

# NUTRITIONAL KNOWLEDGE, DIETARY HABITS, AND BARRIERS TO HEALTHY EATING AMONG UNIVERSITY STUDENTS IN SIALKOT, PAKISTAN

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Nutritional Knowledge, Dietary Practices, University Students, Healthy Eating, Fast Food, Meal Skipping, Nutrition Awareness, Barriers

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## ABSTRACT

Healthy eating habits developed during university years can influence dietary behaviors and health across adulthood. However, having adequate nutritional knowledge does not necessarily led to their healthier food choice. This study examined nutritional knowledge, dietary habits, perceived barriers to healthy eating, sources of nutrition information, physical activity, attitudes toward dietary change, and the association between nutritional knowledge and selected dietary practices among university students. A descriptive cross-sectional survey was conducted among 510 university students using a self-administered questionnaire. Data were summarized using frequencies and percentages. A nine-item nutritional knowledge score was used to classify participants into higher- and lower-knowledge groups, while chi-square tests were used to examine associations between nutritional knowledge and selected dietary practices. Participants generally showed a good level of nutritional knowledge, 92.1% recognizing the relationship between excessive sugar intake and diabetes, 93.1% recognizing the link between excessive salt intake and hypertension. However, dietary practices were inconsistent. Although 56.4% reported daily fruit consumption, 55.8% consumed fast food 2–4 times per week or daily. Academic pressure contributed to meal skipping, with breakfast as most skipped meal (49.0%). Lack of time (29.3%), easy availability of fast food (26.3%), and limited nutritional knowledge (26.3%) were major barriers to healthy eating. Nutritional knowledge was significantly associated with fast-food consumption, fruit intake, and breakfast regularity, but not with self-rated overall dietary habits. These findings highlight knowledge behaviors gap in university students, suggesting that healthy eating is influenced by factors beyond knowledge alone. Interventions should therefore combine nutrition education with behavior and environmental strategies that address time constraints, food availability, academic demands and students' ability to translate healthy intentions into sustainable dietary practice.

## I. INTRODUCTION

Adequate and balanced nutrition during the university years will leave and imprint on health and play a significant role in the dietary habits in adulthood. University students are a population of interest for this study because individuals begin making independent decisions about their diet, physical activity, and lifestyle at that age. Moreover, the academic, financial and social challenges expressed during the university years may be associated

with poor nutritional habits. Students have limited time and money, often lived an independent life and had less family support. All these factors contribute to frequent fast-food consumption, and skipping breakfast (Ali et al., 2020; Wohid et al., 2024). Dietary behaviors are of immense importance since unhealthy dietary patterns associated with several chronic diseases such as obesity, diabetic mellitus, cardiovascular disease, and hypertension. Although nutritional knowledge can support healthier decision-making, knowledge does not necessarily result in consistent healthy behavior. Studies conducted among university students has report varied levels of nutritional knowledge and indicate that the population group often demonstrate unhealthy dietary behaviors such as breakfast skipping, frequent fast-food consumption, and inadequate fruit, vegetable intake (Ali et al., 2020; Kılınç & Çağdaş, 2012; Sajwani et al., 2009; Wohid et al., 2024; Yun et al., 2018). This difference between what individuals know and how they behave has also been observed in other health-related behaviors among university students, suggesting that awareness may coexist with practical and behavioral barriers to healthier choices (Abid et al., 2026).

Healthy diet behaviors are influenced by factors that go beyond an individual's own knowledge. Such dietary choice may be shaped by academic workload, financial limitations, the availability and affordability of healthier foods, social and family influences, and access to nutrition information. Food-related awareness and perceptions of health risks may also be influenced by the sources through which students receive information. In a recent study conducted in Sialkot, Mukhtar et al. (2026) reported substantial awareness of food adulteration among adults while also identifying gaps in awareness regarding specific food-related risks and reliance on different information sources. Examining the relationship between nutritional knowledge and specific dietary practices can therefore help clarify whether greater knowledge is reflected consistently in everyday eating behaviors. This study aimed to assess nutritional knowledge, dietary habits, perceived barriers to healthy eating, sources of nutrition information, physical activity levels, and attitudes toward dietary change among university students. It also examined the association between nutritional knowledge and selected dietary practices.

