

Prevalence and Risk Factors of Gastroesophageal Reflux Disease (GERD) among the Students in Al Baha University – Saudi Arabia

Ramy Hassan Agwa¹, Ahmed Mohammed Alzahrani², Yousef Mohammed Alzahrani³, Saeed Jumaan Alghamdi⁴, Faris Ali Alzahrani⁵, Meshal Ali Alzahrani⁶, Talal Ahmed Alzahrani⁷, Mohammed Ali Alzahrani⁸

¹Assistant Professor, Department of Medicine, Faculty of Medicine, Al-Baha University

^{2,3,4,5,6,7,8}Medical intern, Faculty of Medicine, Al-Baha University

ABSTRACT

Background: In recent years, the incidence of gastroesophageal reflux disease (GERD) seems to occur in the population of Saudi Arabia more than in Western countries and Eastern Asia. Such a higher risk of prevalence also reported by university students may be the result of their changing lifestyle factors.

Aim: The aim of the present study is therefore to determine the prevalence of GERD in Al-Baha university students and determine the risk factors, complications, and relieving strategies.

Methods: A cross-sectional design was carried out among 566 participants in the Al-Baha region. A close-ended questionnaire was used which was comprised of sociodemographic factors and information about risk factors, symptoms, relieving factors, and complications. It was used to collect data from the participants and their responses were analysed using a statistical package for social sciences (SPSS) whereby frequency analysis was conducted for each research variable.

Results: Out of 566 participants, only 144 students with GERD from Al-Baha university those who completed the questionnaire. There was a higher percentage of female (54.95%) respondents than males (45.05%). The data analysis revealed that overall symptom prevalence was high among students (25.44%) and the common symptoms were esophageal refluxes and heart burn. Common risk factors were smoking, alcohol, and stress. Besides, participants reported positive behaviors of relieving factors against GERD. In addition, there were significantly fewer complications reported by the participants.

Conclusion: Overall, the students at the university of Al-Baha have a high prevalence of GERD and therefore retain a higher potential for acceptability of the program to reduce the increasing prevalence of GERD.

ARTICLE DETAILS

Published On:
08 February 2023

Available on:
<https://ijmscr.org/>

1. INTRODUCTION

1.1 Background

Gastroesophageal reflux disease (GERD) is a common clinical problem that affects many people worldwide. The underlying pathophysiology of GERD is the reflux of gastric acid, pepsin, bile and duodenal contents back into the esophagus. This can be influenced by many factors that overcome innate defense mechanisms. The lower esophageal sphincter (LES) is located at the distal end of the esophagus, where it attaches to the stomach; this sphincter is composed of a bundle of smooth muscle which is important for the protection of the esophagus from the reflux of gastric contents. GERD may be associated with lower esophageal

sphincter (LES) incompetence and/or hiatal hernia. Gastroesophageal reflux disease results from many causes, such as anxiety disorders, obesity, nicotine and foods like (chocolate, fatty meals, spicy foods, coffee and alcohol). Also, medications can exacerbate reflux symptoms, for example (anticholinergic, beta-adrenergic, calcium channel blockers, and benzodiazepines).

This condition leads to an injury of the esophagus mucosa. The more frequent symptoms associated with GERD are heartburn, regurgitation, Upper abdominal or chest pain, Trouble swallowing, also known as dysphagia, Sensation of a lump in the throat is also very common in recent generation (Al Saadi, 2016). More often, these pains

Prevalence and Risk Factors of Gastroesophageal Reflux Disease (GERD) among the Students in Al Baha University – Saudi Arabia

escalate in the chest and possibly release from upper body parts such as the neck, throat, or angle of the jaw. Although short-term cases of GERD can be ignorable, the severe case of long-term of GERD can lead to the conditions such as esophagitis, strictures, ulcers, aspiration pneumonia, and Barrett's esophagus (Shiwaku et al., 2022). The root foundations of GERD are numerous, including moderation working of the lower esophageal sphincter, compression of the abdomen, hypersensitivity of the esophagus, high intragastric pressure, impaired esophageal bolus transit, hiatal hernia (Upper part of the stomach protuberances in the upper part of the stomach into the diaphragm) (Richter & Rubenstein, 2018). Besides these root causes, other factors such as age, pregnancy, way of the living, obesity problem, more often use of certain medications, regular use of nicotine-containing substances, etc., are also associated with GERD (Chen et al., 2021). The condition of gastroesophageal reflux disease seems to happen more often than ever. Moreover, the prevalence of GERD is more common in Asia (Wong & Kinoshita, 2006). Additionally, in the context of Saudi Arabia, several emerging studies regarding the prevalence of GERD found in recent literature indicate a high prevalence of GERD is found across the different regions of Saudi Arabia (Alsuwat et al., 2018).

1.2 Research Aims and Objectives

This study aims to assess the prevalence of gastroesophageal reflux disease (GERD) and identify the risk factors that exacerbate GERD among the students at Al Baha University – Saudi Arabia. In this regard following objectives are included in the study.

