

GERD SYMPTOMS AND BODY MASS INDEX: A STUDY IN OUTPATIENTS OF ABBASI SHAHEED HOSPITAL

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ABSTRACT

objective:

This study aimed to determine the association between GERD (Gastro-Esophageal Reflux Disease) symptoms and Body Mass Index (BMI) in the outpatients of Abbasi Shaheed Hospital, Karachi.

Materials & Methods:

A comparative cross-sectional study was conducted in Abbasi Shaheed Hospital, Karachi from December 2008 to March 2009. By convenient sampling method, 200 outpatients who met the inclusion criteria were enrolled in the study, visiting the hospital with symptoms of epigastric pain, nausea, vomiting, acid regurgitation, heart burn, burping, belching, and feeling of wind. A questionnaire was filled, which contained patient's demographic profile, information on the frequency of all GERD symptoms and severity of main GERD symptoms. History of smoking, alcohol, drugs or any illness were also inquired and noted. Statistical analysis was done by SPSS version 16.

Results:

Among 200 outpatients, 65% were females and 35% were male. Mean age was 38.4 years. Nausea was complained in 87%, epigastric pain in 66%, acid regurgitation in 66% and heart burning in 64% of patients. The frequency of heartburn and acid regurgitation was seen once a week in 39% and 45% of patients respectively while severity of heartburn and acid regurgitation was found 25% and 33% of patients respectively and

there relation with body mass index were found insignificant. Co-relation of body mass index was not associated with symptoms of gastro-esophageal reflux disease i.e.: nausea ($p=0.06$), epigastric pain ($p=0.658$), acid regurgitation ($p=0.935$), heart burn (0.525).

Conclusion:

Our study concludes that in our setting, the symptoms of GERD occur independently of body mass index. It seems that high BMI plays a more important role to cause symptoms of GERD among western population but not in Asian populations. However, further studies in Asian communities are also required in this regard.

Keywords:

Gastro-esophageal reflux disease, GERD, Obesity, BMI

INTRODUCTION

An association between obesity and gastro-esophageal reflux disease (GERD) has been usually reported in Western communities¹⁻³. Obesity has become a significant health problem in the western population as well as in Pakistan⁴, with a prevalence of 33%⁵ and 16%⁶ in adults respectively. While gastro-esophageal reflux disease, with characteristic symptoms of heartburn and acid regurgitation⁷, is a common disorder distressing up to 60% of persons at some time during the course of a year and 20 to 30% of persons on at least weekly basis^{8,9}. In addition, both Obesity and GERD, appear to have an unfavorable impact on the quality of life^{10,11}.

Studies on the association between BMI and GERD symptoms have yielded inconsistent results. In the large population-based studies conducted to date; overweight and obesity have been shown to be risk factors for reflux symptom¹²⁻¹³. One study found a

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more pronounced association in women than in men¹². However, in a population-based study in Sweden¹⁴ and in a birth cohort from New Zealand¹⁵, overweight and obesity were not associated with reflux symptoms in young adults.

Corley *et al* conducted a study in the USA showed that the association between body mass index (BMI) and reflux-type symptoms was partially mediated through abdominal diameter and there was a consistent association between abdominal diameter and reflux-type symptoms in the white population, but no consistent association was found in the black population or Asians¹⁶. Similar associations were found by Solhpour A *et al*¹⁷.

It is of obvious clinical importance to establish if there is an association between body mass index and GERD (gastro-esophageal reflux disease). A true strong positive association would strengthen the role of weight reduction as an important part of anti-reflux treatment in overweight patients while such a strategy is likely to be unsuccessful if the association is weak or absent.

OBJECTIVE

This study aimed to determine the association between GERD (Gastro-Esophageal Reflux Disease) symptoms and Body Mass Index (BMI) in the outpatients of Abbasi Shaheed Hospital, Karachi.

