Volume 3, Issue 9, 2025

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

IMPACT OF BREAKFAST SKIPPING ON BODY MASS INDEX AMONG UNDERGRADUATE MEDICAL STUDENTS

Saad Raza[*1], Ubedullah Rahimoon[2], Sani e Zehra[3], Sheeraz Anum[4], Vijay Kumar[4], Muhammad Rahimoon[5]

[*1]*Nursing Instructor, College of Nursing (Female) Badin*
[2]*Assistant Professor, Indus College of Nursing, The University of Modern Sciences at Tando Muhammad Khan*
[3]*Nursing Instructor, College of Nursing (Female) Larkana*
[4]*Instructor, School of Nursing and Midwifery, Aga Khan University, Pakistan*
[5]*Principal, Al-Biruni College of Nursing Hyderabad, Sindh*

[*1]saadrind312@gmail.com

DOI: https://doi.org/10.5281/zenodo.17520984

Keywords
Breakfast skipping, obesity, BMI, undergraduate students, dietary habits.

Article History
Received: 13 September 2025
Accepted: 23 October 2025
Published: 04 November 2025

Corresponding Author: *
Saad Raza

Abstract

Background: *Obesity is a growing global health concern, particularly in low- and middle-income countries, with lifestyle behaviors such as dietary patterns contributing significantly to its prevalence. Breakfast consumption has been identified as an important determinant of nutritional status, yet breakfast skipping is increasingly common among university students.*

Objective: *This study aimed to assess the association between breakfast skipping and BMI among undergraduate students at Liaquat University of Medical and Health Sciences (LUMHS), Jamshoro.*

Methods: *A comparative cross-sectional study was conducted among 345 undergraduate students selected through stratified random sampling across three disciplines: BS Nursing, Doctor of Pharmacy, and Doctor of Physiotherapy. Data were collected using a structured questionnaire that included demographic information, anthropometric measurements, and breakfast-eating behaviors. Breakfast skipping was categorized as skippers (0–3 days/week), irregular skippers (4–5 days/week), and non-skippers (6–7 days/week). Body Mass Index (BMI) was calculated to classify participants into underweight, normal weight, overweight, and obese categories. Statistical analysis was performed using the Fisher exact test, with a significance level set at $p < 0.05$.*

Results: *The majority of participants were female (60.3%) and aged 21–24 years (62%). Most students (60%) were non-skippers, while 23.8% were skippers and 16.2% irregular skippers. BMI distribution showed 66.4% had normal weight, 25.5% were underweight, 5.8% overweight, and 2.3% obese. The Fisher's exact test revealed no statistically significant association between breakfast skipping and BMI categories ($p = 0.075$).*

Conclusion: *Although breakfast skipping was prevalent among a notable proportion of undergraduate students, this study did not find a statistically significant association between breakfast habits and BMI. These findings suggest that other lifestyle and dietary factors may play a more substantial role in influencing BMI.*

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

INTRODUCTION

A persistent global health concern, obesity is becoming more and more common, particularly in low- and middle-income nations.[1] According to a recent estimate from the World Obesity Federation (WOF), one billion people worldwide, including one in five women and one in seven men, will be obese by 2030.[2] Obesity in Pakistan is a growing concern, particularly among children and adolescents. Recent studies indicate alarming rates of overweight and obesity. A study in rural Pakistan found that 15.3% of primary school children were overweight, and 4.1% were classified as obese.[3] Another study reported that 5.5% of school-aged children were overweight, while 5.6% were obese.[4] Among adults, a survey indicated that 17.2% were overweight and 5.8% were classified as obese.[5] Regular breakfast eating plays a key role in general health, especially among children and adolescents. The prevalence of breakfast skipping is reported to be a growing trend in high-income countries.[6] Children and adolescents who do not eat breakfast are not able to obtain the nutrients missed with the rest of the meals of the day. A study found that breakfast skippers had a higher prevalence of obesity, suggesting that missing this meal may disrupt metabolic processes and nutrient absorption.[7] Breakfast skippers had lower energy, protein, carbohydrates, dietary fiber, calcium, and iron intakes, while higher fat and sodium intakes were observed in them.[8] Regular breakfast skipping is linked to increased adiposity or body mass index (BMI), which increases the risk of developing cardiometabolic diseases and diabetes mellitus due to increased resistance, fatigue at noon, altered behavior or altered cognitive performance (memory), and increased behavior.[9]

