

Original Research Article

A study of the symptoms of gastro oesophageal reflux disease and the associated risk factors in a tertiary care centre

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ABSTRACT

Background: Gastro esophageal reflux disease is the commonest pathologies encountered by gastroenterologist in day to day practice. Longstanding and untreated gastro esophageal reflux disease can lead to many complications including adenocarcinoma. This study was conducted to evaluate the various symptoms and to analyze the lifestyle and dietary factors influencing gastro esophageal reflux disease which can be modified.

Methods: Hundred patients with gastro-esophageal reflux disease of age more than 18 years were enrolled in the study. Various patient details including demographic details, lifestyle information and symptomatology data were analyzed and compared with complications.

Results: Mean age of gastro esophageal reflux disease patients was 56.09 ± 15.93 years. Gastro esophageal reflux disease is more prevalent in males than females. Gastro esophageal reflux disease is more frequent in BMI < 25 , greater number of co morbidities and in non-vegetarians. Mean age of gastro esophageal reflux disease with complications was 67 ± 11.53 years and without complications was 52.64 ± 15.57 years. No strong association of smoking, alcohol, spicy foods, fried foods, citrus fruits, heavy meals, tea/coffee, aerated drinks, sleep disturbance and effect on work was identified in gastro esophageal reflux disease.

Conclusions: Classical symptoms of gastro esophageal reflux disease were not present in all the patients. Higher age of the patient infers higher risk of complications. Daily episodes of heartburn, regurgitation and retrosternal chest pain implies higher risk of complications. Presence of *Helicobacter pylori* in gastro esophageal reflux disease patients signify higher risk of complications.

Keywords: Adenocarcinoma, Gastro esophageal reflux, Heartburns, Regurgitation, Retrosternal chest pain

INTRODUCTION

Gastro esophageal reflux disease (GERD) is defined as a condition due to reflux of stomach content into the esophagus causing trouble symptoms or complications or both.¹ GERD is one amongst the common gastro-esophageal junction pathologies encountered by gastroenterologist in day to day practice. GERD occurs either due to patulous lower esophageal sphincter or increased pressure within the stomach. It has a wide variety of clinical presentations ranging from

gastrointestinal (common) to extra-gastrointestinal (uncommon) symptoms. Common gastrointestinal symptoms are heartburn, regurgitation and retrosternal chest pain. Less common gastrointestinal symptoms are dysphagia and odynophagia. Extra-gastrointestinal symptoms are bronchial asthma, laryngitis, hoarseness of voice, chronic cough, sore throat and dental erosions. Furthermore, longstanding and untreated GERD leads to morbid complications such as esophageal ulcer, Barrett's esophagus, esophageal stricture and adenocarcinoma

Every year GERD affects approximately 4.5/1000 persons in the United Kingdom and 5.4/1000 persons in the United States.^{2,3} In Western populations, the prevalence of GERD ranges from 10% to 20%. GERD symptoms occur at least once a month in 44%, once a week in 20% and daily in 7% of the adult US population.^{4,6} However, studies describing the epidemiology of GERD in South-East Asia and for that matter in India are sparse; and traditionally GERD was thought to be uncommon in the developing countries, on the other hand, studies in the multiethnic population showed that people of Indian origin are at higher risk of GERD than ethnic Malay and Chinese.^{7,8} And the studies done in India emphasize that the prevalence of GERD in India is likely to be between 8% and 20%, which is comparable with GERD prevalence rates published in western countries.⁹ In addition, these studies highlight that the risk factors for GERD are related to diet and lifestyle preferences, which are both modifiable risk factors. Hence this study was conducted to evaluate the various symptoms and to analyze the lifestyle and dietary factors influencing it which can be modified. The study also evaluates the association of clinical, lifestyle and endoscopic characteristics with complications of GERD.

METHODS

It was a cross sectional observational study done between February 2016 to March 2017 at the Department of Medicine in a tertiary care hospital in south India. Total of 100 patients with upper gastrointestinal endoscopy proven Gastro-esophageal reflux disease of age more than 18 years were enrolled in the study. Patients with mass lesion in oesophagus or stomach, oesophageal varices, history of corrosive ingestion, pregnant women and terminally ill patients were excluded from the study.

