

# Functional constipation and its association with lifestyle habits of medical students using Rome IV Diagnostic Criteria

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## Abstract

**Background:** Functional constipation (FC) is widespread with various symptoms that impose considerable effects on the quality of life and puts a burden on medical resources. During their education, medical students are more likely to adopt an unhealthy lifestyle that can lead to gastrointestinal problems. This study aimed to explore FC's prevalence and associated lifestyle factors among undergraduate medical students at Jinnah Sindh Medical University, Karachi, Pakistan.

**Methods:** The present cross-sectional study was conducted from August 2019 - September 2019 in Jinnah Sindh Medical University (JSMU), Karachi, Pakistan, according to non-probability purposive sampling. Data were collected by a pre-tested, self-administered questionnaire designed according to Rome IV Criteria. For data analysis, SPSS version-26 was used.

**Results:** A total of 365 medical students were included in this study. The prevalence of FC among medical students as per Rome Criteria IV was 36.3%. Functional constipation was significantly higher in women (72.7%). The hard and lumpy stool was the most experienced symptom (33%). About 123(40.6%) subjects had self-reported constipation. Low fibre consumption (fruits and vegetables), low water intake, and imperfect bowel habits were the most prominent characteristics among constipated subjects. Concerning treatment intervention, high fibre food consumption was noticed as the most frequently used intervention by constipated subjects.

**Conclusion:** Regarding the prevalence rate, FC is a widespread issue among medical students. Low fibre diet, low water intake, stool with-holding, and less frequent defecation are the most apparent risk factors among the constipated subjects.

**Key words:** Functional constipation, medical students, Fibre diet, lifestyle factors.

## Introduction

In the general public, constipation is one of the most frequent gastrointestinal complaints, more prevalent among females and the older populations with 37.2% and 12%-19% prevalence, respectively (1). Its prevalence in Pakistan was found to be 16.1% (2). It badly affects the quality of life, reduces working capacity, and increases healthcare costs (3). Constipation is a global health concern associated with fecal incontinence, low self-esteem, social withdrawal, depression, anxiety, anger, and so forth (4).

Constipation is defined as persistent difficult and ungratified defecation characterized by reduced bowel movements, straining, the passage of painful hard stools, and feeling of distress (3). It is worth noting that there is a wide variation in defining functional constipation (FC) among clinical physicians and patients (5). ROME IV criteria that was revised in 2016, offer a more accurate and precise definition of FC. According to these criteria, "FC is assessed concerning the presence of at least two of the following symptoms for the last three months which include straining (> 1/4 of defecation), lumpy and hard stools (> 1/4 of defecation), feeling of incomplete defecation (> 1/4 of defecation), feeling of anal obstruction (> 1/4 of defecation), physical maneuver to ease defecation (> 1/4 of defecation) and less than 3 unconstrained bowel movements per week (6)."

Painful passage of stool during constipation further decreases the defecation frequency and a vicious cycle sets in that impairs the health-related quality of life (HRQOL) (3, 7). Few long-term complications of chronic constipation include inguinal hernia, hepatic encephalopathy, and colorectal carcinoma (3). The alarming complaints that can complicate constipation are bloody stools, anemia, weight loss, symptoms of obstruction, and age of more than 50 years with rectal bleeding, rectal prolapse and no history of colorectal carcinoma screening (8).

Pathogenesis of functional constipation is multi-factorial with multiple causes and risk factors such as genetic factors, low socioeconomic factors, any underlying organic disease (gastrointestinal, neurological, psychogenic, metabolic and endocrine disorders), drug side effects and behavioural factors (low fibre intake and drinking, lack of physical activities, changes in eating habit and inadequate response to the call of defecation) (3, 9). A study conducted in 2011 reported a greater frequency of functional constipation among young adults and the reason for this could be the poor lifestyle habits as they are significantly correlated with the development of functional constipation (2). In this regard, it is necessary to identify the lifestyle habits among them.

The students are the building block for the nation's development, and the entire success of a nation depends on the youth. A study reported that gastrointestinal disorders (like heartburn, diarrhea, irritable bowel syndrome, constipation, etc.) are common, especially among medical students (2). During their education, the frequency of fruit and vegetable consumption decreases day by day while unhealthy habits like smoking, drinking, and substance abuse increase (10). For medical students, being a part of a future health care providing team, it is mandatory to undertake an appropriate healthy lifestyle early during their student years to inspire patients by setting an example of healthy behaviour. Therefore, this study aimed to explore the frequency of FC using ROME IV criteria and its associated risk factors among medical students.

