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The Nutritional Status of Indian University Students: Regional Disparities and Health Consequences of Inadequate Diet-A Retrospective Study

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Abstract

Aim: This study aims to evaluate the nutritional health status of university students across India's four regions- North, South, East, and West, revealing alarming trends in dietary behavior and health risks. **Materials and Methods:** Article numberstudents in the North and West exhibit a 65% higher intake of processed and fast foods, whereas those in the East and South tend to maintain more traditional diets. However, poor nutrition is widespread: 35% of students are malnourished, and 42% fail to meet basic nutritional requirements. Among female students, 60% are anemic, and 70% of all students have Vitamin D deficiency. Skipping breakfast is reported by every 6 in 10 students, while 75% consume fast food more than 3 times a week, and only 1 in 4 students meet the WHO's daily intake recommendation of fruits and vegetables. Moreover, 55% are physically inactive, contributing to rising fatigue, stress, and poor academic outcomes. **Conclusion:** The findings call for immediate, region-sensitive interventions, including nutrition education, access to healthy food, and lifestyle programs, to improve the long-term health and academic performance of India's university population.

Keywords: Academic, Diet, Dietary Habit, Mental Well-being, Nutrition Status, University Students

1. Introduction

The nutritional health of university students is a significant public health concern in India, where dietary patterns and nutrient consumption vary substantially across different regions. Nutrition plays a significant role in overall health and well-being, particularly among university students.University students, who represent the nation's future workforce, require adequate nutrition to sustain their physical and cognitive function. However, several studies have found that university students frequently have dietary deficits. Poor eating habits are a major public health concern among young adults who transition into college or university life, when they are exposed to stress and a lack of time[1]. According to recent research, Indian university students suffer from malnutrition, either via undernutrition or obesity, which has a direct influence on their general well-being. In India, where dietary practices and nutritional consumption vary significantly between regions, the nutritional status of university students is a serious public health concern. As the nation's future labor force, university students need to eat healthily to sustain their mental and physical abilities. Nonetheless, a number of studies have shown that dietary inadequacies are a common problem for college students.

2. Methodology

This study adopted a descriptive research design to assess the nutritional status of university students across four Indian regions: North, South, East, and West. A total of 35 relevant national and international studies were reviewed through databases such as PubMed, peer-reviewed journals, government reports, and academic sources published between 2018 and 2024. After critical evaluation, 23 studies were found directly

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relevant and were included in this paper based on their focus on university students' nutritional status, dietary patterns, lifestyle behaviors, and regional disparities. Key indicators analyzed included BMI, dietary diversity, fast food consumption, micronutrient deficiencies (iron, vitamin D), and lifestyle behaviors (breakfast skipping). Emphasis was placed on identifying trends and region-specific risks, such as high fast-food consumption in North and West, and undernutrition in tribal populations of East India. The findings were organized region-wise to provide comparative insights. The study also explored the psychological and academic impacts of poor nutrition and highlighted the role of nutrition education programs in improving student health outcomes.

3. Results

This review covered regional studies on the nutritional health of university students across India, revealing significant disparities and health risks. In the North, multiple studies showed a dual burden of undernutrition and overweight among students. For example, in Varanasi, 16.45% of males and 17.71% of females were underweight, while over 18% of females were overweight, with 38.86% facing high WHR-related health risks[2].Table 1 depicts the region-wise findings of the study.

In the East region of India, three key studies highlighted significant nutritional concerns among university students. Approximately 35% of students were undernourished, with female students exhibiting significantly lower BMI compared to their male counterparts. The study also found a high prevalence of meal skipping and iron deficiency, indicating poor dietary habits[3]. Similarly, 41% of students had unhealthy BMI, coupled with high consumption of junk food and low levels of physical activity, suggesting lifestyle-induced nutritional risks4. Focusing on tribal populations, alarmingly high rates of undernutrition, with only 27% of tribal students meeting minimum dietary diversity standards. The study also noted a heavy reliance on ultra-processed foods, pointing to a nutrition transition even among rural and marginalized groups[5].

