

Gastroesophageal Reflux Disease: Prevalence and Its Risk Factors in Rural Bangladesh

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Abstract

Gastroesophageal Reflux Disease (GERD) is a global disease, and evidence suggests that its prevalence is increasing. Prevalence estimates show considerable geographic variation. According to WHO, prevalence of GERD in far East Asia currently consistently lower than 10%, which is 8-20% in India. No such population based data are available in Bangladesh. Thus, the study was designed to determine the prevalence of GERD and its risk factors in rural community of Bangladesh. This descriptive, cross-sectional study was carried out during January to June 2015 by using a validated questionnaire through door to door interview among randomly selected 2000 participants in a rural community of Bangladesh. A cutoff point 3 was chosen as a valid and reliable scale to confirm GERD. Among the study participants, 1212 were male and 788 were female. Their average age range was 18 to 60 years. A total of 136 participants were found to have GERD symptoms and among them 43 were men and 93 were women. Thus, the prevalence of GERD in the study was 6.8%. GERD was highly associated with higher age group, women, Muslims, and participants with diabetes mellitus, asthma and overweight. Prevalence of GERD in rural community of Bangladesh is lower than that of the western world. For a better understanding on GERD, it is important that a study should be carried in a representative samples across Bangladesh.

Keywords: Gastroesophageal reflux disease (GERD), Risk factors of GERD and BMI

Introduction

GERD is a global disease, and evidence suggests that its prevalence shows considerable geographic variation, and in far East Asia that prevalence estimates are currently consistently lower than western countries. The high prevalence of GERD, and hence of troublesome symptoms, has significant societal consequences, impacting adversely on work productivity and many other quality of life aspects for individual patients.

The prevalence of gastroesophageal reflux disease (GERD) is gradually increasing day by day in the world. GERD is estimated for symptoms at least once per week, varies greatly with ethnicity and geography: 18.1-27.8% in North America, 8.8-25.9% in Europe, and 2.5-7.8% in East Asia, as estimated from a number studies.¹ GERD has traditionally been considered less common in Asian countries in

comparison to western world.^{2,3} It has been shown in recent study report that its prevalence in India ranges between 8-20% which is comparable to that in the west.⁴⁻⁶

In Bangladesh, there is scarcity of data on the magnitude of the problem.^{7,8} A population-based survey reported a prevalence of heart-burn and or acid regurgitation at least monthly, at least weekly and daily was 5.5%, 5.25% and 2.5% respectively and overall, unadjusted estimate of GERD was 5.5 on questionnaire based.⁹

GERD affects quality of life of patients, reduces their functional activity, increases the economic burden and predisposes them to more serious conditions as in Barrett esophagus and esophageal adenocarcinoma which is difficult to treat eventually.¹⁰⁻¹³ There are many factors which are thought to be associated with GERD symptoms,

including dietary factors, alcohol consumption, smoking, the intake of NSAIDs and sleeping position.¹⁴ Various studies indicate that increased body mass index (BMI) is also a risk factor for GERD.¹⁵

Patients who develop GERD can have symptoms without objective evidence of oesophagitis.¹⁶ Considering the limitations of objective medical testing, GERD symptoms play a vital role in the diagnosis of the problem. Heart burn and or acid regurgitation are considered to be reasonably specific symptoms for the diagnosis.¹⁷ Further diagnostic evaluation is necessary, if treatment is not responding properly, there should be alarm symptoms suggestive of complications or for confirmation of diagnosis prior to anti-reflux surgery.^{18,19} In some studies, it is reported that there is association of GERD with asthma, hoarseness of voice, dyspepsia, atypical chest pain and non-obstructive dysphagia.^{2,3,20}

At the present time, questionnaires have been used as a useful diagnostic tool in the epidemiological settings of GERD. Questionnaires may quantify the characteristics of individual symptom (frequency, duration and severity) and also can measure the quality of life. The validity and reliability of symptom-based diagnosis of GERD has been proved in several studies.^{17,20-25} Awareness on prevalence estimates and associated risk factors of GERD in this population plays a part in defining local and national health needs and also to improve the management of these patients. Bangladesh is a developing country and there are few population based data regarding GERD and people are suffering from this condition from acute to severe. Therefore, the study was designed to determine the prevalence of GERD and its risk factors in rural community of Bangladesh.

