



THE IMPACT OF BREAKFAST SKIPPING ON TYPE 2 DIABETES RISK AMONG UNIVERSITY STUDENTS IN KARACHI" PAKISTAN

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ARTICLE INFO	ABSTRACT
<p>Keywords: BMI, Breakfast Skipping, Physical Activity, Type 2 Diabetes Mellitus</p> <p>Corresponding Author: Dr Fareeha Shahid, MBBS, MPH, Associate Professor, Department of Community Health Sciences, Bahria University Health Sciences, Karachi, Email: drfareeha@live.com</p>	<p>Objectives: This study aims to investigate the impact of breakfast skipping on the risk of developing Type 2 Diabetes Mellitus among university students in Karachi, Pakistan.</p> <p>Background: In recent years, several studies have suggested a strong link between skipping breakfast and an increased risk of obesity, overweight, and subsequently Type 2 Diabetes Mellitus. Skipping breakfast may lead to poor metabolic regulation, higher body mass index (BMI), and insulin resistance, which are significant risk factors for diabetes. Understanding these patterns among young adults is crucial for implementing effective health-promoting interventions. This study builds upon previous</p>

	<p>research by examining the behavior and consequences of breakfast skipping in a university student population.</p> <p>Study Design: Cross-Sectional Study</p> <p>Study Setting: It was Conducted at the Department of Community Health Sciences of Bahria University of Health Sciences, Karachi.</p> <p>Study Duration: November 2022 – April 2023</p> <p>Methodology: A sample size of 384 was calculated using Epi-info, with a 95% confidence interval and a 5% margin of error. A random sampling method was employed. Data were analyzed using IBM SPSS Statistics 23. Linear regression was applied to assess the association between breakfast skipping and the risk of developing Type 2 Diabetes. A p-value of <0.05 was considered statistically significant.</p> <p>Results: Out of 383 participants, 144 (36.5%) were identified as breakfast skippers, while 63.5% reported regularly consuming breakfast. The primary reason cited for skipping breakfast was lack of time (59%). The most represented age group was 20 years (24.6%), and females comprised the majority of participants (58.9%). Most students acknowledged that eating breakfast enhances energy levels and cognitive performance, although approximately 40% remained neutral, and less than 10% disagreed.</p> <p>Conclusion: The results showed no significant association between breakfast skipping and the risk of developing Type 2 Diabetes Mellitus among the students. Thus, the null hypothesis was accepted, indicating no direct link between breakfast habits and diabetes in this population.</p>
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INTRODUCTION

In recent years, numerous original types of research have demonstrated that skipping breakfast is linked to obesity and being overweight.¹ "Breakfast is the most important meal of the day" is an accord among the population. The standard definition of breakfast is like so: Consume the first meal of the day either before or at the commencement of exercise within two hours of rising up, often no later than eleven in the morning, and the quantity of calories should be between twenty and thirty-five percent of the overall energy required.²

Breakfast is responsible for significant energy and nutritional intake. The unhealthy lifestyle in breakfast skipper is usually because of using fast food, flavored fruit juice, tea or cigarette.³ Avoiding breakfast causes hunger, which may impair focus and academic performance in the classroom. It can also result in poor memory recollection. Skipping breakfast has been noted as a possible risk factor for obesity. According to studies, those who habitually miss breakfast have a higher body mass index (BMI) and are more likely to be overweight or obese than people who eat breakfast every day.⁴ The correlation between skipping breakfast and binge eating later in the day may be one explanation for this link. If you skip breakfast, you might be more inclined to seek for unhealthy snacks or greater servings at following meals since you'll be hungrier. This might result in an overall rise in caloric consumption and help people acquire weight.⁵ A nutritious breakfast can help students in various ways, such as by increasing their participation in class, attending school, and making progress toward achieving the same test results. It can also improve mental acuity and attention.⁶

According to a research conducted in Ghana medical school in 2014 the prevalence of breakfast skipping among females was significantly higher (74.56%) than in males (70.44%). As a whole, 71.92% of the pupils skipped morning meal.

