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**Physiology**

# Obesity in Women: An Observational Study in a District Hospital

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| Abstract | | Original Research Article |
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***Introduction:*** Overweight and obesity presents a major challenge in women around the world, with mainly associated with epidemiological factors. The study aim was to evaluate Socio-Economic Factors Associated with Obesity in Women >20 Years of Age. ***Materials and Methods:*** This was a community based observational study conducted at the Department of Physiology, Dhaka Central International Medical College (DCIMC), and Dhaka, Bangladesh during the period of January 2020 to March 2021. Two hundred participants were selected through a purposive sampling technique as study participants. Data were analyzed using SPSS software version 22. ***Results:*** Among the participants, the majority (32%) was from the age group of 30-39 years. 27.5% were in the age group of 20-29 years, and 21.5% were from the age group of 40-49 years. 55% were Muslim, 41% were Hindu and 4% were Christian. The majority of the participants (86%) were currently married. 75% were modern nuclear families, and 20% were joint families. Over half (51%) of the participants were illiterate. The Mean ± SD weight was 50.34 ± 6.78 in the non-obese group, and 68.85 ± 8.38 in the obese groups. The Mean ± SD BMI was 21.72 ± 2.56 in the non-obese group and 29.85 ± 3.81 in the obese group. The difference between the age groups of participants between the obese and non-obese groups was statistically significant, and the difference in religion and education between the two groups was statistically non-significant. ***Conclusion:*** This community-based study was able to understand certain socio-economic factors associated with obesity in adult women.
**Keywords:** Obesity, Adult women, Community.

# INTRODUCTION

For many years now Bangladesh has been grappling with the pangs of under-nutrition, poverty, and maternal and child deaths [1]. In an attempt to escape this vicious circle of poverty, under-nutrition, poor quality of life, and eventually death, a large number of people migrate from rural areas to more urbanized settlements. There they usually build up slums and become day-to-day earners. As a result of this transition several lifestyle changes like traditional eating habits; exposure to severe stress, and an increase in smoking, tobacco chewing, and other types of substance abuse [2]. A significantly large part of Bangladesh's population seems to be going through such a so-called 'Nutrition Transition'. Hence, Bangladesh, with its substantial burden of under-nutrition across age groups; sees a picture of 'dual burdens'- one where obesity is now rapidly increasing across regions, and often coexisting in the same population (even same households) with chronic under-nutrition. WHO defines obesity as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired [3]. National Family Health Survey (NFHS)-III (2005-06) Bangladesh, found that 33.0% of Ever-Married Adults (age 15-49 years) had Body Mass Index-BMI below normal range whereas 14.8% in the same age group had BMI in the ranges of overweight and obese. This prevalence was 10.6% in NFHS-II. These figures highlighted the fact that besides under-nutrition, Bangladesh already faces a new form of chronic

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malnutrition- obesity [4]. The obesity epidemic moves through a population in a reasonably consistent pattern over time and this is reflected in the different patterns in low-income and high-income countries [3]. In the transition phase, people with less education and lower socioeconomic status (SES) are more likely to be obese, and the gap is generally larger in women [5]. Data from NFHS III shows that in Bangladesh, the trend of overweight and obesity is a rising one especially among women [3]. Higher BMI, and more specifically, increased abdominal fat clearly is an important determinant of blood glucose levels, insulin resistance, and the development of diabetes [6]. It has been observed that the Asian populations develop diabetes at a lower BMI compared to other ethnicities [6]. Considering these facts, it was considered imperative to conduct a study on the epidemiology of obesity in adult women dwelling in an urban slum area. As WHO has defined adolescents as age group from 10 to 19 years, adult women above the age of 20 years were decided upon to be the study population. The aim of our study was to understand the epidemiology of obesity among adult women above the age of 20 years in Bangladesh.

## OBJECTIVES

To assess the factors associated with obesity among the female population in Bangladesh.

### Materials and Methods

This was a community based observational study conducted at the Department of Physiology, Dhaka Central International Medical College (DCIMC), Dhaka, Bangladesh, during the period of January 2020 to March 2021. A purposive selection technique was used for selecting 200 eligible participants for this study. Among the participants, 23% were recognized as obese and 77% were non-obese. A single interviewer collected data by conducting personal face-to-face interviews of the eligible women and completed the semi-structured interview schedule. Informed consent was taken before the interview from each of the participants, and ethical approval was obtained from the ethical review board of the hospital. After the data was collected, all statistical analyses were conducted using STATA version 22.

