002) and sedentary time (r=-0.56; p=0.001) during WL were associated with the rate of WL. Changes in moderate-to-vigorous PA post-WL were associated with 1-year free-living weight change (r=-0.53; p=0.03).

CONCLUSIONS: These data demonstrate that early and longer-term increases in objectively-mesured PA and reductions in sedentary time during and after dietary-induced WL improve the rate of WL and WL maintenance. This emphasises the importance of considering PA as a behavioural target during dietary energy restriction to improve weight outcomes.

CO29. ESTIMATION OF PORTUGUESE POPULATION DIETARY EXPOSURE TO BISPHENOL A

Sofia Almeida Costa[1,2]; Daniela Correia[1-3]; Vânia Magalhães[1,2]; Catarina Carvalho[1,2]; Sofia Vilela[1,2]; Sara Cunha[4]; Susana Casal[4]; Carla Lopes[1-3]; Duarte Torres[1,2,5]

[1] Epidemiology Research Unit - Institute of Public Health of the University of Porto

[2] Laboratory for Integrative and Translational Research in Population Health

[3] Department of Public Health and Forensic Sciences, and Medical Education - Faculty of Medicine of the University of Porto

[4] Laboratory of Bromatology and Hydrology, Faculty of Pharmacy of the University of Porto

[5] Faculty of Nutrition and Food Sciences of the University of Porto

INTRODUCTION: Bisphenol A (BPA) is a food contaminant that migrates from food contact materials, particularly from resins for lining cans used in foods and beverages packages. This compound may act as an endocrine disruptor, affecting negatively human health and future generations.

OBJECTIVES: To estimate the dietary exposure to BPA of the Portuguese population and its associated factors.

METHODOLOGY: Data from the National Food, Nutrition and Physical Activity Survey 2015-2016 (IAN-AF 2015-2016)(n=5811, 3 months–84 years old) was used to estimate the usual BPA dietary exposure. Two-non-consecutive food diaries/24-hour-recalls were used to collect dietary information. Reported foods were described using FoodEx2. Data regarding the concentration of BPA in foods were gathered from the literature. Usual dietary exposure to BPA was calculated using SPADE software, applying an upper bound scenario. Associations between socio-economic characteristics and BPA exposure were tested using relative mean differences (RD), through linear regression models.

RESULTS: Overall, median dietary exposure to BPA was 0.03µg/kg/day, ranging from 0.00 to 0.11µg/kg/day (5th and 95th percentile, respectively). Toddlers had the highest exposure to BPA (P_{50}=0.38µg/kg/day; P_5=0.08µg/kg/day, P_{95}=1.02µg/kg/day) and 0.03% were above the tolerable daily intake (4µg/kg/day). After adjustment for sex, age groups, educational level and total amount of food, males had 24% higher exposure to BPA than females (RD=1.24 (95%CI: 1.11, 1.39)) as well as younger groups when compared to elderly (toddlers: RD=2.74 (95%CI: 2.30, 3.25)). Also, having higher education levels was associated to higher exposure to BPA, compared to those with lower education level (9-12years: RD=1.17 (95%CI: 1.05, 1.31); >12years: RD=1.18 (95%CI: 1.02, 1.36)). "Milk" (29%) was the food group that most contributes to BPA exposure.

CONCLUSIONS: Males, toddlers and individuals with higher education levels were the groups identified with higher dietary exposure to BPA. Nevertheless, the Portuguese population presents a safe level of exposure to BPA.

FUNDING: FEDER/COMPETE and FCT(FOCAcCla-POCI-01-0145-FEDER-031949).

CO30. LUPIN AND CHICKPEA: NUTRITIVE BEVERAGES WITH LOW GLYCAEMIC IMPACT AS ALTERNATIVES TO MILK

Carla Margarida Duarte[1]; Joana Mota[1]; Ricardo Assunção[2]; Carla Martins[2]; Ana Ribeiro[1]; Anabela Raymundo[1]; Cristiana Nunes[1]; Ricardo Boavida-Ferreira[1]; Isabel Sousa[1]

[1] Higher Institute of Agronomy, Tapada da Ajuda

[2] Food and Nutrition Department of the National Institute of Health Doutor Ricardo Jorge

INTRODUCTION: There is a high demand for milk substitutes other than soy beverages from health to ethic and sustainability reasons. However, plant based current offers are essentially poor in protein content (less than 1.5% against the 3.5% in milk). The choice is the use of pulses with high protein content on seeds. Beany flavor may hamper their acceptance, but this is easily mitigated or overcome by current processing technology, which also enhances digestibility and beverage nutritional quality.

