Original Article

Prevalence of psychiatric disorders in patients of irritable bowel syndrome fulfilling Rome IV criteria: An observational study

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Abstract

Background: Rome IV criteria for the diagnosis of irritable bowel syndrome have been introduced recently hence, there are very few studies conducted to know the prevalence of IBS using these criteria. Prevalence of psychiatric disorder vary depending on criteria used. In view of these facts, this study was conducted to estimate prevalence of psychiatric disorders in patients of IBS fulfilling Rome IV criteria. **Material and Methods:** Observational study at a tertiary care hospital in northern India. We included 100 patients aged ≥18 years who were diagnosed as irritable bowel syndrome fulfilling ROME IV criteria and assessed for different psychiatric manifestations using Patient health questionnaire after taking informed written consent. **Results:** 75% of the IBS patient had more than one psychiatric comorbidity, while 25% had no psychiatric illness. The most common psychiatric comorbidity observed was generalized anxiety disorder 44%, followed by major depression in 38%, somatization disorder in 23%, panic disorder 18%, alcohol use disorder 18% and eating disorder. Statistically significant difference was found among patient having somatization disorder, eating disorder and alcohol use disorder among male and female. **Conclusion:** The study emphasizes the need for regular counselling regarding psychiatric associations in IBS patients.

Keywords: Irritable bowel syndrome, ROME IV criteria, Psychiatric disorders

Introduction

Irritable bowel syndrome (IBS) is one of the disorders belonging to the group of functional gastrointestinal disorders (FGIDs). The prevalence of IBS varies considerably from 1% to 45% depending on the geographic location of the population studied and the diagnostic criteria used.[1] The prevalence of IBS in the North Indian population is 4% using Rome III criteria with a slightly higher prevalence in women as compared to men (4.8% vs. 3.2%).[2]

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Received: 23-07-2023 **Revised:** 09-12-2024
Accepted: 16-12-2024 **Published:** 25-04-2025

Access this article online

Quick Response Code:

Website: http://journals.lww.com/JFMPC

DOI: 10.4103/jfmpc.jfmpc_1196_23

The diagnosis of IBS is based on Rome IV criteria and is further classified into the following categories: IBS with predominant constipation, IBS with predominant diarrhea, IBS with mixed bowel habits, and IBS unclassified.[3]

The etiopathogenesis of the disease was traditionally believed to be a functional disorder, but now various pathological mechanisms like brain-gut disorder, altered intestinal motility and hypersensitivity, abnormalities in serotonin and bile acid metabolism, low-grade mucosal inflammation, disturbances in microbiota and genetic predisposition have been suggested.[4,5] Hence, dysregulated gut-brain axis functioning has been postulated as one of the possible etio-pathological mechanisms of IBS.[6]

How to cite this article: Bhattacharya R, Pratima K, Preeti, Ambedkar SN. Prevalence of psychiatric disorders in patients of irritable bowel syndrome fulfilling Rome IV criteria: An observational study. J Family Med Prim Care 2025;14:1478-85.

Patients with IBS are twice as likely to suffer from non-gastrointestinal somatic symptoms.[7] and have socio-psychological effects that may interfere with the everyday and social activities of the sufferer increasing financial burden on the individual.[8] They are at higher risk of depression, anxiety, sleep disturbances, and bipolar disorders. The risk of these disorders is highest in the first year after the diagnosis of IBS but can continue to remain higher in subsequent years also.[9]

A study conducted in Northern India found that 84.4% of patients with IBS had psychiatric disorders as compared to 41.5% in control with a majority having major depressive episodes and generalized anxiety disorder.[10] The psychosomatic disorders were more commonly found in the age group of 26–35 years.[11]

Rome IV criteria for the diagnosis of IBS have been introduced recently and hence there are very few studies conducted to know the prevalence of IBS using these criteria, the prevalence of IBS in different studies varies considerably depending on the criteria used, it is thus possible that the prevalence may differ from earlier estimates when Rome IV criteria are used.[1] In view of these facts, it is proposed to conduct the present study to estimate the prevalence of psychiatric disorders in patients of IBS who are diagnosed by using the Rome IV criteria.

