

Original Research Article

Relation between stress and gastrointestinal disorders

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ABSTRACT

Background: This study investigated psychological influences in gastrointestinal (GI) disorders by analyzing relationships among stress, depression, anxiety, and somatization. Standardized scales were applied with 73 participants, revealing notable associations between stress and physical complaints. Findings highlight the significance of the brain-gut connection and recommend integrative therapeutic approaches. Aim was to evaluate the association between stress levels and general health, somatization, depression, anxiety, and illness perception among patients with gastrointestinal disorders.

Methods: This cross-sectional survey-based research distributed offline questionnaires to patients experiencing gastrointestinal symptoms to assess stress and its associations with general health, somatization, depression, anxiety, and illness perception. Data collection employed four standardized instruments: GHQ-12, SDC, DASS-42, and IPQ-R. Data were processed with Microsoft Excel and SPSS version 23, emphasizing descriptive and inferential methods. Descriptive analysis involved calculating mean and standard deviation for GHQ-12, SDC, DASS-42, and IPQ-R.

Results: Of 73 respondents, SDC showed 6.8% had marked somatic concerns. These findings emphasize the overlap between psychological stress and physical outcomes, as patients with GI symptoms often present emotional struggles through somatic complaints.

Conclusions: Stress was significantly correlated with the somatization disorder checklist (GI).

Keywords: Anxiety, Depression, Gastrointestinal disorders, General health, Illness perception, Somatization, Stress

INTRODUCTION

Stress, a multifaceted psychological and physiological response to perceived threats, significantly influences both mental and physical health. It disrupts homeostasis, alters hormonal and neurological activity, and impacts bodily systems including the gastrointestinal (GI) tract. Chronic stress has been associated with disorders such as irritable bowel syndrome (IBS), inflammatory bowel disease (IBD), and functional GI disorders, demonstrating a strong psychophysiological connection. Stress contributes directly to psychological and physiological disorder and disease and affects mental and physical health, reducing quality of life, by disrupting mind body changes. It is the psychological, physiological and behavioural response by

an individual when they perceive a lack of equilibrium between the demands placed upon them and their ability to meet those demands, which, over a period of time, leads to ill-health.¹ Stress is a feeling of emotions or physical tension. It can come from any event or thought that makes us feel frustrated, angry, or nervous. Stress is our body's reaction to a challenge or demand. In short bursts, stress can be positive, such as when it helps us avoid danger or meet a deadline. But when stress lasts for a long time, it may harm our health.² Distress: the negative stress response, often involving negative affect and physiological reactivity; a type of stress that results from being overwhelmed by demands, losses, or perceived threats.³ Distress triggers physiological changes that can pose serious health risks, especially if combined with

maladaptive ways of coping. Whereas, eustress is the positive stress response, involving optimal levels of stimulation that results from challenging but attainable and enjoyable or worthwhile tasks (e.g., participating in an athletic event, giving a speech).³ It has a beneficial effect by generating a sense of fulfillment or achievement and facilitating growth, development, mastery, and high levels of performance.

The GI tract is highly responsive to stress due to its dense neural network more neurons are present in the gut than in the spinal cord. Stress can disrupt gut motility, increase acid secretion, and exacerbate or precipitate GI symptoms. The general adaptation syndrome (GAS) model proposed by Hans Selye outlines three stages alarm, resistance, and exhaustion that describe the body's response to prolonged stress and its potential role in disease progression.^{4,5} According to a study, stress broadly correlated with QOL characteristics in patients with GERD, IBS, and IBD, and their overall QOL was significantly lower than the general population. Research supports relationships between stress and gastrointestinal (GI) symptoms and disorders. In this study, stress positively correlated with depression, fatigue, sleep disturbance, average pain, and worst pain.⁷ Another study revealed, there were higher proportions of women with IBS (67.8%) and dyspepsia (85.4%) compared with the control group (55.9%) ($p < 0.001$). In IBS, women more frequently reported changes in the number of bowel movements (BMs) associated with the onset of abdominal discomfort/pain, fewer than three BMs/week and abdominal fullness/bloating/swelling than men. Men with IBS more frequently reported swallowing air to belch and abdominal pain that improved after a BM than women. In controls, burping and hard or lumpy stools were both more frequent in men.⁸ In another study among college students during stressful conditions, as compared to lesser demanding periods where more than 40% of the participants declared that gastrointestinal habits changes occurred during stressful periods. We observed significant correlations between the stress levels and gastrointestinal habits changes.⁹ Patients with GI disorders are susceptible to psychiatric co-morbidities. It aimed to ascertain the burden of anxiety, depression, and stress in patients with GI disorders. The prevalence of anxiety, depression and moderate to high stress was 14%, 12%, and 41%, respectively. Females had higher mean perceived stress, anxiety and depression scores compared to males. Where, patients experienced low stress (58.5%), 36.5 % experienced moderate level of stress and 5% experienced high level of stress.¹⁰