## II. METHOD

### Participants

A cross-sectional descriptive study was conducted among currently enrolled university students in Sialkot, Pakistan. Participants were recruited from different academic faculties and level of studies to obtain representation across varying educational and socioeconomic background. A non-probability convenient sampling technique was used. The questionnaire was posted online on 19 June 2026 and closed on 11 July 2026. A total of 510 completed the questionnaire and were included in the analysis. Eligible participants were currently enrolled university students who voluntarily agreed to participate and completed the questionnaire. Responses that did not meet the study eligibility criteria, if any, were excluded before analysis.

### Measures

Data were collected using a structured, self-administered questionnaire developed to assess students' nutritional knowledge, dietary behaviors, perceptions, and factors influencing food choices. The questionnaire was administered electronically through Google Forms. The questionnaire consisted of 50 multiple-choice questions and focused on six major sections: (1) demographic characteristics; (2) nutritional knowledge and awareness; (3) dietary and nutritional behaviors; (4) perceived health consequences of dietary practices; (5) barriers and factors influencing food choice and dietary change; (6) source of nutrition-related information, physical activity, and attitudes towards dietary change.

### Procedure

Descriptive statistics were used to summarize participant characteristics and study variables. Categorical variables were presented as frequencies and percentages. The data were summarized in terms of frequencies and percentages. Associations between nutritional knowledge category and selected dietary indicators were examined using Pearson's chi-square test. The four selected dietary indicators were self-rated overall dietary habits, frequency of fast-food consumption, frequency of fruit consumption, and breakfast regularity. Statistical significance was determined at a two-sided p-value of  $< .05$ . Where applicable, assumptions for the chi-square test

were assessed before interpretation. The results were interpreted in relation to the cross-sectional nature of the study; therefore, observed associations were not considered evidence of causation. Participation was voluntary and participants were informed about the study's aims before completing the questionnaire. No unnecessary personally identifying information was collected, and responses were treated confidentially and used solely for research purposes.

