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The association between GERD patients' knowledge and development of complications in Makkah

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ABSTRACT

Background: Gastroesophageal reflux disease (GERD) is the most common upper gastrointestinal condition. GERD patients report heartburn, regurgitation, chest pain, dysphasia, globus sensation and other symptoms and complications that influence their quality of life. We aimed to determine how patient awareness of disease aggravation affects GERD patients' quality of life in Makkah, Saudi Arabia. *Methods:* A descriptive cross-sectional study was conducted in Makkah 1197 participants completed the online questionnaire, 218 of whom had GERD and met the inclusion criteria for age, gender and ethnicity. Psychiatric patients, pregnant women, cardiovascular patients (angina, myocardial infarction) and asthmatics were excluded. *Results:* There were significant differences in knowledge scores based on occupational status ($p<0.001$). There was a significant difference among different levels of education with $p = 0.00$. The most common symptoms included a burning sensation followed by pain, nausea and regurgitation. The most frequently reported complications were gastric pain and dyspnea. *Conclusion:* Although GERD is a common disorder worldwide, our results showed less knowledge about GERD complications among those diagnosed with the disease. Awareness of complications is important for decreasing incidences and improving quality of life.

Keywords: Gastroesophageal reflux disease, complications, quality life, awareness, Saudi Arabia

1. INTRODUCTION

Gastroesophageal reflux disease (GERD) is the most common upper gastrointestinal disease in different countries. Medical history is an important thing for assessing esophageal signs and symptoms, including heartburn, regurgitation, chest ache, dysphagia and Globus sensation. Vital details cover

weight gain or loss, gastrointestinal bleeding, nutritional behavior, smoking and alcohol consumption. Evidence has shown that GERD may also extensively reduce one's quality of life and result in critical complications, such as gastrointestinal bleeding or Barrett's esophagus (Mayer and Gebhart, 1994; Vakil et al., 2006). Genetics, lifestyle (including vitamins, alcohol consumption, smoking, NSAID intake and sleeping position) and dietary factors play essential roles in the development of GERD, but the specific etiology is still unknown (Cameron et al., 2002; Jarosz et al., 2014; Nocon et al., 2006; Alhuzaim et al., 2022).

Saudi Arabia has a higher incidence of GERD than Western and East Asian nations, where the percentage reached 28.7%, according to a 2018 Saudi Arabian study (Alsuwat et al., 2018). GERD prevalence was 23.47- 45.4% based on two research studies carried out in the western area and Riyadh utilizing the GerdQ questionnaire with an 8 score as the diagnostic criteria for GERD (Alsuwat et al., 2018; Almadi et al., 2014). Additionally, retrospective research found that 15% of Saudi Arabia's southern population had GERD (Al-Humayed et al., 2010). Many studies have focused on studying GERD patients' level of awareness (Mohammad et al., 2021). However, a few studies showed the impact of knowledge on multiple diseases. Some studies demonstrated a statistically significant positive correlation between GERD patients' knowledge and healthier lifestyle changes after an educational intervention. They also found a significant improvement in patients' quality of life, practice and attitude toward their disease, thus elevating their daily symptoms (Jeong et al., 2017; Ahmed and Khalil, 2021; Haruma et al., 2015). Similarly, recent studies showed improved adherence, quality of life and medication effectiveness (Haruma et al., 2015; Song et al., 2020; Alshaikh et al., 2021).

A recent meta-analysis study suggested that patient education improves clinical outcomes, symptoms and general health (Wu et al., 2022). Moreover, previous studies conducted on rheumatoid arthritis patients found an improvement in pain and general health, as well as a positive effect on controlling disease activity (Ravindran and Jadhav, 2013; Riemsma et al., 2003; Engers et al., 2008). Furthermore, studies on type 2 diabetes mellitus patients showed the positive impact of patients' knowledge on minimizing complications and clinical outcomes, as well as enhancing their adherence to treatment (Shawahna et al., 2021; Rani et al., 2008; Chawla et al., 2019; Nassar et al., 2019; Fan and Sidani, 2018). However, previous studies contradict the aforementioned studies. For example, a randomized controlled trial conducted by an educational program for GERD patients did not find an association between patient knowledge and changes or improvements in quality of life (Urnes et al., 2007). In this study, we mainly discuss how patients' consciousness of GERD affects their experience with the disease, either manifesting complications or leading to a healthier, well-managed controllable disease. In addition, we assess other relative topics, including the effect of knowledge on adhering to the treatment plan, quality of life and awareness.