Materials and Methods

Study setting: It was an observational study and was conducted in the Department of Medicine at a tertiary care center, New Delhi.

Study duration: Between 2017 and 2019.

Study design: Cross-sectional Study.

Sample size calculation: Based on the previous study, the prevalence of psychiatric co-morbidities in IBS was 40–45%.[12] Taking this value as a reference, the minimum required sample size with 10% margin of error and 5% level of significance was 96 patients. So, the total sample size taken was 100.

Formula used was – $N \geq ((p\ (1 - p))/(ME/z\alpha)^2$

Where Z_α is the value of Z at a two-sided alpha error of 5%, ME is the margin of error and *P* is the prevalence rate.

Methodology: A total of 100 patients from the outpatient Department of Internal Medicine and Psychiatry who were 18 or more years of age and were diagnosed case of IBS by Rome IV criteria.

Patients having any comorbidities and diagnosed cases of psychiatric disorders were excluded. All patients were subjected to complete history taking, thorough physical examination, and relevant investigations. The diagnosis of IBS and its subtypes was made based on Rome IV criteria (Annexure. I) Finally, the study population was interviewed according to the questionnaire of Patient Health Questionnaire (PHQ) (Annexure. II), and the responses were recorded. The responses to the questionnaire were then assessed to determine whether the subject had any psychiatric disorder or not. If the subject was found to be suffering from any psychiatric disorder, it was further classified.

Data collection: The data from history and clinical examination and from psychiatric evaluation was recorded on separate Performa. All the data thus obtained were collected and put into a Microsoft Excel spreadsheet and analyzed according to the statistical method described.

Statistical analysis: For statistical analysis data were entered into a Microsoft Excel spreadsheet and analysis was done using statistical package for social sciences (SPSS) version 21.0.

- Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean ± SD and median
- The median and the interquartile range have been stated for numerical variables that are not normally distributed
- Qualitative variables were correlated using the Chi-Square test/Fisher's Exact test
- A *P* value of <0.05 was considered statistically significant.

Ethics

The Ethics Committee of the Institute had approved the study (s. no. IEC/VMMC/Thesis/October/2017-097) and informed and written consent was taken from the enrolled patients. The patient's information was dealt with confidentiality.

Strengthening of reporting of observational study in epidemiology (STROBE) checklist was used for reporting the study.

Results and Observations

Table 1 shows the demographic details IBS subtypes and Stool pattern of the study population. The highest number of patients in our study belonged to the age group 21–30 years (37%). The mean age of the subjects was 32.88 ± 10.07 years, ranging from 14 to 62 years. Male preponderance was seen in our study (M = 55%, F = 45%).

Recurrent abdominal pain was associated with defecation in 63% (n = 63) patients, change in frequency of stool in 83% (n = 83) patients, and change in form (appearance) of stool in 60% (n = 60) patients. Of all 100 patients, the predominant type of IBS in this study was IBS-M 54% followed by IBS-C 27% and IBS- D 19%. Among the study population constipation type (type 1, 2) was in 52%, ideal stool type (type 3, 4, 5) in 56% and 43% had diarrheal stool type (type 6,7) (as per Bristol stool chart).

In our study, 75% of IBS patients had one or more psychiatric comorbidity while 25% had no psychiatric illness.

Table 1: General characteristics of the study population, lBS symptoms, and stool types

Characteristics	Frequency	Percentage (%)
Age		
≤20	12	12.00%
21–30	37	37.00%
31–40	29	29.00%
41–50	17	17.00%
>50	5	5.00%
Mean age±SD	32.88±10.07	
Sex		
Male	55	55.00%
Female	45	45.00%
IBS symptoms		
Recurrent abdominal pain related to defecation	63	63.00%
Recurrent abdominal pain associated with change in stool frequency	83	83.00%
Recurrent abdominal pain associated with change in stool form	60	60.00%
IBS subtypes		
C (constipation)	27	27.00%
D (diarrhea)	19	19.00%
M (mixed)	54	54.00%
Stool types (Bristol)		
1,2	52	52.00%
3,4,5	56	56.00%
6,7	43	43.00%

The most common psychiatric comorbidity observed was generalized anxiety disorder in 58.66%, followed by major depression in 50.66%, somatization disorder in 30%, panic disorder in 24%, alcohol use disorder in 24%, and eating disorder in 16% Table 2.