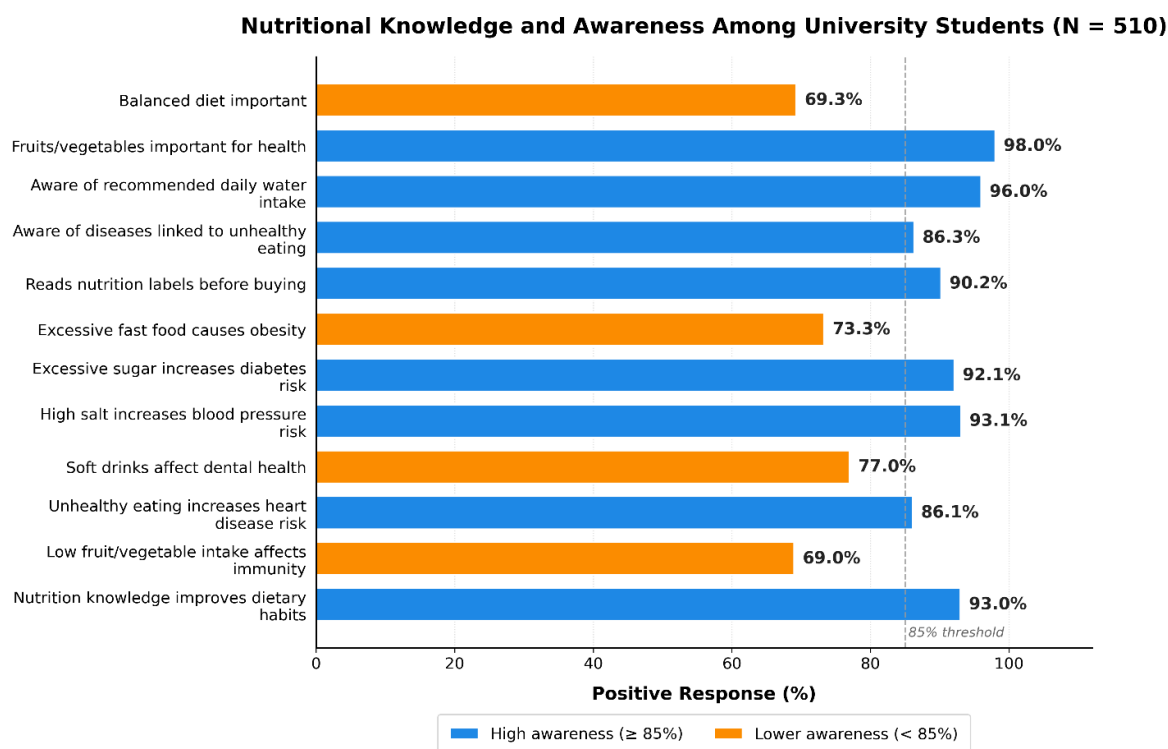
### III. RESULTS

The participants came from different ages, levels of education, residential areas, and social classes. The biggest representative group was aged 18-20 (34.3%), followed by those aged 21-23 (32.4%). As for gender, females comprised 60.4%, and males – 39.6%. In terms of academic performance, the students who were in their first three years of study were as numerous as those who had spent four years or more at university. Most participants reported a middle socioeconomic status (78.2%).

#### Nutritional Knowledge and Awareness

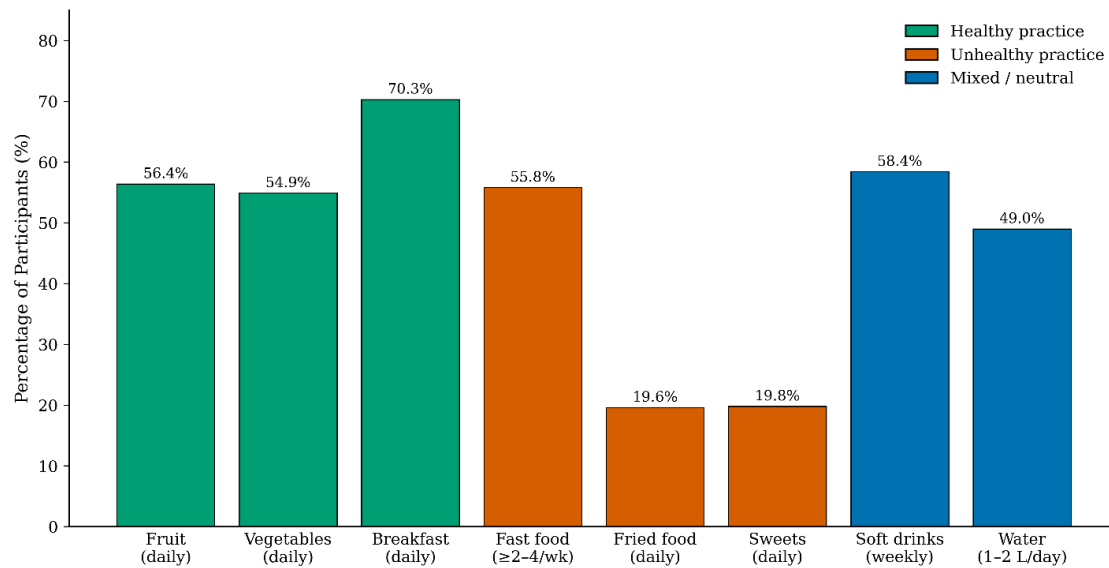
Participants demonstrated generally good nutritional knowledge. More than 90% recognized the relationship between excessive sugar intake and diabetes (92.1%) and between high salt intake and increased blood pressure (93.1%). Awareness was comparatively lower regarding the association between fast-food consumption and obesity (73.3%) and the role of low fruit and vegetable intake in immunity (69.0%). The nine-item composite knowledge score ranged from 1 to 9, with a mean of  $7.6 \pm 1.6$  and a median of 8. (Figure 1).