1. To estimate the prevalence of gastroesophageal reflux disease (GERD) among students of Al Baha university.
2. To determine the risk and triggering factors of GERD among the students at Al-Baha university.
3. To establish the degree of severity of GERD among the students at Al-Baha University based on reported symptoms.

1.3 Research Question

1. Is there any prevalence of gastroesophageal reflux disease (GERD) among students of Al Baha University?
2. What are the risk and triggering factors of GERD among the students at Al-Baha University?
3. What is the level of severity of GERD among the students at Al-Baha University based on reported symptoms?

2. LITERATURE REVIEW

2.1 Prevalence of gastroesophageal reflux disease

A persistent digestive illness called gastroesophageal reflux disease (GERD) is defined by the ejection of stomach contents back into the esophagus. With a frequency of 20% in western and other global societies, it is among the most

often identified gastrointestinal illnesses in the United States, ranging from 18.1% - 27.8% (McLeish, 2015). One of the meta-analyses of the prevalence of GERD reported prevalence rates of between 3% to 8% in east Asian nations (Dirac et al., 2020).

Moreover, in East Asia, the incidence of GERD was between 2.5% to 7.8%; in Australia, it was 11.6%; in South America, it was 23%; in the Middle East, it was between 8.7% to 33.1%; and in North America, it was between 18.1% to 27.8% (Alsuwat et al., 2018).

So, it may be said that GERD is more common in Saudi Arabia's population than in Western nations and much more common than in East Asian nations. To continue preventing this illness and its consequences, nationwide initiatives and educational efforts are needed (Alsuwat et al., 2018).

2.2 Risk and triggering factors of GERD

GERD is one of the most common illnesses in clinical practice. It may be a crippling illness needing lifetime treatment, surgical intervention, and dietary and lifestyle modifications (Nirwan et al., 2020). It is commonly acknowledged that instead of having discrete pathophysiological causes, the pathophysiology of GERD is complex, exhibiting multiple ends of a continuum that change with the intensity of regurgitation. The esophagogastric junction's (OGJ) greater resistance and a greater gradient pressure gradient throughout the OGJ have both been proposed as potential causes of GERD (Nirwan et al., 2020).

The other risk factors include several single-nucleotide polymorphisms (SNPs) found in genes such as FOXF1, MHC, CCND1, an anti-inflammatory cytokine, and DNA repair genes, which have been substantially linked to an elevated risk of GERD (Green et al., 2020). Genetically many loci are shared by GERD, Barrett's esophagus, and esophageal cancer. Considering the genetic foundation of GERD, particular genetic loci have been identified as possible risk factors, including rs10419226 on chromosome 19 and rs520525 on the paired linked homeobox 1 gene. Other triggering factors that contribute to the onset of GERD include obesity, which is related to the early GERD onset, and ineffective esophageal motility (IEM), which causes a decrease in clearance of the esophagus (Argyrou et al., 2018).

2.3 Establishment of the degree of severity of GERD based on symptoms

Heartburn is the traditional and most typical symptoms of GERD. Acid reflux into the esophagus causes heartburn, a searing feeling in the esophagus that spreads to the throat. Along with reflux of gastric acid, a bitter aftertaste in the soft palate is another common symptom of heartburn (Spechler, 2020). Due to the potential major ramifications of cardiac chest pain and the variety of screening and

Prevalence and Risk Factors of Gastroesophageal Reflux Disease (GERD) among the Students in Al Baha University – Saudi Arabia

therapeutic methods that rely on etiology, it is significant to differentiate between the root factors of the stomach pain. Particularly, GERD is a prevalent reason for non-cardiac chest pain (Durazzo et al., 2018).

Extraesophageal manifestations of GERD are widespread but less frequently diagnosed, despite the fact that basic GERD indications are simple to identify. Extraesophageal indications like dysphonia and clearance of the throat are more frequently caused by regurgitation into the throat. Commonly encounter the sensation of globus or a sense of heaviness at the rear of their throat (Clarrett & Hachem, 2018).

Patients should be screened for GERD warning symptoms since they should trigger a gastrointestinal examination. Alarming symptoms might point to potential cancer. Dysphagia and odynophagia are alarming symptoms that might indicate the existence of problems such as constrictions, ulcers, and/or cancer. Moreover, anemia, hemorrhage, and loss of weight are a few other warning signs of GERD (Bredenoord, 2022).

3. MATERIAL AND METHODS

3.1 Study Design and Participants

For this study, a cross-sectional design was selected to assess the prevalence and GERD risk factors among Al-Baha University students in Saudi Arabia. The research was carried out using a close-ended survey questionnaire in November 2022. The sample size for this research was 566 participants aged between 18 and 29 years and both male and female students.