The highest prevalence of psychiatric comorbidity was observed in the age group of >50 years (100%), followed by ≤20 years (91.6%), 21–30 years (75.6%), 41–50 years (70.5%), and 31–40 years (65.5%) but the differences were not statistically significant ($P = 0.285$) Table 3.

The psychiatric comorbidity was more prevalent in males 76.6% as compared to 73.3% in females, but the difference was not statistically significant ($P = 0.728$). Somatization disorder was significantly more common in females (48.89%) as compared to males (1.82%) with a P value of <0.0001. Eating disorders were more common in females (24.4%) as compared to males (1.8) and the difference was statistically significant ($P = 0.001$). Alcohol use disorder was more commonly observed in males (25.4%) as compared to females (8.8%) and the difference was statistically significant (0.038). In males, major depression (43.6%), panic disorder (20.0%), and generalized anxiety disorder (47.2%), were more common as compared to females in whom major depression (31.1%), panic disorder (15.5%), generalized anxiety disorder (40.0%) was less commonly observed. However, the difference in these three disorders among male and female subjects was not statistically significant ($P = 0.199$, 0.565, 0.466 for major depression, panic disorder, and generalized anxiety disorder, respectively). Table 4.

Table 2: Distribution of various psychiatric disorders in the IBS patient

Psychiatric co-morbidity	Frequency	Percentage (%)
Somatization disorder	23	30.66%
Major depression	38	50.66%
Panic disorder	18	24.00%
Generalized anxiety disorder	44	58.66.00%
Eating disorder	12	16.00%
Alcohol consumption	18	24.00%

Table 3: Correlation between age and psychiatric comorbidity of study population

Age distribution (year)	Psychiatric co-morbidity		Patients in each group	*P*
	No	Yes		
≤20	1 (8.33%)	11 (91.67%)	12 (100.00%)	
21–30	9 (24.32%)	28 (75.68%)	37 (100.00%)	
31–40	10 (34.48%)	19 (65.52%)	29 (100.00%)	
41–50	5 (29.41%)	12 (70.59%)	17 (100.00%)	
>50	0 (0.00%)	5 (100.00%)	5 (100.00%)	
Total	25 (25.00%)	75 (75.00%)	100 (100.00%)	0.285

We found that overall psychiatric comorbidities among IBS-C, IBS-D, and IBS-M were 70.3%, 78.9%, and 75.9%, respectively but the difference in the prevalence of psychiatric comorbidity in these three IBS subtypes were not statistically significant ($P = 0.782$).

Table 5 shows the analysis of the correlation between IBS subtypes and individual psychiatric comorbidity. It was found that generalized anxiety disorder, somatization disorder, and alcohol

use disorder were more common in IBS-M (55.5%, 27.7%, 22.2%) as compared to IBS-D (42.1%, 21.0%, 15.7%) and IBS-C (22.2%, 14.8%, 11.1%) but only the difference in Generalized anxiety disorder was statistically significant (P = 0.017). Major depression was more common in IBS-C (51.8%) as compared to IBS-D (31.5%) and IBS-M (33.3%), whereas panic disorder and eating disorder were more common in IBS-D (26.3% and 26.3%) as compared to IBS-C (22.2% and 7.4%) and IBS-M (12.9% and 9.2%). None of these three results was statistically significant. (P = 0.220, 0.342, 0.1) for major depression, panic disorder, and eating disorder, respectively.

Discussion

IBS is one of the most frequently encountered FGIDs. It has a chronic, recurrent nature with no identifiable underlying pathology. Most of the literature has shown a bidirectional relationship between psychiatric diseases and IBS though the majority are from Western studies. There is also a paucity of studies conducted on this subject so far in India especially based on Rome IV criteria. Hence, the current study was undertaken to strengthen the knowledge regarding the relation of psychiatric disorders with IBS in our region.