OBJECTIVES: The objective is to evaluate the impact of processing to keep nutritional characteristics of beverages and achieve its best digestibility.

METHODOLOGY: Two different pulse seeds (*Lupinus albus L.* and *Cicer arietinum L.*) were used to produce beverages with 10% (w/v) of total dry seeds. Seeds were soaked and cooked and liquids discarded, milled into very small particles and coarsely sieved. To overcome starch gelatinization in chickpea beverage, two enzymes were used during beverage production and viscosity was measured. All beverages were submitted to static *in vitro* digestion and analyzed physicochemically. Lupin and chickpea beverages were submitted to gelatinolytic activity quantification and zymographic analysis. ANOVA was used to assess significant differences between samples at a significance level of 95% ($p < 0.05$).

RESULTS: Chickpea-based beverages showed a protein content around 3.6% (w/v) and lupin beverage 4.7% (w/v). The starch hydrolysis of chickpea beverage with both enzymes showed a small increase on glycaemic index (51.3% compared to 50%). The lupin beverage presented the lowest glycaemic index (42.6%) and the lowest starch content (0.08% w/v). The lupin digesta evidenced significant higher contents in Ca, Mg, P, Mn, S and Cu when compared to chickpea. Both phytic acid and lectins did not inhibited digestive enzymes.

CONCLUSIONS: Pulse beverages are as good sources of protein as cow milk, and presented low-glycaemic index. There was evidence of protein hydrolysis by *in vitro* digestion and bioavailability of minerals. In addition, lupin and chickpea beverage evidenced anti-inflammatory and anti-carcinogenic activities.

CO31. DIETARY FIBRE INTAKE AND ITS ASSOCIATION WITH ADIPOSITY INDICATORS AND INSULIN-RELATED BIOMARKERS DURING CHILDHOOD: GENERATION XXI STUDY

Ana Rita Marinho[1-3]; Milton Severo[1,2]; Duarte Torres[1,2,4]; Carla Lopes[1-3]

[1] Epidemiology Research Unit - Institute of Public Health of the University of Porto

[2] Laboratory for Integrative and Translational Research in Population Health

[3] Department of Public Health and Forensic Sciences, and Medical Education - Faculty of Medicine of the University of Porto

[4] Faculty of Nutrition and Food Sciences of the University of Porto

INTRODUCTION: Dietary fibre (DF) was described as protective for cardiometabolic health in adults, but few studies in children analysed the role of DF on metabolic risk and body composition.

OBJECTIVES: To investigate the association between DF intake and its subtypes at 4, 7 and 10 years (y) old and body composition at 7 and 10y in a large prospective cohort.

METHODOLOGY: Dietary data, anthropometrics, socio-demographics and blood samples were collected at 4, 7 and 10y old within the population-based birth cohort Generation XXI (n=4006). Information on DF intake (total, soluble and insoluble) was collected using a food frequency questionnaire, calibrated with 3-day diaries. Analysed outcomes were age- and sex-specific body mass index z-scores (zBMI), percentage of body fat (%FM) and homeostasis model assessment-insulin resistance (HOMA-IR). Standardized coefficients and 95% confidence intervals (CI) were computed using path analysis (adjusted for maternal age and education, pre-pregnancy BMI, exclusive breastfeeding duration, child's sex, sports practice at 10y, and total energy intake from the other macronutrients).

RESULTS: The mean of total DF in g/day, at 4, 7 and 10y were 16.7, 16.9 and 16.9, respectively. These values are higher or equal to the Adequate Intake for children proposed by EFSA (4-6y=14g/day; 7-10y=16g/day). No significant associations were found with DF intake at 4y and later outcomes. Higher DF intake at 7y (g/day) was associated with lower zBMI (β=-0.056;95%CI:-0.100;-0.012), %FM (β=-0.064;95%CI:-0.109;-0.018), and HOMA-IR (β=-0.082;95%CI:-0.143;-0.020) at 10 y. Insoluble fibre at 7y (g/day) was inversely associated with all measures of adiposity and HOMA-R at 7 and 10y, but no significant associations were found for soluble fibre.