Prior to the commencement of the study, ethical clearance was obtained from Institutional Human Ethical Committee. The selected patients were briefed about the nature of the study and written informed consent was obtained from them in regional language. Subsequently, patients were interviewed for demographic details, lifestyle information, and symptomatology data. The patients were divided into GERD with complications and GERD without complications. The demographic, lifestyle and symptoms of the two groups were compared.

Statistical analysis

Data was analyzed using SPSS version 20.0 statistical software. Categorical variables were expressed as percentages and the comparative analysis was done using chi-square test or Fischer exact test. Continuous variables were expressed as mean±standard deviation (SD) and the comparative analysis was done by independent sample 't' test. A probability value (p value) of less than or equal to 0.05 at 95% confidence interval was considered as statistically significant.

RESULTS

A total of 100 patients, diagnosed of Gastro-esophageal reflux disease (GERD) based on UGI scopy were enrolled in this study. Mean age of GERD patients was 56.09±15.93 years (Range: 20 - 82 years). Demographic parameters analyzed were age, sex and BMI of the patients. Lifestyle parameters assessed were smoking, alcohol, spicy food and fried food intake, intake of meat, tea / coffee, citrus fruits, aerated drinks, heavy meals, sleep disturbances and effect on daily work. Clinical symptoms evaluated were heartburn, regurgitation, retrosternal chest pain, dysphagia, odynophagia, positional variation of these symptoms. In addition, presence of *Helicobacter pylori*, GERD grades and its complications were also analyzed.

Table 1: Distribution of demographic parameters.

Sex	Distribution
Male	75
Female	25
Body mass index	
<25	70
>25	30
Number of co morbidities	
<3	48
>3	21
Absent	31

From the Table 1 it is seen that GERD is more prevalent in males than females with male to female ratio of 3:1. It is also seen that GERD is more frequent in BMI <25 and with greater number of co morbidities.

Table 2: Distribution of life style parameters.

Parameter	Present	Absent
Smoking	52	48
Alcohol	44	56
Non veg habit	75	25
Intake of spicy foods	59	41
Intake of fried foods	26	74
Intake of citrus fruits	13	87
Heavy meal intake	33	67
Sleep disturbance	32	68
Effect of work	9	9
Tea/coffee intake (>3 cups / day)	39	61
Aerated drinks intake (>5 drinks / week)	4	96

From the Table 2, it is seen that GERD is more prevalent in non-vegetarians than vegetarians. It is also seen that there was no strong association of smoking, alcohol, spicy foods, fried foods, citrus fruits, heavy meals, tea/coffee, aerated drinks, sleep disturbance or effect on work with GERD.

From the Table 3, it is seen that classical symptoms of GERD such as heartburn, regurgitation and retrosternal chest pain were not present in all the patients. It is also seen that dysphagia and odynophagia were less frequent in GERD.

Table 3: Distribution of clinical symptoms.

Clinical symptom	≤2/ Week	>2/ Week	Daily	Absent
Heart burns	11	41	22	26
Regurgitation	31	25	19	25
Retrosternal chest pain	32	9	25	34
Dysphagia	5	3	17	75
Odynophagia	1	3	14	82

Prevalence of GERD complications were 24% in present population. Most common complication was erosive esophagitis followed by Barrett’s esophagus and esophageal stricture. Furthermore, we divided the total of 100 GERD patients into two groups: GERD with complications (24 patients) and GERD without complications (76 patients) and analyzed the documented variables between these two groups.

Table 4: Demographic variables between GERD with complication and without complications.

Demographic parameters	Independent ‘t’ test		
	Complication Mean±SD	Without complication Mean±SD	P value
Age	67.00±11.78	52.64±15.68	0.000*
BMI	23.00±3.42	23.42±4.19	0.657
Chi square test			
Sex	67% males	78% males	0.279
	33% females	22% females	

From the Table 4 it is seen that mean age of GERD with complications was 67±11.53 years (Range: 41 - 82 years) and mean age of GERD without complications was 52.64 ± 15.57 years (Range: 20 - 82 years). Age of the patient showed significant association with the presence of complications (p= 0.000). Higher the age of the patient, higher is the risk of complication. There was no significant difference in presence of complications with sex of the patient.