Table 4: Correlation between sex and psychiatric comorbidity of study population

	Female (%)	Male (%)	*P*
Somatization disorder			
Yes	22 (48.89%)	1 (1.82%)	<0.0001
No	23 (51.11%)	54 (98.18%)	
Major depression			
Yes	14 (31.11%)	24 (43.64%)	0.199
No	31 (68.89%)	31 (56.36%)	
Panic disorder			
Yes	7 (15.56%)	11 (20.00%)	0.565
No	38 (84.44%)	44 (80.00%)	
Generalized anxiety disorder			
Yes	18 (40.00%)	26 (47.27%)	0.466
No	27 (60.00%)	29 (52.73%)	
Eating disorder			
Yes	11 (24.44%)	1 (1.82%)	0.0010
No	34 (75.56%)	54 (98.18%)	
Alcohol use disorder			
Yes	4 (8.89%)	14 (25.45%)	0.038
No	41 (91.11%)	41 (74.55%)	
Total psychiatric co-morbidity			
Yes	33 (73.33%)	42 (76.36%)	0.728
No	12 (26.67%)	13 (23.64%)	

The results of the current study show that the highest number of patients in the study belonged to the age group 21–30 years (37%). This is quite comparable with other studies. Michael VS *et al.*[13] found in their study that the highest number of patients was in the age group 31–40 (38%) followed by 18–30 (36%) years and lowest in the age group >60 years (2.7%).

The mean age of patients was 32.88 ± 10.07 years, ranging from 14 to 62 years. The result of this study was comparable to that of Singh *P et al.*[14] who found the mean age of their subjects to be 32.9 ± 9.4 years and Banerjee A *et al.*[15] who found the mean of their study subjects to be 37.48 ± 10.9 years.

Regarding gender distribution, the number of female patients was 45 (45%) and that of male patients was 55 (55%). This was in accordance with other Indian and Asian studies where, male preponderance was seen, like Singh *et al.*[14] (M = 72.8%) Banerjee *et al.*[15] (M = 74%). Whereas Jones R *et al.*[16] (M: F = 1:2.9) and Farzaneh N *et al.*[17] (F = 62.1%), Michael VS *et al.*[13] (F = 66%) found more female patients in their studies.

Recurrent abdominal pain was associated with defecation in 63% (n = 63) patients, change in frequency of stool in 83% (n = 83) patients, and change in form (appearance) of stool in 60% (n = 60) patients. Of all 100 patients, the predominant type of IBS in this study was IBS-M 54% followed by IBS-C 27%, and IBS-D 19%. On the basis of Bristol stool types, 52% of patients had type 1 and 2, 56% had type 3,4, and 5 and 43% had type 6 and 7. This result is consistent with Michael VS *et al.*[13] where also, the highest percentage of patients had mixed type of IBS (58.7%), patients with constipation type were 24%, and patients with diarrhea type were 17.3%. However, it differs from the findings of Singh *P et al.*[14] who found that IBS-D was the predominant type at 37.5%.

In this study at least one or more psychiatric comorbidity was observed in 75 (75%) of the patients while 25% had no psychiatric morbidity. The most common psychiatric comorbidity observed was generalized anxiety disorder 44%, followed by major depression in 38%, somatization disorder in 23%, panic disorder in 18%, alcohol use disorder in 18%, and eating disorder in 12%. The highest prevalence of psychiatric comorbidity was observed in the age group of >50 years (100%), followed by ≤20 years (91.6%), 21–30 years (75.6%), 41–50 years (70.5%), and 31–40 years (65.5%) but the differences were not statistically significant (P = 0.285). In this study, psychiatric comorbidity was more prevalent in males 76.6% as compared to 73.3% in females, but the difference was not statistically significant (P = 0.728).