**Figure 1:1 Nutritional Knowledge and Awareness Among University Students (N = 510)**



#### Dietary Habits and Food Consumption Patterns

Among the participants, 70.3% reported eating breakfast daily. Daily fruit and vegetable consumption was reported by 56.4% and 54.9% of participants, respectively. Fast-food consumption was common with 55.8% reporting consumption two to four times per week or daily. Daily consumption of fried-food and sweets/chocolate was reported by 19.6% and 19.8%, respectively. Meal skipping was also reported frequently. A total of 57.4% of participants reported sometimes skipping meals because of academic pressure, while 15.8% reported doing so often. Among the meals skipped, breakfast was the most frequently reported (49.0%), followed by lunch (38.0%) and dinner (13.0%) (Figure 2).

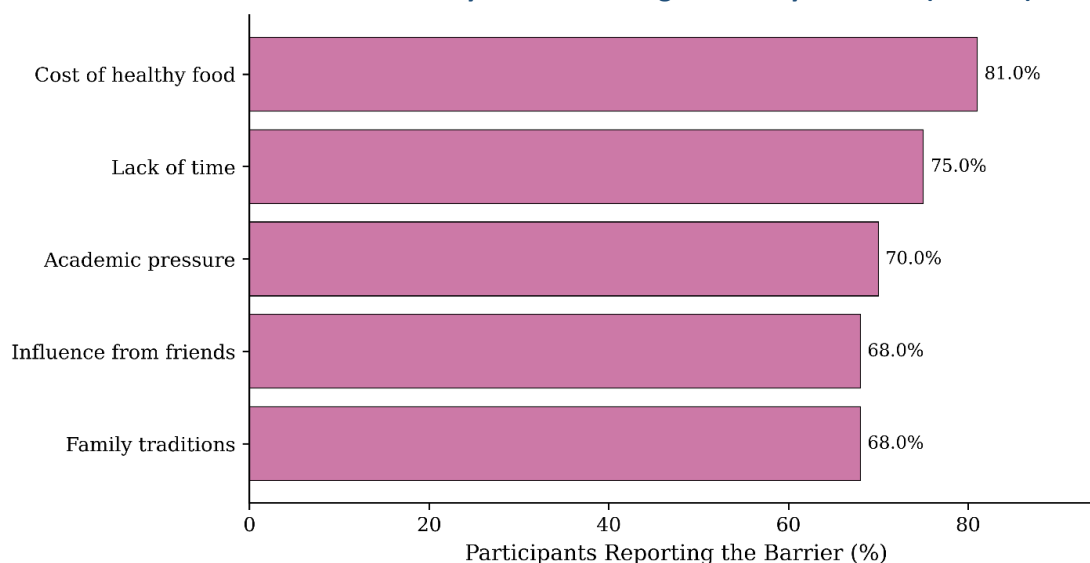
**Figure II: Dietary Habits and Food Consumption Patterns Among University Students (N = 510)**

### Perceived Health Consequences of Dietary Habits

A significant proportion of the respondents indicated that they had experienced consequences related to their nutrition pattern. The most frequent short-term consequence was feeling tired after eating fast-food with 93.0%. Other common consequences included digestive system problems (85.1%) and weight gain in the last year (64.4%). Because participants could report more than one experience, percentages may not sum to 100%.

### Barriers and Influences on Healthy Lifestyle Behaviours

Participants reported several factors that influenced their dietary choices. The most commonly reported influences were the high cost of healthy food (81.0%), lack of free time for physical activity (75.0%), academic stress (70.0%), peer influence (68.0%) and traditional beliefs (68%) (Figure 3). When participants were asked to identify their single biggest barrier to healthy eating, lack of time was the most frequent selected response (29.3%), followed by availability of fast-food restaurants (26.3%), lack of nutritional knowledge (26.3%), and the costs of healthy eating (18.2%). These findings indicate that participants reported multiple influences on their dietary choices, while lack of time was most frequently identified as the single largest barrier.