## Methods

The present questionnaire-based cross-sectional survey was conducted at JSMU, Karachi, Pakistan, between August 2019 to September 2019. The authors obtained the ethical approval from JSMU with reference code: JSMU/IRB/2019/227. A sample size of 345 was recruited, having a confidence level of 95% and an anticipated population proportion of 0.34 in the OpenEpi sample size calculator (2). A non-probability purposive sampling technique was used to enrol participants.

Undergraduate students of JSMU who were present at the time of data collection and gave informed consent were included in the study. Participants with any additional systemic disease, organic bowel disease, and IBS were excluded from this study. A pre-tested self-administered questionnaire was designed for data collection by reviewing the literature on constipation (6). A pilot study was conducted among undergraduate medical students for content validity and to standardize the questionnaires. Data collected were analyzed using SPSS software version 26.0. The qualitative data were presented as frequencies and percentages, and the Chi-square test was used for categorical data analysis. The p-value was taken statistically significant at <0.05.

## Results

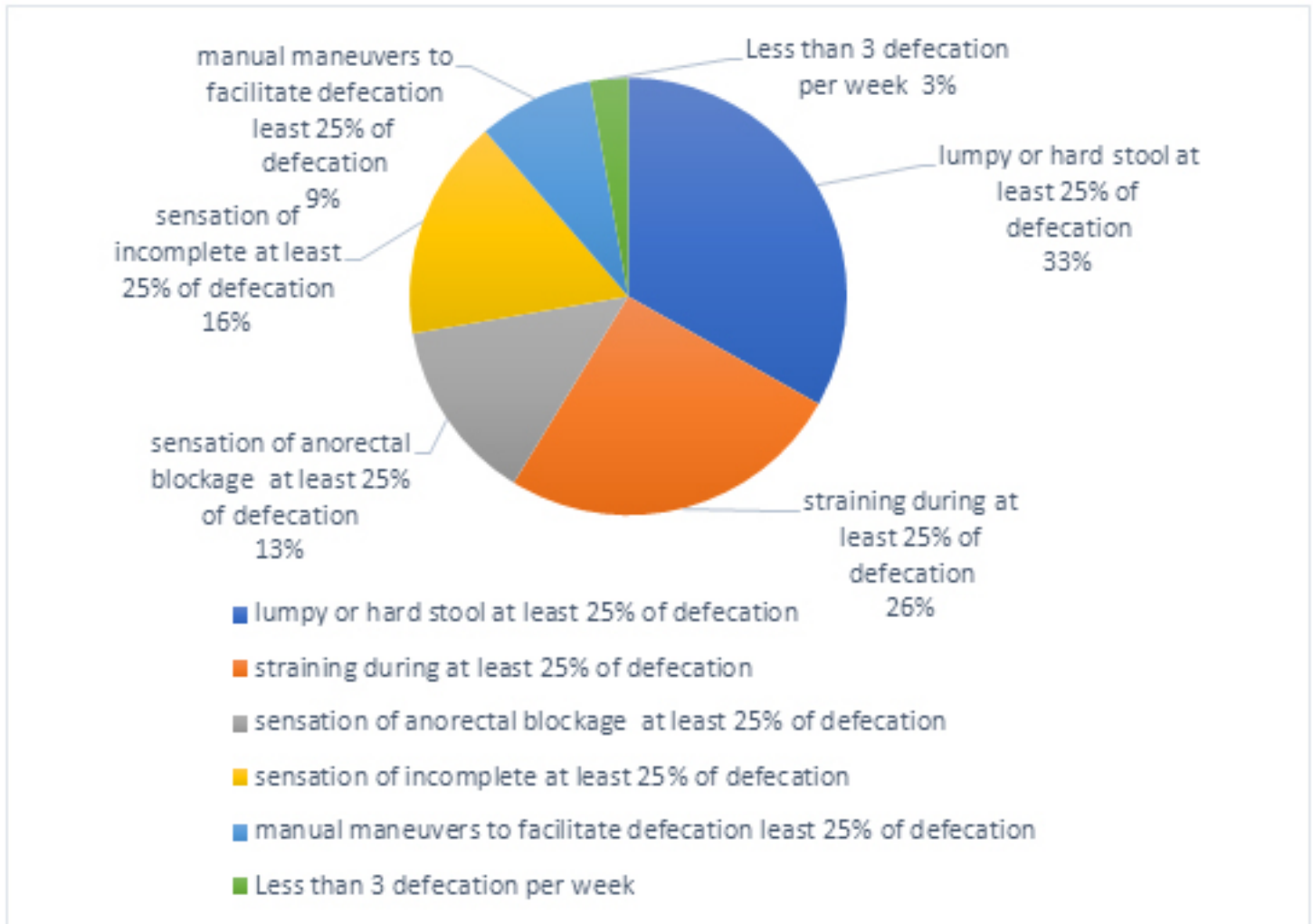
Initially, a total of 365 undergraduate medical students were included in the study, and 62 responders were excluded from the study due to the ineligibility of the participants. Out of 303 responders, 200 (66%) were females. and 103 (34%) were males. The mean age (SD) of students was  $21.7 \pm 2.2$  years, and the majority of students were unmarried 297 (98%). All the sociodemographic characteristics are shown in Table 1.

