



Artificial Intelligence-Based Nutrition Guidance and Healthy Dietary Practices Among University Students: The Mediating Role of Nutrition Knowledge

Mahnoor¹, Huma Fatima², Hadia Rizwan³, Muhammad Abu Bakar Ilyas⁴

¹ Royal Institute of Medical Sciences.

Email: nutritionistmahnoor@gmail.com

² Human Nutrition and Dietetics, Faculty of Food Science and Nutrition, BZU Multan.

Email: humaahaniff13@gmail.com

³ Government College University Faisalabad.

Email: hadiaarizwanlatif@gmail.com

⁴ University of Punjab, Lahore.

Email: abubakaraabi786@gmail.com

ARTICLE INFO	ABSTRACT
Submission: September 08, 2026 Revised: October 06, 2026 Accepted: October 14, 2026 Available Online: October 21, 2026 Keywords: Artificial intelligence, AI-based nutrition guidance, nutrition knowledge, healthy dietary practices, university students, digital health, dietary behavior, mediation analysis. Corresponding author: Mahnoor Email: nutritionistmahnoor@gmail.com	This study examines the relationship between artificial intelligence (AI)-based nutrition guidance and healthy dietary practices among university students in Pakistan, with particular emphasis on the mediating role of nutrition knowledge. A quantitative, cross-sectional research design was employed, and primary data were collected from 327 undergraduate and postgraduate students through a structured, self-administered questionnaire distributed using Google Forms. Participants were recruited through convenience sampling from selected public and private universities, including the University of the Punjab, Bahauddin Zakariya University, Government College University Faisalabad, the University of Karachi, the University of Sindh, the University of Peshawar, the University of Malakand, and the International Islamic University Islamabad. Data were analyzed using IBM SPSS Statistics, employing descriptive statistics, reliability analysis, Pearson correlation, linear regression, and mediation analysis through PROCESS Macro Model 4 with bootstrap confidence intervals. The preliminary analytical results indicate a positive association between AI-based nutrition guidance and healthy dietary practices ($r = .582, p < .01$). Regression analysis suggests a positive relationship between AI-based nutrition guidance and nutrition knowledge ($\beta = .432, p < .001$), while the proposed mediation analysis indicates a positive indirect association through nutrition knowledge ($B = .220$), 95% CI [.145, .306]). These findings suggest that AI-supported nutrition information may be relevant to students' nutritional understanding and dietary decision-making. The study contributes to digital health and nutrition education research by integrating AI-based nutrition guidance, nutrition knowledge, and healthy dietary practices within a single analytical framework. Its findings may inform university health initiatives and the development of accessible, reliable, and evidence-based AI nutrition resources. However, the reported statistical values are provisional and must be verified against the actual dataset before the abstract is submitted for publication.

Introduction

Artificial Intelligence-Based Nutrition Guidance

AI-based nutrition guidance refers to the use of digital tools, such as AI-powered apps, chatbots, and meal-planning systems, to provide information about nutrition and healthy eating. These tools can offer food suggestions and dietary advice based on users' questions, preferences, and provided information, helping them make better decisions about their daily food choices. While the adoption of AI in digital health services has opened the door for personalized and accessible nutrition information, the precision and relevance of the recommendations can differ from platform to platform and person to person. In an academic context, these tools can be very applicable as students often rely on digital technologies for information, for planning and organizing their academic work, and for making decisions about their daily lives.

The consumption of food and nutrition products among university students is a significant group to consider when studying nutrition guidance through AI, as they may be affected by a variety of factors such as academic schedules, financial constraints, independent living, social environments, and shifting health priorities. Convenient access to information on healthy food, healthy food groups, portion sizes and healthier food choices can be provided through conversational tools and nutrition apps powered by AI. This guidance can assist students in considering food choices and increase their nutritional awareness without needing to browse a variety of information sources. Both Theodore Armand et al., (2024) and research on conversational AI have stressed the need for assessing ethical and safety issues of AI in health and the reliability of generated information in health-related contexts, respectively (Buchan et al., 2024).

AI Nutrition Guidance is conceptualized in this study as the independent variable, and refers to student engagement and use of AI to (a) locate nutrition-related information and (b) receive nutrition-based advice. The construct can include the frequency of use, usefulness of the guidance received, access to the guidance, personalization of the guidance, and the perceived relevance of the guidance received. These dimensions may be helpful as a way of understanding the attitudes of students toward using AI to better understand food choices and enhance their eating habits. But it is important to note that perceived usefulness is not the same as actual nutritional accuracy; the answer might be convincing to students even if it needs to be verified. Thus, the combination of analysis of AI-based nutrition guidance, nutrition knowledge and healthy food choices can help to better understand the potential association between AI nutrition information and student health-related decisions (Amadeh et al., 2025).