3.2 Sample Size

For the calculation of the sample size, $n = (z^2 \times p \times q) / d^2$ formula was used where,

n was the desired sample size

Z was the normal standard rate of deviation which was predetermined to 1.96 corresponding to 95% confidence level

P was the GERD prevalence found in similar research = 61.8% = 0.618

Q was $1-p = 1-0.618 = 0.382$

While d was the degree of accuracy which was predetermined as 0.04

$$n = (1.96)^2 * 0.618 * (0.382) / (0.04)^2$$
$$n = 566$$

Though, a total of 566 participants were reached out and survey was shared with them, however, only 144 found to have the high prevalence of the GERD symptoms. so, for analyses the 144 GERD positive participants were selected.

3.3 Data Collection Process

For the data collection method, a close-ended survey questionnaire designed based on the 5-point Likert scale rating was generated, which was distributed online. The

questionnaire comprised five sections, namely sociodemographic, GERD symptoms, aggravating risk factors, relieving factors, and complications of GERD. Each section had varying questions to analyze the knowledge, prevalence, and risk factors of GERD among the students of Al-Baha University.

3.4 Data Analysis Method

The collected data were statistically analyzed using Statistical Package for Social Science (SPSS) version 20. Prior to running the software, data were coded and systematically entered within the computer statistical program. More specifically, descriptive statistical analysis was used along with regression and correlation analysis to determine the impact and linear relationship existing between the dependent and independent variables of the study. A p-value of less than 0.05 was utilized to determine the statistically significant results. Lastly, chi-square was also used to test the independence existing among the categorical research variables. Only the complete surveys were deemed appropriate for running the statistical testing, while incomplete questionnaires were not considered for analytical testing.

3.5 Ethical Considerations

Prior to the data collection process, approval to conduct the research process was formally undertaken by the Research and Ethics Committee of Al-Baha University, Saudi Arabia. The questionnaire comprised a brief introduction of the aims and objectives of the research. Additionally, informed consent was duly signed by the researchers to help them understand the implications of the study. The consent form also validated the voluntary participation of the respondents, providing them with the freedom to walk away from the research at any time without any harmful consequences. Data confidentiality and anonymity were also adhered to, while data protection and safety were maintained by saving the data in password-protected files. Lastly, the findings of previous researchers were given due credit and acknowledgement with the in-text citations and generation of a complete reference list at the end of the study.

4. RESULTS AND FINDINGS

This study aims to identify the prevalence of GERD among students of Al Baha University and to determine the risk and triggering factors of GERD among the students at Al-Baha University. For this, a total of 566 responses were collected from the student registered at Al Baha University using a survey form. Only 144 participants with positive GERD were analyzed. In addition, this chapter has presented risk factors, relieving factors, GERD symptoms, and complications of GERD among university students. The detailed results are discussed as follows.

Prevalence and Risk Factors of Gastroesophageal Reflux Disease (GERD) among the Students in Al Baha University – Saudi Arabia

4.1 Demographic Characteristics

First, it is very important to understand the demographic characteristics of the participants, which are depicted in the

following table. This section presents the demographic characteristics of 566 participants.

Table 1. Demographic Characteristics

	N	%
Are you a student at Albaha university?		
Yes	566	100.00
Gender		
Female	311	54.95
Male	255	45.05
Marital status		
Married	181	31.98
Single	385	68.02

It is observed that most of the participant were females and single. Specifically, 54.95% of them were females, while

only 45.05% were males. In addition, 68.06% of them were single and 31.94% of them were married.

4.2 GERD Symptoms

Table 2: GERD Symptoms

	N	%
Heartburn and Regurgitation of food		
No	422	74.56
Yes	144	25.44
Chest Pain		
No	425	75.09
Yes	141	24.91
Refluxes per day or feeling of heartburn		
Once Per Day or Every Three Days	69	47.92
Once Per Month	75	52.08

When it comes to the presence of GERD symptoms among the students, it is noticed that 25.44% of the participants mentioned that they have heartburn and regurgitation of food, while 74.56% of the respondents indicated no presence of heartburn or regurgitation of food. Similarly 24.91% of the participants mentioned that they have pain in the chest, while 75.09% of them denied the fact. Moreover,

52.08% of students with heartburn have depicted that they face reflexes once per month and 47.92% of them believed that they have refluxes once per day or every three days. Thus, students tend to have moderate refluxes. The number of students complaining from combined chest pain , heartburn and refluxes is 141

