IJHS

Original Article

# Gastroesophageal reflux disease prevalence among school teachers of Saudi Arabia and its impact on their daily life activities

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**WEBSITE:** ijhs.org.sa
**ISSN:** 1658-3639
**PUBLISHER:** Qassim University

## ABSTRACT

**Background:** Gastroesophageal reflux disease (GERD) is the most common upper gastrointestinal disorder encountered in the elderly patient. It is highly prevalent worldwide with a prevalence of 10-20% in the western world. The health-related quality of life (HRQL) is lower in individuals with GERD than in the general population and is comparable to that in individuals with other chronic diseases. It has a considerable impact on the quality of the patient's life through its symptoms and economically by following consultation procedures and medical care. A few studies have been done in Saudi Arabia using general population as subject and have reported a very high prevalence.

**Objective:** (1) Estimation of gastro GERD prevalence among school teachers in Qassim region. (2) To assess the impact of GERD symptoms on teacher's daily life activity. (3) To compare prevalence and risk factors of GERD between age-groups and gender.

**Methodology:** A cross-sectional study that was conducted among 200 school teachers selected by multi-stage stratified random sample method in Qassim region during 2015. A reliable and valid self-administered GERD questionnaire for diagnosis of GERD was used. GERD-HRQL questionnaire was used to assess the impact of GERD on the patient's life quality. Data were analyzed using Statistical Package for Social Sciences Version 20.0; Chi-square was used to test the association between GERD and sociodemographic data.

**Results:** The total number of the participants was 200 with an equal male to female ratio. 55% (116/200) of the participants reported with GERD. 53 point 5% of these (62/116) were female and 46.6% (54/116) were male. The commonest age group was 31-40 years with 45.5% (91/200) participants. 13/200 (6.5%) participants were smokers, of which only 15.9% were female. 41 point 3% (48/116) of the GERD +ve participants were having blood group O +ve 7.8% (9/116) of GERD participants reported symptoms which affected their daily life activity.

**Conclusion:** This study revealed a prevalence of GERD symptoms among 58% of school teachers. 7 point 8% of GERD participants reported symptoms which affected their daily life activities. These data indicate a need for a comprehensive approach to managing the GERD and related diseases and a more intensified level of awareness about GERD symptoms and its complications. In addition, a health care and preventive measure may be implemented to tackle the problem among school teachers.

**Keywords:** Gastroesophageal, reflux, disease, GERD, prevalence, school, teacher, Saudi, Arabia, quality, life

## Introduction

Gastroesophageal reflux disease (GERD) is the most common upper gastrointestinal disorder encountered in patients. It is highly prevalent worldwide with a prevalence of 10-20% in the western world.[1-4] GERD is a general term for many symptoms that range from intermittent heartburn or acid regurgitation to end by most serious complication as Barrett's esophagus[5] and stricture.[6] The experience of GERD symptoms, at least, 2 times weekly is considered sufficient to cause an impaired quality of life.[7] Between adult patients with GERD who get medical care, up to 20% have serious complications.[8]

Health-related quality of life (HRQL) is lower in individuals with GERD than in the general population and is comparable to that in individuals with other chronic diseases, such as diabetes, arthritis or chronic heart failure.[9] It usually has a considerable impact on the quality of the patient's life not only by the symptoms but also economically by following consultation procedures and medical care.[1,10] During the recent decade, several Asian studies about the prevalence of symptom-based GERD and endoscopic reflux esophagitis have revealed a higher number of patients compared to the previous studies.[11] A few studies have been done in Saudi Arabia using general population as subject and have reported a very high prevalence.[12] This study aimed to determine the prevalence and impact of GERD on the educated people and has used school teachers as the representative population.

## Methodology

A cross-sectional study conducted in Qassim region. The study population included elementary, middle and high school teachers from the schools located in the main cities of Qassim region. Counting up of the sample size was depend on the assumption that the prevalence of GERD in Saudi Arabia will range between 37.5% and 52.5% based on the result reported by some earlier studies.[12-14] The estimated sample size was 169. Sample size increased to 200 keeping in view the non-responders. A maximum period of 12-month for their call of symptoms was considered to reduce the chance of recall bias.[15]

A multistage stratified random sample method was used. The sample was first stratified into different educational stages. The second stratification was for male and female schools with a ratio of 1:1, while the third stratification was for selecting teachers from selected schools with a male to female ratio of 1:1. These steps were done using randomizer research software.

