Determinants of Overweight and Obesity among Bangladeshi Diabetic Women of Reproductive Age

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Introduction: Several reproductive disorders are now known to be associated with insulin resistance. Overweight and obesity are major contributors of insulin resistance and their prevalence and determinants are known to vary in different populations. The increasing prevalence of overweight and obesity is a critical public health problem for women of reproductive age. Obesity has been associated with both short- and long-term health effects for women as well as for their offspring's. Existing research supports a link between obesity and conditions that impair a woman's ability to conceive and increase her risk for an adverse pregnancy outcome. Furthermore, this chronic condition has been linked to the development of diabetes and cardiovascular disease later in life.

Obesity is increasing at an alarming rate throughout the world and has become a global problem. The World Health Organization (WHO) has declared overweight as one of the top of 10 health risks in the world and one of the top five in developed nations. According to recent estimates, there are more than one billion overweight people worldwide, and some 250 million of these are estimated to be clinically obese, equivalent to 7% of the world adult population. Once considered a problem related to affluence, obesity is now fast growing in many developing countries and in poor neighborhoods of the developed countries.

The etiology of obesity is multi factorial. Poor diet and physical inactivity cause overweight and obesity. This imbalance between food intake and energy expenditure is determined, in large part, by the socioeconomic context. Although obesity is affected by interaction between multiple genes and the environment, the genetic pool is not changing rapidly; it is the environmental and social context that has changed and caused the epidemic.

There is a large literature demonstrating that women who are overweight are at greater risk of developing pregnancy complications and problems associated with labor and delivery. Finally, obese women are more at risk of postpartum complications. Taken all complications, maternal mortality and morbidity is significantly elevated for obese women. Maternal obesity is also related with health hazards for the fetus and the newborn. Obese women are more likely to give birth to a fetus with congenital anomalies overweight and to have infants who are exposed to a significantly higher perinatal morbidity rate. The effects of maternal obesity do not stop at birth - research has shown that babies born to obese mothers are at greater risk of later developing diabetes, cardiovascular disease and obesity themselves.

The rapid emergence of overweight and obesity has been recognized as a major public health problem; in most regions of the world, overweight now exceeds underweight among women of reproductive age. Obesity is the tip of the iceberg of a cluster of cardiovascular disease (CVD) risk factors, including hypertension and dyslipidemia. The natural consequence will be an epidemic of cardiovascular complications among diabetic patients, such as coronary heart disease and stroke as well as microvascular complications. Obesity also increases the risk of several reproductive disorders, negatively affecting normal natural function and fertility.

In Bangladesh recently the overweight and obesity among the diabetic women of reproductive age is increasing. From this point of view, an intensive research on the dynamics of obesity is needed to understand this upcoming health issue and formulate effective programs to enhance the quality of life of the people. However, due to paucity of data, understanding of the causes and consequences of this rapidly growing public health threat remains poor. Therefore, this study is an attempt to understand the dynamics of obesity among women in Bangladesh scenario. The objective of the present study was to assess the proportion and determinants of overweight and obesity among diabetic women of reproductive age attending a tertiary hospital in Bangladesh.

Materials and methods: This cross-sectional analytic study was conducted among 888 diabetic women of reproductive age attending the out-patient department of the central hospital of the Diabetic Association. Data were collected using a semi-structured questionnaire by face to face interview. Purposive sampling technique was used during data collection. Anthropometric measurements were done using appropriate techniques. BMI (WHO Guideline for SEA population) was used to assess the general obesity. Waist Circumference (WC, IDF criteria for

SEA population) and Waist-Hip Ratio (WHR, WHO criteria) were used to assess central obesity. Pearson's correlation analysis was used to explore the association between two variables and binary logistic regression analysis was performed to quantify the individual effect of predictor variables and to adjust for potential confounding factors.

