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Assessment of gastroesophageal reflux disease signs, symptoms, and food behaviors concerning mental health in Herat, Afghanistan: A descriptive study

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Abstract

Background and Aims: Gastroesophageal reflux disease (GERD) is a highly prevalent gastrointestinal disorder with modifiable risk factors that are associated with considerable health and economic burdens. The current study was conducted to assess the signs and symptoms, food behaviors, depression, anxiety, and stress related to GERD in Herat, Afghanistan.

Methods: A descriptive study was conducted between August 29 and October 20, 2020, among patients with GERD symptoms, who provided informed verbal consent at the Mowaffaq Clinic and Sehat Hospital in Herat, Afghanistan. The minimum sample size was 384. Data were collected using a three-domain questionnaire and Depression, Anxiety, and Stress Scale 42 standard questionnaire. SPSS version 27 was used to perform descriptive statistics and χ^2 tests.

Results: The sample consisted of 396 patients, with the majority being female (67.9%), married (78.5%), and illiterate (34.8%). Heartburn (88.1%) and regurgitation (84.3%) were the most common symptoms reported by participants. Tomato consumption (60.1%) was the most frequent type of eating behavior. Most patients reported severe anxiety (45.9%) and showed statistically significant differences in age, sex, education level, and cigarette usage. This study also found that certain demographic status, eating behaviors, and symptoms were associated with significantly different depression, anxiety, and stress scores among patients with GERD.

Conclusion: Our study demonstrates the association between GERD and various modifiable risk factors in Herat, Afghanistan. Public health initiatives focusing on preventive measures and raising awareness can potentially alleviate the burden of GERD. Moreover, further research and targeted interventions are essential to improve health outcomes, particularly among patients with GERD, who may experience psychological comorbidities.

KEYWORDS

Afghanistan, DASS, gastroesophageal reflux, GERD, Herat, risk factor

Institutions (where the study was performed): Mowaffaq Clinic and Sehat Hospital in Herat, Afghanistan, with ethical approval of Herat University, Faculty of Medicine.

1 | INTRODUCTION

Gastroesophageal reflux disease (GERD) is a prevalent gastrointestinal condition that occurs when stomach contents reflux into the esophagus, causing symptoms and complications. GERD is the most frequent gastrointestinal-related diagnosis, with a reported prevalence of 10%–20% in Western populations.[1] It is considered upsetting when it adversely affects an individual's well-being. Mild symptoms occurring two or more days per week may be considered troublesome in some patients.[1] GERD is subdivided into erosive reflux disease (ERD), in which esophageal mucosal breaks are present, and non-ERD (NERD), in which GERD symptoms are present without esophageal mucosal breaks.[2,3]

GERD is mainly a clinical diagnosis with a reported sensitivity of 75%–90% and specificity of 70%–90% when symptom-based criteria are used.[1,4] It is usually diagnosed based on classic symptoms, such as heartburn and regurgitation, as well as a response to acid suppression therapy. Initiation of treatment with histamine type 2 (H2) receptor blockers or proton pump inhibitors followed by symptom relief is considered a diagnostic measure.[5] Numerous factors can increase the likelihood of developing GERD. These can include lifestyle factors such as excessive body weight, obesity, smoking, postmeal intense physical activity, and insufficient regular physical activity.[6] Poor eating habits such as irregular meal patterns, consumption of large amounts of food, and eating immediately before sleeping may also contribute to GERD symptoms. Additionally, other risk factors include smoking, eating late at night, consuming particular foods such as fatty or fried foods, drinking certain beverages like alcohol, being overweight or pregnant, and having a hiatal hernia or connective tissue disorder.[6–9]

A close relationship exists between the brain and gastrointestinal tract.[10] For example, gastrointestinal function is affected by stress and emotions, as well as gastrointestinal symptoms and disease. Similarly, a person's emotional status may be affected by the state of their gastrointestinal organs. Additionally, the treatment of functional gastrointestinal disorders becomes difficult when psychological factors accompany this condition, leading to poor outcomes.[11] Studies describing GERD have shown that psychological factors, particularly anxiety and depression, play an important role in the disease.[8–10] Studies show that patients with GERD have significantly higher risks of psychological disorders than those without GERD, and that GERD can be a risk factor for subsequent psychological disorders, specifically depressive disorders. The quality-of-life scores of the GERD subgroups can be significantly lower than those of the general population.[12,13] A cross-sectional study revealed that anxiety and depression levels were significantly higher in subjects with GERD than in controls.[14]

In Herat City, there is unavailability of data on the mental status of patients with GERD; therefore, we decided to conduct this study. The coalition between GERD and psychological factors helps administer the best treatment to patients with GERD, because psychological factors can exacerbate GERD symptoms, worsen treatment outcomes, and interfere with quality of life. This cross-sectional descriptive study aimed to explore the risk factors and the impact of psychological comorbidities in patients with GERD in Herat, Afghanistan. This study investigated the relationship between GERD and psychological factors, specifically depression, anxiety disorders, and other related psychological comorbidities.