CONCLUSIONS: Our findings suggest that DF intake, particularly insoluble fibre, may be beneficial to prevent adiposity development and improve metabolic health during childhood, reinforcing the need to promote the consumption of fibre-rich foods from an early age.

CO32. ASSOCIATION BETWEEN FREE SUGARS INTAKE AND DENTAL CARIES IN PORTUGUESE ADOLESCENTS

Madhuri Desai[1]; Maria de Lurdes Pereira[2-4];Joana Araújo[2,3,5]

[1] Institute of Public Health of the University of Porto

[2] Epidemiology Research Unit - Institute of Public Health of the University of Porto

[3] Laboratory for Integrative and Translational Research in Population Health

[4] Faculty of Dental Medicine of the University of Porto

[5] Department of Public Health and Forensic Sciences, and Medical Education - Faculty of Medicine of the University of Porto

INTRODUCTION: Literature on the association between free sugars and dental caries is scarce in adolescents.

OBJECTIVES: To evaluate the association between intake of free sugars and dental caries in 13-year-old Portuguese adolescents.

METHODOLOGY: We used data of 13-year-old participants recruited at Porto schools in 2003/2004 – EPITeen study. A dental examination was performed in a sub-sample of 499 subjects. The decayed, missed and filled teeth (DMFT index) were examined by visual tactile parameters, according to the WHO criteria. The DMFT index was then categorized in three classes: absence of dental caries (DMFT=0); moderate (DMFT ≥1 & <4); and high level of dental caries (DMFT ≥4). Dietary intake was assessed through a food frequency questionnaire, and free sugars intake was estimated for each food item of as the sum of added sugars plus the sugar naturally present in honey, syrups, fruit juices (and concentrates). The association between free sugars and dental caries was estimated through odds ratios (OR) and respective 95% confidence intervals (95% CI), using a multinomial logistic regression model.

RESULTS: In this sample of 13-year-old adolescents, the prevalence of caries (DMFT>0) was 64.5%. High level of caries (DMFT≥4) was more frequent in girls, in adolescents enrolled in public school and among those whose parents had lower education. Additionally, prevalence of caries was higher among adolescents whose intake of free sugars was 10%of energy intake or higher (37.3%), comparing to those consuming less than 10% (26.4%). The association between free sugars intake and dental caries was statistically significant in the crude model (OR=1.59, 95%CI=1.03-2.45 for DMFT≥4), but was no longer significant (OR-1.14, 95% CI=0.70-1.84) after adjustment for sex, type of school and parental education.

CONCLUSIONS: This study suggests that, in addition to reducing free sugars intake, interventions about oral hygiene in more socioeconomically disadvantaged groups should also be implemented.

CO33. ENERGY INTAKE ACCORDING TO THE USE OF SWEETENERS: BRAZILIAN NATIONAL DIETARY SURVEY 2017-2018

Iuna Arruda Alves[1]; Luana Silva Monteiro[2]; Amanda de Moura Souza[3]; Bruna Kulik Hassan[4]; Paulo Rogério Melo Rodrigues[5]; Natália Cardoso[1]; Luciana Guerra Cardoso[1]; Mariana Luiz Marques[1]; Ana Lúcia Rêgo Viégas[1]; Camila Rodrigues[1]; Fernanda Rainho[1]; Luana Blaudt[1]; Geisa Rodrigues[1]; Gabrielle Lopes[6]; Taís Souza Lopes[7]; Edna Massae Yokoo[8]; Rosely Sichieri[9]; Rosangela Alves Pereira[7]

[1] Graduate Program in Nutrition, Institute of Nutrition Josué de Castro of the Federal University of Rio de Janeiro

[2] Nutrition Course of the Federal University of Rio de Janeiro

[3] Institute of Public Health Studies of the Federal University of Rio de Janeiro

[4] Institute of Social Medicine of the University of the State of Rio de Janeiro

[5] Faculty of Nutrition of the Federal University of Mato Grosso

[6] Faculty of Nutrition, Josué de Castro Institute of the Federal University of Rio de Janeiro

[7] Department of Social and Applied Nutrition of the Federal University of Rio de Janeiro

[8] Department of Epidemiology and Biostatistics of the Federal Fluminense University

[9] Department of Epidemiology of the University of the State of Rio de Janeiro

INTRODUCTION: Energy intake may vary according to the use of caloric or non-caloric sweeteners.

OBJECTIVES: To estimate mean daily energy intake according to the use of sugar and non-caloric sweeteners in the Brazilian population.