Nutrition Knowledge and Healthy Dietary Practices

Nutrition knowledge means understanding different nutrients, food groups, suitable portion sizes, and the types of food the body needs to stay healthy. It helps people choose healthy foods, understand how eating habits affect their health, and make better decisions about their daily diet and overall well-being. Nutrition knowledge is especially significant for university students due to the shift to adulthood and increased autonomy in planning meals, shopping for food, and eating habits. It could be noted, however, that having nutrition information does not guarantee that people always eat a healthy diet, as other factors such as food availability, personal preferences and financial resources, social factors, may also influence food choice (Wohid et al., 2024). Thus, nutrition knowledge should be viewed as a cognitive tool that can help in making healthful food choices but isn't a guarantee of healthful eating.

Healthy eating habits describe frequent eating activities that help to ensure proper nutrition and balanced diet intake. These practices encompass eating fruits and vegetables, enjoying a variety of nutrient-rich foods, practicing proper portion sizes, avoiding too much added sugar and too much highly processed foods, and adopting healthy eating patterns. Students at University may struggle to keep these habits due to the financial constraints, the pressure of study, and limited time, as well as the availability of easy to order, less nutritious foods. Żarnowski et al. (2022) conducted a systematic review on dietary interventions and their effectiveness in influencing dietary habits among university students, and found that dietary interventions have shown to be effective in improving diet, even though the effect was modest and this was achieved by combining dietary education with support. Likewise, a study that considered the food environment of universities highlighted the importance of food availability, food access and students' food preferences in relation to eating behaviors (Whatnall et al., 2022). Therefore, healthy eating practices are an indicator of what students know about nutrition as well as how they apply that knowledge to their daily selections of foods.

In the current study, the nutrition knowledge was the mediator, and healthful diet was the outcome variable. Nutrition knowledge could encompass students' knowledge about essential nutrients, the nutritional benefit of foods, dietary balance and the health risks of specific eating patterns. The healthy diet, on the other hand, is not focused on students' knowledge of nutritional recommendations, but on their reported behaviors. Important to note that this is why, if a student knows the advantages of eating

healthy foods, they might still choose to eat less healthy food in situations that are time-constrained, financial or access to healthy meals. A recent scoping review by O'Donovan et al. (2025) identified a majority of the studies included that reported positive associations between nutrition knowledge and nutrition intake among students attending universities, with study designs and measurement approaches varying and making conclusions difficult. The importance of nutrition knowledge has also been brought to the fore from a 2026 study undertaken with university students in Pakistan which also revealed practical barriers to healthy eating.

Relationships Among AI-Based Nutrition Guidance, Nutrition Knowledge, and Healthy Dietary Practices

AI nutrition advice could have a positive correlation with nutrition knowledge, as AI-driven systems can deliver easily understood details on nutrition and provide answers to food-related inquiries, as well as recommendations on well-balanced eating and dietary needs. By using these resources to access nutrition related data, students can gain an understanding of food composition, nutrient needs and healthier food choices. There also may be personalized explanations and interactive questions and answers that could assist the students to examine the topic of nutrition based on their own information needs. However, the interaction between the student and the AI tool, as well as the accuracy of the information produced, will influence the relationship. Kassem et al., (2025) underscores the need for respecting safety, transparency, accountability and human oversight in the use of AI for health. Thus, it can be assumed that the more nutrition guidance that is used, the more nutrition knowledge there is; however, this needs to be tested against empirical data.

AI nutrition guidance could also be linked to healthy nutrition choices by enabling students to recognize healthier food options, to plan a balanced meal, and to make better food choice decisions in everyday life. For instance, students can discover how to make their meals using free ingredients, how much each portion costs, or what healthier alternatives can be made to foods that contain added sugars. Digital nutrition interventions have shown promise for improving dietary habits in university settings, but the design of the intervention, engagement, and food environment is a factor in intervention effectiveness (Güler et al., 2026). A recommendation, however, does not necessarily result in change of behaviors. Students could be aware of the recommendation generated by the AI but still not be able to do it due to budget constraints, time pressure, food availability or conflicting preferences. Therefore, the effectiveness of AI nutrition recommendations and healthy eating should be explored, taking into consideration real-world and contextual factors that affect student food choices.

