

# The association of anxiety and depression among health specialties students with GERD in Makkah city, kingdom of Saudi Arabia (KSA). Cross-sectional study

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## ABSTRACT

**Introduction:** The correlation between psychological factors and digestive abnormalities is significant, yet, the entire mechanism still undetermined.

**Objectives:** Our study aimed to study the correlation between anxiety, depression, and GERD among health specialties students in Makkah city, Saudi Arabia (KSA).

**Methods:** a survey-based study was demonstrated among health-related students in different medical colleges at Umm Al-Qura University in the period time between December 2020 and January 2021. GERD symptom frequency was evaluated using a previously validated gastroesophageal reflux symptom questionnaire GERD-Q; however, depressive and anxious symptoms were assessed using a Hospital Anxiety/Depression Scale (HADS).

**Result:** A total of 353 students participated in the current study. The mean age of participants in the present study was  $22.69 \pm 2.27$ . Male participants represents the predominant of replying. The majority of respondents were 2nd-year students. There is a significant correlation between anxiety and depression among students with GERD (P-value, 0.001), (P-value, 0.017), respectively.

**Conclusions:** Depression and anxiety represent a significant factor in correlation with students with GERD.

**Keyword:** predictors, anxiety, depression, GERD, health students, Saudi Arabia.

## Introduction

Digestive abnormalities encompass a global health issue [1]. About 70 million individuals suffer from digestive issues daily, according to the American Nutrition Association [1, 2]. Gastroesophageal reflux disease (GERD) represents a common chronic gastrointestinal disorder affecting adult populations [1, 3]. Therefore, it is essential to diagnose it before it worsens its classic signs, which have several known importance and complications [4-11]. Many factors may contribute to GERD, according to different studies. However, dietary habits, tobacco smoking and

Obesity represent the highest proportion of these factors [12-15]. Furthermore, psychosocial factors may also contribute to GERD, including chronic stress and emotional instability [16-19]. According to many studies, psychological factors play a vital role in GERD symptoms. Thus, individuals with GERD may have disturbance quietly compared with individuals without GERD [4, 20-28]. There are insufficient investigations concerning anxiety and depression among GERD in college students, particularly medical students [4, 20-28]. However, information is inadequate regarding anxiety, depression, and their

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Association with GERD among health specialties students in the Middle East and Saudi Arabia. Consequently, the current study aimed to study anxiety, depression, and their association with GERD among health specialties students in Makkah city, the kingdom of Saudi Arabia (KSA).

## Methods

This cross-sectional survey was held between July 2021 to September 2021. The study was approved by the Medical Ethics Committee of Umm Al-Qura university, Saudi Arabia (ethical approval number: HAPO-02-K-012-2021-07-707) on July 18, 2021. All health-related departments were included in this survey, while students who refused to participate were excluded. The Epi Info™ 7.1.5 software (Center for Disease Control and Prevention; Atlanta, Georgia, USA) was used for sample size estimation. Thereby, the smallest sample size to accomplish enough power is 353. We surveyed students using a structured survey distributed using the google platform containing three parts; the first part focused on gathering students' demographics. Then, we gathered participants' symptoms of GERD using the validated questionnaire GERD-Q [29]. Lastly, we gathered participants' symptoms of anxiety and depression using a validated questionnaire [30]. Microsoft Excel sheets were used for data collection in the beginning. Then data were uploaded to a Statistical Package for the Social Scientists ver. 23 spreadsheets after being checked for completeness and minor typographical mistakes (IBM, Armonk, NY). For categorical variables, percentages were used, while mean and standard deviation were used for continuous data. A P-value of less than 5% is statistically significant. The categorical variables were compared using the Chi-square test.

