

# Assessment of Dietary Habits and its association with Obesity and Menstrual Irregularities among Medical Undergraduates: A cross-sectional study

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## ABSTRACT

**Background:** Unhealthy dietary behaviors, particularly frequent junk food consumption, have emerged as a major public health concern among young adults. Despite adequate knowledge of nutrition, medical undergraduates are frequently exposed to academic stress, irregular schedules, and unhealthy food environments, predisposing them to poor dietary habits. These behaviors may contribute not only to obesity but also to adverse reproductive health outcomes such as menstrual irregularity.

**Methods:** A college-based cross-sectional study was conducted among 250 medical undergraduate students aged 18–25 years. Data were collected using a structured, self-administered questionnaire assessing dietary habits, junk food consumption patterns, and associated factors. Anthropometric measurements were recorded, and body mass index (BMI) was calculated using WHO Asia-Pacific criteria. Menstrual history was obtained from female participants. Statistical analysis was performed using IBM SPSS version 27. Descriptive statistics, Chi-square test, and multivariable logistic regression analysis were used, with a p-value <0.05 considered statistically significant.

**Results:** Frequent junk food consumption was common, with 43.6% of participants consuming junk food 2–4 times weekly and 27.6% consuming it more than four times weekly. Only 25.2% reported daily fruit intake, whereas 39.6% consumed fruits less than three times per week. Meal skipping was reported by 55.2% of participants, and 52.8% consumed sugary beverages at least three times weekly. Overall, 24.4% of participants were overweight and 22.4% were obese. Frequent junk food consumption (>4 times/week) (AOR: 3.1; 95% CI: 1.5–6.5; p=0.002), low fruit intake (AOR: 2.6; 95% CI: 1.3–5.3; p=0.011), and meal skipping (AOR: 2.0; 95% CI: 1.1–3.8; p=0.020) were independent predictors

of obesity. Among female students, frequent junk food consumption (AOR: 2.9; 95% CI: 1.4–6.0;  $p=0.004$ ), obesity (AOR: 2.5; 95% CI: 1.2–5.2;  $p=0.016$ ), and meal skipping (AOR: 1.8; 95% CI: 1.0–3.4;  $p=0.040$ ) were independently associated with menstrual irregularity.

**Conclusion:** Unhealthy dietary practices are highly prevalent among medical undergraduates and are significantly associated with both obesity and menstrual irregularity. Frequent junk food consumption, inadequate fruit intake, and meal skipping represent important modifiable risk factors. Institution-based nutritional education and behavioral interventions are essential to promote healthier dietary practices, improve metabolic and reproductive health, and encourage lifelong healthy lifestyle behaviors among future healthcare professionals.

**Keywords:** Junk food; Dietary habits; Medical students; Obesity; Menstrual irregularity; Meal skipping; Fruit intake; Cross-sectional study.

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## INTRODUCTION

The transition from adolescence to young adulthood represents a critical period for the establishment of long-term health behaviors, particularly dietary practices. According to Jeffrey Jensen Arnett, this phase, termed “emerging adulthood,” is characterized by increased independence, lifestyle experimentation, and susceptibility to unhealthy habits, including irregular eating patterns and high consumption of energy-dense foods [2]. In recent years, there has been a marked global shift toward the consumption of ultra-processed and junk foods among young populations, driven by urbanization, globalization, and aggressive food marketing strategies [1].

Junk food consumption has emerged as a major public health concern due to its association with poor nutritional quality, high caloric density, and adverse health outcomes. A recent cross-sectional study by Islam IB et al. reported a high prevalence of junk food intake among university students, with inadequate awareness regarding its long-term health consequences [1]. Similarly, evidence suggests that diets rich in processed foods are linked not only to obesity and metabolic disorders but also to impaired mental well-being, highlighting the multidimensional

impact of unhealthy dietary habits [3]. In the United States, nearly half of daily caloric intake among adults is derived from ultra-processed foods, reflecting the magnitude of the problem in both developed and developing settings [4].

