



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} = 1139mg) was within the suggested target, whilst fibre intake (\bar{x} = 23g) 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} = 23.1g, M: r = 0.474, p = 0.04, P: r = 0.608, p = 0.007), and timepoint 2 (\bar{x} = 31.5g, 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} = 18g) and poly-unsaturated fats (\bar{x} = 15g) 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

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