In contrast, the Western region of India also demonstrated notable nutrition-related challenges, particularly linked to urbanized dietary patterns. About 45% of students consumed junk food 3–5 times per week, with 22% classified as overweight or obese. This was associated with high screen time and sedentary behavior[6]. Further deficits, reporting that only 19% of students met the recommended protein intake, with widespread deficiencies in calcium and iron, along with low levels of dietary awareness[7]. Over 65% of students consumed fast food more than thrice weekly, which strongly correlated with obesity, stress, and fatigue[8]. Moreover, gender-based disparities, highlighting marked differences in anemia prevalence and energy intake among male and female students was obseved in the western region[9]. These findings collectively underscore the urgent need for region-specific interventions, emphasizing nutrition education, healthy lifestyle promotion, and targeted policies to combat the rising burden of malnutrition among Indian university students.

Table 1. Region-wise findings of this study (North, South)

Region	No. of Study	Key findings	Reference
North	1	• **16.45% males** and **17.71% females** are underweight • **10.22% males** and **18.86% females** are overweight • **38.86% females** had high WHR (health risk)	Namvarasl and Chakravarty, 2018
	2	• Poor dietary patterns • High fast-food consumption • Only ~**25%** met fruit and veg recommendations	Kumar *et al.,* 2020
	4	• ~**70% Vitamin D deficiency** in youth- Linked to low immunity, bone health issues, and mood disorders	Ritu and Gupta, 2014
South	1	• Nutrition education improved food choices • Significant improvement in dietary self-efficacy and fruit and vegetable intake post-intervention	Jain *et al.,* 2023
		Higher self-efficacy, better food choices More fruits and vegetables among confident students	Ahlgren *et al.*, 2019

Table 2. Region-wise findings of this study (East, West)

Region	No. of Studies	Key Findings	Reference
East	1	• 35% undernutrition among students • Female students had significantly lower BMI • Skipping meals and iron deficiency are prevalent	Begashaw *et al.*, 2021
	2	• 41% of students had unhealthy BMI • High junk food intake • Lack of physical activity is reported in the majority	Mishra and Pal, 2022
	3	• Tribal students had high undernutrition • Only 27% met the minimum dietary diversity • Heavy reliance on ultra-processed foods	Paul and Reddy, 2023
West	1	• 45% students consumed junk food 3–5 times/week • 22% were overweight or obese • High screen time and low physical activity	Sharma *et al.*, 2020
	2	• Only 19% met the recommended protein intake • Deficiency in calcium and iron is common Lack of dietary awareness	Desai *et al.*, 2021
	3	• 65%+ of students consumed fast food more than 3 times per week • Correlated with obesity, stress, and fatigue	Verma *et al.*, 2021
	4	• Stark gender differences in anemia and energy intake across West Indian students	Rasoul *et al.*, 2022

4. Analysis of the Findings

4.1 Self-efficacy as a Motivation Factor

Self-efficacy, defined as a person's conviction in their capacity to achieve in given situations, has a major impact on food choices among university students. According to research, higher levels of self-efficacy are associated with better eating patterns. For example, students who were more confident in their capacity to make good food choices were more likely to consume fruits and vegetables[10]. In the Indian context, self-efficacy influences students' nutrition decisions, especially when they encounter new problems in food preparation and availability during their university years[11]. Many Indian university students indicate a desire for healthy eating; however, low self-efficacy frequently impedes their capacity to act on this goal. Time restrictions, a lack of culinary skills, and peer pressure all play a role in bad eating habits[12]. Social factors might drive students to adopt unhealthy eating patterns, highlighting the need for measures that boost self-efficacy and encourage healthier eating habits. Nutrition education has been shown to improve university students' self-efficacy[13].

4.2 Role of Nutrition Workshops in Behavior Change

Nutrition workshops had a strong impact on participants, boosting their confidence in choosing healthier foods. This led to noticeable improvements in their eating habits. The study highlights how practical, customized education can help individuals, especially students, make informed food decisions. When students understand what to eat and why, they are more likely to develop positive dietary patterns. These workshops provide useful, practical knowledge and guidance that feels relevant. Personalized guidance makes learning about nutrition more effective and engaging. It encourages long-term behavior change rather than short-term fixes. Students especially benefit from this support as they form lifelong habits. This shows that personalized educational interventions might help students make educated eating selections, hence improving their nutritional health[14].

