Original Article

PREVALENCE, PERCEPTIONS AND PROFILE OF GASTROESOPHAGEAL REFLUX DISEASE IN A RURAL POPULATION OF NORTH BIHAR

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ABSTRACT

Background: The prevalence of gastro esophageal reflux disease (GERD) in India ranges from 8-20% according to recently conducted studies based on different case definitions and study methodology. Reports of its association with risk factors are inconsistent between studies. There are lack population based studies to know about the epidemiology of this disease. This study was therefore done to assess the prevalence, symptom profile and perceived precipitating factors of GERD in a rural population of northern Bihar.

Methodology: A community based descriptive cross sectional study was undertaken from April 2013 to July 2013 on 2000 adults (above 20 years) from 20 clusters of 5 adjoining villages of Madhubani district in north Bihar. Clusters were selected from the different pockets (mohallas) of the villages. A semi-structured questionnaire translated into local language was used to collect data regarding symptoms, lifestyle, precipitating factors and socio-demographic characteristics of those affected with GERD.

Results: The prevalence of GERD in this population was 23.6%.The prevalence among males and females was 18% and 30% respectively. Prevalence was more among Muslims than Hindus. Heartburn accompanied by regurgitation was the predominant symptom. Low socioeconomic status, female gender, age group of 31-40 years was associated with this condition. Large fatty and spicy diet, postprandial posture, consumption of meat, tea and Malda variety of mangoes were perceived as precipitating/aggravating factors by the cases.

Conclusion: There is high prevalence of GERD in this population. Analytical studies are recommended to test its association with the observed factors.

Key words: Prevalence, symptoms, GERD, rural population, North Bihar

INTRODUCTION

Gastro-esophageal reflux disease is defined as presence of heart burn regurgitation or both at least once weekly.[1-3]Patients can have symptoms without objective evidence of esophagitis.[4,5]

It negatively affects the quality of life and leads to serious complications like Barret's esophagus, esophageal strictures and adenocarcinoma[6]. GERD has traditionally been considered less common in Asian countries in comparison to western world[7,8]. Recent studies indicate that its prevalence in India ranges between 8-20% which is comparable to that in the west.[9,10,11] Reports on the risk factors and prevalence for GERD have been inconsistent between studies. Some studies have reported older age, male gender, race, family history, higher socioeconomic status, increased BMI, use of non-steroidal anti-inflammatory medications, high meat consumptions, low fruit consumptions and smoking as important risk factors.[1,10,12-16]

On the other hand, other studies have found female gender, [11,17]large fatty diet[18]shorter dinner-to- bed time[19]and younger age[11]to be significant risk factors. The recently conducted studies in India[9,10,11] report inconsistent association with BMI, age, sex, alcohol, smoking and diet.

There is only one population based study in India at high altitude area of Ladakh region.[11]

This study was therefore undertaken in a rural area of Madhubani district of northern Bihar to know the prevalence and perceptions of cases regarding precipitating and aggravating factors, of GERD.

MATERIAL AND METHODS

The population of Madhubani district is 4,476,044 and the population density is 1279/sq km[20].It is the centre of traditional and ancient Mithila region which extends across the border of Nepal.

This was a community based observational study undertaken in 20 randomly selected clusters in five adjoining villages of Pandaul block. The clusters were taken from the different pockets (tola/mohalla) into which the villages are divided according to caste and religion. The sample size for this study was 2000 considering a prevalence of 23% in a rural population[11]. From each cluster 100 subjects more than 20 years of age were selected by systematic random sampling. Data regarding the symptoms and its frequency, sociodemographic and co morbidity profile and perceived precipitating/ aggravating factors were collected by house to house survey in each cluster using a semi-structured questionnaire translated into local language. The colour of their ration card (red, yellow and blue) was used as a proxy indicator for their socioeconomic status. The period of *data collection* was from April to June 2013.

Case definition: GERD was considered present if subjects experienced heartburn (burning in the retro sternum), regurgitation (presence of sour fluid at the back of the throat) or both at least once a week.[1-3]

Persons who were consuming non-vegetarian food at least once a month were considered as non vegetarian. Data was analysed and presented in the form of number and percentage.

RESULTS

A total of 2000 subjects participated in the study out of which 1156(58%) were Hindu and 844 (42%) were Muslim by religion whereas 981 (49%) of them were males and 1019 (51%) females.

Prevalence of GERD and its symptoms: Among the study participants 472 were found to be affected with GERD thus reflecting a prevalence of 23.6% in this study population. The presence of heartburn with regurgitation at least once a week in this population was 17.3% followed by heartburn only in 5.8%.With respect to religion, the prevalence of GERD was 26% in Muslims and 21% in Hindus. The prevalence among females was 30% which was much higher than that in males (18%). Among Muslims the prevalence in females and males were 29.2% and 21.8% respectively whereas the corresponding values among Hindus were 31.4% and 17.3%.