The health implications of junk food consumption are particularly concerning among adolescents and young adults. Studies have demonstrated significant associations between frequent intake of fast food and increased risk of obesity, hypertension, and other non-communicable diseases [5]. Furthermore, recent research indicates that unhealthy dietary patterns are often accompanied by sedentary lifestyles and poor health behaviors, compounding the overall disease burden [6]. The Global Burden of Disease analysis has also emphasized the rising contribution of dietary risk factors to morbidity, including eating disorders and metabolic complications among youth [7].

Globally, the prevalence of fast food consumption among adolescents in low- and middle-income countries (LMICs) has increased substantially, with multicountry data showing widespread adoption of Western dietary patterns [8]. This trend is closely linked to the growing dominance of ultra-processed foods in the global food system, as described by Carlos Augusto

Monteiro et al. [9]. Concurrently, countries are experiencing a “double burden” of malnutrition, where undernutrition coexists with rising rates of overweight and obesity, particularly in transitioning economies [10].

In the Indian context, changing dietary patterns among adolescents and young adults are increasingly characterized by frequent consumption of fast foods, sugary beverages, and meals consumed outside the home. A study conducted in Kolkata highlighted suboptimal dietary practices among adolescents, including low intake of fruits and vegetables and high consumption of energy-dense foods [11]. Similar trends have been observed in other regions, where easy accessibility, affordability, and peer influence significantly drive junk food consumption [12]. Additionally, exposure to food advertisements and digital media has been identified as a key determinant influencing unhealthy food choices among young individuals [13].

Environmental and behavioral factors further contribute to these dietary patterns. Eating outside the home has been consistently associated with higher intake of fats, sugars, and salt, thereby increasing the risk of poor nutritional outcomes [14]. Moreover, perceived barriers such as lack of time, limited availability of healthy options, and taste preferences often hinder the adoption of healthier eating habits among adolescents and young adults [15].

Medical undergraduates represent a unique and important subgroup, as they are future healthcare providers expected to promote healthy lifestyles. However, despite their knowledge, they are not immune to unhealthy dietary behaviors due to academic stress, irregular schedules, and environmental influences. Understanding their dietary habits, reasons for junk food consumption, and readiness to adopt corrective measures is essential for designing targeted interventions.

In this context, the present study aims to assess dietary habits, patterns of junk food consumption, underlying determinants, and readiness for behavioral change among medical

undergraduates, thereby contributing to evidence-based strategies for improving nutritional health in this vulnerable population.

## Materials and Methods

This college-based, prospective cross-sectional observational study was conducted among undergraduate medical students at Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India, over a period of three months from December 2025 to February 2026. The study population comprised MBBS students from first year to internship, aged between 18 and 25 years. Participants who were present during the study period and provided written informed consent were included. Students on prolonged leave, those diagnosed with eating disorders or chronic illnesses affecting dietary intake, and those who submitted incomplete questionnaires were excluded.

The sample size was calculated using Dobson’s formula for estimation of a single proportion, taking a prevalence of 20.6% for frequent junk food consumption, a 95% confidence level ( $Z = 1.96$ ), and a 5% allowable error. The calculated sample size was 251, which was rounded to 250 participants. A consecutive sampling technique was employed, wherein eligible students were recruited sequentially until the required sample size was achieved.

Data were collected using a predesigned, structured, self-administered questionnaire comprising 100 items across eight domains, including demographic characteristics, dietary patterns, frequency and types of junk food consumption, personal reasons for intake, knowledge and awareness, psychological and environmental triggers, and willingness for remedial measures. Responses were recorded using categorical options and Likert scales to capture both behavioral patterns and underlying determinants. The questionnaire was administered during supervised sessions in lecture halls and common areas during non-academic hours to ensure maximum participation and minimize response bias. Each participant completed the questionnaire anonymously within

approximately 15–20 minutes, with clarifications provided when required.

Following questionnaire completion, anthropometric measurements including height and weight were obtained using a standardized stadiometer and calibrated digital weighing scale, and body mass index (BMI) was calculated for each participant. The primary outcomes assessed were dietary habits, frequency and patterns of junk food consumption, and reasons for intake, while secondary outcomes included awareness of health risks and readiness to adopt remedial lifestyle modifications.