## Results

Overall, 353 students of health-related faculties were surveyed. More than half of the students were males (60.9%); (Table 1). The mean age of participants was  $22.69 \pm 2.27$  years; all age groups are labelled in (Table 1). Single participants (242, 68.6%) were considerably more represented than married participants (Table 1). Students of the College of applied medical sciences were the most represented among all the colleges (24.9%). Conversely, the least represented was the College of nursing (7.1%) (Table 1). Moreover, second-year students were predominant (185, 52.4%) compared with intern students (11, 3.1%) (Table 1). Concerning the past medical history, 30.9% of the participants have been diagnosed before with GERD. On the other hand, 35.7% of participants have been diagnosed with anxiety before, while 46.2% represented participants diagnosed with depression.

Therefore, past medical history and description were given in (Table 2).

Regarding Contributor's family history, 45.3% of participants had a positive family history of GERD, while 42.8% and 50.1% had a positive family history of anxiety and depression. Family history descriptions are given in (Table 2). According to the validated questionnaire, in diagnosing GERD [29], the majority of participants (33.7%) had a 50% likelihood rate of having GERD; Conversely, (18.4%) of participants had an 89% likelihood rate of having GERD (Figure 1). On the other hand, concerning anxiety and depression diagnosis, based on the validated questionnaire in diagnosing both of them [30], 50.99% of participants had anxiety while 37.68% had depression (Figure 2), (Figure 3). The most common mild symptoms of GERD duration among participants are burning feelings, difficulty getting sleep due to heartburn or regurgitation, and regurgitation. Moreover, the most common moderate symptoms of GERD among participants are nausea, pain in the center of the abdomen, and regurgitation. Furthermore, the most common severe symptoms of GERD among students are nausea, difficulty in getting sleep due to heartburn or regurgitation, and pain in the center of the abdomen. All GERD symptoms' are given in (Table 3). The association between students' collages and finals likelihood ratios and scores of GERD, anxiety, and depression are given in (Table 4); there is significant variation between students' collages and likelihood ratio of GERD (p-value, 0.013). Concerning the association relation of anxiety and depression among participants with GERD, Depression and anxiety were significantly higher in students with GERD (Table 5).

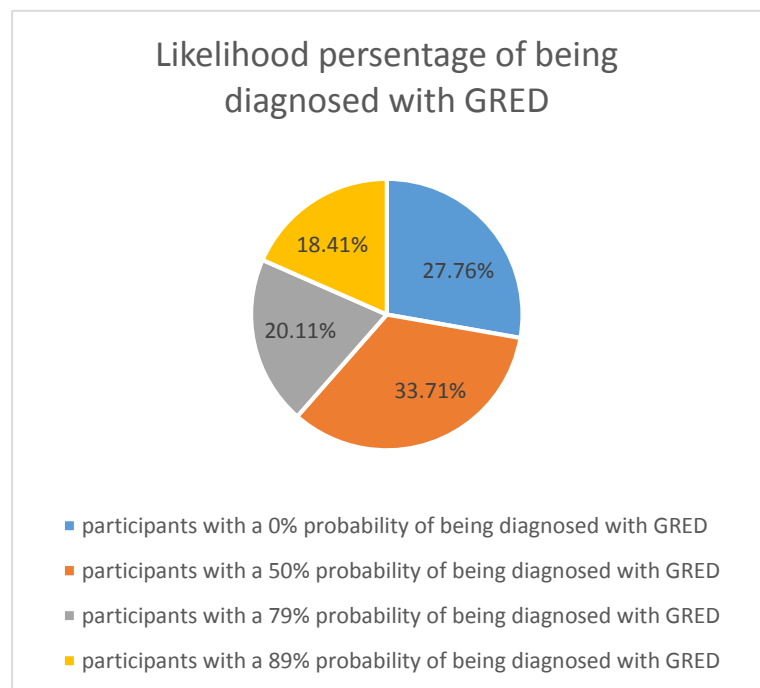


Figure 1 likelihood percentage of being diagnosed with GERD.

The association of anxiety and depression among health specialties students with GERD in Makkah city, kingdom of Saudi Arabia (KSA). Cross-sectional study.