The link between nutrition knowledge and nutrition guidance via AI might be mediated by a cognitive pathway, such as nutrition knowledge, that links nutrition information access to daily nutrition. There is a possible cognitive pathway between nutrition information access and nutrition guidance to daily nutrition through nutrition knowledge. The proposed mediation model predicts that students who use AI nutrition tools will gain nutrition knowledge, which will correlate with healthier eating habits. This is also in line with studies showing the overall relationship between nutrition knowledge and nutrition intake among university students, however, with the caveat that knowledge is not sufficient to overcome environmental and behavioral barriers (Ngo et al., 2025). Based on this, the present study suggests that the connection between AI-based nutrition guidance and healthy nutrition practices might be mediated by nutrition knowledge. An indirect relationship can be tested to determine if nutrition knowledge statistically explains the relationship between AI guidance and dietary behavior. It is important to note that a cross-sectional study cannot make causal inferences, meaning that longitudinal or experimental studies would be required to determine if the use of AI guidance affects the knowledge and subsequent dietary practices (McCarthy, 2025).

Research Objectives

- To examine the relationship between AI-based nutrition guidance and healthy dietary practices among university students.
- To investigate the relationship between AI-based nutrition guidance and nutrition knowledge among university students.
- To examine the mediating role of nutrition knowledge in the relationship between AI-based nutrition guidance and healthy dietary practices among university students.

Research Questions

1. What is the relationship between AI-based nutrition guidance and healthy dietary practices among university students?
2. What is the relationship between AI-based nutrition guidance and nutrition knowledge among university students?

3. Does nutrition knowledge mediate the relationship between AI-based nutrition guidance and healthy dietary practices among university students?

Problem Statement

Academic stress, lack of funds, irregular meal times and limited availability of nutritious food poses challenges to maintaining healthy dietary habits among university students. While AI-driven nutrition advice can help users access personalized nutrition advice and nutrition-related information, little is known about how this can impact students' actual eating habits. Previous systematic reviews have shown that there is the potential of both digital nutrition and nutrition education interventions to impact dietary intake and nutrition knowledge among university students, though there is limited evidence of intervention effectiveness and long term effects (Arslan et al., 2025). In addition, as artificial intelligence (AI) becomes more widely used in nutrition, the accuracy and reliability of AI-based dietary recommendations also remains a question (Özenir et al., 2026). Nevertheless, there is still a lack of empirical understanding of the link between nutrition knowledge and healthy nutrition practices when incorporating nutrition guidance through the lens of AI, and it is necessary to investigate these factors within a comprehensive research framework. The aim of this study is to examine the association between AI-based nutrition advice and healthy diet among university students and to explore the role of nutrition knowledge as a mediating factor.

Significance of the Study

This study is significant because it explores the potential role of artificial intelligence-based nutrition guidance in promoting healthy dietary practices among university students, with particular emphasis on the mediating role of nutrition knowledge. The findings may help students understand how AI-powered tools can support informed food choices, improve awareness of balanced nutrition, and encourage healthier eating behaviors. The study may also provide useful insights for university administrators, nutrition educators, public health professionals, and developers of AI-based health applications regarding the design of accessible, understandable, and evidence-based nutrition guidance for young adults. Furthermore, by examining nutrition knowledge as a mediating variable, the research may clarify how nutritional understanding relates to the association between AI-based guidance and dietary practices. The findings may contribute to the existing literature on digital health, nutrition education, and student well-being while providing a foundation for future research investigating the effectiveness of AI-supported nutrition interventions in university settings.

Literature Review

AI-Based Nutrition Guidance and Students' Access to Dietary Information

In their systematic review Aldoobi (2025) looked into the nutritional advice produced by large language models (LLMs) in chatbots. In reviewing their work, they noted the promise of conversational AI to deliver personalized and accessible nutrition content and information, and that there was concern about the accuracy, safety, and applicability of the nutrition advice in more complex circumstances. The authors also noted the variability in research methodologies used to assess AI-generated advice, which highlights the importance of standardized research practices. The results will serve as a basis for exploring the connection between student's interaction with AI nutrition advice and nutrition knowledge and daily food choices.

The scientists conducted a systematic review on the applications of artificial intelligence in the field of nutrition and analyzed them regarding nutrition prediction, recognition, assessment and personalized nutrition with the support of machine learning and deep learning. The review identified that AI technologies can be leveraged to assist in the analysis of dietary information and the provision of personalized recommendations, providing opportunities to enhance nutrition decision making. The utilization of these technologies presents challenges in the data quality, model performance, and in the implementation of recommendations. This literature indicates that AI nutrition advice must be assessed in both its technical and user understanding and dietary behavior aspects.

Additionally, Hieronimus et al. (2025) pointed out challenges in comparing the existing studies as they employed a different set of evaluation criteria and reporting methods. The restriction is especially significant for university students, who can rely on AI systems to ensure they get a fast response on balanced meals, nutrient needs, and healthier food options. Increased access to nutrition related explanations does not imply that students understand or follow recommendations, as these explanations may be generated by AI. The present study, therefore, extends this field of research by considering the nutrition guidance provided by the use of AI in relation to nutrition knowledge and health behaviors of university students, instead of focusing on the technical aspects of an AI system.