According to a comprehensive review and meta-analysis, having breakfast every day can reduce childhood obesity risk by 34 percent.[10] Similarly, a different systematic review found that skipping breakfast may be a simple indicator of the risk of excess weight and metabolic diseases.[11] A meta-analysis revealed that children and adolescents who skip breakfast have a 59% higher prevalence of obesity compared to those who do not skip it.[7] In Malaysian children, skipping breakfast was linked to a 104% increased odds of being overweight or obese. [12]Skipping breakfast is linked to unhealthy lifestyle choices, such as low physical activity and increased screen time, which can further exacerbate nutritional deficiencies.[13] The prevalence of breakfast skipping is notably higher among socioeconomically disadvantaged groups, indicating a potential link between socioeconomic status and nutritional intake.[6] Obesity is a major global health concern with significant health problems. University students are at a critical life stage where lifestyle habits, including dietary patterns, are often formed. Examining breakfast skipping as a behavioral trend can highlight broader lifestyle choices that might influence physical health.

METHODOLOGY

Study setting

The study was conducted at the Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro.

Study design

A comparative cross-sectional study design was used to seek the association of breakfast skipping with obesity and academic performance among undergraduate students.

Sample Size

The estimated sample size was calculated with a Past study's Prevalence of breakfast skipping: 66%.[14] using a **margin of error of 5% (0.05)** and a **confidence level of 95%,** which corresponds to a **Z-score of 1.96** obtained from the standard normal distribution table. Based on these parameters, the estimated sample size was determined to be **n = 345** participants.

Sampling technique

The stratified random sampling technique was employed to ensure the selection of a representative sample that accurately reflected the proportional distribution of students across the three disciplines: BS Nursing, Doctor of Pharmacy, and Doctor of Physiotherapy. Stratification by discipline was essential to achieve balanced representation and minimize selection bias.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Selection Criteria

Inclusion Criteria

- Students of 2nd year to 4th year of BS Nursing (Generic), Doctor of Pharmacy, and Doctor of Physiotherapy
- Those who are willing to participate in the study
- Both Genders.

Exclusion Criteria

- Students studying 1st year BS Nursing (Generic), Doctor of Pharmacy, and Doctor of Physiotherapy students were excluded to ensure that participants had a minimum level of academic experience.
- Students having a history of diabetes mellitus (DM) or any hormonal disorders or metabolic disorders, lactose intolerance, anorexia nervosa, bulimia nervosa, pregnancy, and food allergies were excluded.
- Those who were not willing to participate.

