

## Are body mass index and waist over hip ratio associated with gastroesophageal reflux symptoms among outpatients in Hospital Tuanku Ja'afar?, Malaysia

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**Objective:** To look at the association between the body mass index (BMI) and waist over hip ratio to gastroesophageal reflux disease (GERD).

**Methodology:** This prospective cross sectional study included subjects who visited gastrointestinal outpatient clinic at Hospital Tuanku Ja'afar, Malaysia. It was a convenient sampling. The subjects were interviewed with a validated questionnaire (GERDq). The data was analyzed using statistical analysis SPSS version 19.

**Result:** A total of 100 subjects were interviewed. The chi-square value for modified BMI was 1.190 ( $p=0.275$ ). 59% of study population had a BMI of

23 kg/m<sup>2</sup> and of these, 31% had GERD impact on daily life. The W/H Ratio had chi-square value of 0.852 ( $p=0.356$ ). 29% of the subjects with W/H Ratio above 0.85 for male and 0.95 for female showed GERD symptoms with high impact on daily life.

**Conclusion:** In this study, BMI and W/H Ratio were not associated with GERD symptoms. However, the results showed a trend of increased BMI with higher GERD symptoms impact on the daily life. (Rawal Med J 201;41:238-240).

**Keywords:** Body Mass Index, BMI, obesity, Waist/Hip Ratio, Gastroesophageal Reflux Disease, GERD.

### INTRODUCTION

Gastroesophageal reflux disease (GERD) is described as a pathological condition where the gastric contents are regurgitated to the esophagus and sometimes the oral cavity causing esophageal and extraesophageal manifestations.<sup>1</sup> GERD is prevalent worldwide, and the disease burden may be increasing.<sup>2</sup> The rise in the prevalence of GERD reflects the dramatic socioeconomic development and consequent life style changes in many Asian countries.<sup>3</sup>

Not much is known about the prevalence and incidence of GERD in Malaysia due to the struggle in obtaining a quantitative data of the disease because patients generally do not seek medical advice.<sup>4</sup> A validated GERD scoring system has been developed to detect GERD symptoms.<sup>5</sup> Identifying the risk factors is crucial in retarding the rising rate of GERD and for lifestyle modification. There is paucity of research to prove that lifestyle changes can prevent the incident of GERD. This study was

aimed to determine whether BMI and W/H ratio are related to GERD.

### METHODOLOGY

A cross sectional study was carried out amongst the Malaysian patients of all ages and genders who came to outpatient gastrointestinal clinics in Hospital Tuanku Ja'afar, Seremban, Malaysia. The minimum sample size was estimated for finite population with the help of EPI-info version 5.0 statistical package. The confidence level was taken as 95%. The normal deviate corresponding to the required confidence interval ( $t$ ) was 1.96. The prevalence rate ( $p$ ) for GERD in Malaysia is 9%.<sup>6</sup>  $q$  was set to 91 (100- $p$ ). The required absolute precision of the estimate was set to 5% in this study. The total eligible population in the study area ( $N$ ) was 400. Hence, the final sample size was estimated to be 96.

All were interviewed randomly using a validated questionnaire, which was a 2 parts instrument. The

first part comprised of validated questionnaires (GERDq)<sup>5</sup> about the GERD symptoms that the subjects were having in a week with frequency scores. Of those cut-offs, 8 had the specificity (78%) and sensitivity (50%) and consequently, it was proposed as the cut-off when testing for GERD. The second part were details such as BMI and waist/hip ratio. The data were analyzed with SPSS v 19.

**RESULTS**

The range of the BMI was 13.3 to 44.5 kg/m<sup>2</sup> (mean 25.1). The range of the waist-hip ratio was 0.49 to 1.11 (mean 0.85) (Table 1). Out of 100 subjects, 21 had GERD symptoms with low impact on their daily life. 27 subjects with GERD symptoms had a high impact on their daily life.