From the Table 5, it is seen that daily episodes of heartburn, regurgitation and retrosternal chest pain implies higher risk of complications (p=0018, 0.023, 0.016 respectively). It is also seen that, although dysphagia and odynophagia showed p value of < 0.05, they didn’t exhibit strong association between these two groups due to lower likelihood ratio of 47.84 and 62.38 respectively.

Table 5: Clinical variables between GERD with complication and without complications.

Clinical parameters	Independent ‘t’ test		P value
	GERD with complication Mean±SD	Without complication Mean±SD	
Number of co-morbidity	1.67±1.30	1.38±1.38	0.375
Chi square test			
Heart burns	0% <2/wk	14 % <2/wk	0.018*
	17 % ≥2/wk	49 % ≥2/wk	
	83% daily	3% daily	
	0% absent	34% absent	
Regurgitation	0% <2/wk	41% <2/wk	0.023*
	25 % ≥2/wk	25% ≥ 2/wk	
	75% daily	1% daily	
	0% absent	33% absent	
Retrosternal chest pain	0% <2/wk	42 % <2/wk	0.016*
	17 % ≥2 /wk	7 % ≥ 2/wk	
	83% daily	6% daily	
	0% absent	45% absent	
Dysphagia	0% <2/wk	7 % <2/wk	0.025*
	13% ≥2/wk	0 % ≥2/wk	
	54% daily	4% daily	
	29% absent	89% absent	
Odynophagia	0% <2/wk	1 % <2/wk	0.035*
	13% ≥ 2/wk	0 % ≥ 2/wk	
	58% daily	0% daily	
	29% absent	99% absent	
Positional variation of symptoms	25% present	25% present	1.000
	75% absent	75% absent	

From the Table 6, it is seen that none of the lifestyle parameters had significant difference between two groups.

From the Table 7, it is seen that, presence of *Helicobacter pylori* in GERD patients signifies higher risk of complications (p=0.000).

DISCUSSION

In present study, authors found that out of 100 GERD patients, 75% were males and 25% were females with male to female ratio of 4:1. Present findings were in contrary to previous meta-analysis study by Kim YS et al, who inferred that GERD affects more frequently women than men.¹⁰

In this present study, we found that 70% of the patients had BMI <25 and 30% of the patients had BMI ≥25, contradicting the inference of previous study by Jacobson BC et al, who found that GERD symptoms exacerbation is more frequent in patients with BMI of ≥25.¹¹

Table 6: Lifestyle parameters between GERD with complication and without complications.

Lifestyle parameters	Chi square test		P value
	GERD with complication	GERD without complication	
Smoking	50% present	53% present	0.822
	50% absent	47% absent	
Alcohol	37% present	46% present	0.462
	63% absent	54% absent	
Veg vs nonveg	37% Veg	21% veg	0.105
	63% Non veg	79% Non veg	
Spicy foods	50% present	62% present	0.304
	50% absent	38% absent	
Fried foods	29% present	25% present	0.685
	71% absent	75% absent	
Citrus fruits	4% present	16% present	0.140
	96% absent	84% absent	
Tea / coffee	38% frequent	39% frequent	0.978
	16% infrequent	18% infrequent	
	46% absent	43% absent	
Aerated drinks	0% frequent	5% frequent	0.305
	0% infrequent	4% infrequent	
	100% absent	91% absent	
Heavy meals	71% present	34% present	0.647
	29% absent	66% absent	
Sleep disturbance	71% present	33% present	0.733
	29% absent	67% absent	
Effect on work	4% present	11% present	0.343
	96% absent	89% absent	

Table 7: Analysis of reflux esophagitis grades and H. pylori between GERD with complications and without complications.

