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Original Article

Psychosocial and Lifestyle Determinants of Irritable Bowel Syndrome Among Medical Students: A Cross-sectional Analytical Study from Northern Bangladesh

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ABSTRACT

Background: Irritable bowel syndrome (IBS) among medical students is often discussed as a count of cases. Less is recorded about which psychosocial and lifestyle items actually separate students who meet diagnostic criteria from those who do not. **Objectives:** To examine associations of self-reported stress, family history and selected lifestyle characteristics with Rome III IBS among medical students. **Methods & Materials:** A cross-sectional analytical study was conducted among undergraduate students of Rangpur Medical College from December 2019 to May 2020. Five hundred students aged 18-27 years completed a structured interview after written consent. Students with self-reported organic gastrointestinal disease, previous gastrointestinal surgery or alarm features were excluded. The outcome was Rome III IBS. Psychosocial items were self-reported stress and a family history of IBS. Lifestyle items were place of residence, source of daily food, regular exercise, current smoking and NSAID use. For each item the prevalence of IBS, Wilson 95% confidence interval (CI), absolute risk difference and unadjusted odds ratio (OR) were calculated. Comparisons used the chi-square test or Student t test. A p value <0.05 was taken as significant. **Results.** Rome III IBS was present in 105 of 500 students (21.0%; 95% CI 17.7-24.8). Prevalence was 70.0% (95% CI 61.3-77.5) in students who reported stress and 5.5% (95% CI 3.6-8.3) in those who did not (risk difference 64.5 percentage points; OR 39.89, 95% CI 22.15-71.84; χ^2 = 228.51; p < 0.001). Prevalence was 72.7% (95% CI 61.9-81.4) with a family history of IBS and 11.6% (95% CI 8.9-15.0) without (risk difference 61.1 percentage points; OR 20.35, 95% CI 11.36-36.47; χ^2 = 146.80; p < 0.001). Hostel residence was associated with IBS (OR 1.95, 95% CI 1.08-3.53; p = 0.025). Source of daily food, regular exercise, current smoking, NSAID use and mean body-mass index were not associated with IBS. **Conclusion.** In this sample the psychosocial items, stress and family history, identified most students with IBS. Among the lifestyle items only hostel residence showed a modest association. Food source, exercise, smoking and NSAID use did not.

Keywords: *Irritable Bowel Syndrome, Psychological Stress, Family History, Lifestyle, Medical Students, Rome III, Bangladesh*

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INTRODUCTION

Irritable bowel syndrome is a functional gastrointestinal disorder. Recurrent abdominal pain or discomfort is tied to a change in bowel habit and no structural lesion explains the symptoms[1]. Global pooled prevalence is close to 11%, with wide variation by region and by diagnostic criteria[2]. Medical students often sit above community estimates[3].

A count of cases does not tell a campus which students to watch. IBS is now framed as a disorder of gut-brain interaction. Psychological load, family setting and daily routine act together[4]. That model fits undergraduate medicine. Examination cycles, hostel living and irregular meals sit on an age band in which IBS is already common[3].

Stress keeps appearing in student surveys. In Jeddah, emotional stress and anxiety predicted IBS among medical students and interns[5]. In Karachi, more than half of IBS-positive students linked their symptoms to stress[6]. Similar findings were reported from Beijing and from nursing and medical students in Japan [7,8]. Family history is another consistent correlate. Young adults with lingering abdominal complaints more often have a first-degree relative with similar symptoms[9].

Lifestyle items give a mixed picture. Lebanese university students living away from their families had more IBS than those living at home[10]. Fatty food, cigarettes and low physical activity were associated with IBS among medical students in northern India[11]. Food type alone is a weak marker, because a label such as canteen food does not capture fat, spice or meal timing[12].

Bangladeshi community data exist. Masud and colleagues reported a high rural adult figure with a broad definition, which fell when stricter Rome rules were used[13]. A Dhaka student study using Rome III found IBS in 4.8% of medical students[14]. Work from northern Bangladesh that treats psychosocial and lifestyle items as the main question, rather than as a side table in a prevalence paper, is limited. The present analysis was designed to rank those items by the size of the association with Rome III IBS in one public medical college.

METHODS & MATERIALS

Study design and setting

A cross-sectional analytical study was conducted in the Department of Medicine, Rangpur Medical College and Hospital, Rangpur, Bangladesh, from December 2019 to May 2020. Eligible participants were undergraduate medical students from first year through final year.

Sample size and sampling

Sample size was first estimated from a previously published Bangladeshi community prevalence of 25%. With Z = 1.96 and a precision of 0.10 the calculated minimum was 73. For stable two-by-two comparisons of psychosocial and lifestyle items, 500 students were enrolled by purposive sampling after the selection criteria were applied.