**Table 1:** Demographic data.

Variable	Category	Frequency (%)
<b>Age (mean [SD])</b>	<b>(22.69 [2.27] )</b>	
Age	19-22	169 (47.9%)
	23-26	171 (48.4%)
	27-30	13 (3.7%)
Gender	Male	215 (60.9%)
	Female	138 (39.1%)
Academic year	2 <sup>nd</sup> year	185 (52.4%)
	3 <sup>rd</sup> year	28 (7.9%)
	4 <sup>th</sup> year	71 (20.1%)
	5 <sup>th</sup> year	40 (11.3%)
	6 <sup>th</sup> year	18 (5.1%)
	intern	11 (3.1%)
Collage	College of medicine	52 (14.7%)
	College of applied medical sciences	88 (24.9%)
	College of dentistry	80 (22.7%)
	College of pharmacy	70 (19.8%)
	College of nursing	25 (7.1%)
	College of public health and health informatics	38 (10.8%)
Marital status	Single	242 (68.6%)
	Married	111 (31.4%)

The association of anxiety and depression among health specialties students with GERD in Makkah city, kingdom of Saudi Arabia (KSA). Cross-sectional study.

**Table 2:** Past medical and family histories for participants.

Variable		Category	Frequency (%)
Past medical history	GERD	Yes	109 (30.9%)
		No	244 (69.1%)
	Anxiety	yes	126 (35.7%)
		No	227 (64.3%)
	Depression	Yes	163 (46.2%)
		No	190 (53.8%)
Family history	GERD	Yes	160 (45.3%)
		No	193 (54.7%)
	Anxiety	yes	151 (42.8%)
		No	202 (57.2%)
	Depression	Yes	177 (50.1%)
		No	176 (49.9%)

The association of anxiety and depression among health specialties students with GERD in Makkah city, kingdom of Saudi Arabia (KSA). Cross-sectional study.

**Table 3:** The percentage of GERD symptoms among students.

Variable	n.%	Mean	Standard deviation (SD)
Burning feeling (heartburn)		1.97	1.013
0 day	41.9		
1 day	29.7		
2-3 days	17.6		
4-7 days	10.8		
Regurgitation		2.03	1.058
0 day	41.9		
1 day	24.6		
2-3 days	21.2		
4-7 days	12.2		
Pain in the centre of the upper stomach		2.03	1.074
0 day	42.8		
1 day	23.8		
2-3 days	20.4		
4-7 days	13.0		
Nausea		2.18	1.119
0 day	38.5		
1 day	21.0		
2-3 days	24.1		
4-7 days	16.4		

The association of anxiety and depression among health specialties students with GERD in Makkah city, kingdom of Saudi Arabia (KSA). Cross-sectional study.

Difficulty getting sleep because heartburn and/or regurgitation		2.04	1.055
0 day	39.9		
1 day	29.5		
2-3 days	17.0		
4-7 days	13.6		
Taking medication(s) for heartburn		1.97	1.060
0 day	45.3		
1 day	24.4		
2-3 days	18.1		
4-7 days	12.2		

The association of anxiety and depression among health specialties students with GERD in Makkah city, kingdom of Saudi Arabia (KSA). Cross-sectional study.

**Table 4:** The association between students' collages and [GERD, anxiety, and depression].

Variables/collages		Collage of medicine (n. %)	Collage of dentistry (n. %)	Collage of applied medical science (n. %)	Collage of pharmacology (n. %)	Collage of nursing (n. %)	College of public health and health informatics (n. %)	p-value
GERD (likelihood ratio n.% )	0%	23.5	30.6	23.5	10.2	4.1	8.2	0.013*
	50%	10.1	23.5	26.9	22.7	5.9	10.9	
	79%	12.7	14.1	32.4	21.1	9.9	9.9	
	89%	12.3	18.5	15.4	27.7	10.8	15.4	
Anxiety	Normal	8.9	26.8	33.9	14.3	10.7	5.4	0.075
	Border line abnormal	11.1	24.8	24.8	18.8	10.3	10.3	
	Abnormal	18.9	20.0	22.2	22.2	3.9	12.8	
Depression	Normal	10.5	24.6	28.1	14.0	8.8	14.0	0.513
	Border line abnormal	19.0	20.9	24.5	22.1	5.5	8.0	
	Abnormal	11.3	24.1	24.1	19.5	8.3	12.8	

The association of anxiety and depression among health specialties students with GERD in Makkah city, kingdom of Saudi Arabia (KSA). Cross-sectional study.