Despite the danger caused by ignorance, particularly in following up with the disease and possible secondary repercussions, no previous studies have been conducted in Saudi Arabia evaluating patients' awareness of GERD complications. Therefore, this study aimed to assess the impact of patients' awareness of the disease's aggravation and its impact on GERD patients' quality of life in Makkah, Saudi Arabia.

2. MATERIALS & METHODS

We conducted a descriptive cross-sectional study among GERD patients in Makkah, Saudi Arabia, from July to November 2022. The study was approved by the Biomedical Research Ethics Committee Internal Review Board (IRB) at Umm Al-Qura University (Approval No HAPO-02-K-012-2022-06-1129). It targeted GIT patients diagnosed with GERD in Makkah, regardless of age, gender or ethnicity. Psychiatric patients, pregnant women, people with cardiovascular disease (angina, MI) and asthmatics were excluded. Studies on the prevalence of GERD in Saudi Arabia are scarce, but those that have been done in 2019 found that 17.8% of the Saudi population had GERD (Al-Zahrani et al., 2019). We used the Raosoft Sample Size Calculator to determine the minimum sample size for a precision of ±5% with a 95% confidence interval (CI) is 353. The sample size of this study was 1916, achieved through a structured self-administered questionnaire distributed online through social media.

A knowledge score was computed to assess participants' knowledge of GERD. A total of 48 items were used for knowledge assessment, including 13 items about disease symptoms, 8 items about risk factors, 11 items about lifestyle habits that increase disease severity, 11 items about potential complications and 5 items about management. The responses to these items were "No" or "Yes". We summed up the correct responses to obtain an overall score (range 0 to 48).

Statistical Analysis

Statistical analysis was performed using R Studio (R version 4.1.1). Categorical data were presented as frequencies and percentages, whereas numerical data were expressed as the median and interquartile range (IQR). Using a one-sample proportions test, the prevalence of GERD was calculated and the prevalence estimate was expressed along with the respective 95% confidence interval

(95%CI). Factors associated with GERD were assessed using Pearson's Chi-squared test or Fisher's exact test. We used Wilcoxon or Kruskal Wallis rank sum tests to explore the differences in knowledge scores between socio-demographic groups (for categorical variables with 2 or >2 groups, respectively). The variables significantly associated with knowledge were used as independent variables in a linear regression model to assess the independent predictors of knowledge. The results were provided as beta coefficients and their corresponding 95% confidence intervals (CIs). A p-value of < 0.05 indicated statistical significance.

3. RESULTS

Socio-demographic characteristics

Initially, we received 1916 responses on the online platform. However, 37 respondents declined to participate. Additionally, 582 respondents were excluded based on the eligibility criteria (486 females were pregnant, 13 had a myocardial infarction, 49 had asthma and 34 had a psychological disease). Therefore, we analyzed 1297 responses in the current study. The majorities of responses were female (88.0%), aged 18 to 30 years (61.9%) and had obtained a university degree or higher (71.9%). Approximately half of the respondents were students (49.6%) and single (59.5%). Saudis represented 93.8% of the sample (Table 1).