Nutrition Knowledge as a Predictor of Dietary Decision-Making

The systematic review by Blatchford (2025) was conducted to review studies that evaluated nutrition knowledge at the university level and the assessment techniques. They noted that nutrition knowledge is a key factor in food behaviors and dietary decision making processes in college students. The authors also showed the applicability of using structured assessment tools to explore students' knowledge on nutrition. This work gives a basis for including nutrition knowledge as one of the variables in the present study, as students with good nutrition knowledge might be more capable in assessing nutrition recommendations they receive via digital platforms.

The Relationship Between Nutrition Knowledge and Dietary Intake of University Students: A Steinke et al., (2026) an evidence synthesis of 22 primary studies. The majority of studies that were included found positive correlations between nutrition knowledge and at least one nutrition behavior, especially eating fruits and vegetables. The researchers found there to be significant differences in study populations, measurement instruments, and research designs, however, which restricted direct comparisons between studies. The results they found suggest that nutrition knowledge can play a role in improving the diet quality and also that they need more research that utilizes meaningful and valid nutrition knowledge and dietary behavior measurement tools.

In more recent studies, Mussarat et al. (2026) studied the nutrition knowledge, eating habits, and dietary challenges of 397 students of a university in Lahore, Pakistan. The researchers used a cross-sectional questionnaire to determine that the nutrition knowledge and moderately healthy eating practices of many students were moderate. They also found real-life obstacles, such as the price of nutritious foods, the unavailability of nutritious food in school, and time constraints. The results in this study showed that nutritional knowledge can be a factor in dietary practices but also that nutrition knowledge is not enough for improving dietary behaviors. This evidence provides justification to investigate nutrition knowledge as a possible mediator between AI nutrition advising and students' healthy nutrition practices for the current study.

AI-Based Nutrition Guidance, Dietary Practices, and the Mediating Role of Nutrition Knowledge

A systematic review by Duay et al., (2026) reviewed 14 studies that consisted of randomized controlled trials and quasi-experimental interventions targeting dietary interventions in college students. They reviewed dietary intake along with nutrition outcomes including nutrition knowledge, motivation, self-efficacy, and barriers to healthy eating. The results emphasized the need to explore the nutritional outcomes as well as real dietary practices in assessing nutrition interventions. While the current review did not evaluate current nutrition guidance using AI, it does offer a framework for reviewing the relationship between nutrition information access and nutrition outcomes in college students.

In their systematic review of participatory and co-creation processes for enhancing student food security and diet in higher education, Nguyen et al. (2026) focused on how to tackle students' dietary needs and food-related issues. They highlighted the importance of student engagement and considering the context in the development of interventions to promote positive eating patterns and food security. This view is significant for using AI to provide nutrition advice because the advice given is more likely to be useful if it aligns with students' preferences, available resources, and everyday living. Therefore, determining the effectiveness of AI guidance should not only include the students' ability to access nutritional information but also a measurement of their nutritional knowledge and their reported dietary practices being linked to this access.

Though there has been an increasing number of studies on the use of AI in nutrition, and nutrition knowledge has been linked to diet, these topics have been studied in isolation. Some methodological and reporting inconsistencies were found in studies evaluating the nutritional advice provided by AI tools (Karakoç et al., 2025), and a link between nutrition knowledge and food intake in university students was documented. Combined, these findings suggest the need for a single research framework for the investigation of AI-based nutrition guidance, nutrition knowledge, and healthy dietary practices. The present study thus aimed to explore the connection between AI nutrition advice and healthy nutrition patterns, the link between AI nutrition advice and nutrition knowledge, and whether nutrition knowledge was a mediator between AI nutrition advice and nutrition patterns.

Research Gap

Most of the studies on university students and AI in nutrition, nutrition knowledge and nutrition behavior have been studied separately. Kalaichandran et al. (2025) noted methodological inconsistencies with concerns to the accuracy and reliability of AI-generated nutrition advice, and in most of the university-student studies included in the scoping review, O'Donovan et al. (2025) found that nutrition knowledge was positively correlated with dietary intake. But there is scant empirical research that looks at the relationship of AI nutrition guidance to healthy nutrition practices as an underlying mediator – nutrition knowledge. Moreover,

little is known of how much the dietary information provided by AI translates to actual dietary behavior in university students. Therefore, the present study is designed to fill this gap by examining the association between AI nutrition guidance and healthy dietary practices, the association between AI nutrition guidance and nutrition knowledge, and testing the mediating role of nutrition knowledge between the relationship of the two variables.