2 | METHODS AND MATERIALS

2.1 | Study design, setting, and duration

This descriptive study was conducted between August 29 and October 20, 2020, among patients referred to the Mowffaq Clinic and Sehat Hospital in Herat, Afghanistan.

2.2 | Sample size

The sample size for this study was determined using a sample calculation method for prevalence studies. The calculations were performed using the Epi Info program.[15] As the prevalence of the disease was unknown, the minimum sample size was 384. The confidence interval for the study was set at 95% with a confidence limit of ±5. The design effect of 1.0 was assumed and the anticipated frequency percentage was set at 50%. The formula used to calculate the sample size was as follows:

$$\text{Sample size } n = \frac{Z^2 p(1-p)}{e^2}.$$

2.3 | Sampling procedures, data collection, and eligibility criteria

The study enrolled all patients who visited hospitals, reported GERD symptoms, and provided informed verbal consent. Trained nurses from both hospitals collected the data for the study.

The diagnosis of GERD was based on clinical symptoms such as pyrosis (heartburn) and regurgitation. The study included patients who met the following criteria: (1) had symptoms of GERD, (2) were older than 18 years, (3) did not have any mental health disorders, and (4) were fluent in Dari (Afghanistan's Dialect of Persian). Patients with other gastrointestinal diseases or severe mental health disorders, such as Alzheimer's disease, dementia, and schizophrenia, were excluded from this study.

2.4 | Assessment questionnaires

Participants were asked to complete a gastroesophageal reflux symptom questionnaire that included three domains: sociodemographics (nine items), food habits/risk factors (13 items), and GERD signs and symptoms (11 items). A five-item Likert scale was used to grade the frequency and severity of food habits and GERD symptoms. GERD was diagnosed based on clinical symptoms such as pyrosis (i.e., heartburn) and regurgitation.

The demographics section of the survey included questions on various personal and socioeconomic factors. Participants were asked about their sex, age group, marital status, education level, number of family members, cigarette use, opioid use, and the presence of any chronic diseases. The economic status was assessed using a Likert scale, where respondents rated their perceived economic condition as poor, average, or good. This self-reported data provided a comprehensive overview of the participants' backgrounds and living conditions.

The GERD signs and symptoms section included questions addressing a range of common issues. Participants reported on their experiences with heartburn, regurgitation, nausea, vomiting, lack of appetite, and stomach upset that prevents sleep. Additional symptoms included feelings of suffocation and congestion, difficulty swallowing, coughing after meals, exacerbation of stomach and esophageal symptoms when lying down, shortness of breath at night, pain behind the sternum, and pain between the shoulders. These items provided a detailed overview of the various manifestations of GERD.

The third part of the questionnaire included questions on food behaviors that could affect GERD. Participants were asked about their use of acid-reducing drugs and their consumption habits of various foods and beverages. This included carbonated beverages, high-fat foods, pickles, raw tomatoes, lemons and oranges, coffee, black tea, and yogurt. Additionally, they reported on behaviors such as overeating and alcohol consumption. These questions aimed to identify dietary patterns that might exacerbate or alleviate GERD symptoms.

To measure the level of depression, anxiety, and stress among patients with GERD, a modified version of the Depression, Anxiety, and Stress Scale 42 (DASS-42) standard questionnaire was used. The DASS-42 is a 42-item self-report scale used to measure the level of depression, anxiety, and stress by assessing the severity of the main symptoms of depression, anxiety, and stress. The DASS-42 comprises three domains—depression, anxiety, and stress—each consisting of 14 items. Respondents assess the frequency and intensity of their experiences over the past week using a four-point Likert scale, from 0 ("*Did not apply to me at all*") to 3 ("*Applied to me very much, or most of the time*"). The scores for each domain are totaled separately, yielding individual scores for depression, anxiety, and stress, with higher scores signifying greater levels of emotional distress. The DASS-42 has been validated in many languages and cultures, including the Dari language in Herat, Afghanistan.[16]

2.5 | Data analysis

The recorded data were entered into the IBM SPSS version 27 software for analysis. Descriptive statistics were used to explore the sociodemographic characteristics, signs and symptoms, risk factors, depression, anxiety, and stress of the participants. The χ^2 test was used to compare differences in the distribution of categorical variables, specifically comparing high and low scores on the depression, anxiety, and stress scales, each dichotomized by the median. Statistical significance was set at $p < 0.05$.

2.6 | Ethical approval

The study was approved by the Ethics Committee of the Medical Faculty, Herat University, Afghanistan (approval number: 2; 06/03/2020). All participants provided written informed consent before participating in the study, including those who were illiterate, and their respective legally authorized representatives were involved in the informed consent process. The confidentiality and privacy of the participants were protected throughout the study following the Declaration of Helsinki and the ethical principles of research involving human subjects.