**Table 5:** The correlation between anxiety and depression among students with or without GERD.

Category	GERD				p-value
	0%	50%	79%	89%	
<b>Anxiety</b>					0.001*
Normal	26 (46.4%)	11(19.6%)	10 (17.9%)	9 (16.1%)	
Borderline abnormal	17 (14.5%)	46 (39.3%)	30 (25.6%)	24 (20.5%)	
abnormal	55 (30.6%)	62 (34.4%)	31 (17.2%)	32 (17.8%)	
<b>Depression</b>					0.017*
Normal	13 (22.8%)	27 (47.4%)	11 (19.3%)	6 (10.5%)	
Borderline abnormal	53 (32.5%)	53 (32.5%)	34 (20.9%)	23 (14.1%)	
abnormal	32 (24.1%)	39 (29.3%)	26 (19.5%)	36 (27.1%)	



The association of anxiety and depression among health specialties students with GERD in Makkah city, kingdom of Saudi Arabia (KSA). Cross-sectional study.

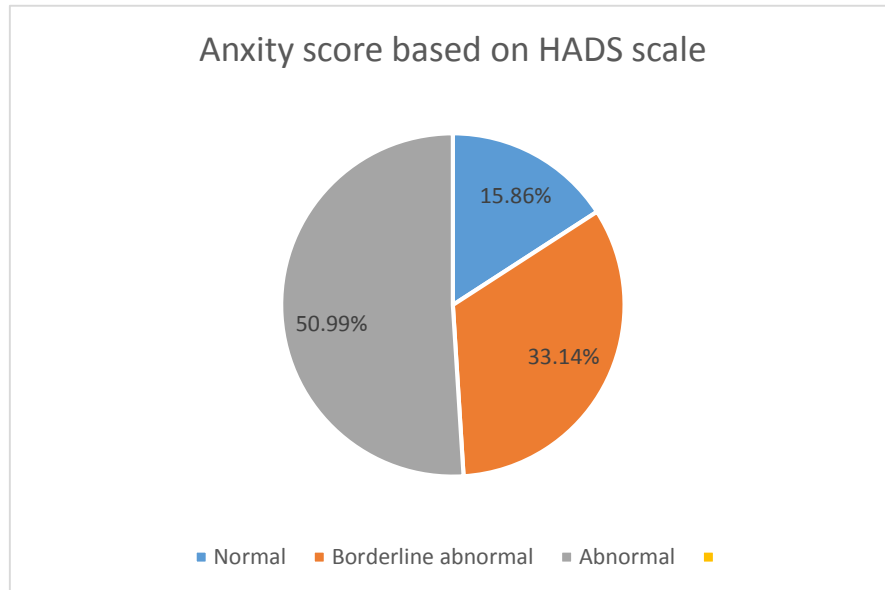


Figure 2 HADS, anxiety score.

