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Predictive Factors of the Persistence and Remission of Irritable Bowel Syndrome at Tertiary Care Hospital

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ABSTRACT

Irritable Bowel Syndrome is a functional gastrointestinal disorder that affects millions of people worldwide, characterized by chronic or recurrent abdominal pain associated with altered bowel habits in the absence of detectable structural or biochemical abnormalities. **Objectives:** To examine the clinical and demographic predictors of irritable bowel syndrome outcomes in a tertiary care hospital in Sindh, Pakistan **Methods:** A prospective study was conducted at the Department of Medicine and Gastroenterology of Liaquat University of Medical and Health Sciences, Jamshoro, from December 2022-July 2023. The study included 240 patients diagnosed with irritable bowel syndrome of all genders and ages of 18 to 60 years. Irritable bowel syndrome was diagnosed via Rome IV Criteria. Patients with clinical evidence of organic or metabolic diseases that may affect the bowel transit or cause abdominal pain along with the patients who were taking the medications for irritable bowel syndrome at the time of enrollment were excluded from the study. **Results:** Over six months, 167 (69.6%) participants showed symptom persistence, while 73 (30.4%) achieved remission. Irritable bowel syndrome D-subtype (p=0.03) and symptom duration under three years (54.8%; p=0.04) were significantly linked to outcomes. Psychological distress, especially stress, and non-digestive symptoms like backache and fatigue predicted persistence. **Conclusions:** The study concluded that a shorter symptom duration of less than 3 years along with irritable bowel syndrome D as a predictor of improved remission rates. Psychological distress, particularly high stress levels, along with non-digestive symptoms such as backache and fatigue, are significant predictors of symptom persistence.

INTRODUCTION

Irritable Bowel Syndrome (IBS) is a functional gastrointestinal disorder affecting millions worldwide. It is characterized by chronic or recurring abdominal pain linked to altered bowel habits, with no identifiable structural or biochemical abnormalities. IBS represents a significant public health concern, with global prevalence rates estimated between 5% and 20%, varying by geography and socioeconomic context. In Pakistan, prevalence is around 33.2% with higher rates reported among women and urban residents [1]. IBS is commonly divided into four subtypes based on dominant stool patterns: IBS with predominant diarrhea (IBS-D), IBS with predominant constipation (IBS-C), mixed IBS (IBS-M), and unspecified IBS (IBS-U) [2]. Symptoms of IBS can be highly variable among individuals, adding to the challenges of managing this condition. The primary symptoms include abdominal pain, bloating, and altered bowel habits, such as diarrhea, constipation, or alternating between the two. Abdominal pain in IBS is often cramp-like and ranges from mild discomfort to severe, typically improving after defecation [3]. The chronic nature of IBS symptoms and limited treatment options can cause significant psychological distress, frequently manifesting as anxiety or depression. This connection between the gut and brain,

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known as the gut-brain axis, plays a crucial role in IBS pathophysiology [4]. The exact cause of Irritable Bowel Syndrome (IBS) remains unknown and is thought to result from a complex mix of genetic, environmental, and psychosocial factors. Evidence increasingly suggests that gastrointestinal infections, alterations in gut microbiota, and low-grade inflammation play key roles in IBS development [5]. Changes in gut microbiota—such as decreased diversity and shifts in bacterial composition—are associated with increased visceral sensitivity and abnormal gut motility, both of which are implicated in IBS [6]. Psychological factors like stress, anxiety, and depression are also known to worsen IBS symptoms by affecting the autonomic nervous system, which helps regulate gastrointestinal function [7]. The diagnosis of IBS is primarily clinical, based on excluding organic causes and applying established criteria. The Rome IV criteria are the most widely accepted guidelines for IBS diagnosis. They require recurrent abdominal pain at least one day per week over the past three months, along with two or more of the following: pain related to defecation, changes in stool frequency, and changes in stool form [8]. While IBS is not life-threatening, its chronic and relapsing nature often leads to significant morbidity and diminished quality of life. Some individuals experience periods of symptom remission, while others endure persistent or fluctuating symptoms over time [9]. Factors linked to persistent IBS symptoms include high baseline severity, psychological comorbidities, and ineffective coping mechanisms [10]. Conversely, those with milder symptoms, effective treatment response, and successful stress management have a better prognosis [11]. Various treatments ranging from dietary changes and medication to psychological therapies like cognitive-behavioural therapy have been shown to alleviate symptoms in some patients. However, no single treatment works for all, and management strategies often need to be individualized based on the patient's predominant symptoms and psychosocial profile [12]. Despite advances in the understanding of IBS pathophysiology and treatment, significant gaps remain, particularly regarding the long-term outcomes of IBS. Most research to date has focused on the prevalence, symptomatology, and short-term treatment responses in IBS patients, with limited attention to the factors that predict long-term persistence or remission of symptoms. Moreover, there is a lack of data from low- and middle-income countries, including Pakistan, where healthcare systems and environmental stressors may differ significantly from those in Western populations.

