



## The GUTFIT Cohort: Identifying dietary intake of Chinese New Zealanders with functional constipation

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Distinct pathophysiology has been identified with disorders of gut-brain interactions (DGBI), including functional constipation (FC)<sup>(1,2)</sup>, yet the causes remain unclear. Identifying how modifiable factors (i.e., diet) differ depending on gastrointestinal health status is important to understand relationships between dietary intake, pathophysiology, and disease burden of FC. Given that dietary choices are culturally influenced, understanding ethnicity-specific diets of individuals with FC is key to informing appropriate symptom management and prevention strategies. Despite distinct genetic and cultural features of Chinese populations with increasing FC incidence<sup>(3)</sup>, DGBI characteristics are primarily described in Caucasian populations<sup>(2)</sup>. We therefore aimed to identify how dietary intake of Chinese individuals with FC differs to non-Chinese individuals with FC, relative to healthy controls. The Gastrointestinal Understanding of Functional Constipation In an Urban Chinese and Urban non-Chinese New Zealander Cohort (GUTFIT) study was a longitudinal case-control study using systems biology to investigate the multi-factorial aetiology of FC. Here we conducted a cross-sectional dietary intake assessment, comparing Chinese individuals with FC (Ch-FC) against three control groups: a) non-Chinese with FC (NCh-FC) b) Chinese without FC (Ch-CON) and c) non-Chinese without FC (NCh-CON). Recruitment from Auckland, New Zealand (NZ) identified Chinese individuals based on self-identification alongside both parents self-identifying as Chinese, and FC using the ROME IV criteria. Dietary intake was captured using 3-day food diaries recorded on consecutive days, including one weekend day. Nutrient analysis was performed by Foodworks 10 and statistical analysis with SPSS using a generalised linear model (ethnicity and FC status as fixed factors). Of 78 enrolled participants, 66 completed the study and 64 (39.4 ± 9.2 years) completed a 3-day food diary at the baseline assessment. More participants were female (84%) than male (16%). FC and ethnicity status allocated participants into 1 of 4 groups: Ch-FC (n = 11), Ch-CON (n = 18), NCh-FC (n = 16), NCh-CON (n = 19). Within NCh, ethnicities included NZ European (30%), non-Chinese Asian (11%), Other European (11%), and Latin American (2%). Fibre intake did not differ between Ch-FC and NCh-FC (ethnicity × FC status interaction  $p > 0.05$ ) but was independently lower overall for FC than CON individuals (21.8 ± 8.7 versus 27.0 ± 9.7 g,  $p < 0.05$ ) and overall for Ch than NCh (22.1 ± 8.0 versus 27.0 ± 10.4 g,  $p < 0.05$ ). Carbohydrate, protein, and fat intakes were not different across groups ( $p > 0.05$  each, respectively). In the context of fibre and macronutrient intake, there is no difference between Ch-FC and NCh-FC. Therefore, fibre and macronutrients are unlikely to contribute to potential pathophysiological differences in FC between ethnic groups. A more detailed assessment of dietary intake concerning micronutrients, types of fibre, or food choices may be indicated to ascertain whether other dietary differences exist.

**Keywords:** asian; dietary intake; functional constipation; functional gastrointestinal disorders

### Ethics Declaration

Yes



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### **References**

1. Heenan P (2021) Doctoral dissertation, *University of Otago*.
2. Heenan P, Creemers RH, Sharma S *et al.* (2020) *Inflamm Intest Dis* **5**, 132–143.
3. Chen Z, Peng Y, Shi Q *et al.* (2022) *Front Med (Lausanne)* **9**, 815156.