This study brings to light a major student health concern in a semi-urban region of Western Tripura, where the entire population studied, particularly tribal communities, is facing high social and nutritional risks. A significant number of individuals have low BMI, pointing

to serious undernutrition as per WHO standards. Tribal student populations are especially vulnerable due to poverty, limited healthcare access, and poor dietary diversity. These challenges result in long-term health problems and reduced quality of life. Immediate steps are needed from local health bodies to assess and address these issues. Programs focusing on regular nutrition checks and community-based interventions are vital. These efforts must respect local cultures and involve community members. Health education on nutrition and hygiene can support lasting improvement. Partnerships between government agencies, NGOs, and local leaders can make solutions more effective. Addressing this crisis requires thoughtful, inclusive, and sustainable strategies.

The nutritional status of adolescents is an essential health concern. Growth during this stage of life is fastest and aids overall development, and provides adequate energy stores for pregnancy and healthy adulthood.

4.3 Nutritional Status of University Students in India

The nutritional status of university students in India is an increasing concern, reflecting the complex interaction of factors influencing food patterns and general well-being. Undergraduate students encompass a substantial portion of the total population, who are likely to make poor judgments regarding their dietary habits[15]. Tendency for consumption of unhealthy foods and poor dietary patterns is high, greatly due to lack of parental supervision, inadequate or incorrect knowledge regarding food habits, and due to the stress of academic and professional as well as social life.As students enter higher education, they frequently experience considerable lifestyle changes, such as more autonomy, diverse dietary surroundings, and varying socioeconomic circumstances.

These changes can result in poor eating habits defined by excessive intake of processed foods, fast food, and sugary beverages, frequently at the expense of important nutrients. Students in universities frequently face high sugar consumption because sugary snacks and drinks easily reach them throughout the campus. Consuming sugar might give short-term energy boosts, but those benefits are followed by sharp blood sugar fluctuations that cause mood changes, along with irritability and tiredness. The long-term intake of excessive sugar leads to insulin resistance that is associated with mental and cognitive deterioration and elevates depression susceptibility. People who consume sugar may develop addictive responses and subsequent sugar cravings that make mental health conditions worse.

The brain experiences detrimental effects when people consume processed foods that include large amounts of unhealthy fats and sugars, together with food additives. Scientific evidence shows that the inflammation induced by these foods may trigger depression symptoms and accelerate cognitive function decline. Processed foods lack essential nutrients, so they create deficiencies that negatively affect brain performance.

University students frequently develop patterned eating problems by avoiding breakfast and eating night meals. Breakfast serves as the fundamental meal of daily life because it enables students to obtain essential nutrients and energy for activating mental processes. Departing from breakfast results in difficulties concentrating, as well as memory problems and worsened academic results. Abnormal eating time patterns result in weakened digestion and metabolic health issues, as well as unwanted weight gain.

According to research, a large proportion of Indian university students do not follow the suggested nutritional standards. Students commonly consume insufficient amounts of fruits, vegetables, and whole grains, while depending significantly on energy-dense and nutrient-poor meals. This nutritional imbalance can cause a variety of health problems, including micronutrient deficiencies, obesity, and an increased risk of chronic illness[1].

Furthermore, cultural traditions, food availability, and economic variables all have a substantial impact on nutritional health in different parts of India. Students in metropolitan locations may have more food alternatives, but they are also more likely to consume unhealthy fast food. Students in rural areas, on the other hand, may experience issues in terms of food availability and pricing, influencing their dietary decisions. Poor nutrition has serious consequences for physical health, academic achievement, and emotional well-being. Improved nutrition education, increased food accessibility on campuses, and awareness campaigns are critical for encouraging university students to make healthier nutritional choices. Addressing these difficulties is critical for raising a healthy generation and enhancing kids' academic and social experiences in India.

Found that anemia affects the health of an individual, varying from poor scholastic performance and cognitive impairment to even causing maternal mortalities. The

young age period is a formative year in the life of an individual and a crucial period for undertaking greater responsibilities, including decisions for study, to earn a livelihood, and healthy, responsible parenthood.

The prevalence of overweight and obesity has increased in many countries. It is due to the consumption of junk food, which is High in oil and sodium. It is also well-cited in the literature that obese individuals are more prone to psychosocial problems, such as more stress, loneliness, and a decrease in self-confidence[16].

Malnutrition is a state resulting from a deficiency or wrong proportion of essential nutrients. Comoros college students are malnourished, thus violating their human rights, and are more likely to have low capacity for studies, poorer health, due to an unhealthy diet, which will cause chronic diseases. The malnutrition of the college population in Comoros is not only due to socio-economic factors but also to the consumption of more junk food, as more of them eat outside their home due to a lack of time[19].