Table 1 Socio-demographic characteristics of the participants

Parameter	Category	Overall, N = 1,297	GERD		
			No, N = 1,0791	Yes, N = 218	p-value
Age	18 to 30 y	803 (61.9%)	717 (89.3%)	86 (10.7%)	<0.001
	31 to 49 y	333 (25.7%)	266 (79.9%)	67 (20.1%)	
	>50 y	161 (12.4%)	96 (59.6%)	65 (40.4%)	
Gender	Male	156 (12.0%)	122 (78.2%)	34 (21.8%)	0.076
	Female	1,141 (88.0%)	957 (83.9%)	184 (16.1%)	
Educational level	Less than secondary	61 (4.7%)	45 (73.8%)	16 (26.2%)	0.001
	Secondary school	303 (23.4%)	271 (89.4%)	32 (10.6%)	
	University or higher	933 (71.9%)	763 (81.8%)	170 (18.2%)	
Occupational status	Student	643 (49.6%)	587 (91.3%)	56 (8.7%)	<0.001
	Unemployed	271 (20.9%)	206 (76.0%)	65 (24.0%)	
	Employed	305 (23.5%)	239 (78.4%)	66 (21.6%)	
	Retired	78 (6.0%)	47 (60.3%)	31 (39.7%)	
Marital status	Single	772 (59.5%)	688 (89.1%)	84 (10.9%)	<0.001
	Married	458 (35.3%)	345 (75.3%)	113 (24.7%)	
	Divorced	40 (3.1%)	27 (67.5%)	13 (32.5%)	
	Widow	27 (2.1%)	19 (70.4%)	8 (29.6%)	
Nationality	Saudi	1,216 (93.8%)	1,015 (83.5%)	201 (16.5%)	0.299
	Non-Saudi	81 (6.2%)	64 (79.0%)	17 (21.0%)	

Prevalence of GERD and disease-related characteristics

In general, 218 participants had been diagnosed with GERD, constituting 16.8% of the sample (95%CI, 14.8 to 19.0). Of those who had GERD, symptoms were apparent among 77.1% (Table 2). The most common symptoms included a burning sensation (47.6%), pain (35.7%) and nausea and regurgitation (11.9%) (Figure 1A). Furthermore, 27.1% developed complications. The most frequently reported complications were gastric pain (25.4%) and dyspnea (10.2%) (Figure 1B). Notably, 46.8% of the respondents were receiving GERD medications. Esomeprazole was the most commonly used medication (35.3%), followed by omeprazole (12.7%) (Figure 1).

Table 2 Characteristics of participants who had ever been diagnosed with GERD (n=218)

Parameter	N (%)
Have symptoms of GERD	168 (77.1%)
Receive medications for GERD	59 (27.1%)
Have complications of GERD	102 (46.8%)

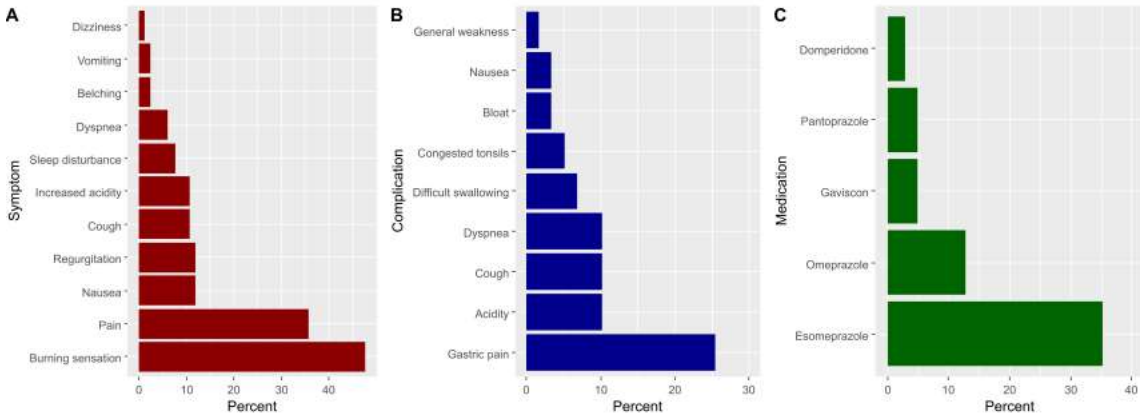

Figure 1 The percentages of self-reported symptoms (A) and complications (B) among participants who had ever diagnosed with GERD. The symptoms, complications and medications were based on the responses of 168, 59 and 102 participants, respectively

Factors associated with GERD

The proportion of participants with GERD was significantly higher among the > 50-year age category (40.4% vs. 20.1% among 31 to 49 years and 10.7% among 18 to 30 years, p-value < 0.001), those who had not completed secondary education (26.2% vs. 10.6% and 18.2% for those with secondary school education, university or higher degrees, respectively, p-value = 0.001), retired respondents (39.7% vs. 21.6% among employed participants, 24.0% among unemployed participants and 8.7% among students, p-value < 0.001) and among divorced participants (32.5% vs. 29.6%, 24.7% and 10.9% among widows, married and single participants, respectively, p-value < 0.001) (Table 1).