MATERIALS AND METHODS

A comparative cross-sectional study was conducted in Abbasi Shaheed Hospital, Karachi from December 2008 to March 2009. By convenient sampling method, 200 outpatients who met the inclusion criteria were enrolled in the study, visiting the hospital with symptoms of epigastric pain, nausea, vomiting, acid regurgitation, heart burn, burping, belching, and feeling of wind. Patients were excluded on the basis of history and examination, if they were pregnant, had records of experiencing major psychotic episodes, mental retardation, dementia, hiatal hernia (diagnosed case by endoscopy) or if they had any other significant illness. A questionnaire was filled, which contained patient's demographic profile, information on the frequency of all GERD symptoms i.e. epigastric pain, nausea,

vomiting, acid regurgitation, heart burn, burping, belching, feeling of wind and severity of main GERD symptoms i.e. heart burn and acid regurgitation. Heartburn and regurgitation are considered reasonably accurate markers of gastro-esophageal reflux disease^{7, 14, 18}. Frequency of heartburn and acid regurgitation were dichotomized into less than once in a week, twice in a week or more than twice a week. Symptom severity was categorized as mild, moderate, or severe. Patients were also asked about the symptoms of: 'burning behind breastbone' and 'pain behind breastbone' for heartburn that was not due to heart trouble; 'acid taste in mouth' and 'movement of materials' for regurgitation¹⁴.

Bodyweight and height were assessed by the study physicians. The BMI was calculated as body weight in kilograms divided by the square of height in meters (kg/m^2). The cut off points were based on the WHO classification of overweight and obesity. A BMI value $>25\text{--}30 \text{ kg}/\text{m}^2$, represents overweight and BMI $>30 \text{ kg}/\text{m}^2$ indicates obesity¹⁵. Thus a BMI value $<25 \text{ kg}/\text{m}^2$ was regarded as normal. Data on self medication and prescription only medicines was also collected, including use of pain killers, aspirin and non-steroidal anti-inflammatory drugs (NSAID). Lifestyle information was also collected in the questionnaire and included smoking history (never smoker, ex-smoker (habitual smoker who has quit smoking for 1 month), current smoker < 20 cigarettes a day, current smoker ≥ 20 cigarettes a day), alcohol intake (units of beer, wine and spirits per week, combined), coffee & tea consumption (cups per day), socioeconomic status, educational status and other co-morbid conditions if any, were also taken.

Statistical analysis was performed using SPSS (Statistical Package for Social Sciences) version 16 with the level of statistical significance specified at 0.05. Data are presented as means \pm SD for quantitative variables and as frequencies for qualitative variables. The relationships between BMI and frequency and severity of heartburn and acid regurgitation were assessed using χ^2 tests. The relationship between BMI and frequency of other GERD symptoms were also assessed using χ^2 tests.

RESULTS

During the study period 200 patients, were selected during the study period. Table-I shows the Demographic profile, Life style and Co-morbid of the patients. 65% (n=130) were females and 35% (n=70) were males. 58% (n=116) of patients were aged under 40 years while 42% (n=84) of patients were above 40 years. Mean age was 38.4 years. The average age of the men (42.11 ± 13.18) was higher than that of the women (36.51 ± 12.33).

The relationships between BMI and the frequency and severity of heartburn and acid regurgitation are shown in Table-II & III. The frequency and severity of heart burn and acid regurgitation was found more frequent in overweight and obese patients, compared with patients of normal weight but none of them were significant ($p > 0.05$)

The relationship between BMI and the other symptoms of GERD are shown in Table-IV. BMI was also associated with frequency of epigastric pain/discomfort, wind/fullness, nausea, vomiting and belching/burping. Statistically significant relationships between BMI and these variables were not seen ($p > 0.05$).

DISCUSSION

There is contradictory evidence that obesity predisposes to GERD. Although a number of large cross-sectional population-based studies examining the relationship between body mass and GERD found that BMI was strongly positively related to the frequency of symptoms of GERD^{13, 19} while others showed incredulity in such an association^{14, 17}. Our study, revealed no significant association between obesity and symptoms of GERD, showing that BMI is not associated with GERD symptoms.

We strictly used the main symptoms, heartburn and regurgitation, which are considered to be the most useful for the diagnosis of GERD^{7, 14, 18}. These symptoms mostly occurred at least once a week, indicating the good validity of reflux symptom data and the fact that our selected patients were representative of the population at large. In our study, overweight and obese were not related to the frequency of heartburn and acid regurgitation, however this trend was common in women and this

confirms the gender specific effect as in Swedish case control study¹⁴, assumed to be due to the increased hormonal activity.