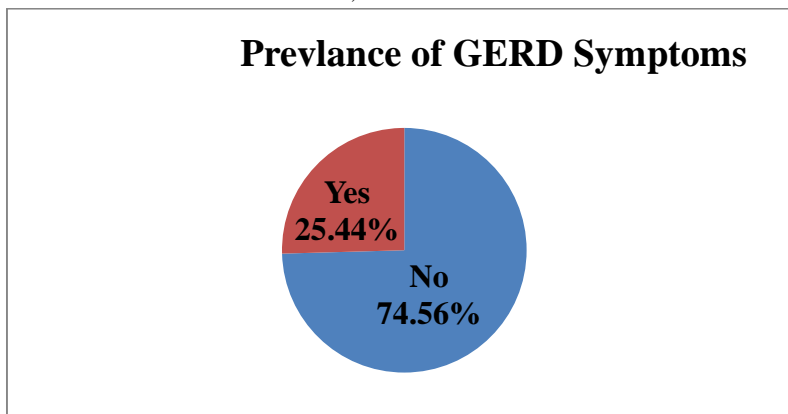


Figure 1: Student Having the Prevalence of the Heartburn

Prevalence and Risk Factors of Gastroesophageal Reflux Disease (GERD) among the Students in Al Baha University – Saudi Arabia

The figure above is also indicating that approximately 25% of the participants of overall sample (566) have prevalence of Heartburn and regurgitation of food. Overall, prevalence of the GERD is only examined in 144 participants out of 566 (25.44%). So, only 144 students with GERD or

heartburn respondents from Al-Baha University were able to complete the questionnaire. The further analysis in this section will be done for the 144 participants (25.44%) which will represent the only student with positive GERD prevalence having the problem of the heartburn.

4.3 Risk Factors

Table 3: Risk Factors

		Female%	Male%	Total	Chi-Square	Odd Ratio
Smoker	No	10.42	14.58	25.00	0.000	1.00
	Yes	31.25	43.75	75.00		
Eat Fatty food	No	25.69	17.36	43.05	0.081	0.907
	Yes	32.64	24.31	56.95		
Caffeine Consumption (Tea and Coffee)	No	27.08	14.58	41.66	1.881	0.621
	Yes	31.25	27.08	58.33		
Eating a large meal before sleeping:	No	28.47	19.44	47.91	0.064	0.918
	Yes	29.86	22.22	52.08		
Using medication like (NSIDs, benzodiazepine, antipsychotic and antidepressant)	No	15.97	7.64	23.61	1.589	0.595
	Yes	42.36	34.03	76.39		
Spicy Foods	No	25.69	13.89	39.58	1.680	1.574
	Yes	32.64	27.78	60.42		
Eating Chocolate	No	19.44	16.67	36.11	0.674	0.750
	Yes	38.89	25.00	63.89		
Obesity	No	18.75	11.11	18.75	0.501	1.303
	Yes	39.58	30.56	70.14		
Anxiety	No	19.44	13.89	33.33	0.000	1.000
	Yes	38.89	27.78	66.67		
Irritable bowel syndrome (IBS)	No	20.83	12.50	33.33	0.514	0.771
	Yes	37.50	29.17	66.67		

Considering the results related to risk factors, the study has found that most of the students do not avoid eating fatty food (56.95%), caffeine consumption (tea and coffee) (58.33%), Eating a large meal before sleeping (52.08%), using medication like (NSIDs, benzodiazepine, antipsychotic and antidepressant (76.39%), and irritable bowel syndrome (66.67%). However, most of them smoke (75.00%), eat spicy foods (60.42%), and eat chocolates (63.89%). Apart from this, 66.67% of the participants indicated being a victim of anxiety. The higher level of

anxiety can be attributed to the burden of studies and exams. Overall, there is a high level of risk factors among the students of Al Baha University, as they are not very active with precautions.

Considering the gender division, it is observed that females tend to have fewer risk factors than males, as their percentage of Saying "No" is higher across the risk factors. Moreover, the prevalence of the risk factor such as smoking is higher in male (43.75%) than female (31.25%).

4.4 Relieving Factors

Table 4: Relieving Factors

		Female	Male	Total	Chi-Square	Odd Ratio
Avoid aggravating factors	No	26.39	18.75	45.14	0.001	1.01
	Yes	31.94	22.92	54.86		

Prevalence and Risk Factors of Gastroesophageal Reflux Disease (GERD) among the Students in Al Baha University – Saudi Arabia

Drinking cold milk or eating cucumber	No	29.86	18.06	47.92	0.866	1.371
	Yes	28.47	23.61	52.08		
Put two pillows under the head or elevate the head	No	20.83	19.44	40.27	1.745	1.575
	Yes	37.5	22.22	59.72		
Use medication like PPI	No	13.19	6.94	20.13	0.771	1.462
	Yes	45.14	34.72	79.86		
Do exercise	No	22.22	13.89	36.11	0.344	0.813
	Yes	36.11	27.78	63.89		

While examining the relieving factors among students, this study finds that most of the students exercise to avoid aggravating factors (54.86%), drink cold milk or eat cucumber (52.08%), and use medication like PPI (79.86%). Similarly, a higher number of students do exercise (63.89%)

and put two pillows under the head or elevate the head (59.72%). Overall, it can be said that there is a higher presence of relieving factors among students as necessary precautions are being exercised by them.

