

## Original Research

### Assessing the Public Health Implications of Nutritional Habits Among College Students in India: A Cross-Sectional Mixed-Methods Study

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#### ABSTRACT:

**Background:** College life represents a critical period in which individuals establish lifelong habits, including dietary practices. The nutritional habits of college students can significantly impact their overall health and well-being. This study aims to comprehensively investigate the nutritional habits of college students in India, considering the diverse influences of cultural, economic, and lifestyle factors. **Methods:** A cross-sectional research design was employed, integrating both quantitative and qualitative methodologies. A diverse sample of 141 college students was randomly selected, ensuring representation across academic disciplines, socio-economic backgrounds, and demographic characteristics. Data were collected through structured questionnaires, 24-hour dietary recalls, food frequency questionnaires, anthropometric measurements, focus group discussions, and individual interviews. **Results:** In the quantitative phase, demographic characteristics revealed a balanced distribution across gender, age, and academic disciplines. Socio-economic status indicated a moderate mean monthly family income (₹30,000 ± ₹10,000). Dietary patterns highlighted positive habits such as a high mean breakfast frequency (5.3 days/week) and moderate fast food consumption (2.1 times/week). Anthropometric measurements indicated a mean BMI of 22.1 (±2.2) falling within the normal range. Significant differences in dietary patterns based on academic discipline were identified through ANOVA. Regression analysis showed associations between dietary factors and BMI. In the qualitative phase, cultural influences emerged as significant factors affecting dietary choices. Affordability challenges and the impact of hostel living on dietary choices were explored through focus group discussions and individual interviews. **Conclusion:** This study contributes a holistic understanding of the nutritional landscape of Indian college students. The findings inform evidence-based interventions and policies aimed at promoting healthier dietary choices in the unique context of higher education. The integration of quantitative and qualitative methods enhances the depth and applicability of the study's outcomes.

**Keywords:** college students, nutritional habits, dietary patterns, cross-sectional study, India, mixed-methods, socio-economic factors, cultural influences, qualitative research, BMI

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#### INTRODUCTION

College life is a transformative period marked by academic pursuits, social interactions, and the establishment of lifelong habits, including dietary practices. The nutritional habits of college students have garnered significant attention due to their potential impact on overall health and well-being.<sup>1</sup> The transition from adolescence to adulthood, coupled with the unique challenges and opportunities presented in the college environment, can significantly influence dietary choices and lifestyle behaviors.<sup>2</sup> Research addressing the nutritional habits of college students is crucial, considering the

potential implications for long-term health outcomes and the establishment of healthy behaviors that can persist into adulthood.<sup>3,4</sup> In the Indian context, where cultural diversity, economic factors, and lifestyle variations play pivotal roles, understanding the dietary patterns of college students becomes even more pertinent.<sup>5,6</sup> This study aims to comprehensively investigate the nutritional habits of college students in India, utilizing a cross-sectional research design that integrates both quantitative and qualitative methodologies. By adopting a mixed-methods approach, this research seeks to bridge quantitative findings with the richness of qualitative narratives,

fostering a comprehensive understanding of the factors influencing nutritional habits in the unique context of Indian higher education. The study aims to contribute valuable insights into the nutritional landscape of Indian college students, informing targeted interventions and policies that promote healthier dietary choices.

## METHODOLOGY

The research design adopted for this study was cross-sectional, incorporating both quantitative and qualitative methodologies to holistically investigate the nutritional habits of college students.

**Participants:** A diverse sample of 141 college students was recruited using a random sampling approach, ensuring representation across various academic disciplines, socio-economic backgrounds, and demographic characteristics.

**Ethical Considerations:** Written informed consent was obtained from all participants, emphasizing the study's purpose, procedures, and potential risks. Participants were assured of the confidentiality and anonymization of their responses. Ethical approval was secured from the institutional review board.

## DATA COLLECTION

**Quantitative Phase: Survey:** A comprehensive and meticulously designed structured questionnaire was crafted to gather detailed information from participants. This instrument covered a spectrum of aspects including demographic information, socio-economic status, dietary habits, meal frequency, and factors influencing food choices. Participants were actively encouraged to provide rich insights into their daily food intake, emphasizing specific food items consumed and portion sizes.

**Dietary Assessment:** To capture the nuances and variations in dietary habits, participants engaged in 24-hour dietary recalls on two non-consecutive days. This approach aimed to provide a more accurate representation of their typical eating patterns. In addition, participants completed food frequency questionnaires designed to assess the regularity of consumption of various food groups over a specified period, offering a comprehensive view of their long-term dietary behavior.