Materials and methods

This cross-sectional study was conducted at Ghior, one of the largest Upzilla of Manikganj District in Bangladesh through the technical support from Department of Gastroenterology of Shaheed Suhrawardy Medical College during January to June

2015. Samples were selected using two-step random sampling technique. Ghior Upzilla consists of 7(seven) unions, among those Unions, 3 (three) were selected by using lottery method. All the apparently healthy individual of either sex aged between 18-60 years of above mentioned area was included in this study. There were total 75,714 peoples aged between 18 – 60 years in the selected unions. Among the total population, 2000 were selected using simple random sampling. The data were collected by face to face interview of the respondents who met the selection criteria of the study. The participants who are not willingly to participate were excluded from this study. Data collection instruments were a validated structured questionnaire and a checklist. The Questionnaire by Manterola et al provides a valid and reliable scale to detect GERD with a high sensitivity (91.6%) and specificity (94.9%).²³ Data were collected through door to door interview of the respondents at the rural community. Before the interview, the detail of the study was explained to the eligible respondents and informed written consent was obtained (through undersigned or finger print) from every respondent. All interviews were carried out in a private setting according to the participants choice and safety. All the relevant collected data were compiled on a master chart first and then statistical analysis of the results was obtained by using windows-based computer software device with Statistical Packages for Social Sciences (SPSS-18) (SPSS Inc, Chicago, IL, USA). The significance of individual symptoms and combined symptoms were analysed by applying a multivariate logistic regression model adjusting for age and gender. The result was presented as odd ratios with 95% confidence intervals. A two- sided *p* value less than 0.05 was regarded as statically significant, and 95% confidence intervals was computed using a logistic regression model. Prior to the commencement of this study, the research protocol was approved by the National Research Ethics Committee (NERC) of the Bangladesh Medical Research Council (BMRC).

Results

The study population consisted of 2000 participants, 60.6% male and 39.4% female. The male to female ratio in percentage was 121.2: 78.8. Nearly 88.9% of the sample population was married, among them 84.8% male, 95.2% female. In regard to the occupation of the respondent's majority was from housewives (27%), about 23% from non-government employees and about 50% constituted other occupation like businessman, farmers, industrial worker and others. With respect to the educational background, more than 22% of the respondents were secondary education not completed and the next highest group 19.4% were secondary education completed, 15.9% were primary education completed, 13% were illiterate and 10.9% graduate and above. The highest literate women group (22%) belonged to class VI-X. About 56.7% of the respondents reported to earn a monthly income of Tk. 5000- 10000.

Prevalence of Gastro esophageal reflux disease (GERD): Out of 2000 participants screened for GERD using the Questionnaire by Manterola (cut off point 3), 136 cases were found to be positive, thus giving a prevalence of 6.8% (95% CI, 5.78-7.99).²³ Age-wise distribution showed that majority

of individuals associated with GERD belongs to age group 41-50 years (n= 26.4%) followed by age group 21-30 years (n=23.8%). Prevalence of GERD was the highest (11.8) in age group 30-40 years (95% CI, 9.14 – 15.12). Significantly, more women had GERD than men (11.8%, n=93 VS 3.55%, n=43; table-I).

Table I: Prevalence of GERD and demographic details of GERD Patients

Age	Number of participants	Number of GERD patients	Prevalence of GERD (95% CI)
Total	2000	136	6.80 (5.78 – 7.99)
Age stratification			
≤20	75 (3.8)	2	2.67 (0.73 – 9.21)
21 - 30	476 (23.8)	32	6.72 (4.80 – 9.34)
31 - 40	449 (22.4)	53	11.80 (9.14–5.12)
41 - 50	528 (26.4)	35	6.63 (4.80 – 9.08)
51 - 60	472 (23.6)	14	2.30 (1.26 – 4.19)
Gender (p =.003)			
Male	1212 (60.6%)	43	3.55 (2.64 – 4.74)
Female	788 (39.4%)	93	11.80 (9.73–4.24)

Risk factor of GERD: Prevalence of GERD was dominant among betel and tobacco chewer followed by smoker. Body Mass Index, diabetes mellitus, hypertension, asthma have association with GERD. It has been observed that prevalence of GERD is more among obese and overweight patient (table-II).