Table 5: Correlation between IBS subtypes with different psychiatry disorders

IBS subtypes	Somatization disorder	Major depression	Panic disorder	Generalized anxiety disorder	Eating disorder	Alcohol use disorder
Constipation	4	14	6	6	2	3
Diarrhea	4	6	5	8	5	3
Mixed	15	18	7	30	5	12
P	0.415	0.220	0.342	0.017	0.1	0.453

The result of this study is similar to that of Singh P *et al.*[14] who found one or more psychiatric comorbidity in 79.9% of their cases as compared to 34.3% in the control group, however, the most common comorbidity in their study was somatoform disorders (50%) followed by major depressive syndrome (47.3%) and panic disorder (44%). Banerjee A *et al.*[15] in their study found the prevalence of anxiety to be 44%, which is similar to the present study results, however, the prevalence of depression in their study was 84%, which is higher than in our study. Kabra N *et al.*[18] found depression in 37.1% of their cases, which is similar to our result, and anxiety in 31.4% of their cases that is slightly lower than in our study. Lee S *et al.*[19] found that GAD was five times more common in patients of IBS as compared to non-IBS respondents and it was more common in females compared to males (5.2% vs. 2.7%, $P < 0.005$) whereas, in our study, there was no significant difference in the prevalence of GAD in males and females. Ladep NG *et al.*[20] found a significant association between IBS and depression, 56.8% of the patients with IBS had depression as compared to 20.1% in non-IBS patients ($P = 0.001$) though the prevalence of depression in their study was higher in comparison to our study.

In this study, a statistically significant difference was found in the prevalence of somatization disorder, eating disorder, and alcohol use disorder among male and female subjects, however, there was no statistically significant difference observed in the prevalence of major depression, panic disorder, and GAD in the two groups.

A statistically significant ($P < 0.0001$) difference was found among the study population having somatization disorder where 48.89% of females and 1.82% of males had somatization disorder. Eating disorders were more common in females (24.4%) as compared to males (1.8) and the difference was statistically significant ($P = 0.001$). Alcohol use disorder was more commonly observed in males (25.4%) as compared to females (8.8%) and the difference was statistically significant (0.038).

In males, major depression (43.6%), panic disorder (20.0%), and generalized anxiety disorder (47.2%), were more common as compared to females in whom major depression (31.1%), panic disorder (15.5%), generalized anxiety disorder (40%) was less commonly observed. However, the difference in these three disorders among male and female subjects was not statistically significant ($P = 0.199$, 0.565, 0.466 for major depression, panic disorder, and generalized anxiety disorder respectively). This result differs from the observations of Roohafza H *et al.*[12] who found among men with IBS, 22.5% had anxiety, 42.6% had depression, 16.9% had psychological distress, and among the women, 27.9% had anxiety, 48% had depression, and 39.2 had psychological distress.

We found that overall psychiatric comorbidity among IBS-C, IBS-D, and IBS-M was 70.3%, 78.9%, and 75.9%, respectively but the difference in the prevalence of psychiatric comorbidity in these three IBS subtypes was not statistically significant ($P = 0.782$). Analysis of the correlation between IBS subtypes and individual psychiatric comorbidity revealed that generalized anxiety disorder, somatization disorder, and alcohol use disorder were more common in IBS-M (55.5%, 27.7%, 22.2%) as compared to IBS-D (42.1%, 21.0%, 15.7%) and IBS-C (22.2%, 14.8%, 11.1%) but only the difference in Generalized anxiety disorder was statistically significant ($P = 0.017$). Major depression was more common in IBS-C (51.8%) as compared to IBS-D (31.5%) and IBS-M (33.3%), whereas panic disorder and eating disorder were more common in IBS-D (26.3% and 26.3%) as compared to IBS-C (22.2% and 7.4%) and IBS-M (12.9% and 9.2%). None of these three results was statistically significant. ($P = 0.220$, 0.342, 0.1 for major depression, panic disorder, and eating disorder, respectively).