Table1: Symptoms of GERD according to religion and sex

Symptoms of GERD	Hindu			Muslim			Total
	Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	Total (%)	(n=2000) (%)
Normal	548 (82.6)	338 (68.5)	906 (78.3)	250 (78.6)	372 (70.7)	622 (73.6)	1528 (76.4)
Regurgitation only	0	0	0	4 (1.2)	4 (0.7)	8 (0.9)	8 (0.4)
Heartburn only	18 (2.7)	39 (7.9)	57 (4.9)	13 (4)	47 (8.9)	60 (7.1)	117 (5.8)
Heartburn with Regurgitation	97 (14.6)	116 (23.5)	193 (16.6)	51 (16)	103 (19.5)	154 (18.2)	347 (17.3)
Total	663 (100)	493 (100	1156 (100)	318 (100)	526 (100)	844 (100)	2000 (100)

Table 2: Socio-demographic profile of cases according to symptoms

Variables	Heartburn with regurgitation (N=347) (%)	Heartburn only (N=117) (%)	Regurgitation only (N=8) (%)	Total (N=472) (%)
Age groups				
20-30	65 (18.7)	26 (22.2)	4 (50)	95 (20)
31-40	93 (26.8)	32 (27.3)	0 (0)	125 (26.4)
41-50	65 (18.7)	20 (17)	1 (12)	86 (18)
51-60	67 (19.3)	22 (18.8)	3 (37)	92 (19.4)
61-70	499 (14.1)	11 (9.4)	0 (0)	60 (12.7)
>71	8 (2.3)	6 (5.1)	0 (0)	14 (2.9)
Sex				
Male	128 (36.8)	31 (26.4)	4 (50)	163 (34.5)
Female	219 (63.1)	86 (73.5)	4 (50)	309 (65.4)
Religion				
Hindu	193 (55.6)	57 (48.7)	8 (100)	258 (54.6)
Muslim	154 (44.3)	60 (51.2)	0 (0)	214 (45.3)
Ration card				
Red card	262 (75.5)	89 (76)	8 (100)	359 (76)
Yellow card	55 (15.8)	19 (16.2)	0 (0)	74 (15.6)
Blue card	30 (8.6)	9 (7.6)	0 (0)	39 (8.2)

Socio-demographic characteristics of the cases: Most of the cases were in the age group of 31-40 yrs and their mean age was 45.7 (±14.94) years. The proportion of Hindus was higher than Muslims among the cases.

Most (76%) of those affected with GERD were economically below poverty line. Females constituted 65% of the cases.

Precipitating factors: A large fatty and spicy meal was perceived as a precipitating factor by most (95%) of the cases. Recumbent posture after meals was perceived as a precipitating factor by 42% of the cases. Consumption of *Malda* variety of mangoes and non - vegetarian food precipitated heart burn in 36% and 12.8% of the cases respectively. Hypertension was present in 22% of the cases. Ingestion of 1-3 cups of tea a day was found in 85% of the cases whereas 46% percent of them were habituated to tobacco. Intake of alcohol was found in only 6% of the cases .Postprandial occurrence of symptoms was reported by 80% of the cases out of which 42% felt that it was followed by recumbent/supine posture after meals.

Table 3: Distribution of symptoms according to habits

Variables	Heartburn with regurgitation (n=347) (%)	Heartburn only (n=117) (%)	Regurgitation only (N=8) (%)	Total (N=472) (%)
Tea frequency				
0	33(9.5)	11(9.4)	0(0)	44(9.3)
1-3 cups/day	293(84.4)	103(88)	8(100)	404(85.5)
≥ 4 cups/day	21(6)	03(2.5)	0(0)	24(5)
Tobacco frequency				
0	195(56.1)	60(51.2)	2(25)	257(54.4)
1-3/day	24(6.9)	14(11.9)	0(0)	38(8)
4-6/day	128(36.8)	43(36.7)	6(75)	177(37.5)
Alcohol frequency				
No/Occassional	326(93.9)	109(93.1)	5(62.5)	440(93.2)
≥ 1/day	21(6)	8(6.8)	3(37.5)	32(6.7)
Meal frequency				
2/day	36(10.3)	7(5.9)	0(0)	43(9.1)
3/day	219(63.1)	92(78.6)	5(62.5)	316(66.9)
≥ 4/day	92(26.5)	18(15.3)	3(37.5)	113(23.9)

Table4: Perceived precipitating /aggravating lifestyle factors according to symptoms