Parameters	Chi square test		P value
	GERD with complication	GERD without complication	
H. pylori	83% present	22% present	0.000*
	17% absent	78% absent	
Reflux esophagitis grades	0% A	75% A	0.000*
	8% B	16% B	
	46% C	8% C	
	46% D	1% D	

In addition, this study showed that out of 100 GERD patients, 69% had associated co-morbidities of which 48% had <3 co-morbidities and 21% had ≥3 co-morbidities. This finding supports the previous study by Moraes-Filho JPP et al, who postulated the strong association of co-morbidities with GERD and its worsening effect on GERD.¹²

Though heartburn, regurgitation and retrosternal chest pain are the classic presenting symptoms of GERD, in

present study these symptoms were not seen in all the patients. Previous study by Kahrilas PJ et al, inferred that heart burn was present in nearly all GERD patients in their study and regurgitation was found in 80% of GERD patients, in contradiction to the results of our present study.¹³ Furthermore, dysphagia and odynophagia have been described as third most common clinical symptom of GERD.¹³ In contrary, in present study 75% of patients didn't have dysphagia and 82% of patients didn't have odynophagia. Amongst 100 GERD patients in our study, 75 patients didn't have positional variation of symptoms. In contrary to our study a recumbent (lying) posture after meals was observed as a precipitating factor by 42% of the cases as reported in one of the studies.¹⁴

In a previous study by Çela L et al, they inferred that the prevalence of GERD is significantly higher in smokers, alcoholics and individuals with increased frequency of consumption of meat, fried foods and spicy foods.¹⁵ In accordance with these findings, present study showed more number of patients (75%) is non-vegetarians. Besides, we found the reverse trend in history of smoking, alcohol, intake of fried foods and spicy foods.

Literature search revealed the refluxogenic properties of the following products: citrus fruits and juices, tomatoes, coffee / tea, aerated drinks and chocolate.^{16,17} Postulated mechanism by which these dietary products cause or aggravate GERD symptoms was by increased gastric juice secretion, delaying stomach evacuation and decreased LES pressure. However, current study did not show any significant association with these.

It was a common belief that eating habits such as heavy meals and eating directly before sleep might contribute to the occurrence of symptoms of GERD. Although previous studies by Iwakiri K et al, and Fujiwara et al, postulated the negative influence of these eating habits on the aggravation or occurrence of GERD symptoms. In our study we inferred that there was no significant contribution of heavy meal intake towards occurrence of GERD symptoms.^{14,17}

A previous study by Gross M et al, postulated that GERD had substantial effect on work productivity in study of 249 German patients with GERD, although patients were on routine clinical care and proton pump inhibitors therapy.¹⁸ In contrary to this finding we found that effect of work was not contributory to GERD.

In another study by Jung H et al, inferred that complex relationship between GERD and sleep exists and further they suggested modest bidirectional association of GERD and sleep disturbance.¹⁹ In contrast to these findings, our study showed sleep disturbances were absent in 68% of the patients.

In this present study, authors found that *Helicobacter pylori* was present in 37% of the patients and was absent in 63% of the patients. Previous studies by many authors

proposed a strong argument regarding the protective role of *Helicobacter pylori* against GERD.^{20,21} Prevalence of *Helicobacter pylori* was reported to be low about 5-10% in patients affected with GERD in comparison to the control groups by previous studies.^{20,21} Present study findings were in contrast to these studies.

Los Angeles classification system published in 1999 was the widely accepted for categorizing reflux esophagitis on UGI scopy.²² In this present study, 57% patients had Grade A reflux esophagitis, 14% patients had Grade B reflux esophagitis, 11% of the patients had Grade C reflux esophagitis and 12% patients had Grade D reflux esophagitis.

Complications of GERD include erosive esophagitis with ulcers, Barrett's esophagus and esophageal stricture. In previous study by Spechler SJ et al, showed that esophageal adenocarcinoma is the most common complication of GERD and warranted serial endoscopic screening for development of Barrett's esophagus.²³ In another study by Chait MM et al, postulated that 20% of the adults with GERD have serious complications.²⁴ Supporting this finding, our study showed that 24% of the patients had complications (12% esophageal ulcer, 6% Barrett's esophagus and 6% esophageal stricture).