Data were entered into Microsoft Excel and analyzed using IBM SPSS version 27. Descriptive statistics were expressed as mean  $\pm$  standard deviation for continuous variables and frequencies with percentages for categorical

variables. Inferential statistics included the Chi-square test for associations between categorical variables, independent t-test or one-way ANOVA for comparison of continuous variables across groups, and Pearson's correlation coefficient to evaluate relationships between junk food consumption, BMI, and readiness scores. A p-value of less than 0.05 was considered statistically significant.

Ethical approval was obtained from the Institutional Human Ethics Committee prior to commencement of the study. Written informed consent was obtained from all participants, and confidentiality and anonymity were strictly maintained throughout the study. Participation was entirely voluntary, and participants were free to withdraw at any stage without any academic consequences.

### Results

**Table 1: Baseline Characteristics of Study Participants (n=250)**

| Category                             | n (%)      |
|--------------------------------------|------------|
| <b>Age (years)</b>                   |            |
| 18–20                                | 108 (43.2) |
| 21–23                                | 97 (38.8)  |
| 24–25                                | 45 (18.0)  |
| <b>Gender</b>                        |            |
| Male                                 | 57 (22.8)  |
| Female                               | 193 (77.2) |
| <b>BMI Category (Asian cut-offs)</b> |            |
| Underweight (<18.5)                  | 18 (7.2)   |
| Normal (18.5–22.9)                   | 115 (46.0) |
| Overweight (23.0–24.9)               | 61 (24.4)  |
| Obese I (25.0–29.9)                  | 44 (17.6)  |
| Obese II ( $\geq$ 30.0)              | 12 (4.8)   |

The study included 250 medical undergraduate students aged 18–25 years. The largest proportion of participants belonged to the 18–20 years age group (43.2%), followed by 21–23 years (38.8%), while 18.0% were in the 24–25 years category, indicating that the study population was predominantly composed of younger students.

A clear female predominance was observed, with females accounting for 77.2% of the participants, whereas males constituted 22.8%. This skewed gender distribution should be considered when interpreting outcomes, particularly those related to menstrual health.

Based on the WHO Asia-Pacific BMI classification, 46.0% of participants had normal

BMI, while 7.2% were underweight. A substantial proportion of participants were either overweight (24.4%) or obese, including 17.6% classified as Obese I and 4.8% as Obese II. Overall, 46.8% of participants had excess body weight ( $\text{BMI} \geq 23 \text{ kg/m}^2$ ), indicating a considerable burden of overweight and obesity in this population.

In summary, the study population was predominantly young and female, with a notable proportion exhibiting excess body weight, highlighting the relevance of evaluating dietary habits and associated health outcomes in this group.

**Table 2: Dietary Habits Pattern Among Participants (n = 250)**

| Category             | n (%)      |
|----------------------|------------|
| <b>Junk Food</b>     |            |
| <2/week              | 72 (28.8)  |
| 2–4/week             | 109 (43.6) |
| >4/week              | 69 (27.6)  |
| <b>Fruit Intake</b>  |            |
| Daily                | 63 (25.2)  |
| 3–5/week             | 88 (35.2)  |
| <3/week              | 99 (39.6)  |
| <b>Meal Skipping</b> |            |
| Yes                  | 138 (55.2) |
| No                   | 112 (44.8) |
| <b>Sugary Drinks</b> |            |
| <3/week              | 118 (47.2) |
| $\geq 3$ /week       | 132 (52.8) |

The dietary assessment revealed that a substantial proportion of participants consumed junk food regularly, with a large proportion of participants consumed junk food 2–4 times per week, followed by **less than 2 times per week (28.8%)** and **more than 4 times per week (27.6%)**, indicating a high proportion of frequent junk food consumption.

With respect to fruit intake, only **25.2% of participants consumed fruits daily**, whereas **39.6% reported intake of less than 3 times per week**, suggesting inadequate consumption of healthy dietary components among a large proportion of students.