Results: The overall prevalence of overweight was 47% (95% CI 48-45) and that of obesity was 23% (95% CI 21-24). Prevalence of central obesity by waist circumference was 77% and by waist-hip ratio was 97%. Overweight and obesity were higher in the age group of 45-49 years (49%) and 35-44 years (24%) respectively. On Pearson's correlation analysis, BMI ($r=0.135$, $p=0.001$) and WC ($r=0.162$, $p=0.001$) were significantly associated with age, but there was no significant correlation between WHR and age. BMI ($r=0.151$, $p=0.001$), WC($r=0.087$, $p=0.009$) and WHR($r=0.094$, $p=0.005$) were also significantly correlated with income. On binary logistic regression analysis, BMI was significantly associated with age ($p<0.05$), income ($p<0.05$) and management of diabetes by OHA ($p<0.05$). On the other hand, WC was significantly associated with age ($p<0.001$), income ($p<0.05$) and management of diabetes by OHA ($p<0.05$). WHR was significantly associated only with duration of diabetes ($p<0.05$) in this analysis.

Discussion: Obesity is one of the important risk factors for NCDs and it correlates with majority of the NCD disorders. This is the leading cause of NCD related morbidity throughout the world. Research showed that current rate of overweight and obesity are already unacceptably high among youths. This is of considerable concern for number of reasons. This is the risk factor of diabetes mellitus, hypertension, dyslipidemia, CHD, depression and various type of cancer. This increasing trend of overweight and obesity, when combined with the continued trend toward globalization, will serve to seriously escalate the population level of obesity. This study showed that 47% and 23% of the Bangladeshi diabetic women of reproductive age are overweight and obese respectively according to Asian specific BMI cut-off value. Thus the results of the present study show that overweight and obesity are major public health problems for reproductive age women in Bangladesh. No study was conducted on Bangladeshi diabetic women of reproductive age for measuring overweight and obesity previously. In Saudi Arab, El Hazmi et al conducted a study, where 29.66% and 39.27% diabetic women were found overweight and obese respectively by using WHO standard BMI cut off value. Our study showed more prevalence of overweight

and obesity in our population. Probably the cut-off value of BMI and ethnicity are the leading cause of difference of this result. Khan et al conducted a study among ever-married non-pregnant urban women in Bangladesh. They had found 15.7% and 3.9% of participants were overweight and obese respectively. The probable reason of difference may be due to the study population and cut-off values. But now this situation has changed dramatically due to rapid demographic transition from traditional lifestyle to modern culture. The prevalence of obesity has reached on its peak, near about 100%, among both Saudi Arabian and Bangladeshi women. The current study found 77% respondent had excess waist circumference and its mean was 88.0±11.2 cm. Anisur et al found 23% urban women at Dhaka had excess waist circumference, which is much lower than our study findings. It is very interesting, 97.4% diabetic women of our study had excess cut-off value of waist to hip ratio and they fall in the higher risk group of obesity related disorders. Among all respondents, near about hundred percent had abnormal waist to height ratio. Women had more body fat composition than men and the values are probably high due to the inclusion of the diabetic population in this study.

The highest prevalence of overweight and obesity has been reported in women aged 35-49 age groups and correlation curve show that BMI and waist circumference are increased with advancement of age. This result was similar with Sotoudeh et al also found that obesity is increased with age. The higher income group people have a sedentary lifestyle and it can induce obesity. The present study shows that increasing household income is associated with anthropometric markers (BMI, WC and WHR). Duration of diabetes is also positively associated with waist to hip ratio. In present study, by multivariate analysis, age and income levels are found to independently correlate with overweight and central obesity. Using of oral hypoglycemic drug for treatment of diabetes is found to create abnormal anthropometric risk markers among diabetic reproductive aged women. OHA users had near about 4 times higher chance of development of central obesity and 2 times higher chance of over weight than the lifestyle modification adopting groups. Drug trials showed that some OHA can induce obesity and which support our research findings.

Conclusion: A high prevalence of both overweight and obesity exists in diabetic women of reproductive age in Bangladesh and it seems to be associated with increasing age, income, duration of diabetes, and use of oral hypoglycemic agents.