Proceedings of the Nutrition Society (2024), **83 (OCE1)**, E152 doi:10.1017/S0029665124001708

47th Annual Scientific Meeting of the Nutrition Society of Australia and Nutrition Society of New Zealand, 28 November – 1 December 2023, Nutrition & Wellbeing in Oceania

Diet and well-being of 1st year Medical Interns during hospital placement

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Hospital placement is essential training for medical interns, involving shift work and high-pressure environments. This can increase physiological and psychological stress, which may be mediated by metabolites of microbial digestion(1). Nutrients of interest include those accessible to microbial digestion and associated with altered signalling within the microbiota-gut-brain axis (MGBA)(1). Fibre is fermented by gut microbes to produce short-chain fatty acids(2) and is associated with improved psychological outcomes(3). Tryptophan, a precursor to gut-derived serotonin(2), has been negatively associated with anxiety(4). Processed foods contain food additives, excess sugars, and saturated fats that may disrupt gut homeostasis(1) and impact psychological well-being(4). Lastly, total energy intake may determine the level of substrate available for microbial fermentation(2). Therefore, this research explores how microbiota-accessible food components interact with physical and psychological well-being in a cohort of medical interns undertaking their first-year of hospital placement. Participants were healthy medical interns, during first-year hospital placement (n = 21) from the Hunter New England Local Health District, NSW, Australia. Participants completed diet and wellbeing surveys at baseline and every 2 months over a 10-month period. 24-hour diet diaries were self-recorded from participants using a mobile application (Easy Diet Diary) and analysed using AusNut and the NOVA classification system of ultra-processed foods (ULP). Wellbeing surveys include depression, anxiety, stress scale (DASS), and PROMIS survey for mental (M), physical (P), and sleep well-being. Current data represents an 'in-progress' of the longitudinal data collection. This study utilised Spearman correlation and Tukey's post hoc test for mixed methods analysis. From baseline to timepoint 3 (T3, 4 months) daily energy intake was consistent with cohort estimated energy requirements (EER). However, consumption ranged from 37% to 167% of EER, indicating a large variation of intakes. Energy consumed from ULP ranged from 30% to 34% ($p = 0.6875$). Baseline tryptophan intake ($\bar{x} = 1139$mg) was within the suggested target, whilst fibre intake ($\bar{x} = 23$g) was below the recommended intake. Neither saw significant changes from baseline to T3. Fibre intake was positively correlated with mental and physical well-being at baseline ($\bar{x} = 23.1$g, M: $r = 0.474$, $p = 0.04$, P: $r = 0.608$, $p = 0.007$), and timepoint 2 ($\bar{x} = 31.5$g, M: $r = 0.647$, $p = 0.026$, P: $r = 0.780$, $p = 0.004$) but not at T3. In addition, baseline consumption of sugar ($\bar{x} = 18$g) and poly-unsaturated fats ($\bar{x} = 15$g) were both negatively correlated with mental and physical well-being. Overall, no significant dietary changes were evident from baseline to mid-year collection in a first-year medical intern cohort during hospital placements. Fibre was significantly associated with mental and physical well-being, building on current understanding of fibre's role in the MGBA. Planned metabolite analysis will explore the mechanisms of proposed microbiome-accessible nutrients alongside diet, well-being, and microbiota data. Findings from this study will identify how diet-microbiome interactions change under stress, with wider positive implications on intense workplace environments with the aim to preserve individual wellbeing.

Keywords: gut microbiota; mental well-being; microbiome; fibre

Ethics Declaration

Yes

Financial Support

This work was supported by the Defence Science and Technology (DST) Group: Next Generation Technology Funding (NGTF) (grant number: G2100173).

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