METHODOLOGY: Data from the Brazilian National Dietary Survey, 2017-2018, examining a nationwide probabilistic sample of ≥10 years-old individuals, excluding pregnant and lactating women (n=46,164). The subjects reported the use of table sugar, artificial sweeteners, both, or none of them to sweeten food and drinks and completed two non-consecutive 24-hour recalls. The procedure adopted by the National Cancer Institute (USA) was applied to estimate mean energy intake (and 95% confidence intervals) corrected by within variability according to the type of sweetener and the categories of explanatory variables (age group, weight status, and *per capita* family income [categorized

ACTA PORTUGUESA DE NUTRIÇÃO 26 (2021) 105-118 | LICENÇA: cc-by-nc
ASSOCIAÇÃO PORTUGUESA DE NUTRIÇÃO® | WWW.ACTAPORTUGUESADENUTRICAO.PT | ACTAPORTUGUESADENUTRICAO@APN.ORG.PT

in quartiles]). All analyses were stratified by sex, considered sample weights, and were performed on SAS on Demand.

RESULTS: The use of sugar was reported by 85% of men and 80% of women; non caloric sweetener by 6% and 9%; both: 3%; 5%; none: 6% for both. In general, both among men and women, those consuming sugar had higher energy intake than those who consumed non caloric sweeteners, both, or none. For both men and women, stratification by age group revealed that differences in energy intake were evident only between those who consumed sugar and those who do not report any sweetener. Stratification according to income quartiles showed that individuals who consumed sugar had lower energy intake than those who reported consuming neither sugar nor sweetener, but these differences were only significant for men.

CONCLUSIONS: Mean energy intake presented difference according to the type of sweetener used. In general, the use of table sugar was associated with greater mean energy intake.

CO34. CONSUMPTION OF FOODS WITH EXCESS SOLID FATS AND SUGAR: VARIATION OVER 10 YEARS IN BRAZIL

Mariana Luiz Marques[1]; Ana Lúcia Viégas Rego[1]; Iuna Arruda Alves[1]; Luciana Guerra Cardoso[1]; Natália Cardoso da Silva[1]; Camila Batista Rodrigues[1]; Fernanda Pereira de Souza Rainho[1]; Luana Senna Blaudt[1]; Geisa Gabriela Rodrigues[1]; Gabriele Lopes Rangel[1]; Luana Silva Monteiro[2]; Taís Souza Lopes[1]; Edna Massae Yokoo[3]; Rosely Sichieri[4]; Rosangela Alves Pereira[1]

[1] Institute of Nutrition Josué de Castro of the Federal University of Rio de Janeiro

[2] Nutrição Course of the Federal University of Rio de Janeiro

[3] Collective Health Institute of the Federal Fluminense University

[4] Institute of Social Medicine of the University of the State of Rio de Janeiro

INTRODUCTION: In general, low nutritional quality diets are rich in foods with excessive content of saturated and trans fats and added sugar (SoFAS foods).

OBJECTIVES: To describe the variation in the consumption of SoFAS foods in the Brazilian population from 2008 to 2018.

METHODOLOGY: Data came from two nationwide dietary surveys carried out in 2008-2009 (n = 34,003) and 2017-2018 (n = 46,164), which investigated representative samples of ≥10 year-old individuals. Food consumption was assessed by diet record in 2008-2009 and by a 24-hour recall in 2017-2018. SoFAS foods were identified. Diets providing more than 50% of the daily energy intake from SoFAS foods were classified as diets with excessive SoFAS content. The proportions (and 95% confidence intervals) of individuals with high consumption of SoFAS were estimated for the total population and stratified into age groups (adolescents, adults, elderly) for the categories of sex, weight status, and family *per capita* income (categorized in multiples of the official minimum wage). All analysis considered sample weights.

RESULTS: In the 10-year period, the proportion of high consumption of SoFAS has increased from 37.1 to 43.2%, in the total population as well as in adolescents (44.8 to 49.9%), adults (35.2 to 42.3%), and elderly (34.2 to 40.0%), the same pattern was observed among men in all age groups, while among women, the increase was observed only for adults. Similar increments were observed across the weight condition categories (under or normal weight; overweight or obesity), except for under or normal weight elderly and adolescents with overweight or obesity. No increments in the proportion of individuals with excessive SoFAS content dietas were observed for inidviduals in the higher income level.