**Figure III: Barriers and Influences on Dietary Choices Among University Students (N = 510)**

### Sources of Nutrition Information

Family members represented the most frequently reported source of nutrition information (39.0%). Healthcare professionals accounted for 31.0%, followed by social media at 28.0%. Teachers were the least frequently reported source at 2.0% (Figure 4).

### Physical Activity and Attitudes Towards Dietary Change

A total of 41.4% of the participants reported engaging in regular physical activities, while 30.0% reported no physical activity during a typical week. Despite this, 88.0% recognized the role of physical activity in maintaining a healthy body weight. Most participants (89.0%) expressed interest in learning more about nutrition and 93.0% agreed that nutritional knowledge helps individuals eat healthy foods. Furthermore, 90.8% of the participants believed that they access to affordable healthily meals would help them eat more healthily. Regarding dietary change, 66.7% of the participants reported that they could change their unhealthy dietary patterns, while a further 33.3% reported being open to change. Regarding self-rated dietary habits, 51.5% described it as fair, 32.7% as excellent and 12.2 % as poor (Figure 4).

### 3.8 Association Between Nutritional Knowledge and Dietary Practices

Participants were categorized into the higher and lower knowledge groups using the median knowledge score of 8 as the cutoff. Chi-square tests were conducted to determine associations between nutritional knowledge and selected indicators of dietary practice. The association between nutritional knowledge and self-rated overall dietary habits was not significant ( $p = .241$ ), whereas significant associations were found between nutritional knowledge and fast-food consumption ( $p < .001$ ), fruit consumption ( $p < .001$ ) (Figure 5), and breakfast regularity ( $p = .035$ ). These results suggest that nutritional knowledge was associated with several specific indicators of dietary practice, though the associations were not consistent across all the indicators (Figure 6).