Table 3 Differences in knowledge scores among different socio-demographic groups

Parameter	Category	Median (IQR)	p-value
Age	18 to 30 y	31.0 (28.0,34.0)	0.356
	31 to 49 y	31.0 (24.5, 33.0)	
	>50 y	29.0 (24.0, 35.0)	
Gender	Male	28.0 (22.0, 32.8)	0.117
	Female	31.0 (26.0, 34.0)	
Educational level	Less than secondary	30.0 (27.5, 33.0)	0.392
	Secondary school	29.5 (21.0, 33.0)	
	University or higher	31.0 (26.0, 34.0)	
Occupational status	Student	32.0 (29.0, 35.2)	<0.001
	Unemployed	27.0 (22.0, 32.0)	
	Employed	31.0 (26.0, 35.8)	
	Retired	31.0 (25.5, 34.0)	
Marital status	Single	31.0 (27.8, 35.2)	0.029
	Married	30.0 (23.0, 33.0)	
	Divorced	31.0 (30.0, 36.0)	
	Widow	27.0 (21.0, 28.5)	
Nationality	Saudi	31.0 (26.0, 34.0)	0.998
	Non-Saudi	30.0 (26.0, 32.0)	

Knowledge among GERD patients

Regarding participants with GERD (n=218), the median knowledge score was 31.0 (IQR = 26.0 to 34.0). There were significant differences in knowledge scores based on occupational status (p value <0.001), where unemployed participants had significantly lower scores (median = 27.0, IQR = 22.0 to 32.0) than students (median = 32.0, IQR = 29.0 to 35.2) and employed (median = 31.0, IQR = 26.0 to 35.8) and retired participants (median = 31.0, IQR = 25.5 to 34.0). Furthermore, marital status groups differed significantly

in knowledge score (p-value =0.029), and widowed respondents scored lowest (median = 27.0, IQR = 21.0 to 28.5) compared with single (median = 31.0, IQR = 27.8 to 35.2), married (median = 30.0, IQR = 23.0 to 33.0) and divorced respondents (median = 31.0, IQR = 30.0 to 36.0) (Table 3). However, based on the regression analysis, only employment status was a significant predictor of participants' knowledge, where unemployed participants were less likely to have high knowledge scores (Beta = -3.99, 95%CI, -6.60 to -1.38, p-value = 0.003) (Table 4).

Table 4 Predictors of knowledge regarding GERD among the participants

Parameter	Category	Beta	95% CI*	p-value
Occupational status	Student	—	—	
	Unemployed	-3.99	-6.60, -1.38	0.003
	Employed	-0.43	-2.99, 2.12	0.738
	Retired	-1.37	-4.59, 1.86	0.405
Marital status	Single	—	—	
	Married	-0.67	-2.87, 1.52	0.546
	Divorced	2.77	-0.99, 6.53	0.148
	Widow	-2.11	-6.77, 2.55	0.372

*CI: confidence interval

4. DISCUSSION

In the Gulf region, GERD prevalence research has not been extensively studied (Almadi et al., 2014). GERD is a common disease and it is widely spread in Saudi Arabia where the reported incidence in Western area of Saudi Arabia and Riyadh was 45.4% and 23.47%, respectively, in two studies of them (Alsuwat et al., 2018; Almadi et al., 2014). The prevalence was reported to be 55% overall in a different study conducted in the Qassim district with 200 Saudi school teachers (Alsuwat et al., 2018). Two retrospective studies that used upper gastrointestinal endoscopy to evaluate GERD and its health consequences discovered that GERD was prevalent in Abha at 15% and that Barrett's esophagus was prevalent in Jizan at 0.003% (Al-Humayed et al., 2010; Gadour and Ayoola, 1999). In our study, the incidence rate of GERD (16.8%) was slightly greater than that of an Abha study and lower than that of previous research studies.