4.5 Complications of GERD

Table 5: Complications of GERD

		Female	Male	Total	Total	Chi-Square	Odd Ratio
Shortness of breathing or asthma	No	50.69	38.19	88.89	128	0.804	0.603
	Yes	7.64	3.47	11.11	16		
Lump sensation in the Throat	No	37.50	31.25	68.75	99	1.87	0.6
	Yes	20.83	10.42	31.25	45		
Hoarseness	No	49.31	32.64	81.94	118	0.907	1.511
	Yes	9.03	9.03	18.06	26		
Mouth Hygiene	No	30.56	25.69	56.25	81	1.226	0.684
	Yes	27.78	15.97	43.75	63		
Dysphagia	No	47.92	34.03	81.94	118	0.005	1.003
	Yes	10.42	7.64	18.06	26		
Cough	No	47.92	33.33	81.25	117	1.05	1.15
	Yes	10.42	8.33	18.75	27		
Sore Throat	No	47.92	34.72	82.64	119	0.035	0.92
	Yes	10.42	6.94	17.36	25		

Finally, the study finds a low level of GERD complications among the students. Specifically, 88.89% of them do not face shortness of breath or asthma and 68.75% denied the presence of a sensation of a lump in the throat (globus). In addition, most of them have mentioned that they do not have hoarseness (81.94%), mouth hygiene (56.25%), dysphagia (81.94%), cough (81.25%), and sore throat (82.64%). This clearly indicates that most of the students at Al Baha University do not have any complications of GERD.

5. DISCUSSION

This cross-sectional design reflected the significant prevalence of GERD symptoms in Al-Baha university students. The primary aim of the research was to determine the prevalence of GERD, its triggering factors, and its degree of severity. In this regard, we found some interesting

findings to discuss with the support of the literature. The demographic data collected from 566 participants in age between 18 to 29 years revealed that 144 participants were from Al-Baha university and therefore the defined target of the study. The majority of the students were females (54.95%) followed by males (45.05%) and most of them were single. The assessment of demographic characteristics can determine the risk of GERD prevalence in university students as studied in the literature. For instance, Alrashed et al., (2019), through their study at Shaqra university students reported (30.8% male, 14.5% female) gender association with GERD prevalence. However, the results were different from the present findings such that the male population are at higher risk of GERD but these results may vary with respect to the differences in sample size composition (Alrashed et al., 2019). On the other hand, GERD

Prevalence and Risk Factors of Gastroesophageal Reflux Disease (GERD) among the Students in Al Baha University – Saudi Arabia

prevalence in the general context of Saudi Arabia in a large sample of 2,043 showed that the disease prevalence is not associated with age, gender, occupation, and education in the community (Alsuwat et al., 2018). However, the overall prevalence of GERD in Saudi Arabia was higher compared to that in Western Europe and East Asia (Alsuwat et al., 2018). This was a cross-sectional study and utilized a GerdQ questionnaire for finding the prevalence. Usually, the prevalence is determined through endoscopy-based diagnosis or assessed through a questionnaire. GerdQ is an inclusive tool with significant validation to determine the prevalence of symptoms in a large sample and the present study has designed a questionnaire accordingly to provide appropriate results (Bai et al., 2013). Binhussein et al. (2016) reported a 28.7% incidence of GERD, which is lower than the research conducted in the capital city of Saudi Arabia, Riyadh, and higher than in the western area of Saudi Arabia. However, our study finds prevalence around 25.44%.

Based on the previous evidence, the questionnaire similarly found GERD-associated symptoms in both male and female populations such that symptoms of chest pain, heartburn, regurgitation, and reflux per day have been reported. These findings were related to the previous literature which reported the cause of these symptoms such as acid reflux causes heartburn and reflux-related cardiac chest pain (Spechler, 2020). Permanent acid reflux is sensitive to induce severe symptoms of esophagitis and Barrett esophagus and these complications among college or university students tend to cause more complications because of their self-medication upon the symptoms (Vakil et al., 2006; Elserag et al., 2004). However, this aspect should be studied in detail to determine the actual cause of the severity of the symptoms. About 24.91% of students reported chest pain, 25.44% reported heartburn and regurgitation, 47.92% reported reflux per day or every three days and 52.08% reported reflux once per month. According to Ye et al., (2017), reflux episodes play a critical role in the development of the severity of disease pathogenesis such that there is a positively deteriorating relationship between reflux incidence and GERD symptoms. This is so because reflux episodes damage the mucosal integrity and therefore mucosal erosion is manifested (Ye et al., 2017). Hence, the greater number of reflux episodes and the time lasting longer these episodes are associated with a greater risk of GERD severity among students (Xu et al., 2006). The determination of risk and symptoms has therefore been followed by the assessment of risk factors that may cause these symptoms to occur frequently. Both males and females reported the risk factors. The reported risk factors were smoking, fatty food, caffeine consumption (tea and coffee), large meals before sleep, use of antidepressants and sedatives, eating spicy food and chocolates, cooccurrence of obesity, anxiety, and irritated bowel syndrome (IBS). These

