

Association between Body Mass Index and Gastroesophageal Reflux Symptoms in Nepalese Adult Population- A Single Centered Hospital Based Study

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ABSTRACT

Background & Objectives: Gastroesophageal reflux disease (GERD) is a common disorder, and studies have reported inconsistent association between high BMI and its elevated risk of GERD symptoms. The aim of the present study was to estimate the strength of the association between body mass index and reflux symptoms in Nepalese adults. **Materials & Methods:** This was a cross-sectional study conducted at National Academy of Medical Science, Bir Hospital, Kathmandu, Nepal. All patients of age 18 years or above who underwent endoscopy and diagnosed to have esophagitis were recruited for the analysis. Symptoms were identified by using a self-administered validated questionnaire regarding GERD that identify the onset for GERD symptoms and grade the frequency and severity of symptoms experienced over a period of one year. BMI data, the cut off points were based on the WHO classification of overweight and obesity. A BMI value \square 25–30 represents overweight and BMI >30 indicates obesity. A BMI value <25 is considered as normal. Severity of erosive esophagitis was graded according to the Los Angeles classification. **Results:** The Among 127 enrolled esophagitis subjects, about 43% were under 20 BMI, 43% overweight and about 24% were obese. Obesity measured by BMI revealed no significant association among age, sex, smoker, alcoholics, hernia and severity grade of esophagitis ($p>0.05$). Ages with various categories (18-40, >40-60,>60) were significantly associated with the GERD symptoms ($P=0.021$). We categorize BMI in three categories. A BMI value < 25 (normal), \square 25–30 (overweight), and BMI >30 (obesity). Categorical analysis of BMI with GERD symptoms confirmed the absence of any tendency towards an association ($p>0.05$). **Conclusion:** The tendency of reflux symptoms towards BMI is null, and weight reduction may not be the adequate justifiable for the symptoms therapy.

Key words: Body mass index, GERD, Obesity

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INTRODUCTION

Gastrointestinal reflux symptoms are common disorder that are associated with the obesity, affecting up to 60% of individuals at some time during the course of a year and 20%–30% of individuals at least weekly.^{1,2} Gastro-esophageal reflux disorders (GERD) are common in Western countries and has been reported to be increasing in the East. Prevalence of GERD in the prevalence of GERD among Nepalese residing in Brunei

Darussalam was 7.2%.³ Overall 45.1% had reported symptoms of gastroesophageal reflux: heartburn and regurgitation (21.4%), heartburn alone (9.2%) and regurgitations alone (14.5%).³ Frequent or severe GERD symptoms are associated with work loss⁴ impaired health-related quality of life,⁵ and esophageal adenocarcinoma,⁶ further emphasizing the clinical significance of this entity.

There is a widespread notion that obese persons are more likely to develop gastro-oesophageal reflux

disease than leaner subjects, and obese patients who seek medical care for symptoms suggestive of reflux are often recommended by clinicians to reduce their body weight to relieve the symptoms. Some but not all studies have shown that high BMI is associated with an elevated risk of GERD symptoms (e.g., heartburn and/or regurgitation). At least four previous population-based cross-sectional studies found positive associations between overweight or obesity and GERD symptoms in the United States, UK, Norwegian, and Spanish populations.^{3,7,10} In contrast, two other large population-based studies from Sweden and Denmark found no such association.^{9,11} To date, no study has been attempted illustrating the relationship between body mass and symptom of GERD in Nepalese population. Given the importance of body mass and symptoms associated with GERD, in this study we examined the association between body mass and GERD symptoms implying the broader range of BMI categories among the adults with varying severity of the disease.

MATERIALS AND METHODS

Setting and study design: This was a cross-sectional study conducted at National Academy of Medical science, Bir Hospital, Kathmandu, Nepal. All age group of 18 years or above who underwent endoscopy and diagnosed to have esophagitis were recruited for the study. Symptoms were identified by using a self administered questionnaire regarding GERD that identify the onset for GERD symptoms and grade the frequency and severity of symptoms experienced over a period of 1 year.¹² Sociodemographic and additional information from the GERD including height, weight, tobacco, smoking and family history of GERD.

Body mass index (BMI), a validated measure of body mass independent of height was calculated as body weight divided by the square of body height in meters (kg/m²).

Symptoms evaluation and definition:

Overweight and obesity: BMI data, the cut off points were based on the WHO classification of overweight and obesity¹³. A BMI value \square 25–30 represents overweight and BMI >30 indicates obesity. A BMI value <25 is regarded as normal. Severity of erosive esophagitis was graded according to the Los angeles classification¹⁴.

Statistical analysis: Numerical data were presented as mean \pm SD. The relation between the explanatory and categorical with BMI variables and the dependent dichotomous reflux variable was modeled using Pearson's Chi square test. In analyses of categorized BMI data, the cut off points were based on the WHO classification of

overweight and obesity. A BMI value \square 25–30 represents overweight and BMI >30 indicates obesity. A p value less than 0.05 considered at level of significance. The study protocol was approved by the ethical board of IRB, National Academy of Medical Science (NAMS), Bir Hospital.

RESULT

A total of 127 patients diagnosed with esophagitis were enrolled for the GERD questionnaire. The mean ages of the subjects were 45.40 ± 14.74 years. Proportion of the male patients were 74 (58.3%) and female 53 (41.7%). Mean Body mass index was 26.23 ± 5.24 . About 43% of the subjects were under 20 BMI, 43% overweight and about 24% were obese. Out of 127 patients, a total of 52 (40.2%) patients were reported having smoking while 42 (33.1%) patients being alcoholics. Two patients demonstrated to have peptic ulcer (Table 1).