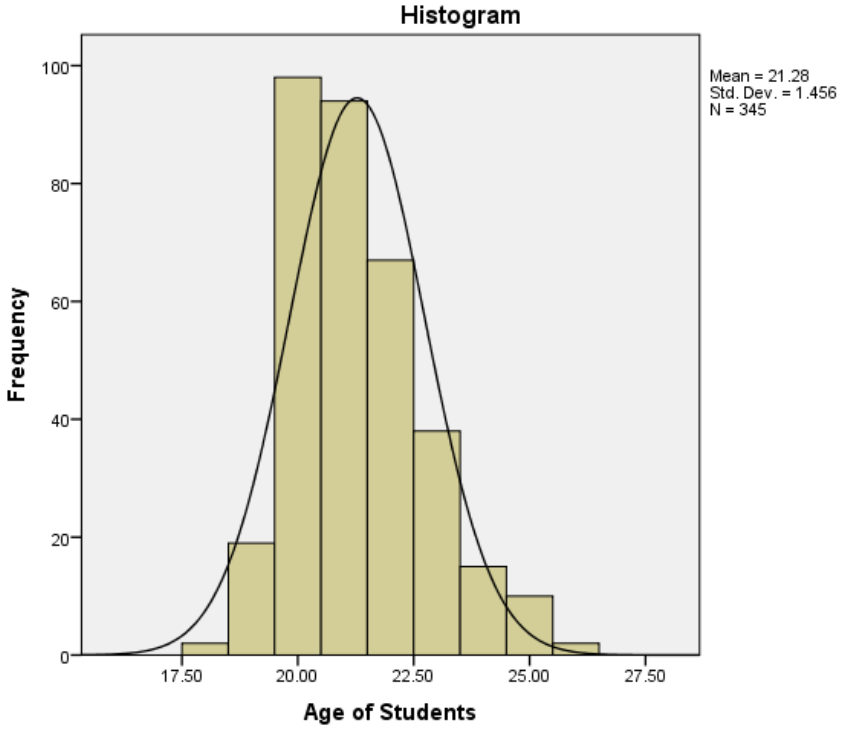
Data Collection Tool

In this study, a self-designed data collection tool was used to gather information; The data collection tool consists of two sections, section one asks for demographic variables and anthropometric characteristics like age, gender, body mass index (BMI), education level, socioeconomic status whereas from section two asks for Breakfast skipping which was measured using questions about breakfast eating like "Do you eat breakfast", For breakfast skipping participants were categorized into three groups: skipper (skip breakfast 6-7 days/week), irregular skipper (4-5 days/week), and non-skipper (1-3 days/week). Obesity was assessed using the Body Mass Index (BMI), a widely accepted tool that provides an estimate of body fat based on an individual's weight relative to their height. BMI is calculated using the following formula:

$$BMI = \text{weight (kg)/height (m)2}$$

Results

Figure 1 Age distribution of Participants



Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

The above graph illustrates the age distribution of the 345 study participants. The majority of respondents (62%) fall within the 21-24 age range, followed by 34.5% in the 17-20 age category. A smaller proportion (3.5%) of participants are over 25 years of age. This distribution reflects a predominantly younger population, with the largest group being in their early twenties.

Table 1 Socio-demographic profile of study subjects

Gender Distribution		
	Frequency	Percentage (%)
Male	137	39.7
Female	208	60.3
Total	**345**	**100**
Age Distribution		
17 – 20	119	34.5
21 – 24	214	62
>25	12	3.5
Total	**345**	**100**
Discipline Distribution		
BS Nursing	92	26.7
Doctor of Pharmacy	114	33
Doctor of Physiotherapy	139	40.3
Total	**345**	**100**
Socio-economic Distribution		
Lower Class	179	51.9
Middle Class	100	29
Upper Class	66	19.1
Total	**345**	**100**
Residency Distribution		
Hostel	225	65.2
Rented Home	49	14.2
Personal Home	71	20.6
Total	**345**	**100**

The above table presents the socio-demographic characteristics of the study participants. Out of 345 students, 60.3% were female, and 39.7% were male. The age distribution shows that the majority (62%) were between 21-24 years, followed by 34.5% in the 17-20 age range, and 3.5% were above 25 years. In terms of discipline, 40.3% were from Doctor of Physiotherapy, 33% from Doctor of Pharmacy, and 26.7% from BS Nursing. The socio-economic status of participants indicates that 51.9% belonged to the lower class, 29% to the middle class, and 19.1% to the upper class. Most participants (65.2%) resided in hostels, with 20.6% living in personal homes and 14.2% in rented homes.