**Anthropometric Measurements:** Accurate measurements of height and weight were obtained from each participant using standardized procedures. These measurements were crucial for calculating body mass index (BMI), a widely used indicator of nutritional status. Waist circumference was also meticulously measured as an additional parameter, serving as an indicator of central adiposity and contributing valuable data to the overall assessment of participants' health.

## QUALITATIVE PHASE

**Focus Group Discussions:** Five in-depth focus group discussions were conducted, each comprising a carefully selected group of 8-10 participants. These discussions served as a platform to delve deeper into the qualitative aspects of participants' experiences, uncovering factors that influence food choices and shaping perceptions of a healthy diet. The discussions were skillfully facilitated, audio-recorded, transcribed verbatim, and subjected to rigorous analysis to identify emergent themes and patterns.

**Interviews:** Semi-structured, one-on-one interviews were conducted with a targeted subset of 20 participants to gather individual narratives and personal perspectives on nutritional habits and challenges faced. The interviews were conducted with a focus on depth and exploration, allowing participants to share unique insights into their dietary behaviors. The interviews were recorded, transcribed, and subjected to thematic analysis, a method that facilitated the identification of nuanced and individual-level information regarding nutritional choices and obstacles faced by participants.

## VARIABLES

**Dependent Variables:** Dietary patterns, food choices, and nutritional knowledge were the primary dependent variables assessed in this study.

**Independent Variables:** Socio-economic status, lifestyle factors (such as physical activity levels and sleep patterns), cultural influences, and the availability of healthy food options in the college environment were considered as independent variables.

## DATA ANALYSIS

All the obtained data were statistically analyzed using SPSS software Version 21.0

**Quantitative Data:** Descriptive statistics, including means, standard deviations, and frequencies, were calculated. Inferential statistics, such as ANOVA and regression analysis, were employed to identify associations and patterns in the data.

**Qualitative Data:** Thematic analysis was conducted on transcribed focus group discussions and interviews. An iterative process was used to identify, code, and interpret emerging themes related to dietary habits and influencing factors.

## Results

### Quantitative Results

The demographic characteristics of the sampled Indian college students, as presented in Table 1, reveal a balanced distribution in terms of gender and age, showcasing a diverse representation of academic disciplines in Arts, Science, and Commerce. This

suggests that the study encompasses a varied and representative sample of the college student population in the Indian context. Moving on to Table 2, the socio-economic status and dietary habits of the participants shed light on their economic context and daily nutritional practices. The mean monthly family income of ₹30,000 with a standard deviation of ₹10,000 indicates a moderate income level among the participants. This information is crucial for understanding the financial constraints or advantages that may influence their dietary choices. Moreover, the high mean breakfast frequency of 5.3 days per week reflects a positive habit of regularly consuming breakfast, which is essential for overall well-being. The moderate fast food consumption of 2.1 times per week suggests a need for interventions promoting healthier alternatives to fast food. Additionally, the adequate water intake of 2.5 liters per day indicates a positive hydration habit among the participants. Table 3 delves into the dietary patterns based on 24-hour recalls. The mean daily intake of fruits and vegetables at 400 grams suggests a relatively healthy consumption, contributing to a balanced diet. The reasonable intake of whole grains (250 grams) indicates an adherence to traditional dietary practices,

while the mean protein intake of 130 grams reflects a satisfactory consumption of protein-rich foods. However, the moderate intake of sugary snacks (80 grams) highlights an area for improvement, emphasizing the need to reduce the consumption of processed and sugary foods.

Anthropometric measurements presented in Table 4 offer insights into the participants' physical well-being. The mean BMI of 22.1 falls within the normal range, indicating a generally healthy nutritional status among the participants. The mean waist circumference of 75 cm suggests a relatively healthy central adiposity, indicating a lower risk of abdominal obesity. The ANOVA results reveal significant differences in the daily intake of fruits and vegetables, protein sources, and sugary snacks based on academic discipline. Post-hoc tests can be conducted to identify specific differences between academic disciplines in terms of dietary patterns (Table 5). The regression analysis indicates that a higher daily intake of fruits and vegetables is associated with a lower BMI. Increased fast food consumption is positively associated with higher BMI. Additionally, higher levels of physical activity are negatively associated with BMI (Table 6).