This study examined how stress and associated psychological symptoms correlate with GI disorders, with a focus on somatization, general health perception, and illness interpretation. The relevance of studying the relationship between stress and gastrointestinal (GI) disorders lies in the growing evidence that psychological factors significantly influence gut health.¹¹ Here's a breakdown of why this study is important (a)

understanding the gut-brain axis, (b) the gut-brain axis refers to the bidirectional communication between the central nervous system and the enteric nervous system. (c) Stress can alter gut motility, increase intestinal permeability, and affect the gut microbiota, all of which can contribute to or worsen GI disorders. (d) Clinical Implications where disorders like IBS, IBD, and others are commonly associated with psychological stress. (e) A better understanding helps in holistic treatment- combining medical and psychological interventions (e.g., psychotherapy, stress management, or mindfulness training alongside medications). Improved diagnosis and management where recognizing stress as a contributing factor can lead to earlier diagnosis and more personalized treatment plans, reducing trial- and-error approaches in GI care. Public health and prevention where stress is widespread in modern society, and GI disorders are common. Understanding the link helps promote preventive measures, such as stress reduction techniques to minimize onset or flare-ups of GI issues. Researching the stress- GI disorder relationship is relevant because it improves our understanding of disease mechanisms, enhances patient care, encourages integrated treatment approaches, and supports preventive healthcare. This is crucial for both individual well-being and public health.¹²⁻¹⁶

METHODS

This cross-sectional study was conducted among 73 male and female patients at Santosh Hospital, Ghaziabad, to assess stress levels and their association with general health, somatization, depression, anxiety, and illness perception.

Inclusion criteria ensured the selection of individuals relevant to the research objectives, focusing on adults aged 18 to 65 years diagnosed with gastrointestinal (GI) disorders linked to psychological stress, including IBS, IBD, peptic ulcers, and gastroesophageal reflux disease (GERD). This age range represents a broad adult population capable of providing reliable self-reports and experiencing stress-related GI symptoms. Informed consent was obtained to ensure ethical standards were maintained, with participants fully understanding the nature and purpose of the study.

Exclusion criteria included individuals with significant physical illnesses unrelated to the GI system to minimize confounding variables and ensure that psychological factors assessed were specific to GI disorders. This approach enhanced the validity and reliability of the findings.

Participants took approximately 15-20 minutes to complete the questionnaires, and confidentiality of their information was assured. Ethical approval for the study was obtained from the institutional ethics committee. This study was conducted during the time period (January 2025- June 2025).

Tools for data collection

General health questionnaire (GHQ)

A 12-item screening tool for detecting psychiatric disorders and assessing general mental health. It is brief, reliable (Cronbach's $\alpha > 0.80$), and widely used in both clinical and research settings. Scored using binary or Likert methods.

Somatization disorder checklist (SDC)

An 18-item checklist developed in 2017 to assess physical symptoms linked to psychological distress. Uses a 3-point scale to measure the severity and frequency of somatization symptoms.

Depression, anxiety, and stress scale (DASS-42)

A 42-item self-report scale measuring depression, anxiety, and stress. Rated on a 4-point Likert scale with high internal consistency ($\alpha = 0.92-0.97$), suitable for both clinical and research use.

Illness perception questionnaire-revised (IPQ-R)

Based on Leventhal's model, this tool assesses patients' beliefs and emotional responses to their illness, helping understand coping, treatment adherence, and health outcomes.