This study aims to address these gaps by examining the clinical and demographic predictors of IBS outcomes in a tertiary care hospital in Sindh-Pakistan. The study was conducted to provide locally relevant insights that can guide tailored interventions and improve the management of IBS in resource-limited settings, ultimately enhancing patient care and quality of life.

METHODS

A longitudinal prospective single-center study was conducted at the Department of Medicine and Gastroenterology of Liaquat University of Medical and Health Sciences, from December 2022 to July 2023. The study included 240 patients diagnosed with IBS of all genders and ages of 18 to 60 years. IBS was diagnosed via Rome IV Criteria [13]. Patients with clinical evidence of organic and or metabolic diseases that may affect the bowel transit or cause abdominal pain along with the patients who were taking the medications for IBS at the time of enrollment were excluded from the study. The sample size was calculated by taking the prevalence of IBS in Pakistan as 33.2% [1] with a 5 % margin of error, and a 90% confidence interval. The study was approved via REC-LUMHS (No. LUMHS/REC-258). All patients were included after taking informed written consent. Patients were divided into IBS sub-types according to Rome IV criteria into IBS-C, IBS-D, IBS-M and IBS-U [13]. The Rome IV Criteria are internationally recognized guidelines used for diagnosing functional gastrointestinal disorders, including Irritable Bowel Syndrome (IBS), with a focus on symptom-based diagnosis, requiring specific patterns of abdominal pain and bowel habit changes while ruling out organic causes. Patients were treated via standard treatment protocol (no specific treatment interventions were included in the study). Patients were followed up at 2, 4 and 6 months and persistence and remission of symptoms were noted down. During the index visit (enrollment phase), demographic, clinical digestive and non-digestive history were obtained. Details about symptoms were noted down at each follow-up along with the assessment of psychological well-being. DASS-21 scale was used to assess the psychological distress among patients [14]. The DASS-21 scale (Depression, Anxiety, and Stress Scale-21) is a brief, self-reported tool used to assess psychological distress across three dimensions: depression, anxiety, and stress, widely used in both clinical practice and research to evaluate the psychological factors that may influence physical and emotional well-being. Improvement in IBS was measured according to the patient's self-reported status of IBS and a decrease in the frequency of bowel problems and abdominal pain. SPSS version 21.0 was used for the analysis of data. Quantitative data like age and duration of symptoms were measured as mean + SD. Categorical data was measured using frequency and percentages. Chi-square was used to measure the association of different predictors (categorical variables) about the symptoms of perseverance and remission.

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RESULTS

The study presents the demographic and clinical characteristics of the study population consisting of 240 participants. The sample included 102 male (42.5%) and 138 female (57.5%), with a mean age of 35.8 ± 10.4 years. The distribution of IBS subtypes was as follows: IBS-C in 61 patients (25.4%), IBS-D in 89 patients (37.1%), IBS-M in 71 patients (29.6%), and IBS-U in 19 patients (7.9%). The mean duration of symptoms was 4.5 ± 2.3 years. Psychological distress, measured using the DASS-21 scale, revealed a mean depression score of 12.6 ± 6.3 (moderate category), an anxiety score of 15.5 ± 3.8 (severe category), and a stress score of 24.2 ± 7.2 (moderate category) (Table 1).

Table 1: Demographic and Clinical Characteristics of Study Population (n=240)

Variables	n (%)
Gender	
Male	102 (42.5%)
Female	138 (57.5%)
Age (mean ± SD)	35.8 ± 10.4 years
IBS Subtype	
IBS-C	61 (25.4%)
IBS-D	89 (37.1%)
IBS-M	71 (29.6%)
IBS-U	19 (7.9%)
Duration of Symptoms (Mean ± SD)	4.5 ± 2.3 years
Psychological Distress (DASS-21)	
Depression (Mean ± SD)	12.6 ± 6.3
Anxiety (Mean ± SD)	15.5 ± 3.8
Stress (Mean ± SD)	24.2 ± 7.2

Results summarize the baseline non-digestive complaints among IBS patients at enrollment and the 6-month follow-up. Notably, anxiety symptoms increased from 120 patients (50.0%) at baseline to 135 patients (56.2%) at 6 months. Similarly, the prevalence of backache rose from 156 (65.0%) to 180 (75.0%). Other complaints, such as fatigue, headache, and halitosis, also showed significant increases at the 6-month mark. Conversely, the percentage of patients reporting depression decreased slightly from 126 (52.5%) at baseline to 117 (48.75%) at follow-up (Table 2).