Of the demographic parameters, age of the patient showed significant association with the presence of complications ($p=0.000$). Higher the age of the patient, higher is the risk of complication. Reduced pain perception can increase the rate of GERD complications in the elderly, because acid injury can occur without the usual warning symptom of significant heartburn and acid reflux symptoms.²⁵ Another study by Thrift AP et al, inferred that risk of Barrett's Esophagus increased linearly with earlier age at onset of frequent GERD symptoms.²⁶ Age at symptom onset may help practitioners decide which patients with GERD symptoms to refer for endoscopic screening for Barrett's Esophagus.

Lifestyle factors can be associated with increased gastro esophageal reflux and more complications of GERD.²⁶ Tobacco smoking, caffeine, alcohol and fatty foods adversely affect GERD. Obesity, sedentary lifestyle and nocturnal gastro esophageal reflux are important mechanisms that are associated with more severe esophageal and extra esophageal complications of GERD in the elderly.^{27,28} Obesity is a significant problem which increases acid reflux and thus increases GERD and its complications.¹¹ Nocturnal effects on GERD are reported by up to 78% of patients, with 75% of patients reporting that it negatively affects their ability to sleep.²⁸ Nocturnal gastro esophageal reflux and the recumbent, supine position remove the protective effect of gravity in GERD in the elderly patient.^{29,30} Nocturnal GERD allows for more gastro esophageal reflux and further increases esophageal injury and GERD complications, especially in elderly patients who often spend more time in bed due to

co morbid illness, such as dementia, Parkinson's disease, cerebrovascular disease, cardiovascular disease, pulmonary disease and diabetes mellitus. However, in the current study none of the lifestyle parameters showed any significant difference between GERD with complication and without complication.

In the present study we found that heart burn, regurgitation, retrosternal chest pain showed significant association between GERD with complications and without complications groups. It can be postulated that daily episodes of heart burn, regurgitation and retrosternal chest pain infers high risk of GERD complications.

In our study, we inferred that presence of *Helicobacter pylori* in GERD patients signifies higher risk of complications. *H. pylori* was present in 83% of patients in GERD with complications group and was absent in 78% of the patients in GERD without complications group. Among grades of reflux esophagitis, grades C and D were moderately higher in GERD with complications group. The worldwide variation in incidence of GERD may be inversely related to the prevalence of *H. pylori* infection.²⁷ Studies have found a negative association between the prevalence of *H. pylori* infection and GERD that is more marked with the more virulent CagA strains.³⁰ Additionally, they have shown a negative association of *H. pylori* status and the complications of GERD including Barrett's esophagus and esophageal adenocarcinoma.³⁰ A study by Labenz et al, revealed a possible protective effect of *H. pylori* infection in the subgroup analysis of patients with severe esophagitis.³¹ In a study from China, a stepwise relationship was found between increasing grade of esophagitis and decreasing prevalence of *H. pylori*.³² In a Swedish study, *H. pylori* was found to be associated with a significantly decreased risk of adenocarcinoma of the esophagus.³³ A subgroup analysis showed that the negative association was only apparent for the CagA positive strains of *H. pylori*. Another study shows that the persistent *H. pylori* infection in GERD has been reported to be a risk factor for a subtype of esophageal squamous cell carcinoma.³⁴

Present study has few limitations as well. It was a single center experience. Terminally ill patients were not included in this study. Patients with esophageal mass were not included in this study, though adenocarcinoma of esophagus can occur secondary to GERD, but it has other multifactorial predispositions. Future studies with large scale, multicenter and case control design focused on this context are warranted.

CONCLUSION

Classical symptoms of GERD were not present in all the patients. Dysphagia and Odynophagia were less frequent presenting symptoms. GERD is more common in non-vegetarians than vegetarians. No strong association of smoking, alcohol, spicy foods, fried foods, citrus fruits,

heavy meals, tea/coffee, aerated drinks, sleep disturbance and effect on work was identified in GERD. Prevalence of GERD complications were 24% in studied population with order of erosive esophagitis >Barrett's esophagus and esophageal stricture. Higher age of the patient infers higher risk of complications. Daily episodes of heartburn, regurgitation and retrosternal chest pain implies higher risk of complications. Presence of *Helicobacter pylori* in GERD patients signifies higher risk of complications.

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