results were coherent with established literature which determined the significant percentages of risk factors such as inadequate eating before sleep, smoking, alcohol use, caffeine consumption (tea and coffee), and higher BMI (a measure of obesity) as responsible for causing GERD (Chen, Youli, et al, 2022). Students mainly reported the risk factors of smoking, eating spicy food and chocolates, and anxiety levels. It was also reported in the literature that students' personal factors such as smoking and stress and academic correlates are major risk factors for GERD symptoms (Awadalla, 2019). However, the overall prevalence of risk factors was lower among the students. In addition, the assessment of genetic factors was also not recorded by the participants. The genetic factors associated with single nucleotide polymorphism are however related to the development of both symptomatic and asymptomatic complications in the case of GERD (Argyrou et al., 2018). These factors must therefore be assessed in the contemporary literature to understand the risk of students developing the symptoms. Besides, the triggering factors have significant Chi-square values from statistical analysis reporting their relationship with GERD symptoms (Schober & Vetter, 2019).

Apart from symptoms and risks, the assessment of relieving factors revealed that students tend to have higher competence in terms of relieving the aggravating factors of GERD. For instance, by eating and drinking cold food and using PPI medication to reduce acid reflux in the stomach. The students have a higher percentage of motivation for relieving the symptoms of GERD. These findings were significant in terms of guiding the relieving factors contrary to the previous literature which reported the clinical treatment through behavioural measures as well but focused on avoiding risk factors in the behavioural approach rather than guiding the relieving factors that can help reduce the symptoms (Domingues & de Moraes-Filho, 2021). However, the results were supported by indications of dietary management of GERD in the literature such that dietary modifications were suggested as first-line therapy for relieving the GERD symptoms. The current management guidelines have also emphasized the role of PPI in relieving stressful symptoms (Sethi & Richter, 2017). In addition, studies have also recommended developing smoking and stress management programs in universities for students to adopt self-management behaviours (Awadalla, 2019). This is very useful for the present findings since the students' positive and self-management behaviours in current findings show their increased anticipation for the acceptability and adaptability of relieving factors against GERD.

The previously mentioned findings have been followed by determining the complications of GERD which were overall reported as low by the students. These results were coherent with findings of symptoms, risk factors, and relieving strategies. It demonstrates that students have

Prevalence and Risk Factors of Gastroesophageal Reflux Disease (GERD) among the Students in Al Baha University – Saudi Arabia

significant knowledge and behavioural adaptations against GERD symptoms. A significant proportion of the sample showed no any presence of the complications like shortness of breath, burning sensation, hoarseness, dysphagia, cough, and sore throat. These results were significantly contrasted with previous findings in university students in other regions of the KSA which revealed the common prevalence of GERD symptoms, and increasing trends in the studied cohort (Elnemr et al., 2018; Alrashed et al., 2019). Gastroesophageal complications are produced followed by chronic events in the gastric mucosa such as inflammatory events and repeated refluxes in the gastric region causing disruption of the mucosal cell layer. Also, reflux esophagitis causes the gastric content to overcome the buffering capacity of the stomach so that the content reaches the esophagus causing the development of GERD symptoms (Malfertheiner, P., & Hallerback, 2005). However, these complications were not reported by university students. Their level of behavioural self-management for GERD represents effective knowledge and perceptions to relieve the symptoms in case of incidence of GERD.

The strength of the present study lies in the fact that the results were deduced through statistical software retaining the significance of results with 95% CI. In addition, the P value <0.05 also reported the significance of findings in terms of reliability (Dahiru, 2008). Likewise, the chi-square value showed a significant association between the studied variables. In addition, the validity of the close-ended questionnaire and its design with the support of literature also emphasizes the value of the validity of responses during data analysis. Not only this but the findings were positive in terms of students' knowledge, perceptions, and potential for dealing with GERD symptoms. However, there are also some limitations that prevent the implication of findings. For instance, the relatively small sample size (Delice, 2018). In addition, some of the participants provided incomplete questionnaires which showed a lack of participation in the study thereby showing a lack of interest in the respondents. Also, some risk factors such as genetic factors are important but not determined. This limitation can be overcome by focusing on a comprehensive research design with a qualitative approach to determine the different types of risk factors.

6. CONCLUSION

The aim of the research was to determine the prevalence and risks of GERD in the population of university students at Al-Baha university. For instance, students have a high prevalence, an effective knowledge of risk factors, suitable adaptability of relieving strategies, and reduced complications of GERD symptoms. However, the assessment of these factors among students is very important since their increased susceptibility to acquiring the symptoms of GERD. The strength of the findings is

reflected by the validity of the questionnaire and student responses. On the other hand, studies also have limitations in terms of sample size within the scope of quantitative research. Besides, some findings were discussed with limited references and support from the literature. Therefore, it is also recommended to propose a qualitative interview-based design in future studies for a comprehensive understanding of the relationship between research variables.