**Table 1: Sociodemographic characteristics of study participants (n = 303)**

Variable	N (%)
<b>Age (Years)</b>	
< 20 yrs.	112 (37.0)
20 – 22 yrs.	151 (49.8)
> 22 yrs.	40 (13.2)
Mean age +/- SD (Years)	21.7 ± 2.2
<b>Gender</b>	
Male	103 (34)
Female	200 (66)
<b>Marital status</b>	
Unmarried	297 (98)
Married	6 (2.0)
<b>Department</b>	
MBBS	277 (91.4)
D-Pharmacy	26 (8.6)
<b>Year of study</b>	
1 <sup>st</sup> year	73 (24.1)
2 <sup>nd</sup> year	42 (13.9)
3 <sup>rd</sup> year	42 (13.9)
4 <sup>th</sup> year	114 (37.6)
5 <sup>th</sup> year	32 (10.6)
<b>Financial support</b>	
Family	268 (88.4)
Family + self	34 (11.2)
Self	1 (0.3)
<b>Place of Residency</b>	
At home	268 (88.4)
At hostel	35 (11.6)

The self-reported constipation was found in 123 (40.6%) individuals and FC, as per ROME IV criteria, was found in 110 (36.3%) individuals.

**Figure 1: Symptoms of functional constipation experienced by study participants.**



Among 110 (36.3%) functionally constipated individuals, FC's symptoms characteristics were assessed (Figure 1). Most of the constipated individuals (33%) experienced hard or lumpy stools, which were found to be the most frequent symptoms faced by the constipated individuals as per Rome IV criteria. Gender and FC were significantly correlated ( $p < 0.05$ ). FC was found to be more prevalent among females than males. FC was significantly correlated with nutritional status ( $p < 0.05$ ).

**Table 2: Sociodemographic characteristics of individuals with constipation (n=110)**

Variables	Individuals with constipation	p-value
<b>Age (Years)</b>		0.224
under 20	4/112	
20 - 22	60/151	
Above 22	10 /40	
<b>Gender</b>		0.04
male	30/103	
female	80/200	
<b>Marital status</b>		0.118
unmarried	106/297	
married	4 / 6	
<b>Department</b>		0.851
MBBS	101/277	
D-Pharmacy	9 / 26	
<b>Year of study</b>		0.338
1 <sup>st</sup> year	28/73	
2 <sup>nd</sup> year	12 / 42	
3 <sup>rd</sup> year	19/42	
4 <sup>th</sup> year	43/114	
5 <sup>th</sup> year	8 / 32	
<b>Financial support</b>		0.743
family	98/268	
family + self	12 / 34	
self	0/1	
<b>Place of Residency</b>		0.312
at home	100/268	
at hostel	10 / 35	
<b>Nutritional Status</b>		0.06
normal	59/187	
underweight	34/69	
overweight	13/35	
obese	3 / 6	

Among the 110 (36.3%) constipated individuals, most of the students were non-smokers (97.2%). Most of them were non-daily consumers of fruits and vegetables (60.9% and 72.7%, respectively). Two-thirds of the students (68.1%) drank an inadequate amount of water (less than 8 glasses/day), while 72% of students defecated more than 3 times per week, and 28% of students defecated less than 3 times per week. Surprisingly, 11.8% of students withheld stool daily, 57.2% of students sometimes and 30% rarely. Statistically, significant relationships of constipation were noted with vegetable consumption ( $p < 0.05$ ), water intake ( $< 0.05$ ), defecation frequency ( $< 0.05$ ). Smoking habits, fruit consumption, exercise, and sleep habits were found to be non-significantly associated with FC (Table 3).