More than half of the participants (**55.2%**) reported **skipping meals**, reflecting irregular eating patterns. Additionally, **52.8% consumed sugary beverages three or more times per week**, which further highlights unhealthy dietary behaviors.

Overall, the findings indicate that **unhealthy dietary practices—including frequent junk food consumption, low fruit intake, meal skipping, and high sugary beverage intake—are prevalent among medical undergraduates**, aligning with the study's objective of evaluating dietary risk factors.

**Table 3: Association Between Dietary Habits and Obesity (Univariate Analysis)**

| Category             | Obese n (%)<br>(n=56) | Non-Obese n (%)<br>(n=194) | $\chi^2$ | p-value |
|----------------------|-----------------------|----------------------------|----------|---------|
| <b>Junk Food</b>     |                       |                            |          |         |
| <2/week              | 9 (12.5)              | 63 (87.5)                  | 13.52    | <0.001  |
| 2–4/week             | 22 (20.2)             | 87 (79.8)                  |          |         |
| >4/week              | 25 (36.2)             | 44 (63.8)                  |          |         |
| <b>Fruit Intake</b>  |                       |                            |          |         |
| Daily                | 6 (9.5)               | 57 (90.5)                  | 12.08    | 0.002   |
| 3–5/week             | 18 (20.5)             | 70 (79.5)                  |          |         |
| <3/week              | 32 (32.3)             | 67 (67.7)                  |          |         |
| <b>Meal Skipping</b> |                       |                            |          |         |
| Yes                  | 39 (28.3)             | 99 (71.7)                  | 6.63     | 0.010   |
| No                   | 17 (15.2)             | 95 (84.8)                  |          |         |
| <b>Sugary Drinks</b> |                       |                            |          |         |
| <3/week              | 19 (16.1)             | 99 (83.9)                  | 4.68     | 0.030   |
| ≥3/week              | 37 (28.0)             | 95 (72.0)                  |          |         |

( $\chi^2$  test (Chi-square test) was used to assess the association between categorical variables. A  $p$ -value  $<0.05$  was considered statistically significant.)

Univariate analysis demonstrated a statistically significant association between dietary habits and obesity among the study participants. Junk food consumption showed a strong positive association with obesity ( $p < 0.001$ ). The proportion of obesity increased progressively with frequency of intake, from **12.5% among those consuming junk food less than twice per week** to **36.2% among those consuming it more than four times per week**. A progressive increase in obesity prevalence was observed with increasing frequency of junk food consumption.

Similarly, fruit intake was significantly associated with obesity ( $p = 0.002$ ). Participants with **lower fruit consumption (<3 times/week)** had a higher proportion of obesity (**32.3%**) compared to those with **daily intake (9.5%)**, suggesting a

protective effect of regular fruit consumption. Meal skipping was also significantly associated with obesity ( $p = 0.01$ ), with a higher proportion of obesity observed among those who skipped meals (**28.3%**) compared to those who did not (**15.2%**).

In addition, frequent consumption of sugary beverages was significantly linked to obesity ( $p = 0.03$ ). Participants consuming sugary drinks **three or more times per week** had a higher proportion of obesity (**28.0%**) compared to those with lower intake (**16.1%**).

Overall, these findings indicate that **frequent junk food intake, low fruit consumption, meal skipping, and high sugary beverage intake are significantly associated with increased odds of obesity**, supporting the role of dietary behaviors as important modifiable risk factors.

**able 4: Association Between Dietary Habits and Menstrual Irregularity (Females n = 193)**

| Category                    | Irregular n (%)<br>(n=65) | Regular n (%)<br>(n=128) | $\chi^2$ | p-value |
|-----------------------------|---------------------------|--------------------------|----------|---------|
| <b>Junk Food</b>            |                           |                          |          |         |
| <2/week                     | 11 (19.6)                 | 45 (80.4)                | 14.96    | <0.001  |
| 2–4/week                    | 24 (34.8)                 | 45 (65.2)                |          |         |
| >4/week                     | 30 (51.7)                 | 28 (48.3)                |          |         |
| <b>BMI (Asian cut-offs)</b> |                           |                          |          |         |
| Normal                      | 24 (24.5)                 | 74 (75.5)                | 12.47    | 0.002   |
| Overweight                  | 15 (36.6)                 | 26 (63.4)                |          |         |
| Obese                       | 26 (52.0)                 | 24 (48.0)                |          |         |
| <b>Meal Skipping</b>        |                           |                          |          |         |
| Yes                         | 41 (39.8)                 | 62 (60.2)                | 6.54     | 0.010   |
| No                          | 24 (26.7)                 | 66 (73.3)                |          |         |