Table1. Patient's characteristics

Parameter	Inference
No. of patients, n	127
Age, mean \pm SD (years)	45.49 \pm 1.47
Male, n (%)	74 (58.3)
Female, n (%)	53 (41.7)
BMI, mean \pm SD	26.62 \pm 4.37
BMI	
<20	54 (42.51)
25-30	43 (33.85)
>30	30 (23.62)
Smoker, n (%)	51(40.2)
Alcoholics, n (%)	42 (33.1)
Symptoms present, n (%)	112 (88.2)
Symptoms absent, n (%)	15 (11.8)
Hiatus hernia, n (%)	38 (29.9)
Peptic ulcer, n	2
<u>Loss angel classification, n (%)</u>	
A	25 (19.7)
B	52(40.9)
C	44 (34.6)
D	6 (4.7)

We also classified the severity of the disease according to Los Angeles classification,¹⁴ and were observed that most of the subjects were graded in class B (40.9%, followed by grade C (34.6%), grade A (19.7%) and least at grade D (4.7%). symptoms with esophagitis were predominantly exhibited in 112 (88.2%), while about 12 % were asymptomatic (Table 1).

Obesity measured by BMI and its association with GERD risk factors are presented in table 2. Different predictors including age (18-40, >40-60, >60), sex, smoker, alcoholics, presence of Hernia and severity grade of esophagitis were compared by BMI. We found no statistically significant between the proportion of obesity measured by BMI with the GERD risk factors (p>0.05).

Distribution of GERD symptoms and potential GERD risk predictors are illustrated in table 3. We categorize BMI in three categories. A BMI value < 25 (normal), 25–30 (overweight), and BMI >30 (obesity). Categorical analysis of BMI with GERD symptoms confirmed the absence of any tendency towards an association (p>0.05). Ages with various categories were significantly associated with the GERD symptoms (P=0.021). Others GERD factors including sex, smoking, alcoholism, hiatus hernia and endoscopic grade showed no tendency of association towards reflux symptoms (p>0.05)

Table 2. Association of obesity, measured by BMI and various GERD risk predictors

Demographic feature	Body mass index			P
	<25	25-30	>30	
Age				
18-40	13	18	8	0.091
>40-60	21	21	116	
>60	20	6	6	
Men	34	26	14	0.327
Women	20	17	16	
Smoker	24	17	10	0.060
Alcoholics	19	11	12	0.397
Hiatal hernia	13	16	9	0.373
Grade				
Grade A	13	8	4	0.876
Grade B	22	18	12	
Grade C	16	15	13	
Grade D	3	2	1	

DISCUSSION

We demonstrated the clinical association of reflux symptoms with the obesity measured by BMI. Our study revealed no association between BMI and gastro- esophageal reflux symptoms. Our findings are consistent with the previous studies where the finding sought that there was not association between BMI at age 20, BMI 20 years before the interview, or maximum adult BMI and occurrence

of reflux symptoms.¹⁵ One showed no differences in oesophageal pH compared with normal weight subjects¹⁶ and the other found no improvement in reflux symptoms or oesophageal pH after weight reduction.¹⁷ However, our results are differ from previous study where the obese participants were 2.5 times as likely as those with normal BMI (<25) to have reflux symptoms or esophageal erosions.¹⁸ The conflict in results may be due to the higher proportion of obese patients in this study comparison to ours. There is also risk of reporting

Table3. Association of reflux symptoms with body mass and other GERD predictors

BMI	Symptoms (+) (112)	Symptoms (-) (15)	P value
<25	48	6	0.447
25-30	36	7	
>30	28	2	
Age (continuous variable)	112	15	0.39
Age (categorical)			
18-40	29	8	0.021
>40-60	51	7	
>60	32	0	
Sex			
Male	65	9	0.885
Female	47	6	
Smoking	66	5	0.566
Alcoholism	40	2	0.084
Hiatus hernia	33	5	0.769
Severity grade			
Grade A	23	2	0.697
Grade B	47	5	
Grade C	37	7	
Grade D	5	1	

under reflux symptoms if the patients are under anti reflux medication. Also, there is no exact definition and standard measure of the incidence of gastro- esophageal reflux disease. Both endoscopy and 24 hour pH monitoring have significant limitations. Only about one third of patients with reflux disease have endoscopically detectable signs of reflux.¹⁹ Reflux symptoms are considered to be main tool of gastro- esophageal reflux disease.^{20,21} Analysis of the main symptoms, heartburn and regurgitation, is probably the most useful method for diagnosing this condition.¹⁹ Improper classification of GERD might have driven to lack of association in our

study.

We also reported the clinical characteristics of the disease and its relation with the reflux symptoms. Severity grade was classified according to Los Angeles classification.¹⁴ Our study demonstrated no association between obesity and Los Angeles classification¹⁴ grade of disease severity.

This study has been performed with its some limitation which should be acknowledged. Several studies however reported the association of BMI and reflux symptoms, the comparatively small sample size in this study might have driven some of the study results difficult to be interpreted. In addition symptoms assessed by questionnaire in our study could have differed from others, leading our association to null.

CONCLUSION

Our study indicates that gastroesophageal reflux symptoms are not independently linked to obesity, defined by body mass index. However, Age factors were associated with the reflux symptoms. Further study in large population should explore the tendency of GERD symptoms towards BMI.

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