**Figure IV: Sources of Nutrition-Related Information Reported by University Students (N = 510)**

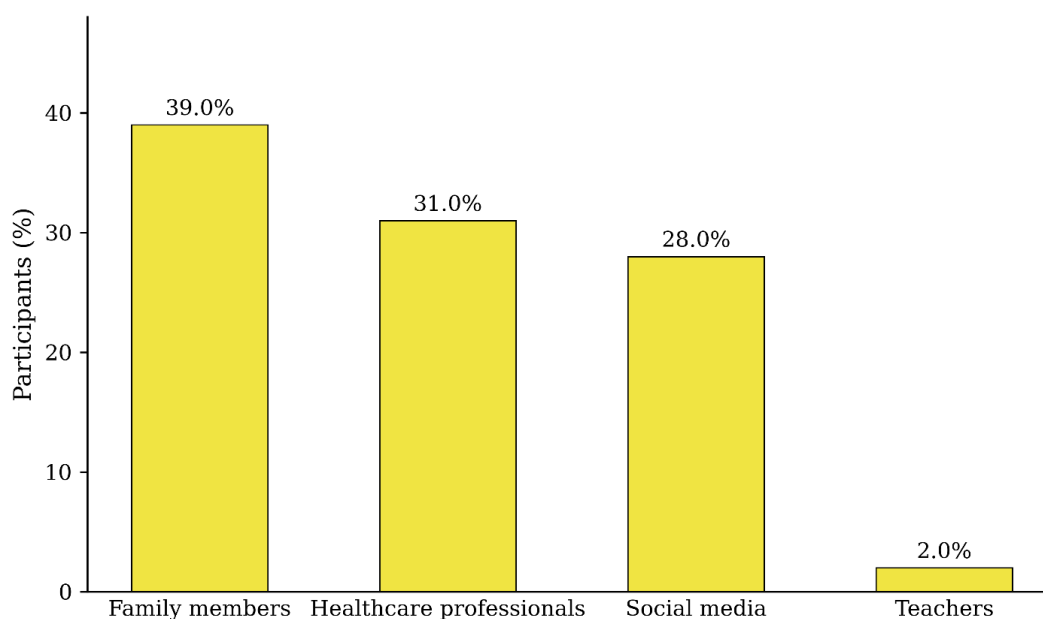
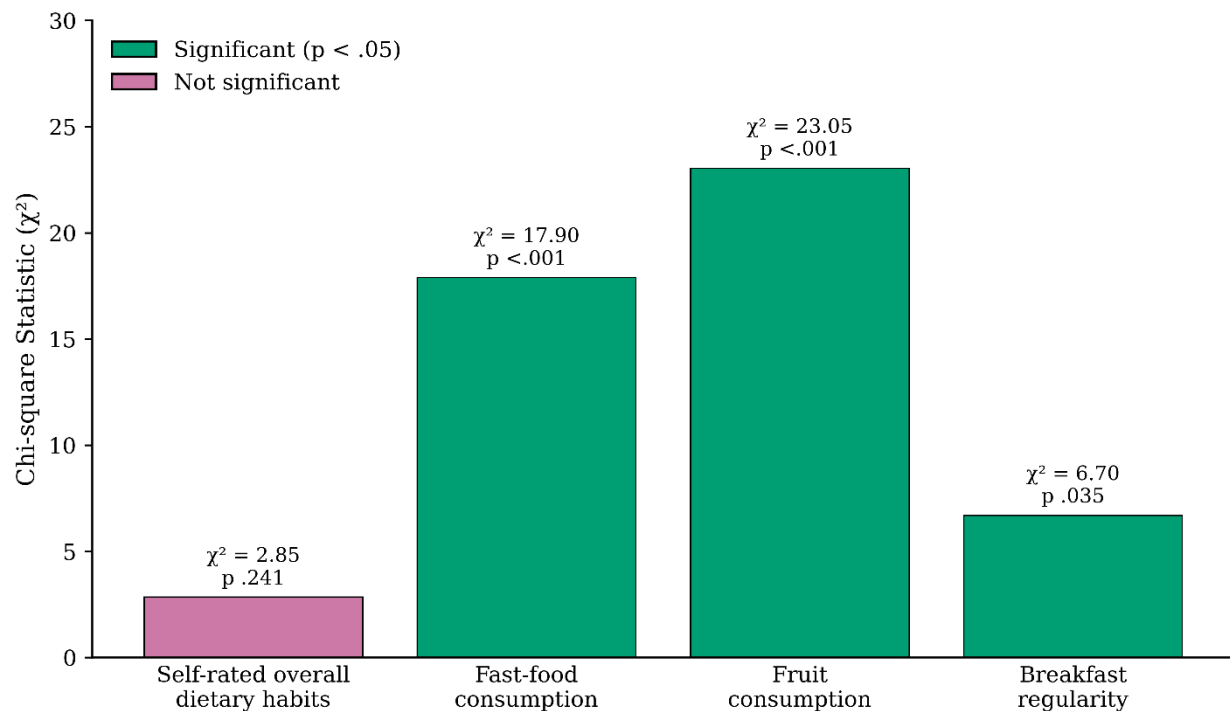
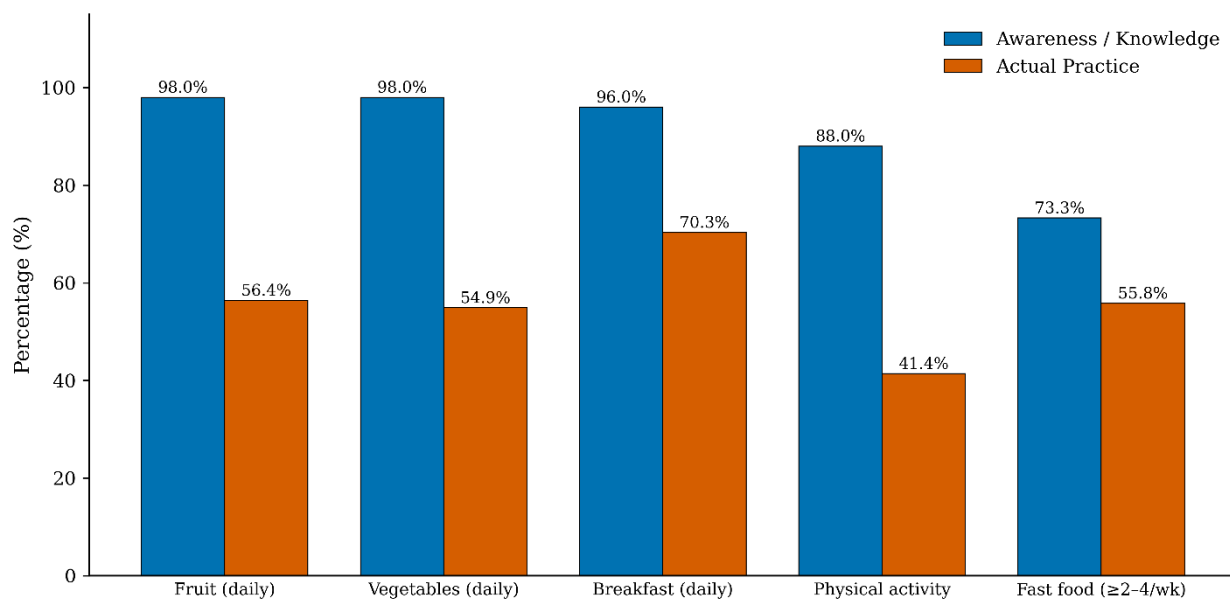