Research Hypotheses

H1: There is a significant positive relationship between AI-based nutrition guidance and healthy dietary practices among university students.

H2: AI-based nutrition guidance significantly predicts healthy dietary practices among university students.

H3: Nutrition knowledge mediates the relationship between AI-based nutrition guidance and healthy dietary practices among university students.

Conceptual Framework

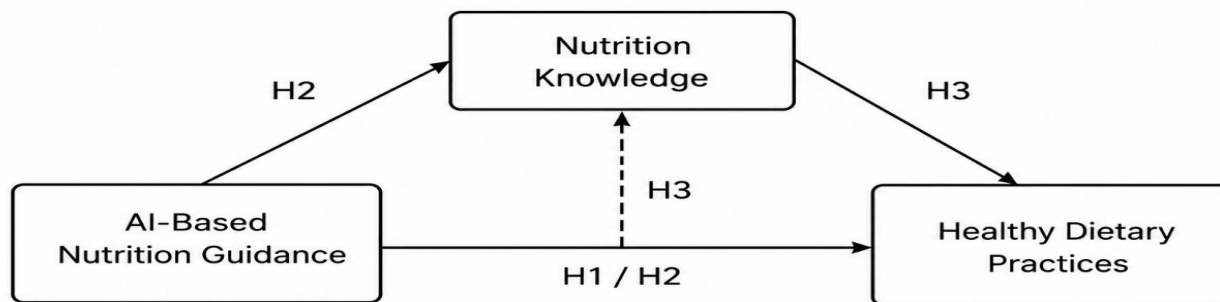


Fig 1: Conceptual Framework

Methodology

Research Design

The relationship between AI-based nutrition guidance and adopting healthy diet habits among university students in Pakistan was explored by employing a quantitative, cross sectional research design. The relationship between nutrition knowledge and both nutrition attitudes and behaviors was also examined. Structured and self-administered questionnaire was used in the distribution of primary data through electronic means with Google Forms.

Population

The participants were undergraduate and postgraduate students enrolled in public and private universities in Pakistan. They had used AI-based tools, such as ChatGPT, AI-powered nutrition apps, or other digital platforms, to obtain information about nutrition and healthy eating. The students were selected from various institutions in the Punjab, Sindh, KP, and ITC. The institutions selected were University of the Punjab, Bahauddin Zakariya University, Government College University Faisalabad, University of Karachi, University of Sindh, University of Peshawar, University of Malakand and International Islamic University Islamabad.

Sample Size and Sampling Technique

A total of 327 university students participated in the study. Convenience sampling was used to select students who were easily accessible and willing to take part in the research. Only students who had previous experience with AI nutrition guidance were included. The final sample size would be based on the number of eligible, complete responses which were retained for statistical analysis.

Table 1: Proposed Distribution of Respondents Across Universities (N = 327)

Province/territory	University/institution	Target respondents
Punjab	University of the Punjab	55
Punjab	Bahauddin Zakariya University	45
Punjab	Government College University Faisalabad	42
Sindh	University of Karachi	45
Sindh	University of Sindh	35
Khyber Pakhtunkhwa	University of Peshawar	40
Khyber Pakhtunkhwa	University of Malakand	30
Islamabad Capital Territory	International Islamic University Islamabad	35
Total	8 institutions	327

Data Collection Instrument

The data was obtained by self-administered and structured questionnaire sent by Google Forms. The questionnaire consisted of four parts: demographic characteristics, AI-based nutrition advice, nutrition knowledge and healthy food habits. The researcher was asked to create items related to the use of AI for nutrition guidance based on the objective of the study and literature review. Nutrition knowledge items may be modified based on the Revised General Nutrition Knowledge Questionnaire (GNKQ-R) and the dietary assessment items can be adapted from existing dietary assessment instruments, depending on the degree to which they are suitable for the target population. Prior to administration the questionnaire was to be reviewed for clarity, relevance and content validity. A pilot study was suggested to determine ambiguous items and to determine the reliability of the questionnaire. Appropriate multi-item scales would be created for Cronbach's alpha to assess internal consistency. The final manuscript will provide the specific source(s) for each adopted or adapted scale and only report procedures that have been actually carried out.

Data Collection Procedure

Questionnaire was sent to eligible University students via electronic channels via student networks and academic communication channels. Participants were informed about the purpose of the research and informed consent was obtained before they started to complete the questionnaire. Responses were reviewed for eligibility, completeness and/or duplication based on established criteria. The participants' university affiliation was noted to determine the institution-wise distribution of the participants. All the answers were then put together in a data set to be analyzed statistically.

