

# An Investigation into Dietary Fibre, Bowel Function, and Mood in Irish Adults

Ellen Lynch<sup>1</sup>

Sophie Mulligan<sup>1</sup> Dr Suzanne Doyle<sup>1</sup>

Technological University Dublin<sup>1</sup>

School of Biological, Health, and Sport Sciences<sup>1</sup>



## Introduction

- Dietary fibre has been demonstrated to play a protective role against gastrointestinal disorders, through its effects on gut motility, microbial composition, and the production of short-chained fatty acids<sup>1</sup>.
- Fibre metabolites like short-chained fatty acids facilitate gut-brain communication via the gut-brain axis potentially optimising both bowel function and mood<sup>2</sup>.
- The development of therapeutic dietary fibre interventions is an area of interest to potentially reduce the burden of metabolic and mental disorders in high-income countries.

## Methods

- An online questionnaire was created using Microsoft Forms and encompassed three previously validated questionnaires to assess participants' dietary fibre intake<sup>3</sup>, typical bowel habits<sup>4</sup>, and mood status<sup>5</sup>.
- The questionnaire was distributed via email and posters to members of the Technological University Dublin. The survey went live on the 28<sup>th</sup> of February 2023 and closed after 13 days.
- Crosstabulations, Pearson-Chi Square, Mann-Whitney U, and Kruskal-Wallis tests were performed on SPSS to statistically analyse the data.

## Aim

This study aimed to assess and explore the association between dietary fibre intake, bowel function, and mood status of Irish adults.

## Results

### 1. Demographic Characteristic

- 275 valid responses: 69.5% female, and 26.9% male
- Most participants were aged between 17-20 (42.2%) or 21-25 (39.3%)
- 66.5% of respondents were from the faculty of science and health

#### 1.Fibre Status across Demographic Subgroups

|                              | Fibre Intake Status |           |           | p-value |
|------------------------------|---------------------|-----------|-----------|---------|
|                              | Low                 | Moderate  | High      |         |
| Total                        | 139 (50.5)          | 46 (16.7) | 90 (32.7) | n/a     |
| Gender, <i>n</i> (%)         |                     |           |           |         |
| Female                       | 85 (44.5)           | 35 (18.3) | 71 (37.2) | 0.034   |
| Male                         | 46 (62.2)           | 10 (13.5) | 18 (24.3) |         |
| Other                        | 8 (80)              | 1 (10)    | 1 (10)    |         |
| Age, <i>n</i> (%)            |                     |           |           |         |
| 17-20                        | 62 (53.4)           | 17 (14.7) | 37 (31.9) | 0.212   |
| 21-25                        | 45 (41.7)           | 23 (21.3) | 40 (37.0) |         |
| 26-30                        | 11 (84.6)           | 1 (7.7)   | 1 (7.7)   |         |
| 31-40                        | 6 (46.2)            | 3 (23.1)  | 4 (30.8)  |         |
| 41-50                        | 8 (53.3)            | 2 (13.3)  | 5 (33.3)  |         |
| 50+                          | 7 (70)              | 0 (0)     | 3 (30)    |         |
| Field of Study, <i>n</i> (%) |                     |           |           |         |
| Science & Health             | 77 (42.1)           | 34 (18.6) | 72 (39.3) | <0.001  |
| Other                        | 62 (67.4)           | 12 (13.0) | 18 (19.6) |         |