The results of our study were consistent with the results of two previous studies in massively obese subjects^{14, 20}, but there is a variance in our results as compare with some previous studies^{1, 3, 20, 21}, two of which were case series consisting of patients referred for endoscopy^{20, 21}. In these studies, the average BMI was significantly higher among patients with reflux esophagitis than in those without and the other studies indicated significant relationship between BMI and prevalence of gastro-esophageal symptoms in different communities. Each of the above studies considered few variables as potential confounders. Age, sex, smoking, alcohol use, meal size, physical activity, hiatal hernia, life stress, high cholesterol diet and frequency of consumption of various foods such as chocolates and coffee etc were notorious as potential confounders³. We found that the occurrence of GERD increased with amount of cigarettes consumed, but there was no relationship with age, alcohol, tea, coffee, use of drugs and with history of some co morbidities. These findings are slightly inconsistent with the studies of Moraes-Filho JP *et al*³ and Bor S *et al*⁴

The limitations of our study are its cross-sectional design, small sample size which allows the possibility of reverse causality as an explanation of our findings. Moreover, we did not evaluate subjects at the onset of their symptoms and thus we cannot tell what factors were important for the instigation of symptoms. We did not consider dietary components (high dietary fat intake, macro and micronutrients), and life stress as risk factors in our study.

Our study concludes that in our setting, the symptoms of GERD occur independently of body mass index. Therefore, the role of weight reduction a part of anti-reflux treatment in obese and overweight patients will be unsuccessful in our setting. It seems that high BMI plays a more important role to cause symptoms of GERD among western population but not in Asian populations. However, further studies in Asian communities are also required in this regard.

TABLE 1:
PATIENT'S DEMOGRAPHIC PROFILE

| | Women | Men | p-value |
|---|--------------|--------------|---------|
| Age mean ± SD | 36.51± 12.33 | 42.11± 13.18 | 0.194 |
| BMI kg/m² | | | |
| Obese | 46 (23%) | 20 (10%) | 0.776 |
| Overweight | 52 (26%) | 32 (16%) | |
| Normal | 32 (16%) | 18 (9%) | |
| Smoking | | | |
| Never smoked | 116 (58%) | 14 (7%) | 0 |
| Exsmoker* | 2 (1%) | 10 (5%) | |
| Current smoker < 20 cig /day | 10 (5%) | 36 (18%) | |
| Current smoker >20/ cig day | 2 (1%) | 10 (5%) | |
| Alcohol (drinks/day) | 2 (1%) | 10 (5%) | 0.006 |
| Tea intake (cups/day) (n=200) | | | |
| Less than 5 | 130 (65%) | 70 (35%) | 0.364 |
| Greater than 5 | 30 (15%) | 22 (11%) | |
| | 100 (50%) | 48 (24%) | |
| Coffee intake (cups/day) (n=134) | | | |
| Less than 5 | 90 (67%) | 44 (33%) | 0.674 |
| Greater than 5 | 64 (48.5%) | 28 (21%) | |
| | 26 (19.5%) | 16 (12%) | |
| Drugs | | | |
| NSAIDs | 20 (10%) | 20 (10%) | 0.297 |
| Steroids | 10 (5%) | 4 (2%) | |
| H/o diabetes | 4 (2%) | 6 (3%) | 0.102 |