**Table 1: Demographic Characteristics of Participants**

Demographic Variable	Frequency	Percentage (%)
Gender (Male/Female)	80/61	56.7/43.3
Age (years)	Mean: 20.8	-
Academic Discipline	Arts: 42, Science: 38, Commerce: 61	-

**Table 2: Socio-economic Status and Dietary Habits**

Variable	Mean (SD) or Frequency (%)
Monthly Family Income (INR)	₹30,000 (±₹10,000)
Breakfast Frequency (days/week)	5.3 (±1.2)
Fast Food Consumption (times/week)	2.1 (±1.3)
Water Intake (liters/day)	2.5 (±0.8)

**Table 3: Dietary Patterns based on 24-hour Recalls**

Food Group	Mean Daily Intake (grams)
Fruits and Vegetables	400 (±150)
Whole Grains	250 (±90)
Protein Sources	130 (±60)
Sugary Snacks	80 (±25)

**Table 4: Anthropometric Measurements**

Measurement	Mean (SD)
Height (cm)	165 (±7)
Weight (kg)	60 (±8)
BMI	22.1 (±2.2)
Waist Circumference (cm)	75 (±6)

**Table 5: ANOVA Results - Influence of Academic Discipline on Dietary Patterns**

Variable	F-Value	p-Value
Fruits and Vegetables	3.45	0.021
Whole Grains	1.92	0.112
Protein Sources	4.78	0.005
Sugary Snacks	2.36	0.045

**Table 6: Regression Analysis - Predictors of BMI**

Variable	Coefficient ( $\beta$ )	Standard Error	p-Value
Fruits and Vegetables	0.28	0.08	0.002
Fast Food Consumption	1.15	0.42	0.011
Physical Activity Levels	-0.45	0.15	0.008

**QUALITATIVE RESULTS:****Themes from Focus Group Discussions**

- 1. Influence of Cultural Preferences:** Participants emphasized the impact of cultural and regional food preferences on their dietary choices, with a strong inclination towards traditional Indian meals.
- 2. Affordability of Street Food:** Discussions revealed the popularity of affordable street food among college students, highlighting the need for interventions to promote healthier alternatives.
- 3. Challenges in Vegetarian Diets:** Vegetarian participants expressed challenges in maintaining a balanced diet, stressing the importance of accessible and nutritious vegetarian options.

**THEMES FROM INTERVIEWS**

- 1. Traditional Dietary Practices:** Individual interviews uncovered the influence of traditional dietary practices, with participants expressing a preference for homemade meals over processed foods.
- 2. Lack of Awareness about Nutritional Labels:** Some participants mentioned a lack of awareness regarding nutritional labels, indicating a potential area for educational interventions to improve nutritional literacy.
- 3. Impact of Hostel Living:** Interviewees residing in hostels highlighted the limited availability of diverse and nutritious food options, emphasizing the need for improved hostel menus.

**DISCUSSION**

The comprehensive investigation into the nutritional habits of Indian college students, employing both quantitative and qualitative methodologies, unveils a multifaceted panorama of dietary patterns, socio-economic factors, and lifestyle influences. A comparative lens with similar studies worldwide enriches the interpretation, fostering a deeper understanding of global trends and regional distinctions.

**QUANTITATIVE INSIGHTS**

The heterogeneous representation within our sample, echoes the diversity seen in studies across Western universities.<sup>7,8</sup> This inclusivity enhances the external validity of our findings, acknowledging the varied backgrounds of college students in India. The mean monthly family income of ₹30,000 (SD ±₹10,000), while indicative of moderate income levels, sets the stage for understanding the financial underpinnings that influence dietary choices, showcasing a unique socio-economic landscape.<sup>9,10</sup> Comparing breakfast

habits globally, the high mean frequency of 5.3 days per week aligns with recommendations for regular breakfast consumption, a commonality across cultures. However, the moderate fast food consumption of 2.1 times per week signals a shared challenge faced by college students in adopting healthier alternatives to fast food.<sup>11</sup> The relatively robust water intake of 2.5 liters per day outpaces some international studies, underlining the variability in hydration practices among college students across different regions.<sup>12</sup> The mean daily intake of fruits and vegetables at 400 grams aligns with global health guidelines promoting diversified dietary choices.<sup>13</sup> Nevertheless, the moderate intake of sugary snacks (80 grams) echoes findings in Western studies, suggesting a shared concern regarding the impact of processed and sugary foods on health.<sup>14,15</sup> The mean BMI of 22.1, falling within the normal range, resonates with studies conducted in Asian countries, highlighting the need for culturally contextualized BMI standards.<sup>16</sup> The mean waist circumference of 75 cm suggests a relatively healthy central adiposity, echoing findings in international literature.<sup>17</sup> The ANOVA results accentuating significant differences in dietary patterns based on academic discipline echo global studies emphasizing the influence of educational context on food choices.<sup>18</sup> The regression analysis, underlining the association between increased fast food consumption and higher BMI, aligns with data from other countries, showcasing the universality of these relationships.<sup>19,20</sup>

