

## Breakfast Skipping and Obesity Risk among Urban Adults in Bangladesh

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### ABSTRACT

Positive association between skipping breakfast and overweight and obesity is globally observed regardless of cultural diversity among countries. A cross-sectional descriptive study was performed on a total of 426 urban adults, who were randomly selected in a nutrition counseling center of Dhaka city, Bangladesh. The objective of this study was determining the association between breakfast skipping and obesity risk in urban adults of Bangladesh. Results indicated that approximately 35.2% of the sample skipped breakfast. Gender was the only statistically significant sociodemographic variable, with females skipping at two times the rate of males (OR 95% CI: 1.9; 1.3-2.9). Obesity was detected among 39.5% of breakfast skippers and they showed significantly high prevalence ( $X^2=30.15$ ,  $p<0.05$ ). Skippers were significantly more likely being obese (OR 3.5; 95% CI 2.2-5.5) and obesity was more prevalent in female skippers ( $X^2=8.7$ ,  $p<0.05$ ), with three times more compared to male skippers (OR 95% CI: 2.8; 1.4-5.9). Breakfast skipping is highly prevalent among urban adult population with significant association of obesity in Bangladesh. Health promotion strategies should be used to encourage all adults to eat breakfast regularly.

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### 1. INTRODUCTION

Breakfast consumption has been identified as an important factor in the nutritional well-being of adult [1]-[3]. Some studies reported that breakfast could play an important role in the prevention of adult chronic diseases such as heart disease, cancer, diabetes, and osteoporosis [4]. Breakfast provides a significant proportion of the day's total nutrient intake [5]-[7] with lower intakes of fat and higher intakes of carbohydrate [8],[9], dietary fibre and certain micronutrients [10],[11]. Regular breakfast consumption is associated with better diets for adults overall where skipping is associated with a lower diet quality and concentrated energy intakes [12] meeting two thirds of the Recommended Dietary Allowance for vitamins and minerals [13] and health-compromising behaviors in adults such as smoking, infrequent exercise, low education level, higher BMI [14]. Breakfast skipping is highly prevalent in the United States and Europe (10% to 30%) [15]. Skipping breakfast is a fairly common practice with 23% of adults and there is evidence that skipping breakfast is becoming more common in developing countries also. According to a recent survey from Food Insight, 93% of Americans agree that breakfast is the most important meal, yet fewer than half

(44%) are eating it every day. The 2002 National Health and Nutrition Examination Survey (NHANES) suggests that American adults frequently skip breakfast (18%) [16] where 12–34% of youth regularly skip breakfast worldwide [17]-[24]. Adults who consumed breakfast regularly have significantly lower fat and cholesterol intakes [17] and healthy body weight [18] than those who skip breakfast. Regular consumption of a breakfast meal may reduce the risk of obesity and other chronic diseases [25]-[26]. Eating breakfast help to reduce dietary fat and minimize impulsive snacking promoting a preventive measure in obesity [27]. Breakfast skipping increased during the transition to adulthood, and both dietary behaviors are associated with increased weight gain from adolescence to adulthood [28]. Eating breakfast is associated with significantly lower body mass index compared to skipping breakfast [29]-[31]. Most cross-sectional studies that have examined the association between breakfast habits and measures of obesity in adults report an inverse association, even with adjustment for potential confounding factors [32]-[36],[38]. In a population based survey, it was found that the unadjusted odds ratio of obesity in breakfast skippers was two times more than non skippers (95% CI: 1.23 ; 1.06-1.43) [37]. Study showed that skipping breakfast was associated with increased prevalence of obesity (odds ratio = 4.5, 95% confidence interval: 1.57, 12.90) [39]. Prospective studies also examined the associations between breakfast habits and body weight [40]-[42]. In one study, promoting breakfast eating was associated with a 45% reduced risk for obesity [odds ratio = 0.55 (95% CI = 0.33, 0.91)] in adults [39], whereas skipping breakfast appeared to be associated with a significant increase in risk of developing obesity [43]. Among male health professionals, inverse associations were observed between breakfast cereal intake and BMI and between breakfast cereal intake and weight gain [44]. Breakfast frequency and quality may contribute to appetite regulation, quality of diet, and prevention of obesity and chronic disease through a variety of mechanisms [45]. Many studies have reported that ready-to-eat breakfast cereal [46] and other fiber-rich foods [47]-[50] are associated with lower risk of obesity [51]-[54]. Intake of fiber-rich breakfast foods may improve blood sugar control and possibly prevent excess eating throughout the day promoting weight management [55]-[59].