( $\chi^2$  test (Chi-square test) was used to assess the association between categorical variables. A  $p$ -value  $<0.05$  was considered statistically significant.)

Among female participants, dietary habits and body mass index showed statistically significant associations with menstrual irregularities. Junk food consumption demonstrated a strong association with menstrual irregularity ( $p < 0.001$ ). The proportion of irregular cycles increased with frequency of intake, from **19.6% among those consuming junk food less than twice per week to 51.7% among those consuming it more than four times per week**, indicating a clear dose–response relationship.

Body mass index was also significantly associated with menstrual irregularity ( $p = 0.002$ ). The proportion of irregular cycles increased across BMI categories, with **24.5% in participants**

**with normal BMI, 36.6% in overweight, and 52.0% in obese individuals**, suggesting that higher adiposity is linked to increased menstrual disturbances.

Meal skipping showed a significant association as well ( $p = 0.01$ ). Participants who reported skipping meals had a higher proportion of menstrual irregularity (**39.8%**) compared to those who did not (**26.7%**), indicating that irregular eating patterns may negatively impact menstrual health.

Overall, these findings suggest that **frequent junk food consumption, higher BMI, and meal skipping are significantly associated with menstrual irregularities**, highlighting the importance of modifiable lifestyle factors in maintaining reproductive health

**Fig 1, Association Between Junk Food Consumption and Menstrual Irregularity**

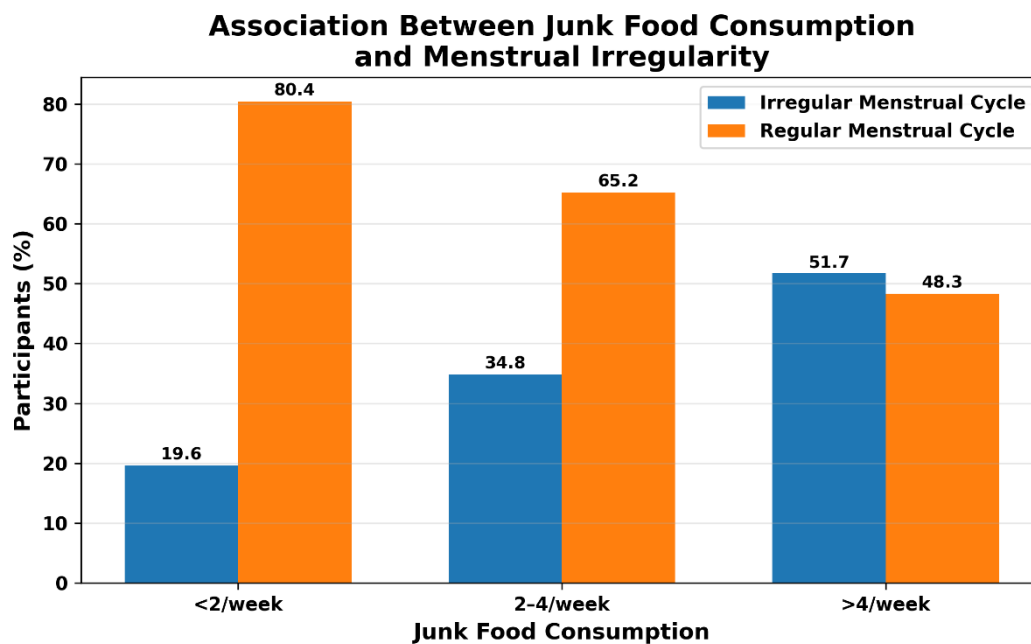


Figure 1 shows that menstrual irregularity increased with higher junk food consumption. Only **19.6%** of participants consuming junk food **<2 times/week** had irregular menstrual cycles, compared to **34.8%** among those consuming it **2–4 times/week** and **51.7%** among those consuming it **>4 times/week**. Conversely, the

proportion of participants with regular menstrual cycles decreased as junk food consumption increased. This suggests a positive association between frequent junk food intake and menstrual irregularity.