Eligibility

Students aged 18-27 years of either sex who gave written informed consent were included. Students were excluded if they reported an organic gastrointestinal disease, previous gastrointestinal surgery, a family history of gastrointestinal cancer, or alarm features (unexplained weight loss, anaemia

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or blood in the stool), or if they declined to take part.

Data collection and definitions

Each student completed a structured interview using a pretested case-record form. The outcome was IBS by Rome III criteria: recurrent abdominal pain or discomfort on at least three days per month in the preceding three months, associated with two or more of (i) improvement with defecation, (ii) onset associated with a change in stool frequency and (iii) onset associated with a change in stool form.

Psychosocial items were self-reported stress, recorded as present or absent and a family history of IBS-like symptoms in a first-degree relative. No scored anxiety or depression inventory was used. Lifestyle items were current residence (home or hostel), source of daily food (homemade, hostel canteen or restaurant), regular physical exercise, current smoking and NSAID use. Height and weight were measured and body-mass index (BMI) was calculated as weight in kilograms divided by height in metres squared. Known diabetes and dyslipidaemia were recorded but were uncommon. Symptom subtype among IBS-positive students is not reported in this paper.

Statistical analysis

Data were entered and checked in IBM SPSS Statistics version 23. Continuous variables are presented as mean ± standard deviation and categorical variables as number (percentage). For each psychosocial and lifestyle item the prevalence of IBS is given with a Wilson 95% CI. The absolute risk difference is the exposed minus the unexposed prevalence, with a Wald 95% CI. Unadjusted odds ratios and 95% confidence intervals were calculated from two-by-two tables. Comparisons used the chi-square test for categorical variables and an unpaired Student t test for means. A two-sided p value below 0.05 was considered statistically significant. No multivariable model was fitted.

Ethical considerations

The protocol was reviewed and cleared by the Ethical and Protocol Review Committee of Rangpur Medical College (Memo No. MC/Rang/2019/1390-c, dated 27 October 2019). Written informed consent was obtained from every participant.

RESULTS

Study population

Five hundred students completed the interview. Mean age was 22.38 ± 2.4 years. Women made up 275 (55.0%) of the sample. Most students lived in a hostel (388, 77.6%) and took their main meals from the hostel canteen (326, 65.2%). Rome III IBS was identified in 105 students (21.0%; 95% CI 17.7-24.8). *Table I* summarises the sample. Age and sex are shown only as background. They are not treated as psychosocial or lifestyle determinants in the later tables.

Table I

Background characteristics of the study sample (*n* = 500).

Characteristic	n	%
Age 18-21 years	181	36.2
Age 22-24 years	279	55.8
Age 25-27 years	40	8.0
Male	225	45.0
Female	275	55.0
Living at home	112	22.4
Living in hostel	388	77.6
Homemade food	88	17.6
Hostel canteen food	326	65.2
Restaurant food	86	17.2
Rome III IBS present	105	21.0

Percentages use a denominator of 500.

Psychosocial items

Table II shows the two psychosocial items. Self-reported stress was present in 120 students. IBS was found in 84 of them (70.0%; 95% CI 61.3-77.5) and in 21 of 380 students without stress (5.5%; 95% CI 3.6-8.3). The risk difference was 64.5 percentage points (95% CI 56.0-73.0). The unadjusted odds ratio was 39.89 (95% CI 22.15-71.84; $\chi^2 = 228.51$; $p < 0.001$). Stress was reported by 80.0% of students with IBS and by 9.1% of students without IBS.

A family history of IBS was reported by 77 students. IBS was present in 56 of them (72.7%; 95% CI 61.9-81.4) and in 49 of 423 students without a family history (11.6%; 95% CI 8.9-15.0). The risk difference was 61.1 percentage points (95% CI 50.7-71.5). The odds ratio was 20.35 (95% CI 11.36-36.47; $\chi^2 = 146.80$; $p < 0.001$).

Table II

Psychosocial items and Rome III IBS (*n* = 500).

Item	IBS / N	% (95% CI)	Risk difference, pp (95% CI)	OR (95% CI); χ^2; p
Stress present	84 / 120	70.0 (61.3-77.5)	64.5 (56.0 to 73.0)	39.89 (22.15-71.84)
Stress absent	21 / 380	5.5 (3.6-8.3)	Reference	$\chi^2 = 228.51$; $p < 0.001$
Family history present	56 / 77	72.7 (61.9-81.4)	61.1 (50.7 to 71.5)	20.35 (11.36-36.47)
Family history absent	49 / 423	11.6 (8.9-15.0)	Reference	$\chi^2 = 146.80$; $p < 0.001$

pp = percentage points. OR = unadjusted odds ratio. Prevalence intervals are Wilson 95% CIs.