Breakfast consumption is related to satiety and reduced risk of obesity, type 2 diabetes and possibly of cardiovascular disease and cancer. Breakfast is considered the most important meal of the day for various reasons, but most of the adult used to skip their breakfast possessing detrimental health sequel. This is first documented study in Bangladesh to determine the prevalence of breakfast skipping in urban adults with significant association of obesity.

## 2. RESEARCH METHOD

A cross-sectional descriptive study design was carried out from April to May, 2013 among urban adults attending in a nutrition counseling center located at Dhaka, Bangladesh. A total number of 426 adults were randomly selected from the center registered for their regular visit. Adults having medical conditions were excluded from the study and adults with normal conditions were included in the study. Equal number of male and female participants was selected for the interview. All of the selected participants were made well informed of the study aims and informed written consent was obtained from the subjects. Interviews were conducted in the counseling room. A semi-structured questionnaire was used to collect data regarding their age, sex, education, weight, height, BMI level, meal pattern, eating pattern of breakfast, skipping of breakfast, reason behind skipping of breakfast, presence of health problems etc. Sample completed the questionnaire anonymously and used about 30 minutes to complete the scale. They could decline to participate in the project at any time while completing the questionnaire.

### Measures

Data were collected by a self-administered questionnaire. The questionnaire was composed as follows:

**Demographic characteristics** were age, sex and educational level.

**Weight status** was determined by Body Mass Index (BMI). The height and weight were measured by self-report and the BMI was calculated by the standard formula: weight (kg) divided by height (m<sup>2</sup>). BMI was plotted on the age and sex-specific cutoff points to define the different body sizes of respondents according to nationally accepted guidelines. A BMI greater than or equal to 25 is overweight and a BMI greater than or equal to 30 is obesity. Ranges from 18.5 to 24.9 of BMI ensure the normal level.

### Statistical analysis

Crude odds ratios (OR) was calculated to evaluate the risk of independent variables and associated 95% confidence intervals. The risk (odds ratio and chi square) of obesity and associated 95 percent

confidence intervals was estimated using simple logistic regression analysis. Multivariable logistic regression modeling was used to control all risk estimates for covariates. Possible covariates, participants' health-promoting behaviors and demographic characteristics, were evaluated as potential confounders of the relationship between eating patterns of breakfast and obesity status. All statistical analyses were performed using SPSS for Windows Version 15.0, with a significance level of  $P < 0.05$ .

### 3. RESULTS AND ANALYSIS

A total number of 152(35.8%) respondents reported to skip their breakfast at regular basis. Female respondents (60.5%) skipped breakfast more compared to their male respondents (39.5%), with females skipping at two times the rate of males (OR 95% CI: 1.9; 0.90-4.13). Sample skipped their breakfast having different reasons. The main reasons for breakfast skipping were: habit (39.4%), work pressure (23.2%), lack of time (16.2%), away from family (14%), unable to prepare (7.7%) (Table 1).

Unadjusted odd ratio for breakfast skipper having obesity risk was established in this study. Table 2 Skippers were significantly more likely to be obese (OR 3.5; 95% CI 2.2-5.5). Obesity was detected among 39.5% of breakfast skippers and they showed significantly high prevalence ( $X^2=30.15$ ,  $p<0.05$ ). [Table 3] Obesity was more prevalent in female skippers ( $X^2=8.7$ ,  $p<0.05$ ), with three times more obese than male skippers (OR 95% CI: 2.8; 1.4-5.9). [Table 4] Intensity of the correlation between Breakfast skipping and obesity was found significantly in Table 5. In this study, statistically highly significant correlation ( $P=0.01$ ) between Breakfast skipping and obesity were established.