**Table 5a: Multivariate Logistic Regression Analysis with Obesity**

| Category | AOR (95% CI) | p-value |
|----------|--------------|---------|
|----------|--------------|---------|

|                      |               |              |
|----------------------|---------------|--------------|
| <b>Junk Food</b>     |               |              |
| <2/week              | 1.00 (Ref)    | —            |
| 2–4/week             | 1.7 (0.8-3.6) | 0.130        |
| >4/week              | 3.1 (1.5-6.5) | <b>0.002</b> |
| <b>Fruit Intake</b>  |               |              |
| Daily                | 1.00 (Ref)    | —            |
| 3–5/week             | 1.5 (0.7-3.3) | 0.200        |
| <3/week              | 2.6 (1.3-5.3) | <b>0.011</b> |
| <b>Meal Skipping</b> |               |              |
| No                   | 1.00 (Ref)    | —            |
| Yes                  | 2.0 (1.1-3.8) | <b>0.020</b> |
| <b>Sugary Drinks</b> |               |              |
| <3/week              | 1.00 (Ref)    | —            |
| ≥3/week              | 1.6 (0.9-3.0) | 0.090        |

*AOR: Adjusted Odds Ratio; CI: Confidence Interval. Multivariate logistic regression analysis was performed to identify independent predictors of obesity. Reference category (Ref) is indicated for each variable. A p-value <0.05 was considered statistically significant.*

Multivariate logistic regression analysis identified several independent dietary predictors of obesity among the study participants. Junk food consumption showed a strong independent association with obesity. Participants consuming junk food **more than four times per week** had significantly higher odds of obesity compared to those consuming it less than twice per week (AOR: **3.1**; **95% CI: 1.5–6.5**; **p = 0.002**). However, moderate consumption (2–4 times/week) was not statistically significant ( $p = 0.130$ ).

Fruit intake demonstrated a protective effect. Participants consuming fruits **less than three times per week** had significantly higher odds of obesity compared to those with daily intake (AOR: **2.6**; **95% CI: 1.3–5.3**; **p = 0.011**), whereas intake of 3–5 times per week was not statistically significant.

Meal skipping was also independently associated with obesity. Participants who skipped meals had **twice the odds of obesity** compared to those who did not (AOR: **2.0**; **95% CI: 1.1–3.8**; **p = 0.020**).

Although higher consumption of sugary beverages ( $\geq 3$ /week) was associated with increased odds of obesity (AOR: 1.6), this association was **not statistically significant** ( $p = 0.090$ ).

**Table 5b: Multivariate Logistic Regression Analysis with Menstrual Irregularity**

| Category      | AOR (95% CI)  | p-value      |
|---------------|---------------|--------------|
| Junk Food     |               |              |
| <2/week       | 1.00 (Ref)    | —            |
| 2–4/week      | 1.8 (0.9-3.7) | 0.082        |
| >4/week       | 2.9 (1.4-6.0) | <b>0.004</b> |
| BMI           |               |              |
| Normal        | 1.00 (Ref)    | —            |
| Overweight    | 1.4 (0.7-2.9) | 0.255        |
| Obese         | 2.5 (1.2-5.2) | <b>0.016</b> |
| Meal Skipping |               |              |
| No            | 1.00 (Ref)    | —            |
| Yes           | 1.8 (1.0-3.4) | <b>0.040</b> |

*AOR: Adjusted Odds Ratio; CI: Confidence Interval. Multivariate logistic regression analysis was performed to identify independent predictors of menstrual irregularity. Reference category (Ref) is indicated for each variable. A p-value <0.05 was considered statistically significant.)*

Multivariate logistic regression analysis identified key independent predictors of menstrual irregularity among female participants.