Table 2 : Baseline Non-Digestive Complaints among IBS Patients at Enrollment and 6 Months (n=240)

Non-Digestive Symptoms	At Base Line	At 6-Months
Anxiety	120 (50.0%)	135 (56.2%)
Backache	156 (65.0%)	180 (75.0%)
Depression	126 (52.5%)	117 (48.75%)
Fatigue	144 (60.0%)	168 (70.0%)
Halitosis (Bad Breath)	69 (28.8%)	84 (35.0%)
Headache	135 (56.2%)	162 (67.5%)
Muscular pain	126 (52.5%)	150 (62.5%)
Palpitations	63 (26.2%)	78 (32.5%)
Polyuria	36 (15.0%)	45 (18.8%)
Stress	108 (45.0%)	120 (50.0%)

Among the 240 participants, 167 (69.6%) exhibited persistence of symptoms, while 73 (30.4%) achieved remission. The subtype-specific results indicated that IBS-C had a persistence rate of 46 (75.4%) and a remission rate of 15 (24.6%). In contrast, IBS-D showed a lower persistence rate of 54 (60.0%) but a higher remission rate of 36 (40.0%). IBS-M reported a persistence rate of 52 (73.2%) and a remission rate of 19 (26.8%). Lastly, IBS-U had the highest persistence rate of 15 (78.9%) and the lowest remission rate of 4 (21.1%) (Table 3).

Table 3: Persistence and Remission of IBS Symptoms at 6-Month Follow-Up (n=240) Based On the IBS Subtype

IBS Subtype	Persistence of Symptoms	Remission of Symptoms
Overall	167 (69.6%)	73 (30.4%)
IBS-C	46 (75.4%)	15 (24.6%)
IBS-D	54 (60.0%)	36 (40.0%)
IBS-M	52 (73.2%)	19 (26.8%)
IBS-U	15 (78.9%)	4 (21.1%)

Study depicts the trends in persistence and remission of IBS symptoms over a 6-month follow-up varied among the subtypes. IBS-C showed a decline in symptom persistence from 86.9% at Month 2 to 75.4% at Month 6, with remission rates increasing from 13.1% to 24.6%. Similarly, IBS-D's persistence decreased from 79.8% to 59.6%, while remission rose from 20.2% to 40.4%. For IBS-M, persistence fell from 85.9% to 73.2%, and remission improved from 14.1% to 26.8%. IBS-U had the highest initial persistence at 89.5%, decreasing to 78.9%, with remission increasing from 10.5% to 21.1% (Figure 1).

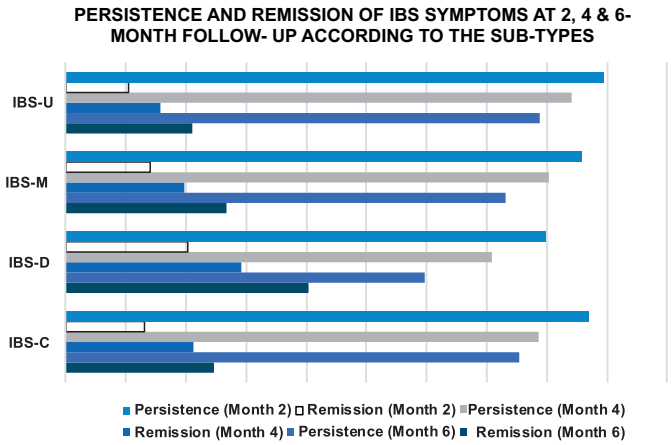

Figure 1: Persistence and Remission of IBS Symptoms At 2, 4 and 6-Month Follow-Up According to the Sub-Types

The predictive factors for the persistence and remission of IBS symptoms at the 6-month follow-up identified several significant associations. Particularly, the IBS-D subtype was linked to greater symptom persistence, with a statistically significant difference in remission rates

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(p=0.03). A shorter duration of symptoms (less than 3 years) was associated with higher remission rates (54.8%) (p=0.04). Psychological distress, particularly stress, emerged as a critical factor influencing symptom persistence, with those experiencing high-stress levels showing a significant correlation (p=0.01). Non-digestive symptoms, specifically backache and fatigue, were also significant predictors of symptom persistence (p=0.03 and p=0.02, respectively) (Table 4).