**Figure V: Association Between Nutritional Knowledge and Selected Dietary Practices (N = 510)****Figure VI: Comparison of nutritional Knowledge and Selected Dietary Practices Among University Students (N = 510)**

## IV.DISCUSSION

The present study assessed nutritional knowledge, dietary habits, barriers to healthy eating, sources of nutrition information, physical activity, and attitudes toward dietary change among university students. Overall, participants demonstrated a satisfactory level of nutritional knowledge, particularly regarding the relationship between dietary factors and chronic health conditions. However, this knowledge was associated with some less healthy dietary practices, such as fast-food consumption, meal skipping, and relatively low daily consumption of fruits and vegetables. These findings suggest that nutritional knowledge does not necessarily translate into consistent

healthy dietary behavior. Over 90% of participants identified the association between extreme sugar intake and diabetes as well as between consuming too much salt and elevated blood pressure. Despite this relatively high level of awareness, only 56.4% reported consuming fruit daily and 54.9% reported consuming vegetables daily, while 55.8% reported consuming fast food two to four times per week or every day. Approximately one-fifth of participants also reported consuming fried foods and sweets daily. Similar differences between nutritional knowledge and dietary practices have been reported among university students in different settings, including Bangladesh, Oman, and Turkey (Ali et al., 2020; Kılınç & Çağdaş, 2012; Wohid et al., 2024). These findings indicate that possessing nutritional information is only one component of dietary decision-making, while practical and contextual factors may also influence everyday food choices.

The knowledge behavior gap found in the present study also resonates with similar search on other health-related behaviors among university students. Indeed, Abid et al. (2026), in a study of university students in Sialkot, reported that favorable attitudes and awareness regarding antibiotic use and antimicrobial resistance did not consistently correspond with appropriate antibiotic-use behaviors. Although the subject of that study was different from nutrition, the behavioral pattern is relevant to the present findings because it illustrates how health-related knowledge and attitudes may coexist with behaviors that do not fully reflect that knowledge. Thus, interventions aimed at improving students' health behaviors may need to address not only knowledge but also motivation, perceived control, social influences, and the environments in which health-related decisions are made. Meal skipping was another notable finding of the present study. Breakfast was the most frequently skipped meal, followed by lunch and dinner, with academic pressure identified as an influence on students eating patterns. Lack of time was also the most commonly reported single barrier to healthy eating. These findings suggest that the busy academic schedules and competing responsibilities may make it difficult for students to maintain regular meal patterns. Thus, irregular eating may not simply reflect limited nutritional knowledge but may also be shaped by the practical demands and time pressure of university life. The sources of nutrition information provide another important dimension of the findings. Family members were the most frequently reported source of nutrition information (39.0%), followed by healthcare professionals (31.0%) and social media (28.0%). The role of social media is particularly relevant because students may encounter health and food-related information through digital platforms alongside information obtained from family members and healthcare professionals.