3 | RESULTS

This descriptive study examined the characteristics of 396 patients diagnosed with GERD. The patients' mean (SD) and median age were reported as 34.6 (±14.0) and 30.0 years, respectively.

Table 1 shows the characteristics of the study participants. The study comprised mainly female participants (67.9%), with the age distribution showing the highest percentage in the 18–29 age group (43.7%) and the lowest percentage in the 60+ years age group (5.8%). Most participants were married (78.5%) and the most common educational level was illiteracy (34.8%). Regarding economic status, 51.0% of the participants reported having a good economic status. The majority of participants had a family size of 5–10 (59.1%), did not use cigarettes (87.6%) or opioids (98.0%), and did not have a chronic disease (70.9%).

The results in Table 2 show the frequency of different symptoms among the patients with GERD. The most reported symptom was heartburn, with 44.9% of the patients reporting continuous symptoms. The second most reported symptom was regurgitation, with 37.1% of the patients reporting continuous symptoms. Nausea, vomiting, lack of appetite, and feeling upset in the stomach were among the least commonly reported symptoms, with 38.4% to 72.7% of participants indicating they did not experience these symptoms. Other symptoms such as feeling suffocated and congested, difficulty swallowing, and coughing after eating food were reported less frequently, with percentages ranging from 58.3% to 81.6% for continuous symptoms. Overall, the results suggested heartburn (88.1%) and regurgitation (84.3%) were the most reported symptoms among patients with GERD in Herat City, ranging from experiences less than 3 times a week to continuous occurrences.

Table 3 outlines the frequency of various food behaviors among participants. Notably, 50% did not use acid-reducing drugs. Furthermore, 58.3% avoided carbonated beverages, 43.9% avoided high-fat foods, and 57.3% refrained from pickled foods. About 39.9% avoided raw tomatoes, while 50% avoided lemons or oranges. In addition, 78.3% avoided coffee and 56.6% avoided black tea.

TABLE 1 Characteristics of the patients with GERD (Herat, Afghanistan, 2020).

Characteristics	*n*	%
Sex		
Male	127	32.1
Female	269	67.9
Age group (years)		
18–29	173	43.7
30–39	97	24.5
40–49	60	15.2
50–59	43	10.9
60+	23	5.8
Marital status		
Single	85	21.5
Married	311	78.5
Education		
Illiterate	138	34.8
Primary	54	13.6
Secondary	44	11.1
Tertiary	43	10.9
University	117	29.5
Perceived economic status		
Good	202	51.0
Average	159	40.2
Bad	35	8.8
Number of family members		
<5	112	28.3
5–10	234	59.1
>10	50	12.6
Cigarette use		
Yes	49	12.4
No	347	87.6
Opioid use		
Yes	8	2.0
No	388	98.0
Chronic disease		
Yes	118	29.1
No	278	70.9
Total	396	100.0

Abbreviation: GERD, gastroesophageal reflux disease.

Moreover, 62.6% did not overeat and 93.4% did not consume yogurt. The percentage of participants who reported consuming these foods less than three times per week, three times per week, more than three times per week, or continuously was also shown. Overall, yogurt consumption (71.7%) was the most frequent eating behavior among patients with GERD in Herat City.

Figure 1 presents the overall depression, anxiety, and stress scores of the patients with GERD using DASS-42 criteria. Most of the participants had normal scores on depression (52.27%) and stress scales (36.36%). However, nearly half of the participants (45.96%) reported extremely severe anxiety.

Table 4 displays the variations in depression, anxiety, and stress scores among GERD patients concerning demographic factors. Depression scores were significantly associated with age, marital status, opioid use, and presence of chronic diseases. Significant associations were found between anxiety scores and sex, age, education level, and cigarette usage. Stress scores were significantly related to age, educational level, economic status, and cigarette and opioid use.

Table 5 displays the variations in depression, anxiety, and stress scores among the patients with GERD in terms of signs and symptoms. Significant relationships were found between depression scores and symptoms such as heartburn, nausea, suffocation, difficulty swallowing, coughing after eating, shortness of breath at night, pain behind the sternum, and pain between the shoulders. Anxiety scores were significantly associated with nausea, lack of appetite, suffocation, difficulty swallowing, coughing after eating, exacerbation of symptoms by lying down, shortness of breath at night, pain behind the sternum, and pain between the shoulders. The stress scores were significantly associated with regurgitation, nausea, lack of appetite, feeling upset in the stomach that prevents night sleep, coughing after eating, shortness of breath at night, pain behind the sternum, and pain between the shoulders.

Table 6 displays the variations in depression, anxiety, and stress scores among patients with respect to their eating behaviors. Significant relationships were found between the depression scores and the use of acid-reducing drugs, consumption of lemons/oranges, and overeating. Anxiety scores were significantly associated with the use of acid-reducing medications and consumption of high-fat foods, lemons/oranges, coffee, black tea, and yogurt. Stress scores were significantly related to the use of acid-reducing medications and consumption of pickles, raw tomatoes, lemons/oranges, coffee, alcohol, and yogurt.