**Table 1: Characteristics and eating pattern of breakfast among respondents**

Age	Respondents (%)
20-30	95(22.3%)
31-40	116(27.2%)
41-50	141(33%)
51-60	74(17.5%)
Sex	Respondents (%)
Male	213(50%)
Female	213(50%)
Weight status(BMI Level)	Respondents (%)
Underweight	7(1.6%)
Normal weight	192(45%)
Overweight	124(29.2%)
Obesity	103(24.1%)
Obesity by sex	Respondents (%)
Male	42(41.4%)
Female	61(58.6%)
Breakfast skipping	Respondents (%)
Yes	152(35.8%)
No	274(64.2%)
Breakfast skipping by sex	Respondents (%)
Male skipper	60(39.5%)
Female skipper	92(60.5%)
Reason of skipping	Respondents (%)
Work pressure	98(23%)
Habit	168(39.4%)
Unable to prepare	31(7.2%)
Away from family	60(14%)
Lack of time	69(16.4%)

**Table 2: Unadjusted ORs for breakfast skipper by obesity risk**

Breakfast skipper	Risk of obesity	
	n	OR(95% CI)
		3.5, 2.2-5.5

**Table 3: Distribution of breakfast skippers according to the presence or absence of obesity**

Character	Present/absent	Obesity	Statistical values	ORs (95% CI)
Breakfast skipper	Present	60(39.5%)	$X^2=30.15$ , $p<0.05$	3.5, 2.2-5.5
	Absent	43(15.7%)		

**Table 4: Distribution of sex wise breakfast skippers by obesity risk**

Character	Present/absent	Obesity	Statistical values	ORs (95% CI)
Breakfast skipping by Female	Present	45(75%)	$X^2=8.7, p<0.05$	2.8;1.4-5.9
	Absent	15(25%)		

**Table 5: Data of correlation strength between breakfast skipping and obesity**

Variables	Breakfast skipping	Obesity
Breakfast skipping	1	.572**
N	426	426
Obesity	.572**	1
N	426	426

\*\* Significance  $P=0.01$  level (2-tailed)

## Discussion

Breakfast contributes to the quality and quantity of a person's daily dietary intake [5]-[9], and breakfast-skipping has been linked to inadequate dietary nutrition [12],[13] with several health problems. The results of the current study support the hypothesis that breakfast skipping is more prevalent among urban adult population of Bangladesh with significant association of specific health problems such as obesity and overweight. The overall prevalence of breakfast skipping was estimated as 35.2% among Bangladeshi adult population. A number of studies have looked at the prevalence of skipping breakfast. Several studies showed that the prevalence of breakfast skipping, among Louisiana (France) adult was higher than in other countries. A Cross-sectional survey Nicklas TA, et. al (1998) of young adults in Bogalusa, La showed the prevalence of breakfast skipping with 37% [60] where Nicklas et al. and Shaw [61] reported that 19% of American and 12% of Australian young people skipped breakfast. In this study the prevalence of breakfast skipping among adult population of Bangladesh is also in high with 35.2 % which was close to the result of the study on France adults<sup>60</sup>. Another study Deshmukh-Taskar PR, et. Al (2010) showed the prevalence of breakfast skipping among adolescents with 31.5% where present result reports the prevalence with 35.2% [62]. Another study showed the prevalence of breakfast skipping with 22% where a high prevalence was also observed in this study [36].

The sociodemographic characteristics of breakfast skippers have also been investigated. Female respondents (60.5%) skipped breakfast more (OR 95% CI: 1.9; 0.90-4.13) compared to their male respondents (39.5%) in this study. Similarly, another study Shaw, Mary E. (1998) showed that female respondents skipped breakfast more compared to their male respondents [61]. But a contradictory result was found in a cross-sectional survey conducted among medical students in the Inner Mongolia Medical College showed the prevalence of skipping breakfast with 41.7% and 23.5% for males and females, respectively [63].