Statistical analysis

Microsoft Excel and SPSS version 23 were used for data analysis, employing descriptive (mean, standard deviation) and inferential (Pearson's correlation) statistics

for GHQ-12, SDC, DASS-42, and IPQ-R. Correlations between variables were assessed at 0.05 (significant) and 0.01 (highly significant) levels among 73 GI disorder patients.

RESULTS

The present study explored psychological aspects in 73 individuals with gastrointestinal (GI) disorders, including IBS, IBD, peptic ulcers, and GERD, using tools like GHQ-12, SDC, DASS-42, and IPQ-R. The sample included 54.8% females and 45.2% males. Most participants (32.9%) were aged 18-30, with 27.4% aged 31-40. Educationally, 35.6% were illiterate, and another 35.6% had completed 10th or 12th grade. Occupationally, 42.5% were unemployed, while 31.5% worked in government or private sectors. Most participants (90.4%) reported illness symptoms lasting under a year, indicating recent diagnoses or episodes.

Table 1: Demographic details of the patients.

Category	Percentage
Gender	Female- 54.8 and Male- 45.2
Age (years)	18-30 (33), 31-40 (27), 41-50 (21) and >50 (19)
Qualification	Illiterate- 36 primary/upper primary- 15 10 th /12 th - 36
	UG/PG - 14
Occupation	Unemployed- 43 Government/Private- 32 Business- 19 Students- 7
Duration of the illness	≤1 year- 90 ≥1 year- 10

Table 2: Outcome of the tests.

Tests	Category
General health questionnaire (GHQ-12)	Moderate health issues: 80% (=58 participants)
	Mild health issues: 20% (=15 participants)
	Mean: 15.7 SD: ±3.6
Somatization disorder checklist (SDC)	Severe somatic symptoms: 7% moderate somatic symptoms: 52% mild somatic symptoms: 41%
	Mean: 24.01 SD: ±8.3
Depression, anxiety and stress scale (DASS- 42)	Depression: Moderate depression. 59% Mild depression.22%
	Severe depression. 11%
	Mean: 15.24 SD: ±4.46
	Anxiety: Severe anxiety.47% Extremely severe anxiety.15%
	Moderate anxiety 32% Mild 3% and Normal.4%
	Mean: 15.83 SD: ±4.40
	Stress: Moderate stress 30%,
	Severe stress 25%, and
Illness perception questionnaire (IPQ-R)	Mild stress 22% and Normal stress levels 23%.
	Mean: 19.91 SD: ±5.68
	Mild (48%) and Moderate (52%)
	Mean: 120.38 SD: ±11.14

DISCUSSION

Somatization, where psychological distress manifests as physical symptoms, is significantly associated with gastrointestinal (GI) disorders, often worsening symptom severity. Patients with GI disorders frequently experience psychiatric co-morbidities. In this study, anxiety, depression, and moderate to high stress prevalence were 14%, 12%, and 41%, respectively, with females reporting higher stress, anxiety, and depression scores. Overall, 58.5% experienced low stress, 36.5% moderate stress, and 5% high stress.¹⁰ These findings suggest moderate insight among participants, highlighting the need for health education and psychological counselling. This is when the GAS model general adaptation syndrome takes place. It was proposed by Hans Selye in 1936 is a foundational framework in stress research. It describes how the body responds to stress in three stages: alarm, resistance, and exhaustion. This model has been widely applied in medical, psychological, and physiological studies, including its relevance to gastrointestinal (GI) disorders.²⁵

GAS in IBS

The resistance and exhaustion stages of the GAS model can explain the chronic nature of IBS, a condition often triggered or worsened by psychological stress. Chronic stress impacts gut motility, increases visceral sensitivity, and alters the microbiome- hallmarks of IBS.

Chronic stress and IBD

In patients with Crohn's disease or ulcerative colitis, stress (especially chronic stress) can worsen symptoms or trigger flare-ups. This aligns with the exhaustion phase of GAS, where immune regulation is compromised.