4 | DISCUSSION

This descriptive study aimed to explore the risk factors and psychological comorbidities associated with GERD in Herat, Afghanistan. The results revealed a significant association between GERD

TABLE 2 Frequency of GERD-related signs and symptoms among patients with GERD (Herat, Afghanistan, 2020).

Sign and symptoms	No (%)	Less than 3 times/ weeks (%)	3 times/ weeks (%)	More than 3 times/weeks (%)	Continuous (%)
Heartburn	11.9	15.4	22	5.8	44.9
Regurgitation	15.7	19.4	14.9	12.9	37.1
Nausea	38.4	16.9	20.2	12.1	12.4
Vomiting	72.7	11.9	10.1	1.8	3.5
Lack of appetite	42.7	7.8	15.2	11.1	23.2
Feeling upset in the stomach that prevents night sleep	42.7	18.7	19.7	8.8	10.1
Feeling suffocated and congestion	58.3	17.9	10.6	8.8	4.3
Difficulty in swallowing	81.6	3.3	9.6	5.6	-
Coughing after eating food	79	10.1	7.6	3	0.3
Exacerbation of stomach and esophageal symptoms by lying down	62.4	9.3	13.1	7.8	7.3
shortness of breath at night	51.5	21.2	11.6	7.1	8.6
Pain behind sternum	35.9	19.4	17.7	11.9	15.2
Pain between the two shoulders	38.4	14.4	14.6	12.4	20.2

Abbreviation: GERD, gastroesophageal reflux disease.

TABLE 3 Frequency of GERD-related food behaviors/risk factors among patients with GERD (Herat, Afghanistan, 2020).

Food behaviors	No (%)	Less than 3 times/ weeks (%)	3 times/ weeks (%)	More than 3 times/ weeks (%)	Continuous (%)
Use of acid-reducing drugs	50	16.7	11.1	6.3	15.9
Consumption of carbonated beverages	58.3	11.9	11.6	4.5	13.6
Consumption of high-fat foods	43.9	12.6	17.9	12.9	12.6
Pickled consumption	57.3	7.3	18.4	12.1	4.8
Raw tomato consumption	39.9	9.6	23.5	15.7	11.4
Consumption of lemons, oranges	50	11.4	16.7	11.9	10.1
Coffee consumption	78.3	8.8	7.3	2	3.5
Consumption of black tea	56.6	5.6	17.4	7.3	13.1
overeating	62.6	14.6	6.3	7.8	8.6
Alcohol consumption	93.4	3	1.5	-	2
Yogurt Consumption	28.3	6.1	15.9	23.7	26

Abbreviation: GERD, gastroesophageal reflux disease.

symptoms and psychological factors, including depression, anxiety, and stress. Demographic factors such as age, marital status, opioid usage, and the presence of chronic diseases were found to be significantly related to depression scores among GERD patients. Additionally, specific GERD symptoms, such as heartburn, nausea, suffocation, and sleep disturbances, were associated with higher levels of depression, anxiety, and stress. Dietary habits, including the consumption of antacids, citrus fruits, high-fat foods, and overeating, also had a significant impact on the psychological comorbidities observed. These findings highlight the complex interplay between GERD and psychological well-being, underscoring the importance of a holistic approach to patient management.