We used the GERD questionnaire (GERDQ) for making the diagnosis of GERD.[16] The GERDQ was developed as a patient-centered, self-assessment questionnaire to assist health-care professionals in the diagnosis of GERD. It has a sensitivity of 65% and a specificity of 71%.[16] Those with a score of ≥8 have a diagnosis of having GERD, while those with <8 don't have GERD.[16] To assess the impact of GERD on the patient's quality of life, we used GERD-HRQL questionnaire,[17] information about age, gender, smoking habit, and blood grouping were also collected from each participant.Teachers were asked about any history and frequency of heartburn, epigastric pain, regurgitation of food, sleep interference from GERD symptoms, and the use of over the counter antacids for the control of their symptoms. They were also asked about the effect of the GERD symptoms on their social interaction.

Based on the age, participants were divided into four groups:
- Group A - 21-30 year
- Group B - 31-40 year
- Group C - 41-50 year
- Group D - 51-60 year.

### Statistical analysis

Statistical Package for Social Sciences Version 20.0 was used to analyze the data Pearson's Chi-square ($\chi^2$) test was used to observe and quantify an association between the categorical outcome and the different variables. All calculated *P* values were two-tailed, with $P < 0.05$ considered as statistically significant.

## Result

The total numbers of the participants were 200 with an equal male to female ratio. According to age groups, 45.5% ($n = 91$) of participants fell in Group B, 28.5% ($n = 57$) in Group A, 24.5% ($n = 44$) in Group C and 1.5% ($n = 3$) in Group D. 6.5% (13/200) participants were smokers, of which 15.9% (2/13) were female 58% (116/200) of the participants reported with GERD. Among those diagnosed as GERD patients,53.4% (62/116) were female and 46.6% (54/116) were male.GERD was the most common among blood group AB+ patients as 70.5% of them reported such symptoms.

### GERD association with age

Around 47% (27/57) participants from Group A were found to have GERD. 51.8% (14/27) of them were male and 48.2% (13/27) were female. 65.9% (60/91) participants from Group B were found to have GERD. 36.6% (22/60) were males and 63.3% (38/60) were females. 59% (29/49) participants from Group C were found to have GERD. 62% (18/29) of them were males and 37.9% (11/29) were female. None of the participants from Group D reported GERD. 7.8% (9/116) of GERD participants reported symptoms which affected their daily life activities. Three of them were from Group A, two from Group B and four were from Group C. All of them from Groups A and B were female while in Group C three were female and one male (Table 1).

### GERD association with smoking

Nearly 11.2% (13/116) GERD participants were smokers. 15.4% (2/13) of them were females and aged from 31-40 years and 11 of them were males (1, 3, 6) from Groups A, B, and C, respectively. Daily life activities were affected in 7.7% (1/13) of smokers who were +ve with GERD. 4.3% (8/187) who reported the GERD symptoms affected their daily life activities were non-smokers. However, the relationship between smoking and GERD is significant statistically as the *P* value was 0.003 (Table 2).

### GERD association with the educational level

About 67.6% (46/68) participants from elementary school level were found to have GERD. 50% of them were males

**Table 1:** Age and gender distribution among study participants

| Age groups | Number of participants | GERD present (%) | GERD present divided by gender | | GERD affect their life | |
|---|---|---|---|---|---|---|
| | | | Male (%) | Female (%) | Male | Female |
| A | The total=57 were 30 male and 27 female | 47 (27/57) | 51.8 | 48.2 | Nil | 3 |
| B | The total=91 were 38 male and 53 female | 65.9 (60/91) | 36.6 | 63.4 | Nil | 2 |
| C | The total=49 were 29 and male and 20 female | 59 (29/49) | 62 | 38 | 1 | 3 |
| D | The total=3 were 3 male | 0 | 0 | 0 | Nil | Nil |