According to the data that had been gathered, the knowledge scores varied significantly based on the occupational status of the applicants. It was found that those who are unemployed had scored remarkably lower than the other categories including students, employed and retired participants. Another factor that had been explored was marital status. Among single, married and divorced patients, it was observed that widowed patients scored the lowest which put them at high risk to develop GERD complications. Furthermore, a study carried out in Saudi Arabia confirmed the presence of a strong correlation between GERD awareness and marital status, employment and income level (Mohammad et al., 2021). Another study conducted in Al-Taif, Saudi Arabia, opposed the association between marital status and patients' knowledge since it did not show any crucial relevance (Taha et al., 2018). Nevertheless, based on the regression analysis, only employment status was a significant predictor of participants' knowledge. In other words, GERD patients who are unemployed are more susceptible than the other occupational status categories (employed, student and retired) to developing GERD complications due to their low knowledge scores regarding GERD compared to them.

In the present study, we showed that older patients are more likely to develop symptoms of GERD than younger patients. Some population-based studies conducted in Saudi and China have shown similar results, whereas another study conducted in Tehran found no relationship between GERD and age (Almadi et al., 2014; He et al., 2010). This contraindication may be due to a genetic disposition, lifestyle factors or the presence of other chronic illnesses that were not measured, as some studies suggested (Almadi et al., 2014; Mohammed et al., 2003; Dent et al., 2005). We found that education level was associated with GERD in our study; patients with a secondary educational level are more likely to report GERD symptoms than other categories (less than secondary, university or higher degrees).

A similar finding was reported in previous studies (He et al., 2010; Nasseri-Moghaddam et al., 2008). These findings indicate the need to focus on increasing the knowledge about the risk factors for developing the symptoms and complications in the population with low education levels and for more research to find out the factors that may affect this population more than others and predispose them to the symptoms. Additionally, our study showed a higher prevalence of GERD symptoms in retired patients, which may result from the older age of the patients and the presence of other comorbidities.

However, previous population-based studies found no significant relationship between GERD and occupational status. This variation in results may be due to different lifestyles and targeted populations (He et al., 2010; Alsulobi et al., 2017). Our study found a significant correlation between marital status and GERD symptoms, which is inconsistent with the previous literature. The reason for this variation is unclear and requires more research (Nasseri-Moghaddam et al., 2008; Alsulobi et al., 2017).

Limitations

Many factors could have been taken into the matter to ameliorate the quality of this study. This includes the collection of data from a larger number of applicants, using another method for data collection besides the questionnaire which allows direct contact with patients, having a dependable source to check the accuracy of patients' answers. Finally, the study's level of awareness may have been impacted by the fact that participants with higher educational backgrounds outnumbered those with lesser levels of education.

5. CONCLUSIONS

GERD is one of the most prevalent GI diseases worldwide. We intended to assess the impact of awareness on the development of complications and its impact on the quality of life among GERD patients in Makkah, Saudi Arabia. Based on our results, the knowledge level of GERD-associated complications was low among those diagnosed with the disease. Consequently, we advise competent authorities and health practitioners to educate patients about GERD and the importance of adhering to treatment and following medical advice to avoid contracting the disease or developing complications through various awareness methods such as social media, distributing brochures in hospitals and strengthening the role of health promotion clinics.

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Author Contributions

Abeer Shaker Elmoursy Ali (design of the study, clinical selection, diagnosis and classification of the cases, interpreted biochemical laboratory investigations, preparing tables and figures, editing, styling, writing and revising of the main manuscript text), Afnan Mousa Alhawsawi (design of the study, writing and interpretation of results, writing manuscript), Ola Abdullah Altwyjri (design of the study, writing and interpretation of results, writing manuscript), Ghaida Raja Allah Alsubhi (design of the study, writing and interpretation of results, writing manuscript), Linah Jamal Shaikh Omar (design of the study, writing and interpretation of results, writing manuscript), Talal Mohamed Karima (design of the study, writing and interpretation of results, writing manuscript), Wesam Ahmed Nasif (revising of the main manuscript text, interpretation of results).

Ethical approval

This study approved by institutional review board (IRB) of MOH, Makkah, Saudi Arabia and Umm Al-Qura University (UQU) under approval NO. (HAPO-02-K-012-2022-06-1129)

Declaration of Patient consent

The running manuscript data was through an online survey and was distributed through different social media platforms.

Informed consent

Not applicable.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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