Table 2 Breakfast Skipping Distribution

Breakfast Skipping	**Frequency**	**Percentage (%)**
Breakfast Skipper (Never and 1-3 days)	82	23.8
Irregular Skipper (4-5 days)	56	16.2
Non-Skipper (6-7 days)	207	60
Total	**345**	**100**

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

This table categorizes participants based on breakfast consumption habits. The majority (60%) reported being "Non-Skippers," consuming breakfast 6-7 days per week, while 23.8% were classified as "Breakfast Skippers" they either never have breakfast or eat breakfast 1-3 days a week and 16.2% as "Irregular Skippers" they have breakfast 4 to 5 days a week.

Table 3 Body Mass Index (BMI) Distribution of Participants

BMI Category	Frequency	Percentage (%)
Underweight	88	25.5
Normal Weight	229	66.4
Overweight	20	5.8
Obesity	8	2.3
Total	**345**	**100**

This table presents the BMI categories of the participants. A significant proportion (66.4%) of students was classified as having a normal weight, followed by 25.5% who were underweight. Overweight individuals comprised 5.8%, while 2.3% of participants were categorized as obese.

Table 4 Association of breakfast skipping with BMI Among Both genders

BMI Category	Breakfast Skipping Category			Total	Fisher exact	P-Value
	Breakfast Skipper	Irregular Skipper	Non-Skipper			
Underweight	19 (5.50)	14 (4.05)	55 (15.94)	88 (25.49)	10.788	.075
Normal weight	53 (15.36)	35 (10.14)	114 (33.04)	229 (58.54)		
Overweight	7 (2.02)	3 (0.86)	10 (2.89)	20 (5.77)		
Obesity	3 (0.86)	4 (1.15)	1 (0.28)	8 (2.29)		
Total	**82 (23.74)**	**56 (16.65)**	**207 (51.7)**	**345 (100)**		

This table explores the association between breakfast skipping and BMI categories. The Fisher exact test yielded a p-value of 0.075, indicating no statistically significant association between breakfast-skipping behavior and BMI.

Discussion

Graph 1 observed the mean age of participants was 21.28 with St Deviation of 1.456. the current study had 60.3% female and 39.7% male participants. The majority of participants (62%) were aged 21-24, Similar gender distribution was noted in a study where 409 (93.6%) of the 305 (69.8%) students were female and the bulk of the students belonged to the 17–21 age group.[15]

The current study findings revealed that only **23.8**% of participants were **breakfast skippers,** either they never eat breakfast or consume breakfast for 1-3 days per week. In contrast to Table 2 a study conducted in Bangladesh by M. Khan et al. (2024) found that a significantly higher percentage of university students **(63.5**%) skipped breakfast regularly.[16] Another cross-sectional study across 28 countries reported that 48% of university students skipped breakfast, with various lifestyle factors contributing to this behavior.[17] The current study revealed that the majority of participants **(60**%) were **non-skippers or breakfast consumers**, who consume breakfast regularly (6-7 days per week). While **16.2**% were identified as **irregular skippers,** consuming breakfast 4-5 days per week. These findings contrast with a study conducted at Akhtar Saeed Medical and Dental College Rawalpindi Pakistan, where **66**% of students skipped breakfast, and only **34**% consumed it regularly.[14]

The findings of current study reveal a notable distribution of Body Mass Index (BMI) categories among the participants, with the majority classified as normal weight

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

(66.4%), followed by underweight (25.5%), overweight (5.8%), and obesity (2.3%) as shown in Table 3, the prevalence of underweight (25.5%) in this study aligns with findings from a study in Bangladesh and Karachi which reported (19.79%) and (33.1%) rates respectively.[18-19] current study reveals majority of students were classified as normal weight (66.4%), these findings align with a study conducted among medical students where (53.7%) of students had normal weight.[20] The low prevalence of overweight (5.8%) and obesity (2.3%) in the current study contrasts with global trends, where obesity rates are rising significantly, the studies in Malaysia (25.4%), Saudi Arabia (23.9%),India (7.6%) where higher prevalence of obesity is observed.[21–23] this discrepancy may reflect cultural attitudes towards body image and dietary habits.