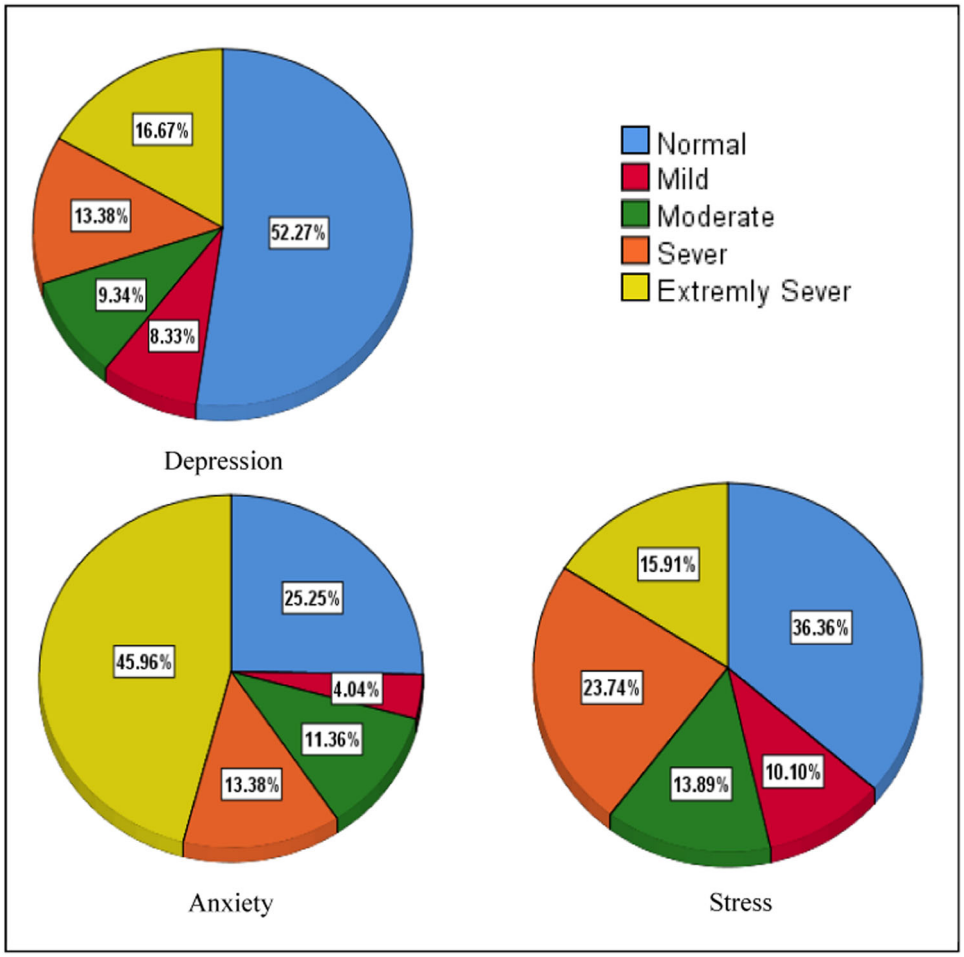

FIGURE 1 Overall depression, anxiety, and stress scores among GERD Patients. GERD, gastroesophageal reflux disease.

This study found heartburn and regurgitation to be the most reported symptoms among patients with GERD in Herat City (Table 2), acknowledging the challenge of distinguishing GERD symptoms from those of heart disease or psychiatric conditions. Furthermore, nearly half of the participants had extremely severe anxiety, while the majority had normal scores on the depression and stress scales (Table 4). Critically discussing these findings, the co-occurrence of severe anxiety with GERD symptoms underscores the need for comprehensive patient assessment and targeted interventions to address mental health issues alongside GERD management.

Comparing the results of this study with other countries in the region, it is important to note that GERD is a prevalent health issue in the Middle East and Central Asia.[17] There are no official or specific data on GERD prevalence in Afghanistan, but according to a study conducted in Herat, Afghanistan, the range of GERD prevalence estimates was 18.1%–27.8%.[18] According to a study published in 2013, the estimated range of GERD prevalence estimates was 8.7%–33.1% in the Middle East.[17] Another study released in 2022 reported that there were 783.95 million cases of GERD globally in 2019.[19] An investigation in Iran found that 26.3% of adults had GERD.[20] In a separate Iranian study, the prevalence of GERD was 43.07%.[21] According to a study conducted in Saudi Arabia, the prevalence of GERD symptoms among adults is 23.1%.[22] The high prevalence of GERD in this region could be attributed to various factors such as dietary habits, lifestyle, and genetic predisposition. However, further research is needed to better understand the factors contributing to the high prevalence of GERD in the region.

This study found that most participants were female and had a low level of education. This is consistent with the findings of other studies that have shown a higher prevalence of GERD among women and individuals with low levels of education.[23,24] The incidence of GERD was found to be higher among married individuals; this finding is inconsistent with previous studies.[24] This contrast could be explained by cultural, lifestyle, or stress-related factors unique to the population studied in Herat City, which may differ significantly from those in the population of the previous study. Furthermore, most participants reported having a family size of 5–10, consistent with the high birth rate in Afghanistan.[25] Having these demographic trends and their implications, it's apparent that sociocultural factors play a significant role in shaping the prevalence and presentation of GERD, highlighting the importance of culturally sensitive healthcare approaches tailored to specific demographic groups.

The findings of this study, indicating that heartburn and regurgitation are the most reported symptoms among patients with GERD

TABLE 4 Relationship of depression, anxiety, and stress scores with demographics of GERD patients (Herat, Afghanistan, 2020).