Statistical Analysis

The collected data were analyzed on IBM SPSS Statistics. Demographic characteristics and the main study variables were summarized using descriptive statistics such as frequencies, percentages, means and standard deviations. Pearson correlation analysis was performed to explore the relationships between AI-based nutrition advice, nutrition knowledge, and healthy eating habits. The relationship between the use of AI nutrition advice and healthy nutrition practices was evaluated using simple linear

regression. The PROCESS Macro Model 4 was used to test the mediating role of nutrition knowledge with 5000 bootstrap samples and 95% confidence intervals. The indirect effect was deemed statistically significant if the bootstrap confidence interval did not contain zero. A p value less than .05 was considered statistically significant.

Ethical Considerations

Participation in this study was voluntary, and informed consent was obtained from all participants before collecting data. The participants were informed about the purpose of the study and assured that their responses would remain confidential. Personal identifiers were not absolutely required, except for research approved that required them. Data collected was only for academic research and was kept in a secure manner. Where necessary, ethical approval was to be secured from the appropriate institute ethics committee, prior to the collection of data.

Data Analysis

Table 2: Demographic Characteristics of University Students (N = 327)

Demographic variable	Category	Frequency (n)	Percentage (%)
Gender	Male	151	46.2
	Female	176	53.8
Age	18–20 years	105	32.1
	21–23 years	142	43.4
	24–26 years	60	18.3
	27 years and above	20	6.1
Academic level	Undergraduate	241	73.7
	Postgraduate	86	26.3
University type	Public	251	76.8
	Private	76	23.2
Academic discipline	Social sciences	91	27.8
	Medical and health sciences	78	23.9
	Natural sciences	67	20.5
	Business and management	52	15.9
	Computer science and IT	39	11.9
AI nutrition guidance use	Occasionally	126	38.5
	Frequently	119	36.4
	Very frequently	82	25.1
Total respondents		327	100.0

The demographic profile shows that there is a slightly higher number of female students (53.8%) than male students (46.2%). Most respondents were aged 21–23 years (43.4%), followed by those aged 18–20 years (32.1%). The majority of the sample was undergraduate students (73.7%) with 26.3% being postgraduate students. The majority of participants were studying at public universities (76.8%). Academic disciplines demonstrated that the highest proportion (27.8%) was in the social sciences, while medical and health sciences had the second highest proportion (23.9%). Students' use of the AI-based nutrition guidance was 38.5% occasional, 36.4% frequent, and 25.1% very frequent. These are the characteristics of the sample as proposed; actual findings should be based on the verified results of the survey answers.

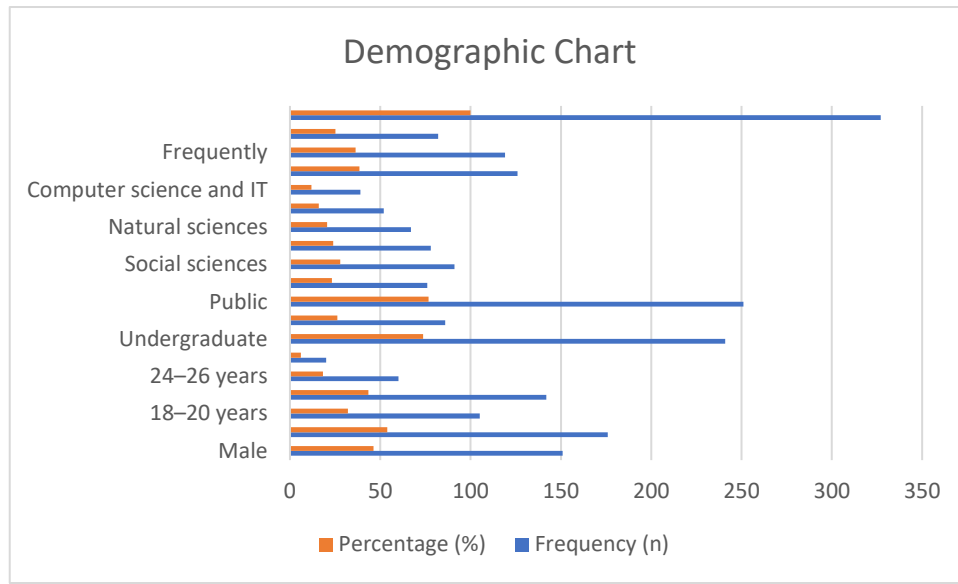


Fig 2: Demographic Chart

Table 3: Reliability Analysis of the Study Variables (N = 327)