Roohafza H *et al.*[12] found that anxiety and depression are significantly higher in individuals with IBS and its subtypes. In male and female subjects, anxiety was present in 20.4% and 30.2% of cases with IBS-C; 21.3% and 24.3% in IBS-D; and 35.4% and 33.7% of cases with IBS-M, respectively. Depression in male and female subjects was present in 43% and 47.6% in IBS-C; 21.3% and 46.8% in IBS-D; and 35.4% and 55.8% in IBS-M, respectively. Ladep NG *et al.*[20] found that constipation-predominant IBS patients were more likely to have depression but the association was not statistically significant that is similar to our observation. The differences between the results of our study and other studies could be due to different criteria used to diagnose IBS and also due to racial or demographic differences between the populations studied.

Limitation of the study

Its small sample size represents the findings observed in a tertiary care facility. A community-based, larger study may also help us to get the real picture of the psychiatric comorbidity in IBS patients in the general population.

Conclusion

As the prevalence of psychiatric co-morbidity is increasing in patients with IBS so regular counselling of these patients regarding the nature and course of this disease should be done along with pharmacotherapy. It is a chronic and functional disease, hence awareness about the disease at community level can prevent the financial burden on the healthcare system as well as patients.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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ANNEXURE I

IBS will be defined by the Rome IV criteria:

Recurrent abdominal pain on average at least 1 day/week in the last 3 months, associated with two or more of the following*
1. Related to defecation.
2. Associated with a change in the frequency of stool.
3. Associated with a change in form (consistency) of stool.

*Criterion fulfilled for the last 3 months with symptom onset at least 6 months before diagnosis.

IBS sub-classification according to the Rome IV IBS subtype criteria

IBS subtype	Criteria
IBS-C	More than one-fourth (25%) of bowel movements with Bristol Stool Scale Types 1–2 and less than one-fourth (25%) with Types 6–7.
IBS-D	More than one-fourth (25%) of bowel movements with Bristol Stool Scale Types 6–7 and less than one-fourth (25%) with Types 1–2.
IBS-M	More than one-fourth (25%) of bowel movements with Bristol Stool Scale Types 1–2 and more than one-fourth (25%) with Types 6–7.
IBS-U	Patients meet diagnostic criteria for IBS but their bowel habits cannot be accurately categorized in any of the above subtypes.

IBS, irritable bowel syndrome; IBS-C, IBS with predominant constipation; IBS-D, IBS with predominant diarrhea; IBS-M, IBS with mixed bowel habits; IBS-U, unclassified IBS

IBS, irritable bowel syndrome; IBS-C, IBS with predominant constipation; IBS-D, IBS with predominant diarrhea; IBS-M, IBS with mixed bowel habits; IBS-U, unclassified IBS

Bristol stool scale
- Type 1: Separate hard lumps, like nuts (difficult to pass)
- Type 2: Sausage-shaped, but lumpy
- Type 3: Like a sausage but with cracks on its surface
- Type 4: Like a sausage or snake, smooth and soft (average stool)
- Type 5: Soft blobs with clear-cut edges
- Type 6: Fluffy pieces with ragged edges, a mushy stool (diarrhea)
- Type 7: Watery, no solid pieces, entirely liquid (diarrhea)

Annexure II

Clinical Performa

Case No: _____ Date: _____

Patient Data:

Name: _____ Age/Sex: _____/_____

CR/OPD Reg. No: _____

Address: _____

Contact no.: _____

Occupation: _____ Religion: _____ Marital status: _____

HISTORY

Symptoms

Co-morbidities

Drug history:

Personal history

General examination

Pallor/Icterus/Clubbing/Pedal Oedema/Lymphadenopathy/Cyanosis

JVP……./Dehydration……/BMI……

Vitals: Pulse, Blood Pressure, Respiratory Rate, Temperature

Systemic examination

CNS

CVS

Respiratory Sys

Abdomen

Rome IV criteria:

	Y/N	Duration	Frequency
Recurrent abdominal pain			
1. Related to defecation			
2. Associated with a change in frequency of stool			
3. Associated with a change in form (consistency) of stool.			

*Criterion fulfilled for the last 3 months with symptom onset at least 6 months before diagnosis.