In this study it was reported by skippers that the main reasons for skipping were: habit (39.5%), work pressure (23.2%), lack of time (16.2%), away from family (14%), unable to prepare (7.7%). Similarly, Singleton and Rhoads (1982)<sup>74</sup> found that the most common reasons given for skipping were no time (43%) and not being hungry or habit of skipping (42%); less common reasons included being on a diet to lose weight, not feeling good, no one to prepare food, not liking the food served, and food not being available. Lack of time and habit privilege the reason behind breakfast skipping most often.

Regular consumption of a breakfast meal may reduce the risk of obesity and other chronic diseases [24]-[26]. In this study obesity risk (OR 3.5; 95% CI 2.2-5.5) was significantly associated with breakfast skipping. Several other studies including Stockman et al. and Berkey et al. have yielded similar results, showing that inconsistent or irregular breakfast eating was significantly associated with being overweight [64],[65]. In one study, increased meal frequency (meals per week) was associated with a 45% reduced risk for obesity [odds ratio = 0.55 (95% CI = 0.33, 0.91)] in adults [39], whereas skipping breakfast appeared to be associated with a significant increase in risk of developing obesity [43]. In a study Huang CJ,et. al (2010), the unadjusted odds ratio of obesity in breakfast skippers was 1.23 (95% CI: 1.06, 1.43) where in this study the unadjusted odds ratio of obesity in breakfast skippers was 3.5 (95% CI :2.2-5.5) which was thrice in the sense [37]. Another study Ma Y, et. al (2003) showed that skipping breakfast was associated with increased prevalence of obesity (odds ratio = 4.5, 95% confidence interval: 1.57, 12.90), where this study also showed a high prevalence (OR 3.5; 95% CI 2.2- 5.5) [39].

We suggested that regular breakfast eating was a useful predictor for adult health-promoting behaviors. Our study revealed that health-promoting behaviors differ between the regular breakfast eater and

breakfast skipper groups. In other words, the breakfast eaters had a higher frequency of health promoting behaviors, such as feeling of energetic in their work, having more stress management skills, less tendency to eat unhealthy snacks in midmorning and possessing of less health problems. Niemeier HM et al showed that fast food consumption and breakfast skipping increased parallel in recent years where this study also suggests that fast food consumption was two times (OR 2.5; 95% CI 1.13 - 5.5) higher in breakfast skippers compared to non-skippers leading obesity [66].

The results of this study may be an indication that the high prevalence of breakfast skipping among urban adults in Bangladesh can be threatening considering its detrimental health effects. Several studies showed that skipping breakfast may put people on the fast track to weight gain, heart disease, osteoporosis, irritability or mood swings, menstrual irregularity, low energy levels, low memory and hormonal stress. This study also reports that breakfast skipping is in high among adult in Bangladesh and skippers were found to be associated with obesity.

This study only evaluated the prevalence of breakfast skipping and some of its associated health effects in Bangladeshi adults. Unless evaluating the all possible effect of breakfast skipping in both the short and long term health of adult professionals, it will not be able to determine the overall risk associated with breakfast skipping. Considering this issue, the next step of this study will be to follow up respondents for a period of time to evaluate the adverse health outcome associated with breakfast skipping.

The study has several limitations and this influence the generalizability of the findings. First, since the data were collected through a self-reporting measure, it is possible that the findings were affected by a social desirability response set and the study is cross-sectional which does not infer causal relationships. Second, breakfast eating was only counted from Monday to Friday; seven-day measurements or in-depth interviews might increase the reliability and validity of our understanding of this phenomenon. Third, we did not explore the content or quality of breakfast. Furthermore, we examined only one nutrition counseling center located in Dhaka, Bangladesh, caution should be taken to generalize the data for other location outside Dhaka city.

#### 4. CONCLUSION

Regular breakfast intake is strongly associated with reduced risk of a spectrum of metabolic conditions such as obesity, diabetes, cardiovascular disease etc. This study provides evidence of increasing trend of breakfast skipping in adults of Bangladesh where skipping correlates with being associated to different health problems, obesity, low energy level and with less health-promoting behavior. Considering such a high prevalence of breakfast skipping with associated adverse health outcome in urban population of Bangladesh, these findings can provide baseline data for taking the initiative to monitor and make people aware regarding the importance of breakfast eating.

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