Stress and peptic ulcers

Research has confirmed that chronic stress, through the exhaustion stage of GAS, leads to increased gastric acid secretion and mucosal damage, contributing to peptic ulcers. Though *Helicobacter pylori* are the main cause, stress is a significant exacerbating factor.²⁵

The GAS model remains a powerful theoretical framework for understanding how chronic stress contributes to GI disorders, such as ulcers, IBS, and IBD. It provides a lens through which physiological and psychological stress responses can be linked to disease progression.²⁶

Data from the longitudinal aging study in India (2017-18) revealed a high prevalence of self-reported GI problems among older adults. The study identified associations between GI issues and non-communicable diseases like hypertension and diabetes, as well as mental health conditions such as depression, anxiety and stress. These findings underscore the need for integrated healthcare approaches addressing both physical and mental health.²⁷

Another study, a population-based case-control study assessed how functional GI disorders like irritable bowel syndrome (IBS) and dyspepsia affect health-related quality of life (HRQoL). The study found that individuals with these conditions reported significantly lower physical and mental HRQoL scores compared to healthy controls. Notably, psychological factors, such as somatization, played a substantial role in this impairment.²⁸

Thus, as a whole the patients were carrying GI discomfort at a moderate level of psychopathology and if they are being taken care of with immediate affect then they are capable of coming out of their daily functioning issues.

Table 3: Correlation between the tests.

Correlation	R value	P value	Interpretation
GHQ and somatization	0.274	0.017	Significant (p<0.05)
GHQ and depression	0.203	0.081	Not Significant (p>0.05)
GHQ and anxiety	0.196	0.092	Not Significant (p>0.05)
GHQ and stress	0.135	0.248	Not Significant (p>0.05)
GHQ and IPQ-R	0.114	0.336	Not Significant (p>0.05)
Somatization and depression	0.204	0.079	Not Significant (p>0.05)
Somatization and anxiety	0.2	0.085	Not Significant (p>0.05)
Somatization and stress	0.231	0.046	Significant (p<0.05)
Somatization and IPQ-R	-0.017	0.887	Not Significant (p>0.05)
Depression and anxiety	0.559	0	Significant (p<0.01)
Depression and stress	0.389	0.001	Significant (p<0.01)
Anxiety and stress	0.47	0	Significant (p<0.01)
IPQ-R and depression	-0.091	0.446	Not Significant (p>0.05)
IPQ-R and anxiety	0.107	0.367	Not Significant (p>0.05)
IPQ-R and stress	0.045	0.705	Not Significant (p>0.05)

Correlation and statistical findings

There was a significant positive correlation between stress and somatization (GI) ($r=0.231$, $p<0.05$), suggesting that as stress levels increase, so do somatic symptoms. GHQ and somatization: a similar significant relationship was found ($r=0.274$, $p<0.05$), implying that worsening general health is associated with heightened somatic complaints. Interrelationships among depression, anxiety, and stress: strong positive correlations were observed: depression and anxiety: $r=0.559$, depression and stress: $r=0.389$ and anxiety and stress $r=0.470$ (all significant at $p<0.01$). However, there was no statistically significant correlation between illness perception (IPQ-R) and psychological variables such as depression, anxiety, or stress. This suggests that although participants may be aware of their health condition, this awareness does not necessarily alleviate or exacerbate their psychological distress.

Interpretation using the GAS model

The GAS model by Hans Selye was used as a framework to interpret how stress manifests in the body through stages: alarm, resistance, and exhaustion. In GI disorders, especially IBS and IBD, prolonged psychological stress triggers physiological reactions such as altered gut motility, heightened visceral sensitivity, and inflammation hallmarks of the exhaustion stage in GAS. The data in this study supports this interpretation, as the majority of participants were found to be in high-stress states.

This study has some limitations. The sample size was relatively small, which limits generalizability to the broader population. A high proportion of participants were illiterate minimally educated (about 71%), which may limit the accuracy or consistency of questionnaire responses. The cross-sectional nature of the study captures only a snapshot in time, preventing any determination of causal relationships between psychological factors (e.g., stress, anxiety, depression) and gastrointestinal (GI) symptoms.

Longitudinal or prospective designs are needed to establish temporal dynamics as the results were significant which makes this study an important part of further recommendations where all the limitations can be met.

CONCLUSION

The study highlighted a significant psychological burden in GI disorder patients, with prevalent stress, anxiety, depression, and somatic complaints. The cyclical link between stress and symptoms emphasizes the need for integrated mental healthcare. Psychological counselling and stress management could improve both emotional well-being and physical health outcomes.

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