Precipitating factors	Heartburn with regurgitation (n=347) (%)	Heartburn (n=117) (%)	Regurgitation (n=8) (%)	Total (n=472) (%)
Large fatty diet				
Yes	331(95.3)	112(95.7)	8(100)	451(95.5)
No	16(4.6)	5(4.2)	0(0)	21(4.4)
Fried spicy food				
Yes	331(95.3)	112(95.7)	5(62.5)	451(95.5)
No	16(4.6)	5(4.2)	3(37.5)	21(4.4)
Nonvegetarian diet				
Yes	31(8.9)	15(12.8)	5(62.5)	51(10.1)
No	316(91)	102(87.1)	3(37.5)	421(89.9))
Stale/sour Curd				
Yes	33(9.5)	14(11.9)	0(0)	47(9.9)
No	314(90.4)	103(88)	0(0)	417(88.3)
Post meal posture				
Recumbent	137(39.4)	54(46.1)	8(100)	199(42.16)
Sitting	153(44)	27(23)	0(0)	180(38.1)
Malda Mango				
Yes	85(24.4)	43(36.7)	4(50)	132(27.9)
No	262(75.5)	74(63.2)	4(50)	340(72)
Hypertension				
Yes	83(23.9)	22(18.8)	0(0)	105(22.2)
No	264(76)	95(81.1)	8(100)	367(77.7)

DISCUSSION

Gastroesophageal reflux disease hitherto considered a health problem of western and affluent society is highly prevalent (23.6%) in this population of north Bihar. A prevalence of 23%was reported by Sushil Kumar et al[11] among rural population of Ladakh region adopting a cut off point of symptom score. A recent study from Delhi which also used a cut off score based on symptoms for a year to define a case, reported a prevalence of 16.2% among hospital employees.[10]Studies in Chennai and Jaipur reported prevalence rates of 24% and 22% respectively.[21,22]A lower prevalence (7.6%) was reported in a health facility based study by the taskforce of Indian Society of Gastroenterology (ISG)following the same case definition.[9]A similar study, among rural residents of Bang-

ladesh using the same case definition reported a prevalence of 19%.[23]

The higher prevalence among females is in agreement with that observed in high altitude area.[11]

Heartburn was present in 100% of the cases in a study done in Bangladesh[24] like 98% found in this study.

As much as 95% of the cases with GERD felt that intake of large fatty diet led to the development of heartburn and regurgitation because fat delays gastric emptying and is a known risk factor[25].

Symptoms were associated with fried spicy food in 95% of cases in this study. Moderately spicy food was associated with 87% of GERD in a recent study.[9]A study on an urban populationin Pakistan has associated fried spicy food with 71% of GERD cases.[26]

Consumption of non-vegetarian food was associated with only 10% of the cases inthis study contrary toprevious studies which have shown a significant association.[2,9,11] The fatty and spicy nature of the fried non-vegetarian food items may be responsible for symptoms and should be validated by analytical study.

A recumbent (lying) posture after meals was observed as a precipitating factor by 42%of the cases as reported in one of thestudies[19]. Postprandial occurrence of symptom was seen in80% of the cases like that (82%) found among pregnant women[2]. The ISG taskforce study also found that the symptoms were aggravated by meals (49.2%) and 15%had elevated the head end of their bed[9].

Intake of *Malda* variety of mangoes was followed by heartburn in 36.7% of the cases because of the acid content in the ripe fruit.[27]

Alcohol intake was absent in93% of the cases which is supported by the recently done studies in India[9,10].

Most of the affected subjects (26%) were in the age group of 31-40 years like that (<50 years) found in a high altitude area[11].A study among hospital employees in Delhi reports no association of GERD with age[10]. As much as 76% of the cases were BPL (red card) card holders contrary to the previous finding that it is a disease of affluent societies by Sonneburg[15].

Tobacco intake 4-6 times a day was associated with 37% of the cases while 54% of them didn't take tobacco. No association of GERD with tobacco intake was observed among the people of high altitude area[11] whereas a recent study on hospital employees has revealed an association of GERD with current smoking[10]. Hence, tobacco as a risk factor for GERD needs to be investigated further.

Most of the cases (85%) ingested 1-3 cups of tea a day whereas 78% of those having heartburn took meals thrice a day. The previous study by Sushil et al[11] didn't find it significant. We did not find any other study that had looked for an association with frequency of meals.

Only one study has investigated its association with hypertension and found it significant[10].In our study we found 22% of the cases to be on antihypertensive medication. This should be investigated further.

The strength of this study is that this is the first observational study on an exclusively rural population in a plain area of India. The sample size is relatively larger than the previousstudy.[11]Themeaning of the symptoms were translated into phrases used by the local people to express the symptoms. Symptom score based on subjective feeling and memory about severity and duration of symptoms was not used for case definition unlike other studies[10,11,24] in order to make the study objective and bias free. The prevalence estimates of this study can be generalized for the population.

LIMITATIONS OF THE STUDY

This study did not take into account the atypical symptoms, previous drug therapy or self medication for GERD, health seeking behaviour or any lifestyle or dietary modification made if the subject had earlier been experiencing GERD.

CONCLUSION AND RECOMMENDATION

The prevalence of GERD in this study was 23.6%. The prevalence was relatively more among females(30%).Among cases, symptoms were more common among female (65%), low socioeconomic status (76%), middle age group (31-40 years), large fatty (95%)and spicy diet consumers (95%). These factors along with factors like consumption of meat, beverages and Malda variety of mangoes, antihypertensive drugs and frequency of meals should be investigated further for causal association by analytical studies.

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