REFERENCES

- I. Al Saadi, T., Idris, A., Turk, T., & Alkhatib, M. (2016). Epidemiology and risk factors of uninvestigated dyspepsia, irritable bowel syndrome, and gastroesophageal reflux disease among students of Damascus University, Syria. *Journal of epidemiology and global health*, 6(4), 285-293.
- II. Alrashed, A. A., Aljammaz, K. I., Pathan, A., Mandili, A. A., Almatrafi, S. A., Almotire, M. H., & Bahkali, S. M. (2019). Prevalence and risk factors of gastroesophageal reflux disease among Shaqra University students, Saudi Arabia. *Journal of family medicine and primary care*, 8(2), 462.
- III. Alsuwat, O. B., Alzahrani, A. A., Alzhrani, M. A., Alkathami, A. M., & Mahfouz, M. E. M. (2018). Prevalence of gastroesophageal reflux disease in Saudi Arabia. *Journal of clinical medicine research*, 10(3), 221.
- IV. Argyrou, A., Legaki, E., Koutserimpas, C., Gazouli, M., Papaconstantinou, I., Gkiokas, G., & Karamanolis, G. (2018). Risk factors for gastroesophageal reflux disease and analysis of genetic contributors. *World Journal of Clinical Cases*, 6(8), 176–182. <https://doi.org/10.12998/wjcc.v6.i8.176>
- V. Awadalla, N. J. (2019). Personal, academic and stress correlates of gastroesophageal reflux disease among college students in southwestern Saudi Arabia: A cross-section study. *Annals of medicine and surgery*, 47, 61-65.
- VI. Bai, Y., Du, Y., Zou, D., Jin, Z., Zhan, X., Li, Z. S., ... & Chinese GerdQ Research Group. (2013). Gastroesophageal Reflux Disease Questionnaire (GerdQ) in real-world practice: a national multicenter survey on 8065 patients. *Journal of gastroenterology and hepatology*, 28(4), 626-631.
- VII. Binhussein, M., Alamoudi, A., Bajawi, A., Alghafis, M., Baz, M., & Bakhsh, R. (2016). Prevalence of gastro-oesophageal reflux in western region of Saudi Arabia. *Saudi J Gastroenterol*, 22(7), pS13.
- VIII. Bredenoord, A. J. (2022). Approach to the patient with dysphagia, odynophagia, or noncardiac chest

Prevalence and Risk Factors of Gastroesophageal Reflux Disease (GERD) among the Students in Al Baha University – Saudi Arabia

