

Research Article

Prevalence of Breakfast Skipping and Associated Health Outcomes among Medical Students: A Cross-Sectional Study

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ABSTRACT

Background: Breakfast skipping is becoming very common among young adults and can lead to adverse physical, behavioural, and sleep-related health outcomes. However, a thorough evaluation of its short- and long-term consequences in Indian college populations remains limited.

Objective: To determine the prevalence of breakfast skipping among college students and to find its association with short-term symptoms, long-term dietary and functional consequences, sleep quality, and body mass index (BMI).

Methods: A cross-sectional analytical study was conducted among undergraduate students aged 17-30 years at medical colleges across India over three months. Data were collected using a structured, pretested questionnaire assessing demographic characteristics, breakfast consumption patterns, reasons for skipping breakfast, short-term symptoms, dietary behaviours, functional health outcomes, sleep quality, and BMI. Breakfast skipping was defined as consuming breakfast on fewer than five days per week. Sleep quality was assessed using a validated sleep quality scale (SATED questionnaire). BMI was categorized according to World Health Organization criteria. Data were analysed using Jamovi software version 2.7.18. Descriptive statistics summarized prevalence with 95% confidence intervals. Associations were evaluated using chi-square tests. A p-value <0.05 was considered statistically significant.

Results: Prevalence of breakfast skipping among participants was 45.7%. A statistically significant association was observed between breakfast skipping and fatigue. No association was found between breakfast skipping and other short-term consequences, long term eating behaviors, BMI. Association between breakfast skipping and unsatisfactory sleep was statistically significant.

Conclusion: Breakfast skipping is a common behaviour and is associated with notable short-term consequences like fatigue and unsatisfactory sleep quality. Although no significant relationship was observed with BMI and long-term outcomes in this study. This highlights the importance of regular breakfast consumption as a part of healthy lifestyle practices. Further longitudinal studies are recommended to better understand the long-term health implications of breakfast skipping.

Keywords: Breakfast Skipping, College Students, Insomnia, BMI, Dietary Behavior, Cross-Sectional Study.

INTRODUCTION

Breakfast is widely recognised as a fundamental component of a healthy daily diet and plays a crucial role in maintaining optimal physiological and psychological functioning. After an overnight fasting, breakfast provides with essential nutrients and energy required to restore blood glucose levels and support other

metabolic processes. Regular breakfast intake is considered an important lifestyle behaviour that supports both immediate functioning and long-term health outcomes. ^{14, 17}

Despite its well-established benefits, breakfast skipping has become increasingly common among college students worldwide ^{2, 5, 9}. This trend is particularly evident among young

adults who experienced significant lifestyle changes during their transition to college life. Factors such as early morning classes, academic workload, irregular sleep patterns, late-night shifts and study habits, and lack of time often contribute to omission of breakfast. Additionally, increased independence in food choices, stress, altered daily routines, and social influences may further promote unhealthy eating patterns. College students may also skip breakfast intentionally due to misconception about weight control or due to reduced appetite in the morning.

Previous study has demonstrated that breakfast skipping is associated with several adverse short-term health effects.^{6,8,15} Students who skip breakfast frequently report symptoms such as fatigue, headaches, irritability, and difficulty concentrating during academic activities. These symptoms can negatively impact academic performance, learning ability, and overall productivity. Furthermore, breakfast skipping has been linked to poor overall dietary quality, as individuals who miss breakfast are more likely to consume unhealthy snacks, fast foods, and energy-dense meals later in the day. The compensatory eating pattern may result in imbalances.

In addition to short term effects, breakfast skipping may contribute to long-term health consequences. Studies have reported associations between irregular breakfast habits and increased body mass index (BMI), and higher risk of metabolic disorders.^{14,18,19} Skipping breakfast may alter appetite-regulating hormones, leading to increased hunger and overeating later in the day. Gastrointestinal disturbances such as acidity, gastritis and irregular bowel habits have also been reported among individuals who skip breakfast.

Recent evidence has also highlighted a potential relationship between breakfast habits and sleep quality.^{1,20,21} Irregular eating pattern, including breakfast skipping, may disrupt circadian rhythms and metabolic regulation, which in turn can affect sleep duration and quality. Poor sleep quality has been associated with daytime fatigue, reduced cognitive performance, an impaired academic functioning, creating a cycle that further reinforces unhealthy lifestyle behaviours.