## RESULTS

Among the participants, the majority (32%) was from the age group of 30-39 years. 27.5% were in the age group of 20-29 years, and 21.5% were from the age group of 40-49 years. 55% were Muslim, 41% were Hindu and 4% were Christian. Majority of the participants (86%) were currently married. 75% were modern nuclear families, and 20% were joint families. Over half (51%) of the participants were illiterate. The Mean ± SD weight was 50.34 ± 6.78 in the non-obese group, and 68.85 ± 8.38 in the obese groups. The Mean ± SD BMI was 21.72 ± 2.56 in the non-obese group and 29.85 ± 3.81 in the obese group. The difference between the age groups of participants between the obese and non-obese groups was statistically significant, and the difference in religion and education between the two groups was statistically non-significant.

**Table-1: Background characteristics of the study participants. (n=200)**

| Characteristics | N= 200 | % |
|---|---|---|
| Age Group | | |
| 20-29 | 55 | 27.5 |
| 30-39 | 64 | 32 |
| 40-49 | 43 | 21.5 |
| 50-59 | 20 | 10 |
| 60-69 | 14 | 7 |
| >70 | 4 | 2 |
| Religion | | |
| Muslim | 110 | 55 |
| Hindu | 82 | 41 |
| Christian | 8 | 4 |
| Marital Status | | |
| Unmarried | 11 | 5.5 |
| Currently Married | 172 | 86 |
| Widow | 15 | 7.5 |
| Divorced | 2 | 1 |
| Type of Family | | |
| Nuclear | 150 | 75 |
| Extended | 10 | 5 |
| Joint | 40 | 20 |
| Literacy Status | | |
| Illiterate | 102 | 51 |
| Primary | 48 | 24 |
| Secondary | 38 | 19 |
| Higher Secondary | 7 | 3.5 |
| Graduate | 8 | 4 |

| Post Graduate | 1 | 0.5 |
|---|---|---|

The majority of the participants (27.5%) were from the youngest age group of 20-29. Only 2% of the participants were above 70, and 7% were from the age group of 60-69 years. 55% of the participants were Muslim, 41% Hindu, and 4% Christian. 86% of the participants were married at the time of the study.

Among the participants, 75% were modern nuclear families, 5% were extended families and 20% were from join families. Over half the participants had no education, and very few participants had education above secondary level, with only 1 with education up to postgraduate levels.

**Table-2: Comparison of anthropometric and other measurements of respondents**

| Anthropometric Factor | Non-Obese (N=154) Mean ± SD | Obese (N=46) Mean ± SD |
|---|---|---|
| Weight (kg) | 50.34 ± 6.78 | 68.85 ± 8.38 |
| Height (m) | 1.52 ± 0.04 | 1.52 ± 0.05 |
| BMI (kg/m2) | 21.72 ± 2.56 | 29.85 ± 3.81 |
| Waist circumference (cm) | 77.68 ± 11.61 | 96.54 ± 14.95 |
| Hip circumference (cm) | 90.24 ± 12.38 | 108.14 ± 9.22 |
| Waist-Hip Ratio | 0.86 ± 0.06 | 0.89 ± 0.11 |
| Systolic BP (mm Hg) | 117.40 ± 14.19 | 125.84 ± 15.85 |
| Diastolic BP (mm Hg) | 76.69 ± 8.81 | 81.06 ± 9.39 |
| RBS (mg/dl) | 105.23 ± 45.78 | 149.58 ± 64.47 |

Table 2 shows the mean values of various anthropometric factors evaluated in the study. The difference between the average weight of obese and non-obese participants was quite high, but not much difference was observed between the average heights of the two groups. The mean systolic and diastolic BP was higher in the obese group. The Mean ± SD BMI was 21.72 ± 2.56 in the non-obese group and 29.85 ± 3.81 in the obese group.

**Table-3: Association of Epidemiological Parameters and Obesity Status**

| Variables | BMI Category | | | | Total (N=200) | Chi square Value | P value |
|---|---|---|---|---|---|---|---|
| | Non-obese (N=154) | | Obese (N=46) | | | | |
| | Freq. | % | Freq. | % | | | |
| Age group (years) | | | | | | | |
| 20-39 | 96 | 62.34% | 22 | 47.83% | 118 | | |
| 40-59 | 43 | 27.92% | 20 | 43.48% | 63 | 10.32 (d.f-2) | 0.005 |
| ≥60 | 15 | 9.74% | 4 | 8.70% | 19 | | |
| Religion | | | | | | | |
| Muslim | 84 | 54.55% | 27 | 58.70% | 111 | | |
| Hindu | 66 | 42.86% | 16 | 34.78% | 82 | 4.61 (d.f-2) | 0.1 |
| Christian | 4 | 2.60% | 3 | 6.52% | 7 | | |
| Education | | | | | | | |
| Illiterate | 80 | 51.95% | 22 | 47.83% | 102 | | |
| Primary & secondary | 66 | 42.86% | 18 | 39.13% | 84 | 2.49 (d.f-2) | 0.29 |
| Higher education | 8 | 5.19% | 6 | 13.04% | 14 | | |