This study also showed that the prevalence among the pre-clinical students was 76.62% and clinical students 67.48%.⁷ Young individuals engage in bad eating habits, according to studies, such as eating energy-dense snacks and skipping breakfast frequently due to time constraints, financial constraints, and concerns about their weight.⁸ It has been connected to reduced total calories, nutrients, and minerals, worse-quality diets, a higher chance of central obesity frequency, insulin resistance indicators, and a higher risk for heart diseases. It is widely accepted that skipping breakfast is associated with increased body fatness and obesity in all cultures.⁹

This investigation is an attempt to identify and prove a connection between skipping breakfast and obesity. Our goal is to expand on previously completed studies and further contribute useful knowledge. It is essential that a proper understanding is made that there may

be various other factors leading to improper nutritional habits and obesity and how one perceives its effect on their quality of life.

METHODOLOGY

This was a cross sectional study conducted through a self-administered questionnaire from the department of Community Health Sciences of Bahria university Health Sciences, Karachi. The study was carried out over a duration of Six months (November 2022 to April 2023) after the approval from the Ethical Committee (Reference No: ERC 104/2022, Dated: 17-Nov-2022).

A sample size of 384 was calculated using Epi-info, with a 95% confidence interval and a 5% margin of error. A random sampling approach was utilized; on being selected and giving the consent, the respondent was subjected to an interview, where all candidates were asked the same set of questions mentioned in the Questionnaire, and their responses were processed into the respective google form by our research team.

The questionnaire used in the survey was developed based on a search of the literature relevant to the objectives of our study, which aims to correlate the habit of breakfast skipping with the prevalence of obesity among university students and to discover the factors that lead to breakfast-skipping behavior among university students. Only university students of Karachi with ages between 18-30 were included. Any candidates with hypo/hyperthyroidism and eating disorders were excluded. The ethical Review Committee of Bahria University Health Sciences approved this study. A pilot study after receiving the approval was carried out with 20 candidates, to ensure that the questions were relevant, and changes were also made according to the feedback received.

In a standing position, body weight and height were measured and BMI was calculated. The body weight was measured by a portable electronic scale to the nearest kilogram. The height was measured by a portable stadiometer to the nearest meter. Participants over a BMI of ≥ 25 were classified obese, according to the WHO Asia-Pacific BMI Scale. The physical activity, dietary habits and addictions were assessed through recall during the interview. The physical activity was assessed by asking how frequently the candidate indulges in it through the week. Questions related to dietary habits included the number of meals per day, type of breakfast (light, moderate, heavy), the type of snacks take if any etc. Moreover, the candidates were divided into two groups, (i) breakfast skippers (ii) breakfast eaters. Each group was asked a different set of questions revolving about their own perceptions regarding consumption or skipping of breakfast accordingly. All questions related to perceptions were answered through a 5-point Likert scale of likelihood (every time->almost every time->neutral->almost never->never).

Data was analyzed using the IBM SPSS Statistic 23 Software. Linear Regression was used to find the association between breakfast skipping and obesity. P value < 0.05 was considered significant.

RESULT

Table 1 displays the of ages, gender and whether the students in this study group of a total sample size of 394 were hostellites or do they reside in their homes? The predominant age group being 20 years, 97 (24.6%). The prime gender taking part in the study is “female” at 232 (58.9%). Most of the candidates resided in hostels, there population being 232 (60.7%).

Table 2 shows that the population of breakfast skippers is 144 (36.5%) with people who consume breakfast predominant at 250 (63.5%) (Table 2). The most common reason for skipping breakfast is not having enough time at 85 (59%). Most students perceived that eating breakfast makes them feel energetic throughout the day, it has a positive impact on their concentration during lectures and their ability to perform daily tasks, with a very small population that disagrees (<10%) and 40% of candidates being neutral on average. Furthermore, 30.02% of participants on average perceive to have negative effects of skipping breakfast such as feeling tired throughout the day, bad concentration in lectures, inability to perform daily tasks and symptoms like nausea and headache. 34.4% of participants on average disagree to having these effects. 35.6 % on average have a neutral mindset.

Gender	Frequency	Percent
Male	162	41.1
Female	232	58.9
Total	394	100.0
Type of student	Frequency	Percent
Day Scholar	155	39.3
Hostellite	239	60.7
Total	394	100.0

Table 1. Socio-demographic characteristics of the study group (N=394)

After putting the variables through linear regression, to determine the association between breakfast skipping and obesity, the following results were obtained. The R value being 0.003 show very low correlation between the variables. R square value is 0.000 indicating that there is no change in the study's dependent variable due to the independent variable (model summary). Looking at the ANOVA table, the sig value is 0.955, thus p value is >0.05. All of the above information indicates that there is no association between breakfast skipping and Obesity.