Junk food consumption showed a significant association with menstrual irregularity. Participants consuming junk food **more than four times per week** had significantly higher odds of menstrual irregularity compared to those consuming it less than twice per week (AOR: **2.9**; **95% CI: 1.4–6.0**; **p = 0.004**). Although moderate consumption (2–4 times/week) showed increased odds (AOR: 1.8), it did not reach statistical significance (p = 0.082).

Body mass index was also an independent predictor. Obese participants had **2.5 times higher odds** of menstrual irregularity compared to those with normal BMI (AOR: **2.5**; **95% CI: 1.2–5.2**; **p = 0.016**), whereas the association with overweight was not statistically significant (p = 0.255).

Meal skipping demonstrated a significant association as well. Participants who skipped meals had **1.8 times higher odds** of menstrual irregularity compared to those who did not (AOR: **1.8**; **95% CI: 1.0–3.4**; **p = 0.040**).

## DISCUSSION

The present study demonstrates a high prevalence of unhealthy dietary behaviors among medical undergraduates, characterized by frequent junk food consumption, inadequate fruit intake, meal skipping, and regular consumption of sugar-sweetened beverages.

More than half of the participants reported skipping meals (55.2%), only one-quarter consumed fruits daily (25.2%), while 52.8% consumed sugary beverages at least three times per week. These findings suggest poor adherence to healthy dietary recommendations despite participants being future healthcare professionals. Similar observations have been reported by Musaiger et al. [15], who identified lack of time, academic workload, limited availability of healthy foods, and lifestyle constraints as important barriers to healthy eating among adolescents and young adults.

Frequent junk food consumption was common in the present study, with 43.6% of students consuming junk food two to four times weekly and 27.6% consuming it more than four times weekly. These findings are comparable to those reported by Banik et al. [16], who observed high fast-food consumption among college students together with increasing prevalence of overweight and obesity. Similarly, almost half of the participants in the present study (46.8%) were either overweight or obese, indicating that excess body weight has become a significant health concern among medical undergraduates.

The contribution of unhealthy dietary intake to obesity is further supported by Shamim et al. [17], who demonstrated high consumption of unhealthy foods and sugar-sweetened beverages among adolescents. In the present study, obesity prevalence increased significantly with increasing junk food consumption, while frequent sugary beverage intake was also associated with obesity during univariate analysis, indicating that energy-dense dietary habits contribute substantially to metabolic risk.

Meal skipping emerged as another important unhealthy dietary behavior. More than half of the participants skipped meals, and obesity was significantly more common among meal skippers. Similar findings have been reported by Tareq et al. [18], who documented widespread unhealthy dietary practices among university students. Likewise, Akter and Hossain [19] reported that poor dietary habits frequently

coexist with sedentary lifestyles and contribute to adverse metabolic outcomes among young adults.

The progressive increase in obesity observed with increasing junk food consumption in the present study demonstrates a clear dose-response relationship. Similar dietary preferences have been described by Bipasha and Goon [20], who reported a high preference for fast food among university students. Furthermore, Goon et al. [21] demonstrated that frequent fast-food intake significantly increases obesity risk. Consistent with these findings, students consuming junk food more than four times weekly in the present study had significantly higher obesity prevalence than those consuming junk food less than twice weekly, and multivariate analysis confirmed junk food consumption as an independent predictor of obesity (AOR 3.1; 95% CI: 1.5–6.5).

Comparable dietary trends have also been reported in developing countries. Arulogun and Owolabi [22] found that convenience, affordability, and easy accessibility were major determinants of fast-food consumption among Nigerian undergraduates. Similar environmental influences are likely responsible for the high prevalence of unhealthy dietary behaviors observed among medical students in the present study.

Behavioral and psychosocial determinants also contribute substantially to unhealthy eating practices. Nancy et al. [23] demonstrated that academic stress, peer influence, and time constraints significantly affect dietary behaviors among adolescents. Although these factors were not directly measured in the present study, the high prevalence of meal skipping and frequent junk food intake indirectly supports the influence of these behavioral determinants.