Lifestyle items

Table III shows the lifestyle items. IBS was present in 90 of 388 hostel residents (23.2%; 95% CI 19.3-27.6) and in 15 of 112 students living at home (13.4%; 95% CI 8.3-20.9). The risk difference was 9.8 percentage points (95% CI 2.2-17.4). The odds ratio was 1.95 (95% CI 1.08-3.53; $\chi^2 = 5.03$; $p = 0.025$).

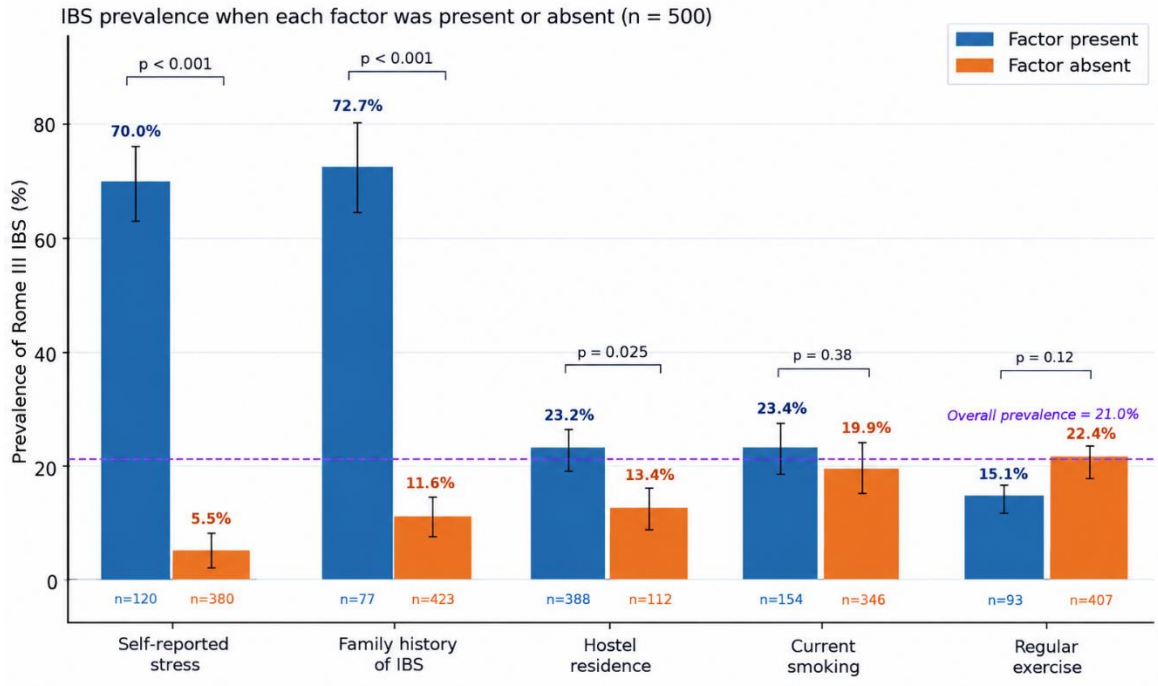
Source of daily food did not separate the groups ($p = 0.52$). Regular exercise was reported by 14 of 93 students who exercised (15.1%) and by 91 of 407 who did not (22.4%; OR 0.62, 95% CI 0.33-1.14; $\chi^2 = 2.43$; $p = 0.12$). Current smoking (OR 1.22, 95% CI 0.78-1.93; $p = 0.38$) and NSAID use (OR 0.81, 95% CI 0.30-2.18; $p = 0.67$) were not associated with IBS. Mean BMI was 23.5 ± 2.5 kg/m² in students with IBS and 22.6 ± 3.8 kg/m² in those without IBS ($p = 0.47$).

Table III
Lifestyle items and Rome III IBS (n = 500).