The present study revealed that the most breakfast skippers are either underweight or of normal weight, and there is a low prevalence of overweight and obesity among them. Irregular breakfast skippers also exhibit low levels of overweight and obesity. In contrast, the majority of non-skippers (51.7%) fall into the normal weight category, The Fisher exact test showed a value of **10.788** with a **P-value of 0.075,** indicating a trend towards significance in the relationship between BMI categories and breakfast habits, though it did not reach conventional significance levels. In contrast to the current result, multiple studies have found that skipping breakfast is associated with an increased risk of overweight and obesity. This association has been confirmed through systematic reviews and meta-analyses, which show that individuals who skip breakfast have higher odds of being overweight or obese compared to those who eat breakfast regularly.[24,25] However, some studies align with the current findings and have reported no significant association between skipping breakfast and BMI/obesity among university students. These studies suggest that other factors, such as overall dietary intake and lifestyle habits, may play a more significant role in determining BMI.[26-27]

Conclusion

The present study found that while breakfast skipping was common among undergraduate students, it showed no significant association with obesity. Most participants maintained a normal BMI, suggesting that other lifestyle and dietary factors may have a stronger influence on body weight. Further research is needed to clarify the long-term impact of breakfast habits on obesity.

References

1. Obesity: Health and Economic Consequences of an Impending Global Challenge. Obes Heal Econ Consequences an Impending Glob Chall. 2020;
2. The World Obesity Federation. Projections of Obesity Prevalence in 2030. World Obes Atlas 2022. 2022;(March):18–41.
3. Bibi A, Sultan A, Usama Siddique, Ullah N, Naveed Ullah, Shuaib N, et al. Prevalence of Overweight and Obesity among Primary School Children's in Rural Areas of Pakistan. J Heal Rehabil Res. 2024;4(2):1294–300.
4. Tanveer M, Tanveer U, Zeba A, Siener M. Prevalence of Body Mass Index and Its Association With Interpersonal Family-Level Factors Among School-Aged Children and Adolescents in Pakistan. J Popul Ther Clin Pharmacol. 2024;
5. Kiran A, Shah NA, Khan SM, Ahmed H, Kamran M, Yousafzai BK, et al. Assessment of knowledge, attitude, and practices regarding the relationship of obesity with diabetes among the general community of Pakistan. Heliyon. 2024;10(8).
6. Sincovich A, Moller H, Smithers L, Brushe M, Lassi ZS, Brinkman SA, et al. Prevalence of breakfast skipping among children and adolescents: a cross-sectional population level study. BMC Pediatr. 2022;22(1).
7. Wang K, Niu Y, Lu Z, Duo B, Effah CY, Guan L. The effect of breakfast on childhood obesity: a systematic review and meta-analysis. Front Nutr. 2023;10.
8. Abbasi K, Beigrezai S, Ghiasvand R, Pourmasoumi M, Mahaki B. Dietary Patterns and Attention Deficit Hyperactivity Disorder Among Iranian Children: A Case-Control Study. J Am Coll Nutr. 2019;38(1):76–83.
9. Fatima M, Waqas M, Tariq U, Sarwar R, Ahmad S, Faizan M. Effect of breakfast on academic performance of medical students. Rawal Med J. 2019;44(3):618–21.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