In a recent study conducted in Sialkot, Mukhtar et al. (2026) found that social media was the leading reported source of information about food adulteration and food-safety risks. Although that study addressed food adulteration rather than nutritional habits, the finding provides relevant local evidence that digital platforms are an important part of the food-related information environment. Therefore, reliable nutrition communication through social-media platforms may complement information provided through families, universities, and healthcare professionals. A discrepancy was also observed between awareness of physical activity and reported behavior. Although 88.0% of participants recognized the role of physical activity in maintaining a healthy body weight, only 41.4% reported engaging in regular physical activity, while 30.0% reported no physical activity during a typical week. This difference provides another example of the broader knowledge–behavior gap identified in the study. A similar discrepancy between awareness or favorable attitudes and actual health-related behavior has been documented among university students in the context of antibiotic use (Abid et al., 2026). The findings therefore suggest that awareness of healthy behaviors does not necessarily guarantee their regular implementation. The findings also suggest that nutritional knowledge alone may not be sufficient to produce consistent changes in dietary behavior. Students' food choices may be influenced by time availability, affordability, academic demands, food availability, social influences, and established dietary patterns. This interpretation is consistent with the broader knowledge–behavior discrepancies reported in other health contexts, including antibiotic use among university students (Abid et al., 2026).

At the same time, the high level of interest in nutrition education and willingness to change reported by participants indicates that there may be an opportunity to combine education with practical support. The practical implications of these findings extend beyond nutrition education alone. Campus-based approaches could include affordable healthier food options, improved availability of fruits and vegetables, nutrition information in cafeterias, practical meal-planning education, and opportunities for physical activity that fit students' academic schedules. Because family, healthcare professionals, and social media were important sources of nutrition information,

interventions could also use these communication channels to provide consistent and reliable health messages. The findings from Mukhtar et al. (2026) regarding the importance of social media in food-related information seeking further support the relevance of digital communication in the local context. Overall, the results showed that university students have a fairly good level of nutritional knowledge but simultaneously experiencing behavioral and environmental barriers to healthy eating. The fact that some dietary practices showed a significant association with dietary behaviors and a non-significant association with the self-rated overall dietary habits indicates a complex relationship between these variables. Therefore, providing university students with nutritional education is insufficient for improving their dietary habits. Other factors such as the availability of healthy foods and availability, limited time, academic demands, social influences, and the overall food environment on campus.

## V. CONCLUSION

University students in the present study demonstrated a satisfactory level of nutritional knowledge, about the connections between diet and chronic health conditions. However, the students' knowledge did not necessarily translate into healthy dietary practices. Despite being aware of the importance of a healthy diet, many students have reported frequent fast-food consumption, meal skipping, and insufficient daily consumption of fruits and vegetables were observed despite relatively high awareness of the health importance of nutrition. Academic pressure, lack of time, food availability, and the cost of healthy food were among the important barriers influencing students' dietary choices. Nutritional knowledge was significantly associated with some dietary practices, such as fast-food consumption, fruit consumption, and breakfast regularity. However, no significant association was found between nutritional knowledge and students' self-rated dietary habits. These results indicate that the connection between nutritional knowledge and dietary behavior is intricate and that knowledge by itself might not be enough to sustain consistent healthy eating. Therefore, efforts to improve healthy dietary behavior among university students should combine nutrition education with practical and environmental assistance. Enhancing access to affordable healthy foods, tackling time-related obstacles, providing reliable nutrition information, and creating supportive campus environments that make healthier choice easier. Such approaches may help students in converting their current nutritional awareness into healthier and more consistent dietary habits in university students.

### Disclosure Statement

No potential conflict of interest was reported by the authors.

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