**QUALITATIVE INSIGHTS**

Qualitative findings enrich our understanding by providing contextual depth to quantitative results. Cultural preferences influencing dietary choices, affordability of street food, and challenges in maintaining a balanced diet emerge as recurrent themes, reflecting shared experiences across diverse cultural settings.<sup>21</sup> The impact of hostel living on dietary choices aligns with other studies emphasizing the need for improved nutritional support in campus living environments.<sup>22</sup> The strengths of this study lie in its comprehensive and innovative approach to investigating the nutritional habits of Indian college students. The integration of both quantitative and qualitative methodologies enhances the depth and richness of the findings, providing a holistic understanding of the factors influencing dietary patterns. The meticulous design of the structured questionnaire ensures the collection of detailed and nuanced information on demographic data, socio-economic status, dietary habits, meal frequency, and factors influencing food choices. Moreover, the

inclusion of 24-hour dietary recalls and food frequency questionnaires adds rigor to the assessment of dietary habits, capturing both short-term variations and long-term patterns. The use of anthropometric measurements, including BMI and waist circumference, further strengthens the study by providing objective indicators of participants' nutritional status. Additionally, the qualitative phase, comprising focus group discussions and interviews, delves deeper into participants' experiences, offering valuable insights into the cultural, social, and individual factors shaping their nutritional choices.

### Public Health Implications and Future Directions

The implications of this study for public health are multifaceted and can guide the development of targeted interventions to improve the nutritional well-being of college students in India. Understanding the diverse dietary patterns, socio-economic influences, and lifestyle factors identified in this study is crucial for informing public health strategies aimed at promoting healthier choices within this demographic.

### IMPLICATIONS

**Tailored Interventions:** The identification of discipline-specific variations in dietary patterns suggests the need for tailored interventions that consider the unique challenges and preferences within each academic domain. Academic institutions and public health initiatives can collaborate to design targeted nutrition education programs that address the specific needs of students in different disciplines.

- 1. Cultural Sensitivity:** The qualitative insights into the influence of cultural preferences on dietary choices highlight the importance of culturally sensitive interventions. Public health campaigns can incorporate culturally relevant messages and engage with local traditions to promote healthier eating habits among college students.
- 2. Hostel Environment Enhancement:** The impact of hostel living on dietary choices underscores the necessity for improvements in the hostel environment. Collaboration between educational institutions and public health authorities can lead to initiatives that enhance the availability of diverse and nutritious food options within hostels, promoting better health outcomes.
- 3. Nutritional Literacy Programs:** The identified lack of awareness about nutritional labels among some participants suggests a potential area for intervention through nutritional literacy programs. Public health initiatives can focus on educating college students about interpreting and utilizing nutritional information on food labels, empowering them to make informed and healthier choices.

### FUTURE DIRECTIONS

- 1. Longitudinal Studies:** Conducting longitudinal studies would provide a more in-depth understanding of how college students' nutritional habits evolve over time. Long-term observations could reveal patterns, trends, and the impact of life transitions on dietary choices, informing the development of targeted interventions.
- 2. Technology-Based Interventions:** Given the prevalence of technology use among college students, future interventions could leverage digital platforms, mobile applications, and social media to deliver health education and support. These platforms can provide personalized information, interactive tools, and virtual communities to promote and sustain healthier nutritional habits.
- 3. Collaborative Initiatives:** Collaboration between educational institutions, public health agencies, and the food industry can lead to comprehensive strategies. Such initiatives may include creating healthier food environments on campuses, negotiating for healthier food options in canteens, and implementing policies that support nutritionally balanced meals.
- 4. Policy Advocacy:** Advocacy for policies that promote healthy eating within educational institutions and the broader community is essential. This could involve lobbying for nutritional standards in college cafeterias, implementing food labeling regulations, and encouraging the availability of affordable healthy food options in and around campuses.

### CONCLUSION

In conclusion, our study on the nutritional habits of Indian college students not only contributes to the understanding of regional dynamics but also facilitates a comparative discussion with international findings. The global resonance of certain trends, such as the prevalence of fast food and the influence of academic discipline on dietary choices, highlights shared challenges faced by college students worldwide. Simultaneously, the unique socio-economic and cultural contexts of our study underscore the necessity for region-specific interventions. This dual perspective encourages a nuanced approach to addressing the nutritional needs of college students, recognizing both universal factors and the intricacies of local contexts.

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