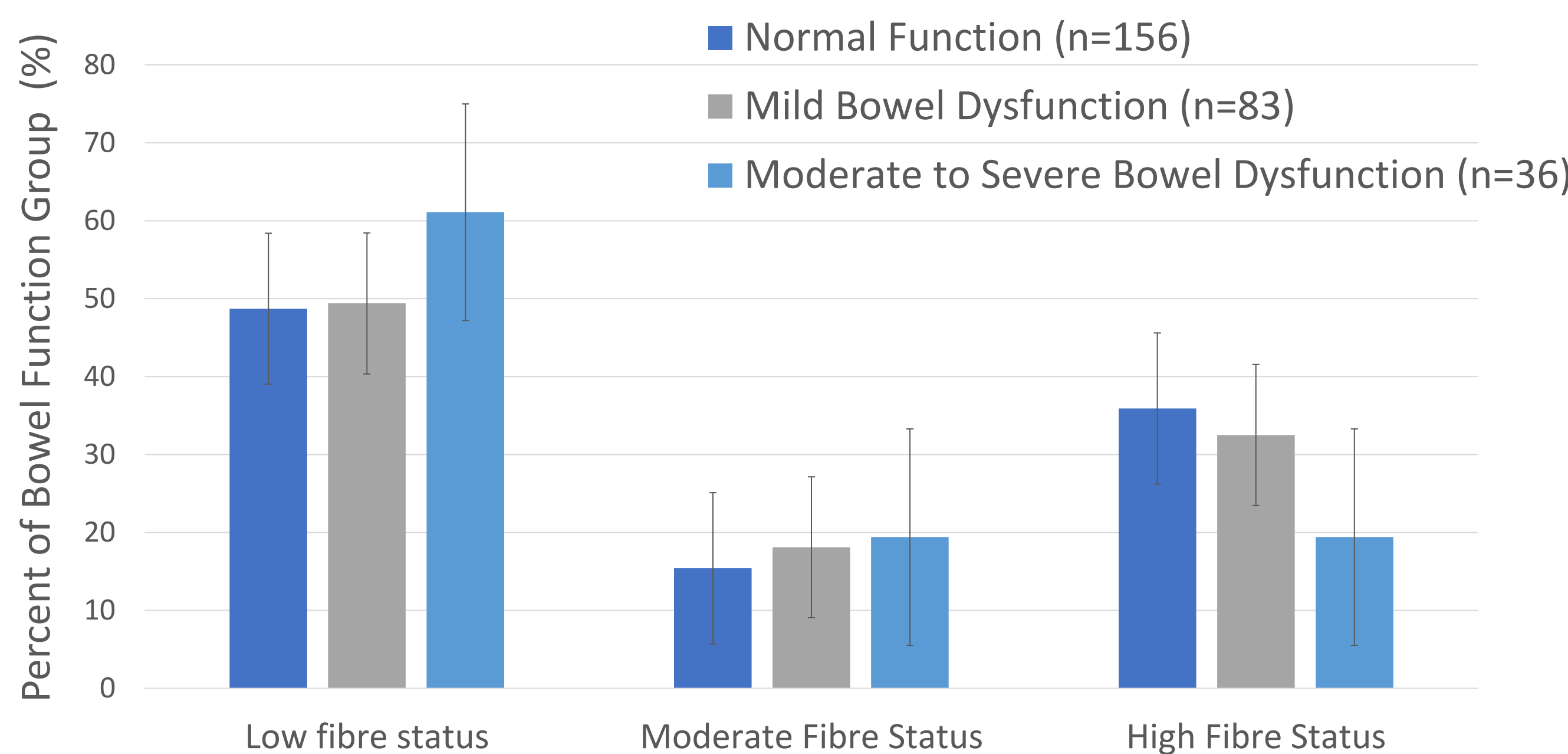
- Majority of participants (50.5%) had a low-fibre status
- Excluding those identifying as "other", females were more likely to have high fibre status than males (p<0.039)
- Those within the Faculty of Science and Healthy were more likely to have a high fibre status than others (p<0.001)

### 2. Stool Frequency and Fibre Status

| Fibre Intake Status | n   | Stool Frequency |           |           | P-value |
|---------------------|-----|-----------------|-----------|-----------|---------|
|                     |     | Every 2/3 days  | 1-2 a day | 3+ a day  |         |
| Low                 | 139 | 46 (33.1)       | 80 (57.6) | 13 (9.4)  | 0.008   |
| Moderate            | 46  | 7 (15.2)        | 35 (76.1) | 4 (8.7)   |         |
| High                | 90  | 14 (15.6)       | 61 (67.8) | 15 (16.7) |         |