**Table 1. Demographic and risk factor related to GERD**

| Category        |                                                | %  |
|-----------------|------------------------------------------------|----|
| Gender          | Male                                           | 29 |
|                 | Female                                         | 71 |
| Race            | Malay                                          | 51 |
|                 | Chinese                                        | 27 |
|                 | Indian                                         | 22 |
| BMI             | 22.9 and below                                 | 41 |
|                 | 23.0 and above                                 | 59 |
| Waist Hip Ratio | Male W/H Ratio <0.9 and Female W/H Ratio <0.85 | 65 |
|                 | Out of Range                                   | 35 |

Table 2 shows 41% had BMI 22.9 and below, with remaining 59% with BMI 23 and above. Among those with BMI 22.9 and below, only 17% had GERD impact on daily life. Among those with BMI 23 and above, 31% had GERD impact on daily life.

**Table 2. Modified BMI\* Modified GERD score.**

|              |                | Modified GERD                                |                                | Total |
|--------------|----------------|----------------------------------------------|--------------------------------|-------|
|              |                | Low probability/no GERD impact on daily life | High GERD impact on daily life |       |
| Modified BMI | 22.9 and below | 24                                           | 17                             | 41    |
|              | 23.0 and above | 28                                           | 31                             | 59    |
| Total        |                | 52                                           | 48                             | 100   |

P=0.275

**Table 3. W/H Ratio \* Modified GERD Score Cross-tabulation Table**

|           |                                                | Modified GERD                                |                                    | Total |
|-----------|------------------------------------------------|----------------------------------------------|------------------------------------|-------|
|           |                                                | Low probability/no GERD impact on daily life | Low/high GERD impact on daily life |       |
| W/H Ratio | Male W/H Ratio <0.9 and Female W/H Ratio <0.85 | 36                                           | 29                                 | 65    |
|           | Out of Range                                   | 16                                           | 19                                 | 35    |
| Total     |                                                | 52                                           | 48                                 | 100   |

P=0.356

Males with W/H Ratio <0.9 and females with W/H Ratio <0.85 accounted for 65% of total subjects. Out of these, 29% suffers from GERD impact on daily life, whereas 36% shows none or low GERD impact on daily life (Table 3). On the other hand, out of those having W/H Ratio >0.9 for male and >0.85 for female, 19% showed GERD impact on daily life (p=0.35)

**DISCUSSION**

The results of our study showed there were no associated between the BMI with GERD impact on daily life. Some studies have shown that BMI is independent risk factors for GERD. However, a meta-analysis suggested inconsistent association between GERD and elevated BMI.<sup>7</sup> Another study reported no evidence of an association between BMI and GERD.<sup>8</sup> As reflux symptoms are likely due to other factors such as metabolic syndrome, smoking, alcohol assumption, Wu et al suggested that metabolic syndrome other than obesity has not been studied extensively.<sup>9</sup> The literature that evaluated the association between GERD and metabolic syndrome has not been sufficient to prove the hypothesis.<sup>9</sup>

Our study included waist to hip ratio (WHR) measurements, which is a simple and reliable method to correlate the abdominal fat content. The increase in WHR indicated the increase of abdominal fat that contributes to the intra-abdominal pressure.<sup>9</sup> The increased abdominal girth is associated with the increase of transient lower esophageal sphincter (LES) relaxation.<sup>10</sup> These would lead to GERD. In our sample

population, 65% were having normal WHR. It was an expected outcome as the mean of the samples BMI was 25.1 kg/m<sup>2</sup>. In other words, the BMI distribution was average among the samples. Thus, the comparison of significance relationship between WHR and GER symptoms were difficult.

Besides the risk factors mentioned above, there are actually other factors involved in the manifestations of the symptoms of GERD. For example, medication usage such as beta-blockers for hypertension, anti-cholinergics, bronchodilators for asthma and dopamine-active drugs for Parkinsonism.<sup>11</sup> Some examples of the unhealthy eating habits commonly practiced are late night binge eating, sleeping immediately after eating food, eating heavy meals during dinner and so on and so forth.

There are some limitations of our study. Patients with reflux symptoms presenting to the medical outpatient were not included due to logistic reasons. The patients' pool was mainly from the surgical clinic and hence the sample size was small. The sample size was insufficient to make a significant conclusion of relationship among the risk factors with reflux symptoms. Another factors that was not analyzed in this study that we had conducted was the intake of spicy food, caffeine and anti-oxidants such as chocolates.

## CONCLUSION

Our study showed a trend of high BMI with increased GERD impact on daily life. However, BMI and WHR were not significantly associated with GERD.

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**Conflict of Interest:** None declared

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