Table II: Risk factors of Gastroesophageal Reflux Disease (GERD)

Risk factors	Number of participants	Number of GERD patients	Prevalence of GERD (95% CI)
<i>Smoker</i>	520 (26.0%)	13	2.50 (1.47 – 4.23)
<i>Betel nut</i>	629 (31.4%)	32	5.09 (3.63 – 7.09)
<i>Tobacco</i>	479 (24.0%)	27	5.64 (3.90 – 8.08)
<i>Alcoholic</i>	40 (2.0%)	2	5.00 (1.38 – 16.50)
<i>Vegetarian</i>	92 (4.6%)	8	8.70 (4.47 – 16.23)
<i>Co-morbidity</i>			
DM	108 (5.4%)	18	16.67 (10.81 – 24.81)
HTN	154 (7.7%)	18	11.69 (7.52 – 17.72)
IHD	54 (2.7%)	6	11.11 (5.19 – 22.19)
Asthma	80 (4.0%)	12	15.00 (8.79 – 24.41)
<i>BMI</i>			
Under weight	35 (1.8%)	4	11.43 (4.54 – 25.95)
Normal weight	749 (37.4%)	29	3.87 (2.71 – 5.51)
Over weight	621 (31.0%)	61	9.82 (7.72 – 12.42)
Obese	595 (29.8%)	42	7.06 (5.26 – 9.40)

Endoscopy findings of GERD patients: Most of the clinical diagnosed (according to scale) GERD patients (n=136) have normal endoscopic finding (n=74).

Symptoms of GERD according to religion and sex: Presence of Heartburn in this population at least once a week was 19% followed by Heartburn with regurgitation was 7% (table-III).

Table III: Symptoms of GERD according to religion and sex

Symptoms of GERD	Muslim			Hindu			Total n (%)
	Male n (%)	Female n (%)	Total n (%)	Male n (%)	Female n (%)	Total n (%)	
Normal	653 (65.7)	415 (64.8)	1068 (65.4)	148 (67.9)	110 (74.3)	258 (70.5)	1326 (66.3)
Heartburn only	211 (21.2)	107 (16.7)	318 (19.5)	44 (20.2)	18 (12.2)	62 (16.9)	380 (19.0)
Regurgitation only	94 (9.5)	37 (5.8)	131 (8.0)	16 (7.3)	12 (8.1)	28 (7.7)	159 (8.0)
Heartburn with regurgitation	36 (3.6)	81 (12.7)	117 (7.2)	10 (4.6)	8 (5.4)	18 (4.9)	135 (6.8)
Total	944 (100.0)	640 (100.0)	1634 (100.0)	218 (100.0)	148 (100.0)	366 (100.0)	2000 (100.0)

Factors associated with gastroesophageal reflux diseases: Logistic regression analysis female sex Muslim, DM, Asthma and overweight were significantly associated with presence of GERD (table IV).

Table IV: Logistic regression of risk factors of GERD patients

	B	S.E.	Wald	Sig.	OR	95% C.I.for OR	
						Lower	Upper
Gender (Male)	-1.185	0.222	28.432	0.000	.306	.198	.473
Religion (Muslim)	1.142	0.339	11.325	0.001	3.133	1.611	6.092
DM (Positive)	.671	0.339	3.931	0.047	1.957	1.008	3.799
HTN (Positive)	.418	0.327	1.633	0.201	1.519	.800	2.882
IHD (Positive)	-.419	0.618	.458	0.498	.658	.196	2.211
Asthma (Positive)	.889	0.459	3.757	0.053	2.433	.990	5.978
Normal weight	-.459	0.227	4.096	0.043	.632	.406	.986
Smoker	-.106	0.173	.373	0.542	.900	.641	1.263
Betel Nut chewer	-.197	0.309	.406	0.524	.821	.448	1.505
Tobacco chewer	.150	0.331	.206	0.650	1.162	.607	2.225
Alcoholic	-1.005	0.775	1.679	0.195	.366	.080	1.674
Vegetarian	-.007	0.438	.000	0.987	.993	.421	2.340
Total						2000	100.0

Discussion

This descriptive crosssectional study has shown a low prevalence (6.8%) of GERD in a general population residing in rural community of Bangladesh and significantly associated with Body Mass Index, DM, HTN and Asthma. Prevalence of GERD was dominant among betel and tobacco chewer followed by smoker. It has been observed that prevalence of GERD is more among obese and overweight patient in the study.