	FREQUENCY	PERCENT
People who take breakfast	250	63.5
People who do not take breakfast	144	36.5
Total	394	100.0

Table 2. Prevalence of breakfast skippers

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.003 ^a	.000	-.003	.87539

a. Predictors: (Constant), 9) Do you usually have breakfast before going to your university?

ANOVA^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.002	1	.002	.003	.955 ^b
	Residual	300.393	392	.766		
	Total	300.396	393			

a. Dependent Variable: Weight Status according to BMI

b. Predictors: (Constant), 9) Do you usually have breakfast before going to your university?

DISCUSSION

In recent years, numerous original types of research have demonstrated that skipping breakfast is linked to obesity, overweight and end up in diabetes mellitus. Skipping breakfast also puts people at risk for higher BMI and diabetes mellitus.¹¹ As a result, a comprehensive understanding of breakfast skipping aids in the development of appropriate interventions aimed at promoting breakfast as a positive health behavior. We aim to build upon past research conducted and further add valuable information.¹²⁻¹⁴

Previous research revealed that the hazard ratio for obesity among those who skipped breakfast was higher. Breakfast skippers had a higher chance of becoming obese after accounting for age, sex, marital status, educational attainment, monthly income, smoking, drinking, and exercise habits. The prevalence rate of obesity reduced as the frequency of breakfast intake rose, according to the Cochran-Armitage trend test ($P=0.005$). Those who skipped breakfast had a considerably lower health-related quality of life than those who ate breakfast ($P 0.001$).¹⁵

In a study, participants who ate breakfast more than four days per week had a 15% reduced chance of becoming overweight than those who only ate it once per week. Although it was only marginally significant in male students, this significant correlation was also observed in female students. It was also discovered that there was a vital inverse relationship between breakfast consumption and obesity. This meant that students who ate breakfast more than four days a week had a 33% lower risk of being obese than those who only did so once a week. The exact highly substantial inverse correlation was observed in both sexes.¹⁶

There have been various studies conducted in the past that revolve around the similar topic of breakfast skipping and obesity.^{17,18} Our study shows that there is a higher proportion of student that still consume breakfast, and among our study population there are merely 41 (10.4%) who are obese. There were studies that targeted people of older age, or children.

Our study targeted the young adult population who as we observed have a lot of time constraints due to which they skip breakfast, the most important meal of the day. This leads to a higher consumption of snacks like fast foods, which we assessed to be 121 (30.7%) the most commonly selected option among snacks. Fast food and meals consumed away from home had greater levels of energy, cholesterol, saturated fat, and sodium. Frequent and consistent fast food consumption will almost certainly result in weight gain.¹³

Although, we wanted to carry out a more elaborate study, within at least more than 15 universities of Karachi, we were not granted approvals from a few universities so we had to exclude them.

CONCLUSION

The prevalence of breakfast skippers was low in university students, so was the prevalence of obesity. After applying linear regression on the data, and according to the results obtained, the alternate hypothesis is rejected and null hypothesis is accepted. Hence, showing that there is no association between breakfast skipping and obesity.

LIMITATION OF THE STUDY:

This study has several limitations that should be considered when interpreting the findings. Being a cross-sectional study, it does not establish causality between breakfast skipping and the risk of developing Type 2 Diabetes Mellitus or obesity. The reliance on self-reported data through questionnaires and recall-based interviews may introduce bias, as participants might inaccurately report their dietary habits or physical activity. The sample was limited to students from only five universities in Karachi due to restricted access and institutional approvals, which may limit the generalizability of the results. Additionally, excluding individuals with thyroid disorders and eating disorders may have eliminated a subgroup relevant to metabolic and behavioral outcomes. Moreover, the absence of objective clinical parameters such as fasting blood glucose or HbA1c levels restricts the study's ability to directly assess diabetes risk. Future research should consider a longitudinal design, broader participant inclusion, and the use of biochemical markers for a more comprehensive analysis.