		Depression			Anxiety			Stress		
Variables	Categories	<8.40 %	≥8.40 %	*p*	<18 %	≥18 %	*p*	<21 %	≥21 %	*p*
Sex	Male	55.9	44.1	0.122	70.1	29.9	0.000*	48.8	51.2	0.504
	Female	47.6	52.4		46.5	53.5		52.4	47.6	
Age group	18–29	48	52	0.000*	55.5	44.5	0.000*	45.7	54.3	0.000*
	30–39	42.3	57.7		52.6	47.4		49.5	50.5	
	40–49	48.3	51.7		36.7	63.3		38.3	61.7	
	5–59	83.7	16.3		81.4	18.6		88.4	11.6	
	60+	43.5	56.5		43.5	56.5		65.2	34.8	
Marital status	Single	63.5	36.5	0.006*	55.3	44.7	0.794	58.8	41.2	0.116
	Married	46.6	53.4		53.7	46.3		49.2	50.8	
Education	Illtreat	47.1	52.9	0.623	52.9	47.1	0.012*	46.4	53.6	0.007*
	Primary	51.9	48.1		51.9	48.1		57.4	42.6	
	Secondary	43.2	56.8		45.5	54.5		31.8	68.2	
	Tertiary	55.8	44.2		79.1	20.9		67.4	32.6	
	University	53.8	46.2		50.4	49.6		55.6	44.4	
Economic	Good	49	51	0.074	48.5	51.5	0.073	46	54	0.016*
	Average	47.8	52.2		59.1	40.9		53.5	46.5	
	Bad	68.6	31.4		62.9	37.1		71.4	28.6	
Number of family members	<5	55.4	44.6	0.072	58	42	0.119	51.8	48.2	0.885
	5–10	50.9	49.1		50	50		51.7	48.3	
	>10	36	64		64	36		48	52	
Cigarette use	No	56.3	43.8	0.375	25	75	0.000*	27.1	72.9	0.000*
	Yes	49.4	50.6		58	42		54.6	45.4	
Opioid use	No	49.2	50.8	0.004*	53.4	46.6	0.055	52.1	47.9	0.027*
	Yes	100	0		87.5	12.5		12.5	87.5	
Chronic disease	No	57.6	42.4	0.000*	54	46	0.693	51.4	48.6	0.677
	Yes	34.2	65.8		56.1	43.9		49.1	50.9	

Abbreviation: GERD, gastroesophageal reflux disease.

*χ^2 test, $p < 0.05$ was the significance level.

in Herat City, are consistent with other studies showing these as the two most common symptoms of GERD.[26,27] In addition to heartburn and regurgitation, other frequently reported symptoms include nausea, vomiting, loss of appetite, and sleep disruption due to stomach discomfort. These findings are consistent with a systematic review that reported dyspepsia, nausea, bloating, sore throat, globus sensation, and epigastric pain as the common symptoms of GERD.[26]

It is important to note that the frequency of these symptoms can be affected by factors, such as disease severity, lifestyle, and diet. Most patients with GERD reported that they did not use acid-reducing drugs, which is similar to another study in the United States.[23] This may be explained by a lack of awareness or access to these medications, or a preference for alternative treatments and lifestyle modifications. However, the use of acid-reducing drugs is not always necessary for GERD treatment, and there are other treatment options available such as lifestyle changes and surgery. Additionally, this study was conducted in a specific population and may not be generalizable to different populations.

Our study investigated several potential risk factors for GERD, including the consumption of carbonated beverages (41.7%), high-fat foods (51.6%), pickled foods (42.7%), raw tomatoes (60.1%), lemons and oranges (50.0%), coffee (21.7%), black tea (43.4%), overeating (37.4%), and yogurt (6.6%). Studies in Iran have shown that common risk factors for GERD include the consumption of nonsteroidal anti-inflammatory

TABLE 5 Relations of depression, anxiety, and stress scores with signs and symptoms of GERD patients (Herat, Afghanistan, 2020).

		Depression			Anxiety			Stress		
Variables	Categories	<8.40 %	≥8.40 %	p	<18 %	≥18 %	p	<21 %	≥21 %	p
Heartburn	No	29.8	70.2	0.003*	59.6	40.4	0.417	59.6	40.4	0.225
	Yes	53	47		53.3	46.7		50.1	49.9	
Regurgitation	No	54.8	45.2	0.432	56.5	43.5	0.678	72.6	27.4	0.000*
	Yes	49.4	50.6		53.6	46.4		47.3	52.7	
Nausea	No	58.6	41.4	0.009*	75	25	.000*	65.1	34.9	0.000*
	Yes	45.1	54.9		41	59		42.6	57.4	
Vomiting	No	50.3	49.7	0.951	55.2	44.8	0.446	51.4	48.6	0.935
	Yes	50	50		50.9	49.1		50.9	49.1	
Lack of appetite	No	55	45	0.101	66.9	33.1	.000*	60.9	39.1	0.001*
	Yes	46.7	53.3		44.5	55.5		44.1	55.9	
Feeling upset in the stomach that prevents night sleep	No	54.4	45.6	0.151	56.2	43.8	0.454	42	58	0.001*
	Yes	47.1	52.9		52.4	47.6		58.1	41.9	
Feeling suffocated and congestion	No	55.4	44.6	0.015*	61.5	38.5	.000*	51.1	48.9	0.932
	Yes	43	57		43.6	56.4		51.5	48.5	
Difficulty in swallowing	No	53.3	46.7	0.012*	58.2	41.8	0.000*	52.9	47.1	0.16
	Yes	37	63		35.6	64.4		43.8	56.2	
Coughing after eating food	No	53	47	0.032*	57.8	42.2	0.003*	55.6	44.4	0.001*
	Yes	39.8	60.2		39.8	60.2		34.9	65.1	
Exacerbation of stomach and esophageal symptoms by lying down	No	53.8	46.2	0.066	58.7	41.3	0.016*	49.8	50.2	0.453
	Yes	44.3	55.7		46.3	53.7		53.7	46.3	
Shortness of breath at night	No	63.7	36.3	0.000*	58.8	41.2	0.049*	64.7	35.3	0.000*
	Yes	35.9	64.1		49	51		37	63	
Pain behind sternum	No	65.5	34.5	0.000*	70.4	29.6	0.000*	71.8	28.2	0.000*
	Yes	41.7	58.3		44.9	55.1		39.8	60.2	
Pain between the two shoulders	No	71.1	28.9	0.000*	75.7	24.3	0.000*	72.4	27.6	0.000*
	Yes	37.3	62.7		40.6	59.4		38.1	61.9	