CONCLUSIONS: In the Brazilian population, over the period from 2008 to 2018, there was increase in the consumption of SoFAS foods, especially among women and adolescents.

CO35. BODY FAT DISTRIBUTION AND HIGH-SENSITIVITY C-REACTIVE PROTEIN IN ADULTHOOD

Vanda Craveiro[1,2]; Milton Severo[1-3]; Elisabete Ramos[1-3]

[1] Epidemiology Research Unit – Institute of Public Health of the University of Porto

[2] Laboratory for Integrative and Translational Research in Population Health

[3] Department of Public Health and Forensic Sciences, and Medical Education, Faculty of Medicine of the University of Porto

INTRODUCTION: The localization of body fat is an important predictor of its inflammatory effects. However, population-based studies exploring and quantifying the changes on low-grade systemic inflammation according to the body fat distribution are scarce.

OBJECTIVES: To examine the association between regional body fat and low-grade systemic inflammation in adults.

METHODOLOGY: A cross-sectional analysis of 987 adults (aged 27 years) was conducted as part of the population-based EPITeen cohort. Regional body fat was determined based on the fat content of the trunk and of both legs of the participants, measured by dual-energy X-ray absorptiometry. Low-grade systemic inflammation was determined based on the serum high-sensitivity C-reactive protein (hsCRP) of the participants, measured in a fasting blood sample from the antecubital vein of the non-dominant arm. The association of both trunk fat and legs fat with hsCRP was estimated by linear regression models, stratified by sex. Models were adjusted for total body fat, weight and height.

RESULTS: Both women and men, had a negative association between legs fat and hsCRP (women: β= -0.001; 95%CI: -0.008, 0.006; men: β= -0.040; 95%CI: -0.069, -0.012), and a positive association between trunk fat and hsCRP (women: β= 0.121; 95%CI: -0.422, 0.664; men: β= 0.209; 95% CI: 0.061, 0.358). The magnitude of the effects was stronger for men than for women.

CONCLUSIONS: Trunk fat increases low-grade systemic inflammation, being this effect higher for men than for women. In fact, trunk fat encompasses visceral fat, already known as pro-inflammatory, but also subcutaneous fat, which also presents a deep structure of adipose tissue with properties more similar to the visceral tissue than to the superficial fraction of the subcutaneous adipose tissue. An important focus should be given to the overall trunk fat reduction, in order to diminish the chronic health-deleterious effects associated with low-grade inflammation.

TABLE 1

Association between body fat distribution and high-sensitivity C-reactive protein

	β (95% CI)	β (95% CI)
VARIABLES ON BODY FAT DISTRIBUTION	WOMEN	MAN
Legs fat	-0.001 (-0.008, 0.006)	**-0.040 (-0.069, -0.012)**
Total body fat	**0.002 (0.001, 0.003)**	**0.003 (0.001, 0.005)**
Weight	**0.085 (0.066, 0.104)**	**0.041 (0.029, 0.053)**
Height	-0.031 (-0.068, 0.006)	**-0.027 (-0.052, -0.001)**
	β (95% CI)	β (95% CI)
VARIABLES ON BODY FAT DISTRIBUTION	WOMEN	MAN
Trunk fat	0.121 (-0.422, 0.664)	**0.209 (0.061, 0.358)**
Total body fat	**0.002 (0.001, 0.003)**	**0.003 (0.001, 0.004)**
Weight	**0.085 (0.066, 0.104)**	**0.042 (0.030, 0.054)**
Height	-0.031 (-0.067, 0.006)	**-0.028 (-0.053, -0.004)**

Statistically significant estimates are in bold.

FUNDING: This study was financed by national funds through the Foundation for Science and Technology [Portuguese public agency that supports science, technology and innovation, in all scientific domains, under responsibility of the Ministry for Science, Technology and Higher Education], under the project UIDB/04750/2020 and under the scientific project PTDC/DTP-EPI/6506/2014 and the doctoral studentship PD/BD/149264/2019 (VC).

C.O. VENCEDORES

1.º Prémio

CO20 | A new height-for-age growth reference and its efficiency in the classification of the nutritional status of multi-ethnic children and adolescents

2.º Prémio

CO35 | Body fat distribution and highsensitivity C-Reactive Protein in adulthood

3.º Prémio

CO31 | Dietary fibre intake and its association with adiposity indicators and insulin-related biomarkers during childhood: Generation XXI study