References

1. NAYYAR MFH. Factors associated with skipping breakfast among Day scholars and Boarding Adolescent and their effects on their academic performance. *Age (years)*.19(1.3):18.9-1.1.
2. Ma X, Chen Q, Pu Y, Guo M, Jiang Z, Huang W, et al. Skipping breakfast is associated with overweight and obesity: A systematic review and meta-analysis. *Obesity research & clinical practice*. 2020;14(1):1-8.
3. Rani R, Dharaiya CN, Singh B. Importance of not skipping breakfast: A review. *International Journal of Food Science and Technology*. 2021 Jan;56(1):28-38.
4. Khan AR, Lodhi F, Muneer R, Mahmood H. The Effect of Mental Pressure Due to Covid-19 on Students' Educational Performance: A Study from Karachi, Pakistan. *Utamax: Journal of Ultimate Research and Trends in Education*. 2022;4(1):39-49.
5. Kumar R, Rizvi MR. Beyond a Meal: The In-Depth Analysis of Breakfast and Its Impact on Obesity Prevention-A Comprehensive Review. *JK Practitioner*. 2024 Jan 1;29(1).

6. Kawabata M, Lee K, Choo HC, Burns SF. Breakfast and exercise improve academic and cognitive performance in adolescents. *Nutrients*. 2021 Apr 13;13(4):1278.
7. Dogbe E, Abaidoo B. Breakfast Eating Habits Among Medical Student. *Ghana medical journal*. 2014;48(2):66-70.
8. Almoraie NM, Alothmani NM, Alomari WD, Al-Amoudi AH. Addressing nutritional issues and eating behaviours among university students: a narrative review. *Nutrition Research Reviews*. 2024 Feb 15:1-45.
9. López-Gil JF, Sánchez-Miguel PA, Tapia-Serrano MÁ, García-Hermoso A. Skipping breakfast and excess weight among young people: the moderator role of moderate-to-vigorous physical activity. *European Journal of Pediatrics*. 2022 Aug;181(8):3195-204.
10. Darebo T, Mesfin A, Gebremedhin S. Prevalence and factors associated with overweight and obesity among adults in Hawassa city, southern Ethiopia: a community based cross-sectional study. *BMC obesity*. 2019;6:1-10.
11. Badr HE, Lakha SF, Pennefather P. Differences in physical activity, eating habits and risk of obesity among Kuwaiti adolescent boys and girls: A population-based study. *International journal of adolescent medicine and health*. 2019;31(1).
12. Otaki N, Obayashi K, Saeki K, Kitagawa M, Tone N, Kurumatani N. Relationship between breakfast skipping and obesity among elderly: cross-sectional analysis of the HEIJO-KYO study. *The Journal of nutrition, health and aging*. 2017;21(5):501-4.
13. Koca T, Akcam M, Serdaroglu F, Dereci S. Breakfast habits, dairy product consumption, physical activity, and their associations with body mass index in children aged 6–18. *European journal of pediatrics*. 2017;176:1251-7.
14. Lim JU, Lee JH, Kim JS, Hwang YI, Kim T-H, Lim SY, et al. Comparison of World Health Organization and Asia-Pacific body mass index classifications in COPD patients. *International journal of chronic obstructive pulmonary disease*. 2017:2465-75.
15. Huang C, Hu H, Fan Y, Liao Y, Tsai P. Associations of breakfast skipping with obesity and health-related quality of life: evidence from a national survey in Taiwan. *International journal of obesity*. 2010;34(4):720-5.
16. Mansouri M, Hasani-Ranjbar S, Yaghubi H, Rahmani J, Tabrizi YM, Keshtkar A, et al. Breakfast consumption pattern and its association with overweight and obesity among university students: a population-based study. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*. 2020;25:379-87.
17. Thompson-McCormick JJ, Thomas JJ, Bainivualiku A, Khan AN, Becker AE. Breakfast skipping as a risk correlate of overweight and obesity in school-going ethnic Fijian adolescent girls. *Asia Pacific journal of clinical nutrition*. 2010;19(3):372.

18. Vanelli M, Iovane B, Bernardini A, Chiari G, Errico MK, Gelmetti C, et al. Breakfast habits of 1,202 northern Italian children admitted to a summer sport school. Breakfast skipping is associated with overweight and obesity. *Acta bio-medica : Atenei Parmensis*. 2005;76(2):79-85.