Item	IBS / N	% (95% CI)	OR (95% CI)	χ^2; p
Hostel residence	90 / 388	23.2 (19.3-27.6)	1.95 (1.08-3.53)	5.03; 0.025
Living at home	15 / 112	13.4 (8.3-20.9)	Reference	
Hostel canteen food	73 / 326	22.4 (18.2-27.2)	1.40 (0.76-2.59)	0.52*
Restaurant food	17 / 86	19.8 (12.7-29.4)	1.20 (0.55-2.60)	
Homemade food	15 / 88	17.0 (10.6-26.2)	Reference	
Regular exercise, yes	14 / 93	15.1 (9.2-23.7)	0.62 (0.33-1.14)	2.43; 0.12
Regular exercise, no	91 / 407	22.4 (18.6-26.7)	Reference	
Current smoking, yes	36 / 154	23.4 (17.4-30.7)	1.22 (0.78-1.93)	0.76; 0.38
Current smoking, no	69 / 346	19.9 (16.1-24.5)	Reference	
NSAID use, yes	5 / 28	17.9 (7.9-35.6)	0.81 (0.30-2.18)	0.18; 0.67
NSAID use, no	100 / 472	21.2 (17.7-25.1)	Reference	

Asterisk: p value for food source is for the three-group comparison. Odds ratios for canteen and restaurant food use homemade food as the reference.

Figure 1 shows IBS prevalence when each main item was present and when it was absent. Blue bars are students in whom the factor was present and orange bars are students in whom it was absent. Error bars are Wilson 95% confidence intervals. Sample size is given under each bar. The purple dashed line marks the overall prevalence of 21.0%. Pairwise p values sit above each pair of bars.



Blue = factor present; orange = factor absent. Error bars indicate Wilson 95% confidence intervals. The dashed line indicates overall prevalence.

Figure 1 Prevalence of Rome III IBS according to selected psychosocial and lifestyle items.

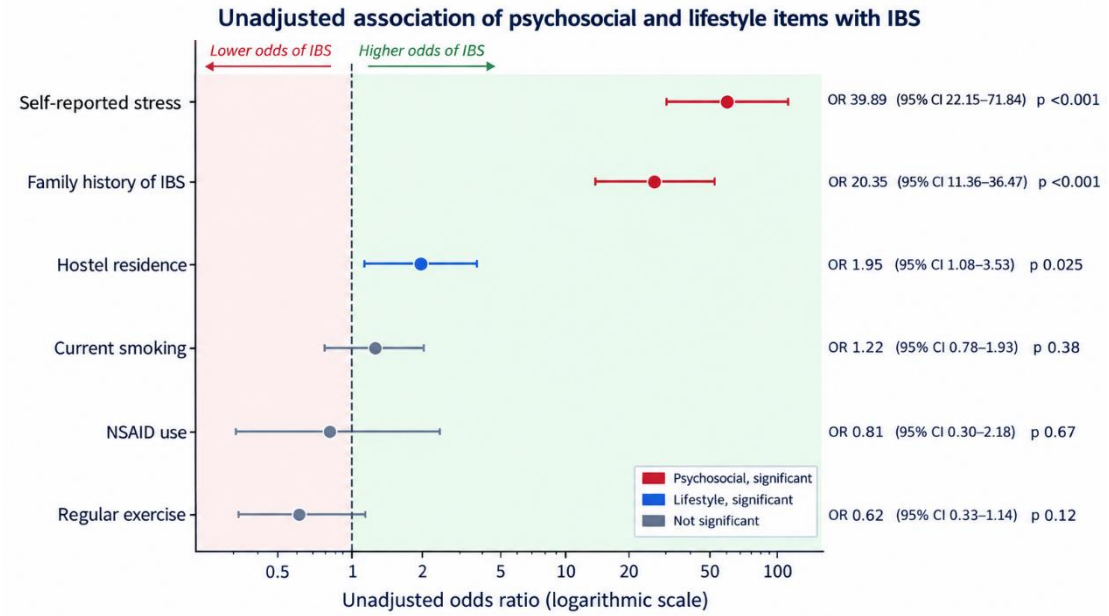
Ranking of associations
Table IV ranks the psychosocial and lifestyle items by absolute risk difference. Stress and family history occupy the top two rows. Hostel residence is the only lifestyle item with a statistically significant difference. Smoking, exercise and NSAID use do not.

Table IV
Ranking of psychosocial and lifestyle items by absolute risk difference.

Item (present vs absent)	Risk difference, pp (95% CI)	OR (95% CI)	p
Self-reported stress	64.5 (56.0 to 73.0)	39.89 (22.15-71.84)	<0.001
Family history of IBS	61.1 (50.7 to 71.5)	20.35 (11.36-36.47)	<0.001
Hostel residence	9.8 (2.2 to 17.4)	1.95 (1.08-3.53)	0.025
Current smoking	3.4 (-4.5 to 11.3)	1.22 (0.78-1.93)	0.38
NSAID use	-3.3 (-18.0 to 11.3)	0.81 (0.30-2.18)	0.67
Regular exercise	-7.3 (-15.6 to 1.0)	0.62 (0.33-1.14)	0.12

A negative risk difference indicates a lower prevalence among students with the item. Odds ratios are unadjusted.