GERD: Gastroesophageal reflux disease

**Table 2:** Association of smoking with age and gender distribution among study participants

| Smokers | Age group | Number of participants | GERD present (%) | GERD present divided by gender | | GERD affect their life | |
|---|---|---|---|---|---|---|---|
| | | | | Male (%) | Female (%) | Male | Female |
| No | A=56 | The total=187 were 89 male and 98 female | 55.6 (104/187) | 42.3 | 57.6 | Nil | 8 |
| | B=85 | | | | | | |
| | C=43 | | | | | | |
| | D=3 | | | | | | |
| Yes | A=1 | The total=13 were 11 male and 2 female | 92 (12/13) | 83.3 | 16.6 | 1 | Nil |
| | B=6 | | | | | | |
| | C=6 | | | | | | |
| | D=0 | | | | | | |

GERD: Gastroesophageal reflux disease

**Table 3:** Educational level with age and gender distribution among study participants

| School levels | Age group | Number of participants | GERD present (%) | GERD present divided by gender | | GERD affect their life | |
|---|---|---|---|---|---|---|---|
| | | | | Male (%) | Female (%) | Male | Female |
| Elementary school | A=27 | The total=68 were 34 male and 34 female | 67.6 (46/68) | 50 | 50 | Nil | 1 |
| | B=29 | | | | | | |
| | C=12 | | | | | | |
| | D=0 | | | | | | |
| Middle school | A=18 | The total=66 were 33 male and 33 female | 54.5 (36/66) | 52.7 | 47.2 | Nil | 1 |
| | B=33 | | | | | | |
| | C=14 | | | | | | |
| | D=2 | | | | | | |
| High school | A=12 | The total=66 were 33 male and 33 female | 51.5 (34/66) | 35.2 | 64.7 | 1 | 6 |
| | B=29 | | | | | | |
| | C=23 | | | | | | |
| | D=1 | | | | | | |

GERD: Gastroesophageal reflux disease

and other 50% were females. 54.5% (36/66) participants from middle school level were found to have GERD. 52.7% (19/36) were male and 17 (47.2%) were female. 51.5% (34/66) participants from high school level were found to

**Table 4:** Blood group association with age and gender distribution among study participants

| Blood group | Age group | Number of participants | GERD present (%) | GERD present divided by gender | | GERD affect their life | |
|---|---|---|---|---|---|---|---|
| | | | | Male (%) | Female (%) | Male | Female |
| $A^+$ | A=17 | The total=50 were 27 male and 23 female | 60 (30/50) | 30 | 30 | Nil | 1 |
| | B=26 | | | | | | |
| | C=7 | | | | | | |
| | D=0 | | | | | | |
| $A^-$ | A=0 | The total=4 were 1 male and 3 female | 25 (1/4) | 0 | 25 | Nil | |
| | B=2 | | | | | | |
| | C=2 | | | | | | |
| | D=0 | | | | | | |
| $B^+$ | A=4 | The total=28 were 16 male and 12 female | 64 (18/28) | 32.1 | 32.1 | Nil | 2 |
| | B=13 | | | | | | |
| | C=11 | | | | | | |
| | D=0 | | | | | | |
| $B^-$ | A=0 | The total=3 were 2 male and 1 female | 66.6 (2/3) | 33.3 | 33.3 | Nil | |
| | B=1 | | | | | | |
| | C=2 | | | | | | |
| | D=0 | | | | | | |
| $AB^+$ | A=4 | The total=17 were 7 male and 10 female | 70.5 (12/17) | 23.5 | 47 | Nil | 3 |
| | B=9 | | | | | | |
| | C=4 | | | | | | |
| | D=0 | | | | | | |
| $AB^-$ | A=1 | The total=2 were 2 male | 50 (1/2) | 50 | 0 | Nil | |
| | B=0 | | | | | | |
| | C=0 | | | | | | |
| | D=1 | | | | | | |
| $O^+$ | A=29 | The total=86 were 40 male and 46 female | 55.8 (48/86) | 23.2 | 32.5 | 1 | 2 |
| | B=35 | | | | | | |
| | C=20 | | | | | | |
| | D=2 | | | | | | |
| $O^-$ | A=2 | The total=10 were 5 male and 5 female | 40 (4/10) | 40 | 0 | Nil | |
| | B=5 | | | | | | |
| | C=3 | | | | | | |
| | D=0 | | | | | | |

GERD: Gastroesophageal reflux disease

have GERD. 35.2% (12/34) were males and 22 (64.7%) were female, but the relationship between educational level and GERD is not statistically significant as the *P* value was 0.071 (Table 3).