Abbreviation: GERD, gastroesophageal reflux disease.

*χ^2 test, $p < 0.05$ was the significance level.

drugs (NSAIDs), overeating, chronic diseases, tea consumption, and lifestyle factors such as excessive body weight, obesity, moderate/high alcohol consumption, and smoking.[6,28–30] A study conducted in Southern Punjab, Pakistan, assessed the frequency and risk factors related to GERD in a previously unstudied population and found that GERD is a highly prevalent gastrointestinal disorder with modifiable risk factors, such as higher body mass index, past disease, smoking history, and frequent use of NSAIDs, soft drinks, pickles, and spicy foods.[31] It is evident that addressing modifiable risk factors through targeted health education and lifestyle interventions could significantly reduce the burden of GERD.

The results of this study also showed that nearly half of the participants had extremely severe anxiety, while the majority were normal on the depression and stress scales. This finding is consistent with other studies that have shown a high prevalence of anxiety among patients with GERD.[32,33] The relationship between GERD and anxiety is complex and may be bidirectional because GERD can cause anxiety, which can worsen GERD symptoms.[34] Some studies have also suggested that acute stress can exacerbate GERD symptoms.[35] Therefore, clinicians should consider assessing the mental health status of patients with GERD and providing appropriate treatment when necessary.

The results of this study highlight the need for interventions aimed at improving the mental health outcomes of patients with GERD. Given the high prevalence of anxiety among GERD patients in

TABLE 6 Relations between depression, anxiety, and stress scores and eating behaviors of GERD patients (Herat, Afghanistan, 2020).

		Depression			Anxiety			Stress		
		<8.40	≥8.40		<18	≥18		<21	≥21	
Variables	Categories	%	%	*p*	%	%	*p*	%	%	*p*
Use of acid-reducing drugs	No	64.6	35.4	0.000*	67.2	32.8	0.000*	58.1	41.9	0.007*
	Yes	35.9	64.1		40.9	59.1		44.4	55.6	
Consumption of carbonated beverages	No	51.5	48.5	0.552	52.8	47.2	0.562	50.6	49.4	0.773
	Yes	48.5	51.5		55.8	44.2		52.1	47.9	
Consumption of high-fat foods	No	47.1	52.9	0.271	44.8	55.2	0.001*	55.7	44.3	0.114
	Yes	52.7	47.3		61.3	38.7		47.7	52.3	
Pickled consumption	No	50.7	49.3	0.851	54.6	45.4	0.787	56.8	43.2	0.010*
	Yes	49.7	50.3		53.3	46.7		43.8	56.2	
Raw tomato consumption	No	51.9	48.1	0.593	56.3	43.7	0.457	58.9	41.1	0.014*
	Yes	49.2	50.8		52.5	47.5		46.2	53.8	
Consumption of lemons, oranges	No	56.1	43.9	0.021*	66.2	33.8	0.000*	60.6	39.4	0.000*
	Yes	44.4	55.6		41.9	58.1		41.9	58.1	
Coffee consumption	No	52.3	47.7	0.13	58.7	41.3	0.000*	57.4	42.6	0.000*
	Yes	43	57		37.2	62.8		29.1	70.9	
Consumption of black tea	No	46.9	53.1	0.125	46.9	53.1	0.001*	51.3	48.7	0.972
	Yes	54.7	45.3		63.4	36.6		51.2	48.8	
overeating	No	56.9	43.1	0.001*	54	46	0.997	52.8	47.2	0.421
	Yes	39.2	60.8		54.1	45.9		48.6	51.4	
Alcohol	No	51.4	48.6	0.099	54.9	45.1	0.214	53.5	46.5	0.001*
	Yes	34.6	65.4		42.3	57.7		19.2	80.8	
Yogurt consumption	No	53.6	46.4	0.407	67	33	0.001*	60.7	39.3	0.018*
	Yes	48.9	51.1		48.9	51.1		47.5	52.5	

Abbreviation: GERD, gastroesophageal reflux disease.