Figure 2 presents the same six items as unadjusted odds ratios on a logarithmic scale. Red markers are significant psychosocial items; blue markers are significant lifestyle items and grey markers are items that were not significant. Horizontal lines are 95% confidence intervals. The vertical dashed line marks an odds ratio of 1. The shaded bands show the direction of the association.



Red = significant psychosocial item; blue = significant lifestyle item; grey = not significant. Horizontal lines are 95% confidence intervals.

Figure 2 Unadjusted odds ratios for Rome III IBS according to psychosocial and lifestyle items.

Items that did not separate the groups

Table V gathers the null or unstable findings in one place. Mean age did not differ (22.3 ± 2.17 years with IBS versus 22.4 ± 2.3 years without IBS; p = 0.52). Mean BMI did not differ. Known diabetes and Dyslipidaemia were rare and the cell counts are too small for a firm statement.

Table V

Additional comparisons that did not identify a useful lifestyle marker.

Comparison	IBS present (n = 105)	IBS absent (n = 395)
Age, years, mean ± SD	22.3 ± 2.17	22.4 ± 2.3
BMI, kg/m², mean ± SD	23.5 ± 2.5	22.6 ± 3.8
Known diabetes, n (%)	3 (2.9)	2 (0.5)
Dyslipidaemia, n (%)	10 (9.5)	19 (4.8)

Age p = 0.52. BMI p = 0.47. Diabetes and Dyslipidaemia comparisons rest on small numbers.

DISCUSSION

The question in this analysis was not how many students had IBS, but which recorded items marked those who did. Two psychosocial items did most of the work. Self-reported stress and a family history of IBS each identified a group in which about seven in ten students met Rome III criteria. Among lifestyle items only hostel residence showed a modest association. Food source, exercise, smoking, NSAID use and BMI did not.

The odds ratio for stress is large and should be read with care. Stress was a single yes-or-no question, not a scored inventory. Students who already have abdominal pain may be more ready to call their lives stressful and the reverse sequence is also possible. Even so, 80.0% of students with IBS reported stress against 9.1% of students without IBS. That direction matches other medical-school studies. Ibrahim et al. found emotional stress and anxiety among the main predictors in Jeddah[5]. Naeem et al. linked more than half of student IBS in Karachi to stress[6]. Shen et al. and Okami et al. reported the same pattern in Chinese and Japanese students [7,8]. The finding also fits a gut-brain account of the disorder[4].

Family history produced the second largest association. Pace et al. found that young adults with persistent abdominal complaints were more likely to have a sibling with similar symptoms[9]. Shared meals, learned response to discomfort and inherited visceral sensitivity can sit in the same household. In this sample a single question about family bowel symptoms identified a group in which 72.7% of students met criteria.

Hostel residence nearly doubled the odds of IBS relative to living at home. Costanian et al. reported a similar finding among Lebanese university students living away from their families[10]. Irregular meals, shared toilets and a different sleep pattern are plausible explanations. Food source itself was not associated with IBS. A category such as canteen food does not record fat content, spice or skipped breakfasts[15].

Exercise, smoking and BMI also failed to separate the groups. Basandra and Bajaj found associations with fatty food, cigarettes and low activity among medical students in northern India[16]. The present sample was predominantly female, cigarette use among young Bangladeshi women remains uncommon and regular structured exercise is not the campus norm. Those features may explain the null findings.

The practical point is narrow. Two questions, current stress and family bowel symptoms, marked most of the IBS-positive students. Hostel residence added a smaller signal. Asking about canteen food, smoking

or BMI would not have helped in this sample. That pattern is useful at hostel admission or before professional examinations, when a short screen is all that is realistic[17].

LIMITATIONS

This was a single-centre, purposive, questionnaire-based survey. The associations cannot be applied to all Bangladeshi medical students. Stress and family history were self-reported. No validated psychometric scale was used.

CONCLUSION

Among medical students at Rangpur Medical College, self-reported stress and a family history of IBS were the items most strongly associated with Rome III IBS. Hostel residence showed a smaller association. Source of daily food, regular exercise, smoking, NSAID use and BMI did not. Campus screening that starts with stress and family bowel symptoms will catch more affected students than a list of diet and smoking questions.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

FUNDING

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ETHICAL APPROVAL

Ethical clearance was granted by the Ethical and Protocol Review Committee of Rangpur Medical College, Rangpur (Memo No. MC/Rang/2019/1390-c, 27 October 2019).

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