A systematic review by Saha et al. [24] further identified affordability, accessibility, peer influence, and food availability as important determinants of junk food consumption among South Asian college students. The dietary patterns observed in the present study closely resemble these regional findings, suggesting that similar environmental and behavioral factors

influence food choices among Indian medical students.

Environmental factors also play an important role in determining dietary behavior. Shaw et al. [25] reported that social environments and food environments strongly influence adolescents' food choices. Similarly, the widespread consumption of junk food, inadequate fruit intake, and frequent sugary beverage consumption observed in the present study may reflect easy availability of unhealthy foods within and around educational institutions.

Behavioral mechanisms underlying unhealthy eating have also been explored by Cao et al. [26], who demonstrated significant associations between psychosocial factors and unhealthy eating behaviors. Although psychological determinants were not specifically evaluated in the present study, the clustering of unhealthy dietary practices suggests common underlying behavioral influences.

Regular fruit intake appeared to exert a protective effect against obesity. Participants consuming fruits daily had substantially lower obesity prevalence than those consuming fruits less than three times weekly. Similar protective effects of healthy dietary habits have been reported by Isacco et al. [27], emphasizing the importance of adequate fruit consumption for maintaining healthy body weight.

The present study also extends previous evidence by evaluating menstrual health among female medical undergraduates. Frequent junk food consumption showed a strong dose-dependent association with menstrual irregularity, with prevalence increasing progressively as junk food intake increased. In addition, obesity independently increased the likelihood of menstrual irregularity by 2.5-fold, while meal skipping also remained an independent predictor. Although Al-Otaibi and Basuny [28] primarily demonstrated the relationship between unhealthy dietary habits and obesity among university students, the present findings suggest that these unhealthy dietary behaviors may also adversely influence reproductive health through obesity-related hormonal disturbances.

Similarly, Irfan et al. [29] reported that unhealthy dietary habits are closely associated with overweight and obesity among university students. The present findings extend this evidence by demonstrating that obesity associated with unhealthy dietary behaviors is also accompanied by increased menstrual irregularities, emphasizing the broader health consequences of poor nutrition among young women.

Recent evidence from Nepal by Chuwan [30] also highlights the widespread prevalence of junk food consumption among undergraduate students. Taken together, these regional findings indicate that unhealthy dietary behaviors have become common throughout South Asia. The present study adds to this evidence by demonstrating that frequent junk food consumption, inadequate fruit intake, and meal skipping are independently associated not only with obesity but also with menstrual irregularity among medical undergraduates, emphasizing the need for institution-based nutritional education and behavioral interventions aimed at improving both metabolic and reproductive health.

## CONCLUSION

The present study demonstrates a high prevalence of unhealthy dietary practices among medical undergraduates, characterized by frequent junk food consumption, inadequate fruit intake, meal skipping, and regular consumption of sugar-sweetened beverages. Nearly half of the participants were either overweight or obese, highlighting the growing burden of nutrition-related health problems even among future healthcare professionals.

Frequent junk food consumption, low fruit intake, and meal skipping were identified as significant independent predictors of obesity, while frequent junk food consumption, obesity, and meal skipping were also independently associated with menstrual irregularity among female students. The observed dose-response relationship between increasing junk food consumption and both obesity and menstrual disturbances underscores the adverse effects of

unhealthy dietary behaviors on metabolic as well as reproductive health.

Despite possessing adequate nutritional knowledge, medical undergraduates exhibited unhealthy eating patterns comparable to those reported in the general young adult population, emphasizing the persistent gap between knowledge and practice. These findings highlight the need for comprehensive, institution-based interventions aimed at promoting healthy eating behaviors through structured nutrition education, improved availability of healthy food

choices within campus environments, behavioral counselling, and regular health promotion activities.

Early adoption of healthy dietary practices during medical training may not only reduce the future burden of obesity and other non-communicable diseases but also improve reproductive health among female students. Encouraging healthier lifestyle choices among medical undergraduates is essential to enhance their personal well-being and strengthen their role as future advocates of preventive healthcare.

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