Table 3 shows the association between various epidemiological factors observed in the present study and the BMI categories the respondents belonged to. Among the non-obese participants, 62.34% were between the age of 20-39 years, and 27.92% were from the age group of 40-59 years. Only 9.74% were 60 years or older. Among the obese participants, 47.83% were between the age of 20-39 years, and 43.48% were from the age group of 40-59 years. Only 8.7% were 60 years or older. The p-value was 0.005, which was statistically significant. Among the non-obese participants, 54.55% were Muslim, 42.86% were Hindu, and 2.60% were Christian. In the Obese group, 58.70% were Muslim, 34.78% were Hindu, and 6.52% were 6.52% were Christian. This difference was not statistically significant. In the case of education,

51.95% were illiterate, 42.86% had primary and secondary levels of education, and 5.19% had higher education in the non-obese group. In the obese group, 47.83% were illiterate, 39.13% had primary and secondary levels of education, and 13.04% had higher education. The difference in education levels between the two groups was statistically insignificant.

# DISCUSSION

The overall Mean BMI of the respondents was 23.54 kg/m2 (SD- 4.39 kg/m2), which comes under the category of overweight according to the WHO classification of BMI for the Asian population. This was similar to another study where they found that the Mean BMI of their study population was 22.87kg/m2 [9]. This study also found that the prevalence of obesity increased with a rise in age till 50 years, after which it declined (p<0.001); similar to the present study. The mean random blood sugar (RBS) level was 115.25 mg/dl amongst the general respondents. Amongst those who were obese, the mean RBS was higher than the general population i.e. 149.58 mg/dl. In the present study, 86 women out of a total (17.2%) were found to be Hypertensive. Similar to RBS, Mean Systolic and Diastolic BP was also higher among the obese respondents (Sys. BP = 125.84, Dias. BP = 81.06). Only 42 respondents (8.4%) reported some or the other form of addiction, all of whom reported being addicted to Smokeless forms of tobacco. This was similar to another study where it was found that 10% of female respondents of their study gave a history of addiction to tobacco chewing [10]. Significant positive correlations between parity number and various obesity markers were found in a study [11]. Also, comparable to the findings of the present study, a study conducted in 2011 found no statistical association between religion, occupation, type of family, and marital status with obesity [8]. However, unlike in the present study where no statistical association was found, the previously mentioned study [8] found a highly significant association between education as well socio-economic status and obesity (p <0.001). Findings of dietary patterns varied in the present study and other similar pieces of literature. The odds of women who took a higher calorie diet (whether urban or rural) being overweight or obese was five times more than women who had low calorie diet [12]. No association between frequency of green leafy vegetable (GLV) consumption, fruit consumption and obesity were found [8]. A study by Basagoudar conducted in 2013 found statistically significant higher occurrence of overweight or obesity among women who had the habit of eating junk foods or snacks in between the meals regularly [7]. Some findings of the present study were comparable to other study findings like no statistical association between type of diet and obesity [8]; a significant association between frequency of eating fried foods at home and obesity [13]; a significant association between the amount of oil used per person per day [9]; no

statistically significant differences for meat and occurrence of obesity [14]. In the present study, total duration of sleep taken in the day (which included night sleep as well as any time spent sleeping in the day) was compared with obesity status and the difference was found to be statistically significant (Chi-Square value= 7.89, p value= 0.019) which was comparable to other studies [8] (p=0.006). started. The current study showed that 30.1% obese respondents had RBS levels ≥200 mg/dl. So, being obese was significantly associated with the risk of having a deranged blood sugar level (p value <0.001). In the study by Deshmukh P R, [15] they analyzed fasting blood glucose levels in their study subjects (present study estimated random samples blood glucose). They found that fasting blood glucose level was impaired in 10.7% women in their study. The percentage prevalence of Hypertension amongst obese women in the present study was 27.4%. This difference was found to be statistically significant (Chi Square value= 10.74, p value= 0.001) similar to the findings of another study [16] (p=<0.001).

# CONCLUSION

Significantly higher number of obese women had RBS levels ≥200 mg/dl and many were Hypertensive. Results of the study strongly suggest that Obesity is associated with numerous factors and their interplay in various combinations rather than a single cause. Obesity needs to be curbed at its roots. Measures should be deployed at its various trigger points at the individual and community level to help contain this fast-growing epidemic.

### Limitations

The present study was not devoid of limitations. No information about childhood factors of the respondents like birth weight, exclusive breast feeding in their childhood, history of childhood obesity etc. were obtained in the study. Psychological factors like body image perception, depression etc. associated with obesity were not considered in the present study. Details of whether she had exclusively breast fed her child/children was not obtained.

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