- pain. *Yamada's Textbook of Gastroenterology*, 549–559.
<https://doi.org/10.1002/9781119600206.ch30>
- IX. Chen, G., Liu, W., Liao, W., Song, L., Yang, P., & Zhang, X. (2021). An epidemiological survey of gastroesophageal reflux disease at the digestive endoscopy center in Guangzhou. *European Archives of Oto-Rhino-Laryngology*, 278(12), 4901-4908.
- X. Chen, Y., Chen, C., Ouyang, Z., Duan, C., Liu, J., Hou, X., & Bai, T. (2022). Prevalence and beverage-related risk factors of gastroesophageal reflux disease: An original study in Chinese college freshmen, a systemic review and meta-analysis. *Neurogastroenterology & Motility*, 34(5), e14266.
- XI. Clarrett, D. M., & Hachem, C. (2018). Gastroesophageal Reflux Disease (GERD). *Missouri Medicine*.
- XII. Dahiru, T. (2008). P-value, a true test of statistical significance? A cautionary note. *Annals of Ibadan postgraduate medicine*, 6(1), 21-26.
- XIII. Delice, A. (2010). The Sampling Issues in Quantitative Research. *Educational Sciences: Theory and Practice*, 10(4), 2001-2018.
- XIV. Dirac, M. A., Safiri, S., Tsoi, D., Adedoyin, R. A., Afshin, A., Akhlaghi, N., Alahdab, F., Almulhim, A. M., Amini, S., Ausloos, F., Bacha, U., Banach, M., Bhagavathula, A. S., Bijani, A., Biondi, A., Borzì, A. M., Colombara, D., Corey, K. E., Dagnew, B., ... Naghavi, M. (2020). The global, regional, and national burden of gastro-oesophageal reflux disease in 195 countries and territories, 1990–2017: A systematic analysis for the global burden of disease study 2017. *The Lancet Gastroenterology & Hepatology*, 5(6), 561–581. [https://doi.org/10.1016/s2468-1253\(19\)30408-x](https://doi.org/10.1016/s2468-1253(19)30408-x)
- XV. Domingues, G., & de Moraes-Filho, J. P. P. (2021). Gastroesophageal reflux disease: a practical approach. *Arquivos de Gastroenterologia*, 58, 525-533.
- XVI. Durazzo, M., Gargiulo, G., & Pellicano, R. (2018). Non-cardiac chest pain: A 2018 update. *Minerva Cardioangiologica*, 66(6). <https://doi.org/10.23736/s0026-4725.18.04681-9>
- XVII. El-Serag, H. B., Petersen, N. J., Carter, J., Graham, D. Y., Richardson, P., Genta, R. M., & Rabeneck, L. (2004). Gastroesophageal reflux among different racial groups in the United States. *Gastroenterology*, 126(7), 1692-1699.
- XVIII. Elnemr, G. M. H., Almuntashiri, A. H., Alghamdi, S. A., Alharthi, F. R., & Masoodi, I. (2018). The predictors of Gastroesophageal Reflux Disease among University students: A cross-sectional study in the western region of Saudi Arabia. *The Egyptian Journal of Hospital Medicine*, 73(1), 5828-5838.
- XIX. Green, H. D., Beaumont, R. N., Wood, A. R., Hamilton, B., Jones, S. E., Goodhand, J. R., Kennedy, N. A., Ahmad, T., Yaghootkar, H., Weedon, M. N., Frayling, T. M., & Tyrrell, J. (2020). Genetic evidence that higher central adiposity causes gastro-oesophageal reflux disease: A Mendelian randomization study. *International Journal of Epidemiology*, 49(4), 1270–1281. <https://doi.org/10.1093/ije/dyaa082>
- XX. Kingsley-Godwin, D., Kingsley-Godwin, M. J., & Godwin, J. (2021). Infectious Esophagitis. In *Esophagitis and Gastritis-Recent Updates*. IntechOpen.
- XXI. Malferteiner, P., & Hallerböck, B. (2005). Clinical manifestations and complications of gastroesophageal reflux disease (GERD). *International journal of clinical practice*, 59(3), 346-355.
- XXII. Mcleish, S. (2015). *Gastroesophageal reflux disease: An overview*. Hayle Medical.
- XXIII. Nirwan, J. S., Hasan, S. S., Babar, Z.-U.-D., Conway, B. R., & Ghori, M. U. (2020). Global prevalence and risk factors of gastro-oesophageal reflux disease (GORD): Systematic review with meta-analysis. *Scientific Reports*, 10(1). <https://doi.org/10.1038/s41598-020-62795-1>
- XXIV. Richter, J. E., & Rubenstein, J. H. (2018). Presentation and epidemiology of gastroesophageal reflux disease. *Gastroenterology*, 154(2), 267-276.
- XXV. Schober, P., & Vetter, T. R. (2019). Chi-square tests in medical research. *Anesthesia & Analgesia*, 129(5), 1193.
- XXVI. Sethi, S., & Richter, J. E. (2017). Diet and gastroesophageal reflux disease: role in pathogenesis and management. *Current opinion in gastroenterology*, 33(2), 107-111.
- XXVII. Sharma, A., Sharma, P. K., & Puri, P. (2018). Prevalence and the risk factors of gastro-oesophageal reflux disease in medical students. *medical journal armed forces india*, 74(3), 250-254.
- XXVIII. Shiwaku, H., Sato, H., Shimamura, Y., Abe, H., Shiota, J., Sato, C., ... & Inoue, H. (2022). Risk factors and long-term course of gastroesophageal reflux disease after peroral endoscopic myotomy: A large-scale multicenter cohort study in Japan. *Endoscopy*.
- XXIX. Spechler, S. J. (2020). Refractory gastroesophageal reflux disease and functional

Prevalence and Risk Factors of Gastroesophageal Reflux Disease (GERD) among the Students in Al Baha University – Saudi Arabia

- heartburn. *Gastrointestinal Endoscopy Clinics of North America*, 30(2), 343–359. <https://doi.org/10.1016/j.giec.2019.12.003>
- XXX. Vakil, N., Van Zanten, S. V., Kahrilas, P., Dent, J., & Jones, R. (2006). The Montreal definition and classification of gastroesophageal reflux disease: a global evidence-based consensus. *Official journal of the American College of Gastroenterology/ ACG*, 101(8), 1900-1920.
- XXXI. Wong, B. C., & Kinoshita, Y. (2006). A systematic review on the epidemiology of gastroesophageal reflux disease in Asia. *Clinical gastroenterology and hepatology*, 4(4), 398-407.
- XXXII. Xu, X. R., Li, Z. S., Zou, D. W., Xu, G. M., Ye, P., Sun, Z. X., ... & Zeng, Y. J. (2006). Role of duodenogastroesophageal reflux in the pathogenesis of esophageal mucosal injury and gastroesophageal reflux symptoms. *Canadian journal of gastroenterology*, 20(2), 91-94.
- XXXIII. Ye, B. X., Jiang, L. Q., Lin, L., Wang, Y., & Wang, M. (2017). Reflux episodes and esophageal impedance levels in patients with typical and atypical symptoms of gastroesophageal reflux disease. *Medicine*, 96(37).