Table 3: Lifestyle factors (LSF) of individuals with constipation (n=110)

Characteristics	Individuals with constipation (total Number)	p-value
Number	110 (303)	-
LSF 1		0.488
daily	1 (4)	
sometimes	2 (10)	
never	107 (289)	
LSF 2		0.014
daily	29 (93)	
sometimes	62 (178)	
rarely	18 (30)	
LSF 3		0.056
daily	43 (135)	
sometimes	50 (147)	
rarely	17 (31)	
LSF 4		0.01
< 6 glasses	37 (72)	
6-8 glasses	38 (87)	
8-10 glasses	23 (90)	
> 10 glasses	12 (54)	
LSF 5		0.458
daily	13 (42)	
sometimes	34 (93)	
rarely	43 (124)	
never	20 (43)	
LSF 6		0.874
4-6 hours	29 (74)	
6-8 hours	57 (168)	
8-10 hours	22 (57)	
> 10 hours	2 (6)	
LSF 7		0.01
after every meal	3 (16)	
once a time daily	61 (181)	
> 3 times a week	22 (70)	
< 3 times a week	24 (36)	
LSF 8		0.03
daily	13 (16)	
sometimes	63 (134)	
rarely	33 (152)	

Where, LSF 1 = Smoking Habits, LSF 2= Vegetables Consumption, LSF 3= Fruit Consumption, LSF4= Water Intake, LSF 5= Exercise, LSF 6= Sleeping Habits, LSF 7= Defecation, LSF 8= Stool Withholding Habits

## Discussion

Medical students are future health care providers. However, with the ever-increasing academic stress, the students often ignore the symptoms of various common ailments (11). Depending on the diagnostic criteria used, the prevalence of FC varies among different populations (9). In a study conducted among tertiary education students of Malaysia, FC's reported prevalence based on ROME III criteria was 16.2%(5). Another study conducted by students at Dow University of Health and Sciences, Karachi, in 2011, inferred that the frequency of FC among medical students, hospitalized patients, and their attendants was 34%, 53%, and 52%, respectively (2). We could not discover any review that used ROME IV criteria to find the prevalence of functional constipation in Pakistan, as the criteria was updated in May 2016 (12). In our study, based on ROME IV diagnostic criteria, prevalence of FC among medical students was found to be 36.3%, which was relatively higher than previous literature.

Our results are in accordance with a recent study that demonstrated 36.5% of individuals had self-reported constipation, and out of those, more than four-fifths fulfilled the ROME IV diagnostic criteria(13). Therefore, these findings were suggestive that perception regarding FC among medical students and the general population was compelling. Considering the FC symptoms, frequently reported symptoms in our study were straining during stool passage and hard stool consistency. Wald and Lim elucidated the same result in their reviews (14).

As for sociodemographic factors, gender was found to be significantly associated with FC (p-value <0.05) in our study. As per our survey, a high prevalence of FC was found in female students (72.7%) with a sex ratio of 0.37. This finding was in agreement with other research outcomes, which stated that FC was more prevalent among females (15-17). A Malaysian study reported higher incidence of FC among female students (12). Women's higher predominance could be attributed to hormonal factors (increased risk of constipation during menstrual cycles) (18). Moreover, eating behaviour, physical and emotional problems could also impact FC in females (19,20).

Our study found no significant association between FC and other factors like age, body mass weight (BMI), marital status, and place of residence (home or hostel). Certainly, a high fibre diet and good water intake keep the bowel healthy(21,22). In a study, it was observed that many constipated patients in Berlin, Germany, got relief after using a high fibre diet as a treatment of FC (23). Another study deduced that low intake of water is strongly associated with FC (p-value <0.05) (20). Our results showed a significant correlation between FC and high fibre consumption as fruits and vegetables and increased water intake (p-value <0.05).

Our study did not find exercise to be significantly associated with FC. This contrasted with other studies, which had reported that moderate-intensity exercises could improve stool consistency and frequency(24, 25). A study suggested that due to decreased defecation frequency and stool withholding, the transit time of faeces passing through the intestine increases, making the stool harder (26). According to our study, we found a significant

relation of functional constipation with stool withholding and infrequent defecation in medical students. As far as this association is concerned, we were unable to obtain it in any other studies. It can be described how medical students' life is very stressful and busy, so they usually avoid defecation during long working hours that is an apparent risk factor for functional constipation among medical students, which was not referred to in other studies. Further research should be undertaken to explore this risk factor.

Evidence from various research also indicated that a high fibre diet, increased fluid intake, herbal supplements, and laxatives are the most preferable and effective means to counter constipation symptoms. It is important to urge medical students to assume a healthy lifestyle and consume a balanced diet (2, 27-28).

### Limitations

Our study's limitations are limited sample size and cross-sectional nature. It was also a study based on questionnaire; therefore, it is likely for students to pick acceptable responses regardless of what the real response might be.

## Conclusions

This study concludes that according to ROME IV criteria, FC was prevalent among medical students. Medical students had a good perception of FC. Straining during defecation and lumpy hard stool showed great accuracy in diagnosing FC in medical students. Females were more prone to functional constipation. Low fibre diet decreased water intake, less frequent defecation, and stool withholding were found to be the major lifestyle factors contributing to FC among medical students.

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