About 11.11% (1/9) participants who reported with GERD symptoms which affected their daily life activities were from elementary school (one female), 11.11% (1/9) from middle school (one female), and 77.77% (7/9) were from high school (one male+six female).

## GERD association with blood group

The frequency of GERD among the blood groups can be seen from Table 4.

GERD was the most common among AB+ patients as 70.5% of them reported such symptoms. 11.11% (1/9) participants who reported with GERD symptoms which affected their daily life activities were one from blood group A+ (one female), 22.22% (2/9) from blood group B+ (two female), 33.33% (3/9) were from blood group AB+ (three female) and 33.33% (3/9) were from blood group O+ (one male + two female). However, the relationship between blood group and GERD is not statistically significant as the *P* value was 0.424.

## Discussion

Our study found a higher prevalence of GERD among the Saudi school teachers as compared to the results reported by Almadi *et al.*, who have reported a prevalence of 45.4% among the general population in Saudi Arabia.[12] A similar study done in Nigerian public elementary school teachers by Akande and Fadupin have reported a prevalence of 13.4%.[18] Fluctuating prevalence has been reported by various researchers across the world in general population including, 31.6% in Spanish.[19] 40.0% in Swedish, 25.7% in Iran, and 12% in Taiwan. Many factors have shown an association with GERD but still controversial. Male gender, hiatus hernia, and chronic obstructive pulmonary disease are three independent risk factors for the developmentof reflux esophagitis.[20-22] Nearly all epidemiologic studies have found a relationship between increasing body mass index due to obesity and changes in gastroesophageal anatomy and physiology. These include an increased prevalence of diminished pressure of lower esophageal sphincter, esophageal motor disorders, intragastric pressure, and the development of a hiatal hernia. Central obesity may be considered the most important risk factor for the development of reflux and related complications.[23,24] This study finds a higher prevalence of GERD among study population with age range 31-40 year though statistically non-significant. The association between GERD and age is controversial. Some studies have reported a direct association[25-27] while others an inverse[28-30] and still others no association whatsoever.[31-35] Our study has shown a higher prevalence of GERD in females. The effect of GERD on females was most severe with the fact that eight of nine teachers who reported the GERD symptoms affected their daily life activities were females.

Our study has shown a significant correlation ($P = 0.003$) of smoking with 6.5% of our study participants were smokers, and 92% (12/13) of them reported GERD. 56% (104/187) of non-smoking participants were also having GERD in our study. Several studies have revealed a direct relationship between GERD and smoking.[36-37] However, others did not find any significant relationships.[19,38] Our study also finds an inverse relationship between educational levels with GERD. Elementary school teachers have shown highest prevalence as compared to high school teachers. A similar finding has been reported by Diaz-Rubio *et al*. and El-Serage *et al.*[19,39] The impact of symptoms on patients' daily life is one of the most common reasons for consultation for GERD.[40] Studies conducted among Swedish general population measure the impact of the severity and frequency of GERD symptoms on quality of life have found that even symptoms rated as mild are associated with a clinically meaningful reduction in well-being.[41,42] The highest numbers of our study participants were having blood group O +ve while the highest prevalence of GERD was in participants with blood group AB +ve. Type O has shown an association with naturally high stomach acid production and is much more likely to develop GERD, But when type A contracts GERD, it is more likely to develop Barrett's esophagus, and even esophageal cancer suggesting a genetic susceptibility.[43]

## Conclusion

This study showed a high prevalence of GERD symptoms among school teachers which has an impact on their daily life activities. These data indicate a need for acomprehensive approach to GERD management in the health-care system. In addition, a health-care program may be implemented to address the problem among the teachers.

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