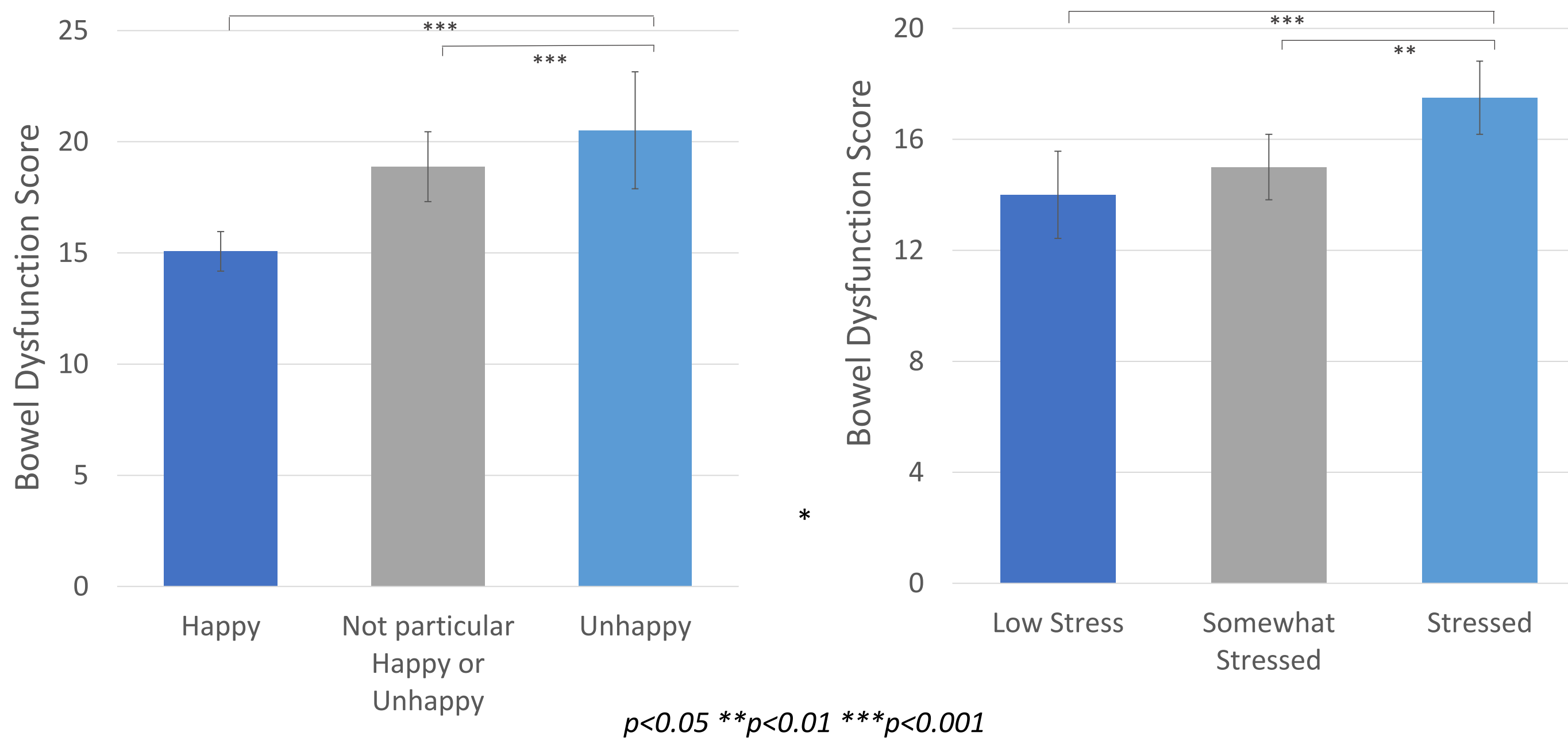
- Those who defecate once every 2 or 3 days were found to have significantly lower fibre intakes to those who defecate once a day or more

### 3. Bowel Function and Fibre Status



- Of those with a low fibre status, moderate to severe symptoms of bowel dysfunction were prevalent
- Similarly, of those with a high fibre status, normal bowel function was prevalent
- When analysed as a continuous variable, a significant decrease was found in fibre intake (g/day) in those with moderate to severe symptoms of bowel dysfunction compared to those with normal bowel function (p=0.033)
- Similar tests found a significance increase in fibre intake in those who had optimal stool type compared to those who had a hard stool type (0.024)

### 4. Bowel Function Status and Mood/Stress



- Significant associations were observed between both mood status and bowel dysfunction score, and stress levels and bowel dysfunction score.

## Discussion & Conclusion

- Findings of this study suggest a strong relationship exists between fibre status and stool frequency, and there is an association between fibre intake (g/day) and improved stool type and bowel function habits.
- This study demonstrates an association between mood and bowel function, with results suggesting a correlation between low mood and disordered bowel function. Results also establish a significant relationship between high stress levels and increased symptoms bowel dysfunction.
- Given that this study suggests fibre demonstrates beneficial effects on bowel function, and normal bowel function is associated with improved mood and a lower stress status, it can be postulated that fibre may positively impact both mood and bowel function via the bidirectional gut-brain axis.
- Given the prevalence of suboptimal fibre intakes observed in this study, further research in this area should evaluate the need for dietary fibre intervention strategies to decrease the prevalence of gastrointestinal and physiological diseases.

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