Table 4: Predictive Factors for Persistence and Remission of IBS Symptoms at 6-Month Follow-Up (n=240)

Predictive Factor	Persistence of Symptoms (n=167)	Remission of Symptoms (n=73)	p-value
Gender			
Male	74 (44.3%)	28 (38.4%)	>0.05
Female	93 (55.7%)	45 (61.6%)	
IBS Subtype			
IBS-C	46 (75.4%)	15 (24.6%)	>0.05
IBS-D	54 (60.0%)	36 (40.0%)	0.03*
IBS-M	52 (73.2%)	19 (26.8%)	>0.05
IBS-U	15 (78.9%)	4 (21.1%)	>0.05
Duration of Symptoms (Years)			
<3 Years	60 (35.9%)	40 (54.8%)	0.04*
≥3 Years	107 (64.1%)	33 (45.2%)	
Psychological Distress			
Depression (DASS-21)	89 (53.3%)	28 (38.4%)	>0.05
Anxiety (DASS-21)	97 (58.1%)	38 (52.1%)	>0.05
Stress (DASS-21)	101 (60.5%)	19 (26.0%)	0.01*
Non-Digestive Symptoms			
Backache	135 (80.8%)	45 (61.6%)	0.03*
Fatigue	129 (77.2%)	39 (53.4%)	0.02*
Headache	120 (71.9%)	42 (57.5%)	>0.05
Palpitations	63 (37.7%)	15 (20.5%)	>0.05
Muscular Pain	106 (63.5%)	44 (60.3%)	>0.05

DISCUSSION

This prospective longitudinal study assessed the natural history of IBS and predictors of symptom persistence or remission over six months. The current study observed IBS's clinical course and its potential predictors for persistence and remission of symptoms in outcomes and its relation with IBS subtypes (IBS-C, IBS-D, IBS-M, and IBS-U). In this study, nearly half the patients reported symptom persistence at the six-month follow-up, echoing previous findings where up to 50% of patients experienced unchanged or fluctuating symptoms over time [15]. Non-digestive symptoms, such as backache (p=0.03) and fatigue (p=0.02), were significant predictors of persistence, reflecting the multi-systemic nature of IBS, similar to findings from Norlin *et al.*, who reported that comorbid somatic symptoms are strong determinants of IBS severity and persistence [16]. The association of symptom duration under three years with higher remission rates (54.8%; p=0.04) emphasizes the importance of early diagnosis and intervention. This is consistent with Staudacher *et al.*, who identified shorter symptom duration as a favourable prognostic factor in IBS management [17]. Psychological distress, particularly stress, emerged as a significant predictor of symptom persistence (p=0.01), in line with the broader literature highlighting the role of the gut-brain axis in IBS pathophysiology. For example, Fadgyas *et al.*, demonstrated that stress exacerbates gastrointestinal symptoms by amplifying visceral hypersensitivity [18]. Depression and anxiety, though prevalent, did not show a significant association with outcomes in this study. Notably, the results showed that patients with severe symptoms at the time of enrollment had a higher likelihood of symptom persistence at six months, an association also supported by Ozer *et al.*, on IBS prognosis [19]. In terms of IBS subtypes, the findings align with previous studies indicating a significant remission rate observed in the IBS-D subtype (p=0.03) aligns with global data, including the study by Pereyra *et al.*, which highlights that diarrhea-predominant IBS may respond better to usual care and targeted therapies compared to other subtypes [20].

CONCLUSIONS

It was concluded that the study determined a shorter symptom duration of less than 3 years along with the IBS-D sub-type as a predictor of improved remission rates. Psychological distress, particularly high stress levels, along with non-digestive symptoms such as backache and fatigue, are significant predictors of symptom persistence. These findings highlight the importance of early intervention, particularly for individuals with a shorter symptom history, to improve remission outcomes. Incorporating mental health support and addressing non-digestive symptoms in the management of IBS may enhance treatment effectiveness and improve patients' overall quality of life.

Authors Contribution

Conceptualization: KHS
Methodology: KHS, AKN, MH, AM, TG, SF
Formal analysis: TG
Writing review and editing: AKN, MH

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

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