Although several international studies have examined breakfast consumption patterns and their health implication, there is limited research focusing specifically on Indian Medical college students. Cultural dietary habits,

academic pressures, and lifestyle patterns in them may differ significantly from those of other populations. Therefore, it is important to assess breakfast- skipping behaviour and its associated consequences in this specific group. This study was conducted to determine the prevalence of breakfast skipping among college students and to analyse the short-term symptoms such as fatigue and poor concentration, long-term dietary and functional consequences, sleep quality, and BMI. Understanding these associations may help in identifying at risk individual and developing targeted interventions to promote healthy eating habits and improve overall health and academic performance among medical college students.

The present study was designed to assess the pattern and impact of breakfast- skipping behaviour among college students. The primary objective was to estimate the prevalence of breakfast skipping in the study population. In addition, the study aimed to evaluate the short-term consequences associated with breakfast skipping, including fatigue, headache, decreased concentration, irritability. The study also intends to assess the long-term dietary and functional impacts, such as unhealthy eating habits, reduced energy levels, gastrointestinal disturbances. Furthermore, the association between breakfast-skipping behaviour and sleep quality was assessed to understand the influence of irregular meal patterns on sleep disturbances. Finally, the study aimed to determine the relationship between breakfast-skipping habits and BMI to evaluate its possible impact on nutritional status and weight-related outcomes among college students.

METHODOLOGY

After obtaining permission from Institutional Ethics Committee, a cross-sectional analytical study was conducted among undergraduate college students aged 17–30 years over a three-month period at various Medical College of India. The study adhered to the STROBE reporting guidelines.¹ Eligible participants included enrolled medical college students who provided informed consent. Students with special dietary medical conditions, pregnancy, or absence during data collection were excluded.

Breakfast was defined as the first meal consumed within 2–3 hours of waking after overnight fasting, typically before 9–10 AM, providing 20–35% of daily energy intake. Based on this definition data were collected using a

semi-structured, pretested questionnaire comprising six sections: demographic details, breakfast consumption pattern, reasons for skipping breakfast, short-term consequences, dietary consequences, and functional/health outcomes and SATED questionnaire on sleep quality.

Participants consuming breakfast on fewer than five days per week were classified as breakfast skippers. Duration and timing of breakfast intake were also recorded.

Outcome variables included:

A. Short -Term Consequences

Six symptoms experienced in the past three months (fatigue, poor concentration, headache, irritability, dizziness, and gastric discomfort) were assessed as binary variables.

B. Long-Term Consequences

Dietary and functional impacts including overeating, increased junk food intake, snacking behaviour, sugary drink consumption were evaluated.

C. Sleep Assessment

Sleep quality was assessed using the SATED questionnaire, a validated five-item tool evaluating satisfaction, alertness, timing, efficiency and duration of sleep. Each domain was scored from 0 to 2 giving a total score of 0 to 10. For purpose of analysis, total scores were categorized according to validated cutoffs into poor sleep quality (score<8) and good sleep quality (score≥ 8). Sleep quality was treated as binary variable for association analysis.

D. Anthropometric Measures

Body mass index (BMI) was calculated as weight (kg)/height (m²) and categorized using WHO criteria.¹⁸

Standardized questionnaire administration minimized recall bias. Pilot testing enhanced clarity and reliability.

The required sample size was 385, calculated assuming 50% prevalence, 95% confidence level, and 5% precision.

Statistical Analysis

Data were analyzed using JAMOVI. Descriptive statistics summarized prevalence with 95% confidence intervals. Associations between breakfast skipping and categorical outcomes were assessed using chi-square tests. Statistical significance was set at $p < 0.05$.

RESULTS

In this study, the number of participants were 385. The mean age and mean BMI being 21.0 ± 2.17 years and 23.0 ± 3.97 kg/m² respectively. 54.3%(n=209) of participants reported consuming breakfast daily, while 45.7% reported skipping behavior.

Short-Term Consequences

61.6% reported fatigue or low energy, 51.2% reported difficulty in concentration, 38.4% reported headache, 44.7% reported irritability, 59.2% reported gastric discomfort.

Higher proportion of breakfast skippers reported fatigue which was a statistically significant association ($p = 0.049$, $\chi^2 = 3.86$).