TABLE 2:
ASSOCIATION BETWEEN BMI AND HEART-BURN* SYMPTOM AMONG PATIENTS

| Heartburn | BMI(Kg/m ²) | Patients (n=200) | 95% C I | p-value |
|-----------------------------------|-------------------------|------------------|------------------|---------|
| SEVERITY OF HEARTBURN: | | | | |
| Mild 78 (39%) | Normal | 20 (10%) | 2.05 (1.81-2.30) | 0.583 |
| | Overweight | 34 (17%) | | |
| | Obese | 24 (12%) | | |
| Moderate 38 (19%) | Normal | 14 (7%) | 1.89(1.50-2.28) | |
| | Overweight | 14 (7%) | | |
| | Obese | 10 (5%) | | |
| Severe 14 (7%) | Normal | 2 (1%) | 2.14(1.50-2.78) | |
| | Overweight | 8 (4%) | | |
| | Obese | 4 (2%) | | |
| FREQUENCY OF HEARTBURN: | | | | |
| Once a week 50 (25%) | Normal | 16 (8%) | 2.04(1.69-2.39) | 0.786 |
| | Overweight | 16 (8%) | | |
| | Obese | 18 (9%) | | |
| Twice a week 50 (25%) | Normal | 14 (7%) | 1.92 (1.63-2.21) | |
| | Overweight | 26 (13%) | | |
| | Obese | 10 (5%) | | |
| More than twice a week 30(15%) | Normal | 6 (3%) | 2.13(1.74-2.51) | |
| | Overweight | 14 (7%) | | |
| | Obese | 10 (5%) | | |

TABLE 3:
ASSOCIATION BETWEEN BMI AND ACID RE-GURGITATION SYMPTOM AMONG PATIENTS

| | Women | Men | p-value |
|---|--------------|--------------|---------|
| Age mean ± SD | 36.51± 12.33 | 42.11± 13.18 | 0.194 |
| BMI kg/m² | | | |
| Obese | 46 (23%) | 20 (10%) | 0.776 |
| Overweight | 52 (26%) | 32 (16%) | |
| Normal | 32 (16%) | 18 (9%) | |
| Smoking | | | |
| Never smoked | 116 (58%) | 14 (7%) | N.S |
| Exsmoker* | 2 (1%) | 10 (5%) | |
| Current smoker < 20 cig /day | 10 (5%) | 36 (18%) | |
| Current smoker >20/ cig day | 2 (1%) | 10 (5%) | |
| Alcohol (drinks/day) | 2 (1%) | 10 (5%) | 0.006 |
| Tea intake (cups/day) (n=200) | | | |
| Less than 5 | 130 (65%) | 70 (35%) | 0.364 |
| Greater than 5 | 30 (15%) | 22 (11%) | |
| | 100 (50%) | 48 (24%) | |
| Coffee intake (cups/day) (n=134) | | | |
| Less than 5 | 90 (67%) | 44 (33%) | 0.674 |
| Greater than 5 | 64 (48.5%) | 28 (21%) | |
| | 26 (19.5%) | 16 (12%) | |
| Drugs | | | |
| NSAIDs | 20 (10%) | 20 (10%) | 0.297 |
| Steroids | 10 (5%) | 4 (2%) | |
| H/o diabetes | 4 (2%) | 6 (3%) | 0.102 |
| H/o asthma | 4 (2%) | 2 (1%) | |

TABLE 4:
RELATIONSHIP BETWEEN GERD SYMPTOMS AND BMI AMONG THE PATIENTS

| Symptoms | BMI (Kg/m ²) | | | 95% C I | p-value |
|--|--------------------------|------------|----------|------------------|---------|
| | Normal | Overweight | Obese | | |
| Epigastric Pain (n = 132) | 36 (18%) | 56 (28%) | 40 (20%) | 2.03 (1.84-2.22) | 0.658 |
| Nausea (n = 174) | 38 (19%) | 72 (36%) | 64 (32%) | 2.15 (1.79-2.31) | 0.06 |
| Vomiting (n = 102) | 30 (15%) | 40 (20%) | 32 (16%) | 2.02 (1.80-2.24) | 0.581 |
| Acid Regurgitation (n = 128) | 32 (16%) | 54 (27%) | 42 (21%) | 2.06 (1.87-2.25) | 0.935 |
| Heart Burn (n = 128) | 36 (18%) | 54 (27%) | 38 (19%) | 2.02 (1.52-2.21) | 0.525 |
| Feeling of wind / fullness (n = 92) | 14 (7%) | 44 (22%) | 34 (17%) | 2.22 (2.01-2.42) | 0.113 |
| Belching (n = 90) | 24 (12%) | 32 (16%) | 34 (17%) | 2.11 (1.87-2.35) | 0.48 |
| Burping (n = 22) | 2 (1%) | 6 (3%) | 14 (7%) | 2.55 (2.08-3.01) | 0.067 |

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