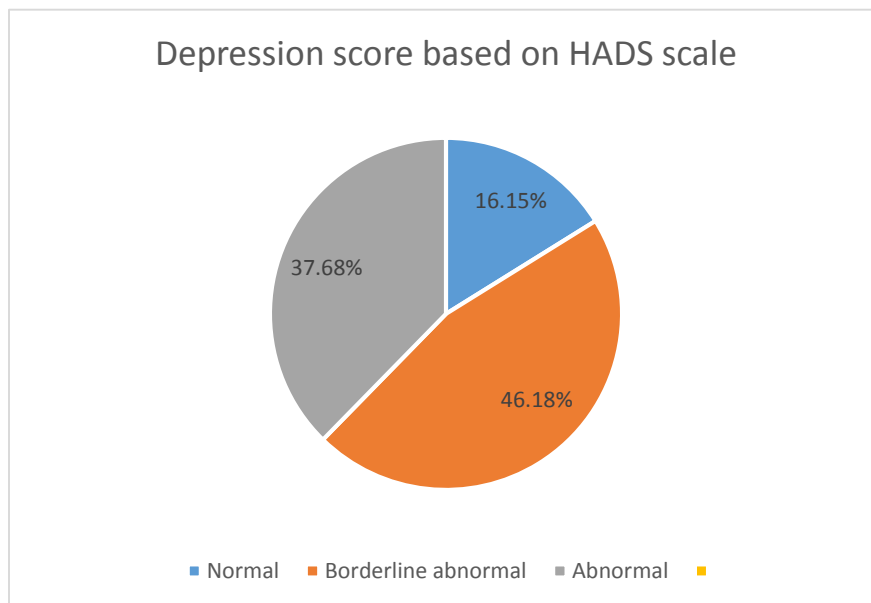


Figure 3 HADS, depression score

The association of anxiety and depression among health specialties students with GERD in Makkah city, kingdom of Saudi Arabia (KSA). Cross-sectional study.

## Discussion

Psychological factors complicate the treatment of functional GI disorder, resulting in poor outcomes [31-32]. Still, the correlation between the severity of symptoms of GERD and pathophysiological abnormalities is not significant. This supports the concept that psychological factors strongly affect GERD symptoms [31, 33]. Limited studies globally have been investigating the relationship between depression and anxiety and GERD symptoms; however, no constant outcome from those studies [31, 34]. To specify the appropriate treatment, a clear picture of the relationship between psychological factors and GERD should be established [31]. However, if left undetermined, it will lead to poor consequences as these psychological factors can increase GERD symptoms and worsen treatment and quality of life. [31]. Thus, the current study aims to recognize the frequency of GERD, depression, and anxiety and identify their relationship. Our study emphasizes a substantial level of anxiety and depression compared to GERD. A Pakistani cross-sectional study [31] revealed that 41.4% of respondents had depression, and 34.4% of participants had anxiety. This closely corresponds with the present study in which 51% of participants had anxiety while 33.1% were still borderline abnormal. Additionally, the majority of participants, 46.2%, remain in borderline abnormal depression, while 37.7% had depression. The association between anxiety and depression among GERD students is not yet understood. However, the association between the brain and the GI tract has been recognized. The disturbance of GI function may be influenced and escalated by stress and emotions by inducing the pain perception through the gut-brain axis; the same induction was also applicable to patients with GERD [31, 32]. A significant association between anxiety and depression among participants with GERD was emphasized in the current study, and this strongly agreed with the study of Mohammad S, 2019 [31]. Concerning the frequency of GERD symptoms among students, our study shows that nausea is the most common moderate and severe symptom. This disagrees with one of the Saudis studies in which regurgitation represents the most common symptom among participants [35]. The current study found that GERD had a significant association with students' collages. However, the univariate and multivariable analysis of factors associated with GERD among university students in one of the Saudi studies [1] shows that students in non-health colleges could be a factor in association with GERD, which disagrees with our study. Furthermore, another international study reveals that in individuals with major depressive disorder, the prevalence of GERD was substantially

higher [36]. Moreover, Indian research finds that there are psychiatric illnesses among people with GERD [37]. Our study aimed to investigate the frequency of depression and anxiety among students with GERD at UQU in Makkah city, Saudi Arabia. However, a few possible limitations may be noticed; firstly, this is a single-center study; accordingly, the results are not illustrative. A second potential article limitation is that the particular direction of correlation between GERD and psychological symptoms cannot be determined, as this is a cross-sectional study. Henceforth, we recommend more investigation to determine the exact prevalence of depression and anxiety among people with GERD and find out the correlated risk factors.

## Conclusion

The study findings suggest a significant frequency proportion of anxiety and depression among students with GERD. However, this topic needs supplementary investigation to determine the particular frequency of depression and anxiety among people with GERD and the correlated risk factors.

## Conflict of Interest

None

## Funding

None

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The association of anxiety and depression among health specialties students with GERD in Makkah city, kingdom of Saudi Arabia (KSA). Cross-sectional study.

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