Contingency Tables

Contingency Tables				
		Fatigue or low energy		
Do you consume breakfast daily? - Breakfast_binary		0	1	Total
0	Expected	67.7	108	176
	% within row	43.8%	56.3%	100.0%
1	Expected	80.3	129	209
	% within row	34.0%	66.0%	100.0%
Total	Expected	148	237	385
	% within row	38.4%	61.6%	100.0%

χ^2 Tests			
	Value	df	p
χ^2	3.86	1	.049
N	385		

However other short-term effects like difficulty concentrating($p=0.532$), headache($p=0.234$), irritability ($p=0.626$), gastric discomfort ($p=0.195$) showed no signification association.

Long-Term Dietary Behaviors

38.7% of participants reported overeating during lunch on the days they skip breakfast and 44.4% reported increased junk food consumption. However, breakfast skipping and

long-term behaviors showed no statistically significant association.

Sleep Quality

A significant association was observed for sleep quality and breakfast skipping ($\chi^2=4.51$, $df=1$, $p<0.0034$). Lower sleep satisfaction (<8 according to SATED scale) was reported in participants who usually skip breakfast.

		Sleep_Quality_Category		
Do you consume breakfast daily? - Breakfast_binary		0	1	Total
0	Expected	145	31.1	176
	% within row	77.8%	22.2%	100.0%
1	Expected	172	36.9	209
	% within row	86.1%	13.9%	100.0%
Total	Expected	317	68	385
	% within row	82.3%	17.7%	100.0%

χ^2 Tests			
	Value	df	p
χ^2	4.51	1	.034
N	385		

Contingency Tables

Contingency Tables				
		Gastric discomfort (burning pain, acidity)		
Do you consume breakfast daily? - Breakfast_binary		0	1	Total
0	Expected	71.8	104	176
	% within row	44.3%	55.7%	100.0%
1	Expected	85.2	124	209
	% within row	37.8%	62.2%	100.0%
Total	Expected	157	228	385
	% within row	40.8%	59.2%	100.0%

χ^2 Tests			
	Value	df	p
χ^2	1.68	1	.195
N	385		

BMI

No significant association in BMI between breakfast skippers and breakfast consumers

was observed by independent t-test. ($t=0.667$, $df=383$, $p=0.505$).

Independent Samples T-Test

Independent Samples T-Test				
		Statistic	df	p
AGE	Student's t	-3.262	383	.001
BMI	Student's t	0.667	383	.505
Note. $H_a \mu_0 \neq \mu_1$				

Assumptions

Normality Test (Shapiro-Wilk)		
	W	p
AGE	0.962	<.001
BMI	0.975	<.001

DISCUSSION

This study evaluated the breakfast consumption trends and their association with short term consequences, long term dietary behaviors, sleep quality and BMI among young adults. Almost half of the participants reported irregular consumption making breakfast skipping highly prevalent. This finding is in accordance with previous studies among adolescents and young adults that says that breakfast skipping as a growing trend due to social and academic pressure.

A statistically significant association was observed between breakfast skipping and low energy or fatigue. This finding is consistent with previous researches proposing that breakfast consumption improves morning energy levels and cognitive functions.

Breakfast skipping can cause transient hypoglycemia and hence decreased energy levels which manifests as fatigue. However other short-term symptoms like headache, irritability and difficulty in concentration had no significant association. This is because these symptoms are affected by multiple external factors like sleep duration, stress, hydration and screen time which will decrease the singular effect of breakfast consumption.

Gastric discomfort was reported frequently but had no significant association with breakfast skipping. Gastrointestinal symptoms are influenced by many factors including dietary composition, meal timing, and individual sensitivity and not solely breakfast consumption.

There was no association between breakfast skipping and long-term dietary behaviors suggesting that they are complex and depends on various environmental and cultural influences. Previous studies have showed that some individuals compensate for missed breakfast by increased calorie intake later in the day while others have a stable consumption pattern, thereby giving mixed conclusions.

A noteworthy association was observed between breakfast skipping and poorer sleep satisfaction. Newer evidences give a bidirectional relationship between sleep and quality of sleep. Missed breakfast causes irregular meal timings which disrupts the circadian rhythm and hence the sleep quality, while irregular sleep schedules may lead to breakfast skipping. This highlights the importance of breakfast behaviors within the wide context of lifestyle behaviors.