*χ^2 test, $p < 0.05$ was the significance level.

Herat, it is important to consider the potential benefits of psychological interventions such as cognitive-behavioral therapy and relaxation techniques. These interventions are effective in reducing anxiety and improving patients' quality of life.[36,37] Furthermore, healthcare providers should be encouraged to screen patients with GERD for symptoms of depression, anxiety, and stress and refer them to mental health professionals if necessary.

Based on the results presented in Tables 4–6, it is evident that there is a significant association between GERD and symptoms of depression, anxiety, and stress among the study participants. The findings highlight the impact of various demographic factors, clinical manifestations, and dietary habits on the severity of these psychological conditions.

These findings are consistent with previous research that has established a bidirectional relationship between GERD and psychological disorders, such as depression, anxiety, and stress.[38–40] The presence of GERD symptoms can contribute to the development or exacerbation of these psychological conditions, while stress and anxiety can also worsen GERD symptoms by altering physiological processes like gastric acid secretion and esophageal motility.[41–43] Given the unique sociocultural context of Herat, Afghanistan, and the paucity of region-specific data, the results of this study provide valuable insights into the interplay between GERD and psychological disorders in this setting.

In our study, the sample size was obtained from patients who were referred to the Mowaffaq Clinic and Sehat Hospital in Herat City, and these findings may not apply to people from other parts of Afghanistan. Future studies that investigate samples from larger geographic areas and more analytical views may provide more significant findings. However, to our knowledge, this is the first study in Afghanistan to investigate the signs and symptoms, food behaviors, and mental health related to GERD.

5 | RECOMMENDATIONS

Based on the findings of this study, it is recommended that healthcare professionals in Herat, Afghanistan should consider GERD symptoms as a common health issue, particularly among females and those with a low level of education. It is important to educate patients on risk factors and lifestyle changes that can help reduce GERD symptoms, such as avoiding carbonated beverages, high-fat foods, and overeating. Clinicians should also consider assessing the mental health status of patients with GERD, as anxiety is a common comorbidity. Furthermore, longitudinal studies and comparative analyses across different regions of Afghanistan or neighboring countries could shed light on the role of cultural, environmental, and genetic factors in modulating the association between GERD and psychological disorders. Although the study provides valuable insights, future research incorporating diagnostic workups, such as MII-pH studies, could further validate the GERD diagnosis and enable subgroup analysis, potentially revealing additional nuances in the relationship between GERD and psychological comorbidities. Finally, future research is needed to better understand the factors contributing to the high prevalence of GERD in this region.

6 | STRENGTH AND LIMITATION

This study employed a descriptive study design with a robust sampling methodology, validated assessment tools, and a standard sample size, enhancing its generalizability. However, the cross-sectional nature of the study limits causal inference, and reliance on self-reported data may introduce bias. Additionally, exclusion criteria and the difficulty in differentiating GERD symptoms from other conditions may affect the findings' generalizability and accuracy. he difficulty in distinguishing GERD symptoms from those of heart disease or psychiatric conditions may have influenced the accuracy of symptom reporting.

7 | CONCLUSION

This comprehensive investigation reveals the significant relationship between GERD symptoms, psychological comorbidities, and demographic factors among patients in Herat, Afghanistan. The findings underscore the necessity for multifaceted patient care approaches that encompass physical and mental health aspects. Healthcare providers should prioritize mental health assessments for GERD patients and implement targeted interventions accordingly. Moreover, public health initiatives aimed at raising awareness of GERD and promoting healthy lifestyle behaviors are imperative to address this prevalent health issue effectively. Further research is warranted to elucidate the underlying mechanisms contributing to GERD prevalence in the region and to inform tailored interventions for optimal health outcomes.

AUTHOR CONTRIBUTIONS

Said A. G. Saeedy: Conceptualization; methodology; writing—original draft; data curation; resources; investigation; project administration; supervision. **Ahmad F. Faiz**: Conceptualization; methodology; writing—original draft; data curation; resources; investigation; project administration; supervision. **Ali Rahimi**: Conceptualization; methodology; writing—review and editing; writing—original draft; formal analysis; project administration; investigation; supervision. **Nasar A. Shayan**: Conceptualization; methodology; writing—review and editing; supervision; formal analysis; project administration; investigation; validation.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data collection tools and data sets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The study was approved by the Ethics Committee of the Medical Faculty, Herat University, Afghanistan (approval no: 2; 06/03/2020). All participants provided written informed consent before participating in the study, including those who were illiterate, and their respective legally authorized representatives (LARs) were involved in the informed consent process. The confidentiality and privacy of the participants were protected throughout the study following the Declaration of Helsinki and the ethical principles of research involving human subjects.

TRANSPARENCY STATEMENT

The lead author Nasar A. Shayan affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

PATIENT CONSENT STATEMENT

Informed consent was obtained from all the participants.

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