10. Poorolajal J, Sahraei F, Mohamdadi Y, Doosti-Irani A, Moradi L. Behavioral factors influencing childhood obesity: a systematic review and meta-analysis. Obes Res Clin Pract. 2020;14(2):109–18.
11. Monzani A, Ricotti R, Caputo M, Solito A, Archero F, Bellone S, et al. A systematic review of the association of skipping breakfast with weight and cardiometabolic risk factors in children and adolescents. What should we better investigate in the future? Nutrients. 2019;11(2).
12. Yeo GS, Lee ST, Wong JE, Khouw I, Safii NS, Poh BK, et al. Association of Breakfast Skipping on Nutrient Intake and Adiposity in Malaysian Children: Findings from SEANUTS II. Appetite. 2024;107607.
13. Daneshvar M. Breakfast skipping as an indicator of unhealthy lifestyle among adolescents: A short letter. medRxiv [Internet]. 2023;2023.04.10.23288359. Available from: https://www.medrxiv.org/content/10.1101/2023.04.10.23288359v1%0Ahttps://www.medrxiv.org/content/10.1101/2023.04.10.23288359v1.abstract
14. Rai FH, Niazi A, Maqsud M, Fatima Rai A, Niazi A. Skipping Breakfast and Its Associated Factors Among Undergraduate Students. Pakistan J Heal Sci. 2023;116–22.
15. Haldar P, James A, Negi U. Breakfast Eating Habits and Its Influence on Nutritional Status. J Heal Allied Sci NU. 2023;
16. Khan MSI, Paul T, Al Banna MH, Hamiduzzaman M, Tengan C, Kissi-Abrokwah B, et al. Skipping breakfast and its association with sociodemographic characteristics, night eating syndrome, and sleep quality among university students in Bangladesh. BMC Nutr. 2024;10(1).
17. Pengpid S, Peltzer K. Prevalence and associated factors of skipping breakfast among university students from 28 countries: A cross-sectional study. Int J Adolesc Med Health. 2022;34(2):97–103.
18. Khan UH, Asif E, Hassan SA, Zohra RR, Hanif E. Prevalence of nutritional anaemia with association of body mass index among karachi university students, pakistan. J Pak Med Assoc. 2021;71(1-A):55–8.
19. Gupta R Das, Haider SS, Eusufzai SZ, Hoque Apu E, Siddika N. Differences in Prevalence and Associated Factors of Underweight and Overweight/Obesity among Bangladeshi Adults by Gender: Analysis of a Nationally Representative Survey. Int J Environ Res Public Health. 2022;19(17).
20. Ehsan F, Asim M, Zainab A, Ahsan H. Association Between Water Intake and Anthropometric Measurements: a Cross Sectional Study Among a Sample Population of Pakistani Dental Students. Pakistan J Physiol. 2022;18(4):14–7.
21. Alhomaidan H, Alqefari A, Alburaidi A, Alqefari A, Alrubayan A, Alqifari H, et al. Knowledge, attitude, and practice of obesity and its prevalence among undergraduate medical students at Qassim University, Saudi Arabia. Int J Med Dev Ctries. 2024;1243–52.
22. Khairul Azhan KNW, Abdul Jalil AA, Syed Putera SSPA. Knowledge and attitudes towards and prevalence of overweight and obesity among undergraduate students at Universiti Kuala Lumpur Royal College of Medicine: A cross-sectional study. Malaysian Fam Physician. 2024;19.
23. Gupta R Das, Tamanna N, Siddika N, Haider SS, Apu EH, Haider MR. Obesity and Abdominal Obesity in Indian Population: Findings from a Nationally Representative Study of 698,286 Participants. Epidemiologia. 2023;4(2):163–72.
24. 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. Obes Res Clin Pract. 2020;14(1):1–8.
25. Wicherski J, Schlesinger S, Fischer F. Association between breakfast skipping and body weight—a systematic review and meta-analysis of observational longitudinal studies. Nutrients. 2021;13(1):1–20.
26. Yu KX, Ambalavanan S, Aziz AF, Deligannu P. Relationship between Skipping Breakfast and Dietary Intake with Body Mass Index of a Private University Students in Shah Alam, Malaysia. J Manag Sci. 2022;19(1):9.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

27. Chellaiyan VG, Kamble BD, T.K. R, Liaquathali F, Saha R, Singh SK, et al. A Study of Determinants of Obesity - Is Skipping Breakfast Meal a Risk Factor? J Evol Med Dent Sci. 2021;10(25):1883–8.