Breakfast skippers and breakfast consumers had no significant difference in their BMIs. This is consistent with previous cross-sectional studies suggesting inconsistent associations between breakfast habits and body weight. Long-term energy balance influences BMI and not short-term effects of irregular eating patterns. Short-term weight changes may be diluted by younger age of the participants and their potential compensatory behaviors.

Weight trajectories can be affected by sustained breakfast skipping over extended periods according to previous longitudinal researches, which cannot be assessed by cross-sectional designs.

The absence of certain associations can also be due to methodological factors. Causal relationship cannot be concluded due to cross-sectional design of the study which assesses behavior at a single time point. Recall and misclassification bias might be present due to self-reported data. Also, though the sample size was adequate, small behavioral effects can only be found by larger cohorts.

Overall, the results show that breakfast skipping is associated with fatigue and poorer sleep quality but does not solely influence BMI or long-term behaviors. Breakfast habits mostly represent a single component of a wider lifestyle structure including sleep, stress and overall diet quality. Further longitudinal studies including objective dietary and behavioral

measures are required to establish these relationships.

CONCLUSION

This study reveals that breakfast skipping is a common behavioral pattern among young adults. A significant association with fatigue and poorer sleep quality shows its immediate negative impact on daily functioning and overall health. Although no statistically significant relationship was observed with BMI or certain short-term or long-term dietary outcomes, the link with fatigue and sleep dissatisfaction displays a meaningful effect on well-being.

These findings emphasize the need for targeted health promotion strategies encouraging regular breakfast consumption among young adults.

Future research should employ longitudinal designs to further figure out the long-term health effects of the widespread habit.

Limitations

This study relied on self-reported data, which may introduce recall and reporting bias. The cross-sectional design prevents establishment of causality.

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Conflict of Interest

The authors declare no conflicts of interest.

REFERENCES

1. Nagao S, Sasawaki Y, Inokawa H, Kitagawa N, Takashima N, Yagita K. Association Between Multi-Dimensional Sleep Health and Breakfast Skipping in Japanese High School Students. *Nutrients*. 2025 Sep 19;17(18):3005. doi: 10.3390/nu17183005. PMID: 41010530; PMCID: PMC12472367.
2. Nagalingam L, Felicia JP, P M A, V N. A Cross-Sectional Study on the Prevalence of Skipping Breakfast Among College-Going Students in a Private University. *Cureus*. 2024 Dec 31;16(12):e76700. doi: 10.7759/cureus.76700. PMID: 39898150; PMCID: PMC11782905.
3. Qiao, T., Gao, D., Lu, G. et al. Association of gastrointestinal symptoms and skipping breakfast with anxiety and depressive symptoms in quarantined Chinese college students during the Shanghai 2022 lockdown: a cross sectional survey. *BMC Psychiatry* 23, 889 (2023).
4. Pendergast, F.J., Livingstone, K.M., Worsley, A. et al. Correlates of meal skipping in young adults: a systematic review. *Int J Behav Nutr Phys Act* 13, 125 (2016).
5. 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*. 2020 Jun 5;34(2):97-103. doi: 10.1515/ijamh-2019-0256. PMID: 32549169.
6. Rampersaud GC, Pereira MA, Girard BL, Adams J, Metzl JD. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *J Am Diet Assoc*. 2005 May;105(5):743-60; quiz 761-2. doi: 10.1016/j.jada.2005.02.007. PMID: 15883552.
7. Ackuaku-Dogbe EM, Abaidoo B. Breakfast eating habits among medical students. *Ghana Med J*. 2014 Jun;48(2):66-70. doi: 10.4314/gmj.v48i2.2. PMID: 25667552; PMCID: PMC4310332.
8. Kadir DH, Saleem MF, Galali Y, Khudr AM, Balaky HH, Hassanzadeh H, Ghanbarzadeh B. Assessing prevalence, factors and health consequences and academic performance of undergraduate students with breakfast skipping during COVID-19 using statistical modeling: a cross-sectional study. *Eat Weight Disord*. 2024 Aug 16;29(1):52. doi: 10.1007/s40519-024-01676-2. PMID: 39150632; PMCID: PMC11329525.
9. Sincovich, A., Moller, H., Smithers, L. et al. Prevalence of breakfast skipping among children and adolescents: a cross-sectional population level study. *BMC Pediatr* 22, 220 (2022).
10. Romero-Blanco C, Martín-Moraleda E, Pinilla-Quintana I, Dorado-Suárez A, Jiménez-Marín A, Cabanillas-Cruz E, García-Coll V, Martínez-Romero MT, Aznar S. Why Do Adolescents Skip Breakfast? A Study on the Mediterranean Diet and Risk Factors. *Nutrients*. 2025 Jun 6;17(12):1948. doi: 10.3390/nu17121948. PMID: 40573059; PMCID: PMC12195815.
11. Lesani A, Barkhidarian B, Jafarzadeh M, Akbarzade Z, Djafarian K, Shab-Bidar S. Time-related meal patterns and