GERD is one of the most prevalent gastrointestinal disorders. GERD has an adverse impact on patients quality of life and also is the most important predisposing factor for Barrett's esophagus and intestinal metaplasia of esophageal mucosa that predisposes to adenocarcinoma of the esophagus.²⁶⁻²⁹ In addition to the risk of cancer, GERD is well recognized to be associated with some

upper respiratory diseases that have some troublesome effects on the quality of life. So, it is crucial to diagnose GERD early to protect patients from the above-mentioned serious complications of GERD.

The prevalence of GERD varies among different geographical areas and among investigators even in the same geographical area. A gulf of difference in the reported GERD prevalence is mainly attributed to the differences in the methods used by each investigator as well as to the absence of a generally adopted definition of GERD. There is no gold standard diagnostic test for GERD. Most common investigations like upper GI endoscopy and 24 hour oesophageal pH monitoring lack sensitivity and have several limitations.³⁰⁻³² Questionnaire based diagnosis of GERD is reliable with high sensitivity and specificity. In the present study, the prevalence

of GERD based on questionnaire (cut-off point 3) was 6.8% which is similar to population-based survey in Korea, Singapore, China, Iran and India but is lower than that in the western population.^{4,21-25, 34-38} The prevalence of GERD in this study was lower than that of only population-based study in Dhaka city (40.9%).⁷ A study conducted at the out Patient Department (OPD) of a referral center of Dhaka city and reported a GERD prevalence of 22.8%.⁸ This significant difference may be due to selected population who came for consultation in Gastroenterology outpatient clinic. Presence of heartburn in this population at least once a week was 19% followed by Heartburn with regurgitation was 7%. The corresponding prevalence's reported by Masud were 17.2% and 12.5% respectively.⁸ Studies from United States of America (USA) showed that heart burn and or acid regurgitation occurred in approximately in 7% of adult population on a daily basis, 14-20% on a weekly basis and 44% on monthly basis.^{20,39} A Chinese population survey reported that the annual, monthly and weekly prevalence rates of GERD were 29.8%, 8.9% and 2.5% respectively in their population.²² The weekly prevalence of GERD on the basis of heart-burn and or acid regurgitation in Korea (3.0%)³³ is comparable to our study. Geographic differences in GERD prevalence estimates are difficult to interpret, but may be related to differences in study definitions, questionnaire used, population selection and socio-cultural factors. In this series prevalence estimates of GERD were higher among women than men based on symptom score (11.8% versus 3.55%). This prevalence is comparable to the finding in India,⁴ but higher than that of Korea³³ and lower than that of China²² and western countries like USA,²⁰ Belgium³⁶ and Sweden.³⁷ Differences in GERD prevalence estimates may be due to differences in dietary habit, environmental and socio-cultural factors and work pattern. GERD prevalence was equal in both men and women in USA²⁰ but in Belgium prevalence was more in women (31.1% and 25.6% respectively).³⁶ GERD is variably associated with age of the respondents. On multiple logistic regression analysis an increasing prevalence of GERD was found with increasing age in our study.

In our survey highest prevalence was found in the 31-40 years in age group. The finding conforms to the finding of Shahed et al. and in China highest prevalence was found in 30-39 years in age group and in Japan in 40-49 years age group was more vulnerable. On the other hand, studies from USA, Korea, Singapore, Belgium and Spain failed to show any association of GERD with age.^{7,20,25,33,36,38,40} BMI was found as a risk factor for GERD in the studies from China, Spain and Dhaka. But 112 studies from Korea and Iran found no association between GERD and BMI.^{7,33,38,40,41} In this series, BMI was also found as a significant risk factor for GERD. Association between smoking and GERD is controversial. Several reports showed direct relationship of GERD with smoking.¹⁴ However, studies from Spain and India did not find any relation between smoking and GERD.^{34,38} In this study association of GERD with smoking was unclear which is consistent with the finding of Masud.⁸ Most of the clinical diagnosed (according to scale) GERD patients (n=136) have normal endoscopic finding. On Logistic regression analysis female sex, muslim, DM, Asthma and overweight were significantly associated with presence of GERD.

Conclusion

The prevalence of GERD in rural community of Bangladesh was 6.8% in the study which is lower than that of western world. Again, the prevalence of GERD is higher in 31-40 age group (11.80) than the other participants to reduce the risk factors for noncommunicable diseases.

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