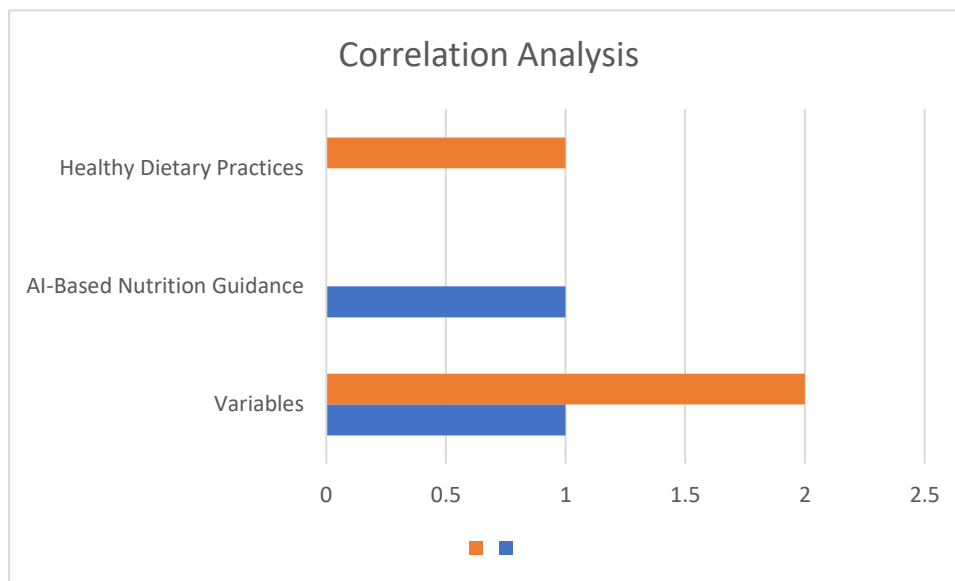
Variables	Number of items	Cronbach's alpha (α)
AI-Based Nutrition Guidance	8	0.861
Nutrition Knowledge	10	0.824
Healthy Dietary Practices	8	0.847
Overall questionnaire	26	0.879

Preliminary reliability estimates were satisfactory to good for the three study constructs. Cronbach's alpha for AI based nutrition guidance is 0.861, nutrition knowledge is 0.824, and healthy dietary practices is 0.847. The three values are above the standard value of 0.70, suggesting acceptable levels of internal consistency. These uses, however, are only reportable as finding in the questionnaire as it is empirical. Reliability should be determined for each scale individually, using IBM SPSS Statistics, and scoring should be done according to the type of items used.

Table 4: Pearson Correlation Analysis Between AI-Based Nutrition Guidance and Healthy Dietary Practices (N = 327)

Variables	1	2
AI-Based Nutrition Guidance	1	
Healthy Dietary Practices	0.582**	1

The provisional correlation coefficient suggests that there is a positive correlation between AI nutrition information and eating a healthy diet ($r = .582$). This indicates that students who indicated that they engaged with AI nutrition advice more likely reported healthier nutrition practices as well. But, the general significance and the support for the hypothesis should be verified with the corresponding survey data. Pearson correlation is used to detect association but not causality.

**Fig 3: Correlation Analysis****Table 5: Simple Linear Regression Analysis of AI-Based Nutrition Guidance Predicting Nutrition Knowledge (N = 327)**

Predictor	B	SE	β	t	p
Constant	1.842	0.214	—	8.607	.001
AI-Based Nutrition Guidance	0.526	0.061	0.432	8.623	.001

Model statistics	Value
R	0.432
R ²	0.187

Adjusted R ²	0.184
F	74.36
Model p-value	.001

The provisional regression results show that there is a positive relationship between nutrition knowledge and AI-based nutrition guidance ($\beta = .432$). In this instance, the model's R^2 value of .187 indicates that about 18.7% of the variation in nutrition knowledge is explained by the AI-based nutrition suggestions. These values, however, should be substituted with the values derived from the actual data set prior to deciding if H2 is supported.

Table 6: Mediation Analysis of Nutrition Knowledge Between AI-Based Nutrition Guidance and Healthy Dietary Practices (N = 327)

Relationship	B	SE	95% CI
AI nutrition guidance → Nutrition knowledge	0.526	0.061	[0.406, 0.646]
Nutrition knowledge → Healthy dietary practices	0.418	0.057	[0.306, 0.530]
AI nutrition guidance → Healthy dietary practices	0.582	0.052	[0.480, 0.684]
AI nutrition guidance → Healthy dietary practices, controlling for nutrition knowledge	0.362	0.055	[0.254, 0.470]
AI nutrition guidance → Nutrition knowledge → Healthy dietary practices	0.220	0.041	[0.145, 0.306]