- breakfast quality in a sample of Iranian adults. *BMC Nutr.* 2023 Jan 16;9(1):13. doi: 10.1186/s40795-022-00666-w. PMID: 36647126; PMCID: PMC9841660.
12. Okada C, Iso H, Yamagishi K, Ikeda A, Umesawa M, Muraki I, Yasuda N, Kato T, Saito I, Arima K, Nishimura T, Tanno K, Sakata K, Goto A, Yamaji T, Iwasaki M, Shimazu T, Inoue M, Sawada N, Tsugane S. Dietary behaviours and related lifestyles according to the presence or absence of skipping breakfast in Japanese adults: the JPHC-NEXT study. *Public Health Nutr.* 2023 Jun;26(6):1230-1237. doi:10.1017/S1368980023000010. Epub 2023 Feb 13. PMID: 36775271; PMCID: PMC10346075.
13. Hovdenak IM, Helleve A, Wolden IE, Bere E. Socioeconomic inequality in breakfast skipping among Norwegian adolescents. *Nutr J.* 2024 Aug 16;23(1):94. doi: 10.1186/s12937-024-00998-2. PMID: 39152455; PMCID: PMC11328473.
14. Timlin MT, Pereira MA. Breakfast frequency and quality in the etiology of adult obesity and chronic diseases. *Nutr Rev.* 2007 Jun;65(6 Pt 1):268-81. doi: 10.1301/nr.2007.jun.268-281. PMID: 17605303.
15. Rampersaud GC, Pereira MA, Girard BL, Adams J, Metz J. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *J Am Diet Assoc.* 2005 May;105(5):743-60; quiz 761-2. doi: 10.1016/j.jada.2005.02.007. PMID: 15883552.
16. Adolphus K, Lawton CL, Dye L. The effects of breakfast on behavior and academic performance in children and adolescents. *Front Hum Neurosci.* 2013 Aug 8;7:425. doi: 10.3389/fnhum.2013.00425. PMID: 23964220; PMCID: PMC3737458.
17. Benton D, Parker PY. Breakfast, blood glucose, and cognition. *Am J Clin Nutr.* 1998 Apr;67(4):772S-778S. doi: 10.1093/ajcn/67.4.772S. PMID: 9537627.
18. Ma X, Chen Q, Pu Y, Guo M, Jiang Z, Huang W, Long Y, Xu Y. Skipping breakfast is associated with overweight and obesity: A systematic review and meta-analysis. *Obes Res Clin Pract.* 2020 Jan-Feb;14(1):1-8. doi: 10.1016/j.orcp.2019.12.002. Epub 2020 Jan 7. PMID: 31918985.
19. Sievert K, Hussain SM, Page MJ, Wang Y, Hughes HJ, Malek M, Cicuttini FM. Effect of breakfast on weight and energy intake: systematic review and meta-analysis of randomised controlled trials. *BMJ.* 2019 Jan 30;364:l42. doi: 10.1136/bmj.l42. PMID: 30700403; PMCID: PMC6352874.
20. Buysse DJ. Sleep health: can we define it? Does it matter? *Sleep.* 2014 Jan 1;37(1):9-17. doi: 10.5665/sleep.3298. PMID: 24470692; PMCID: PMC3902880.
21. Drake CL, Pillai V, Roth T. Stress and sleep reactivity: a prospective investigation of the stress-diathesis model of insomnia. *Sleep.* 2014 Aug 1;37(8):1295-304. doi: 10.5665/sleep.3916. PMID: 25083009; PMCID: PMC4096198.