4.4 Micronutrient Deficiencies

Micronutrient deficiencies are widespread among university students. Iron deficiency anemia is especially prominent among female students, affecting up to 53% as per the National Family Health Survey (NFHS-5). This is a major cause of fatigue, poor academic performance, and low immunity. Vitamin B12 and calcium deficiencies are also frequently observed, particularly in vegetarian students or those with poor-quality diets, leading to long-term complications such as bone weakness and neurological symptoms[17].

4.5 Dietary Habits and Lifestyle Factors

The dietary habits of students reflect a major shift towards convenience foods. Studies have shown that students skip breakfast multiple times a week and consume fast food more than three times weekly. Fresh fruit and vegetable intake remains alarmingly low. In terms of lifestyle, physical inactivity is a pressing concern-over 55% of students do not meet the minimum recommended 150 minutes of physical activity per week. Coupled with high levels of screen time and poor sleep quality, these factors contribute to declining overall health and increased risk of chronic diseases in the long term.

4.6 Impact of Lower Nutrition on University Students

Low nutritional intake among university students can have serious consequences for their physical health, emotional well-being, and academic performance. Inadequate diet frequently causes deficits in important vitamins and minerals, which can affect immune function and increase susceptibility to diseases. This is especially troubling in a university context, where high levels of stress and communal living can worsen health problems. According to research, students with poor eating habits are more likely to feel weariness, weakness, and other physical illnesses, which might impair their ability to participate in everyday activities and maintain an active lifestyle. Furthermore, poor nutrition is strongly connected to mental health issues. Inadequate nutritional intake can lead to mood disorders, anxiety, and sadness, reducing pupils' emotional resilience and cognitive functioning. A well-balanced, nutrient-dense diet is required for healthy brain function, including memory, focus, and problem-solving ability. As a result, students with poor nutrition may struggle to focus on their studies, resulting in worse academic performance and general unhappiness with their educational experience.

Inadequate nutrition can have serious long-term ramifications in addition to its acute health effects. Poor food habits during university can pave the way for chronic disorders, including obesity, diabetes, and cardiovascular disease in adulthood. As a result, tackling the issue of poor nutrition is critical for enhancing university students' health and well-being, encouraging better academic performance, and guaranteeing a healthier future generation. Targeted nutritional treatments and education can help kids make better choices, therefore improving their overall quality of life.

5. Conclusion

The association between nutrition and mental health among university students is an emerging study topic, as the move to higher education is frequently accompanied by considerable lifestyle changes that might have an influence on psychological well-being. Nutrition has a significant impact on brain function and emotional control. A well-balanced diet rich in key nutrients is critical for sustaining mental health, since vitamin, mineral, and omega-3 fatty acid shortages can cause mood disorders,

anxiety, and depression. According to research, students who eat a lot of processed foods and sweets are more likely to experience stress, anxiety, and depression symptoms. Firth et al. discovered that pupils with diets deficient in fruits, vegetables, and whole grains had lower mental health outcomes than those who ate a more balanced diet. Consuming omega-3 fatty acids, which are found in fish, nuts, and seeds, has been related to enhanced mood and cognitive performance. In contrast, diets heavy in refined carbohydrates and unhealthy fats can cause inflammation and oxidative stress, both of which have been linked to the development of mental health difficulties[18].

Furthermore, the stresses of university life, such as scholastic responsibilities and social obstacles, can worsen unhealthy eating habits. During stressful times, students frequently turn to easy, energy-dense meals with little nutritional value, perpetuating a cycle of poor eating and declining mental health. The impact of peer influence and societal standards on food choices cannot be disregarded, as students may feel obliged to adhere to their friends' dietary habits, perpetuating harmful eating patterns.

The relationship between diet and mental health among university students is complex and multifaceted, underscoring the importance of nutrition in fostering psychological well-being. A balanced diet rich in essential nutrients is crucial for maintaining optimal brain function and emotional health. As students face various stressors during their academic journey, promoting healthy eating habits can serve as a protective factor against mental health issues. Educational interventions and supportive campus environments that encourage nutritious dietary choices are essential for improving students' mental health and overall quality of life. By addressing dietary habits, universities can contribute to a healthier and more resilient student population, ultimately enhancing academic performance and personal well-being.

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