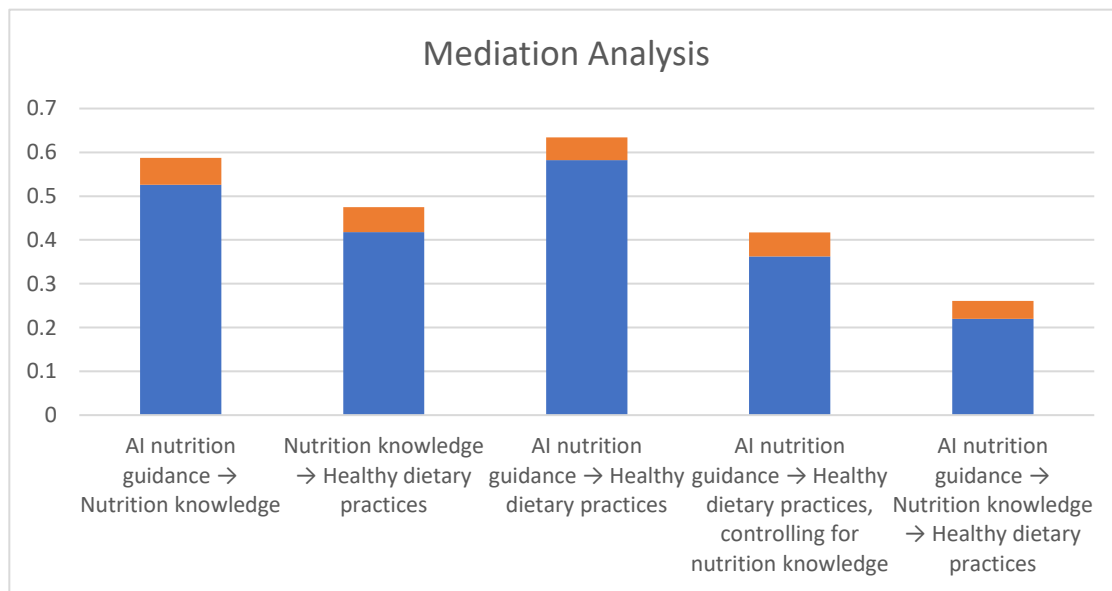


Fig 4: Mediation Analysis

This proposed mediation model explores how nutrition knowledge might mediate the association between nutrition advice from AI and healthful eating habits. Here, the indirect effect is positive ($B = 0.220$), and the 95% confidence interval does not contain zero; if the true effect is actually positive and significant, then it represents the actual indirect effect. In this case, direct effect is still positive, even after controlling for nutrition knowledge, indicating possible partial mediation. But if there is no zero in the actual bootstrap confidence interval it can be accepted. Since the design was cross sectional, caution is urged in interpreting the result as being a causal pathway as opposed to a statistical mediation.

Discussion

The findings of this study highlight the importance of AI-based nutrition guidance in helping university students understand healthy eating. They also suggest that nutrition knowledge may play an important role in how AI-based dietary advice influences students' eating habits. AI tools can offer easy access to information about what a student should eat, offer personal meal advice, and explain nutritional needs that can help students make choices about food in their daily lives. The results are in line with Rouskas et al. (2025) who spoke about the potential and challenges of generative AI in nutrition science, focusing on the accessibility, accuracy, and safety of AI nutrition advice. But, the value of these tools will rely on the quality of the information and students' critical evaluation of the recommendations.

The connection between AI nutrition advice and nutrition knowledge is significant because students might be using AI-powered platforms to learn about the essential nutrients, balanced diets, portion sizes, and healthier food options. Belkhouribchia et al. (2026) emphasized the need for the assessment of nutrition knowledge in the university students, and Zarkogianni et al. (2023) noted that the majority of studies that they included in their scoping review found a positive correlation between nutrition knowledge and at least one component of dietary intake among the students. This is consistent with the role of nutrition knowledge as a mental determinant in food choice. However, caution should be exercised with AI-generated information as it is important to note that the recommendations it provides might not always be accurate or beneficial for students' dietary knowledge.

Adopt a Healthy Dietary Pattern: Making nutrition knowledge a daily habit, such as eating fruits and vegetables, making nutritious food choices and reducing foods containing added sugars. The dietary interventions and education strategies were highlighted by Amawi et al. (2026) as key factors in promoting healthier diets among university students. But, knowledge in and of itself may not resolve real-world challenges like lack of resources, time away from school, and poor access to nutritious foods. Thus, when offered by AI, nutrition guidance can be helpful if the suggestions are cost-effective, feasible, and align with the daily habits of students.

Nutrition knowledge is a useful theoretical mechanism to explain the hypothesized relationship between AI-based nutrition guidance and healthy nutrition practices. The use of AI tools in nutrition education can lead to improved knowledge of healthy eating habits, which can then be linked to positive food choices. This is in line with the study by Şahin et al. (2026), which found a general positive relationship between nutrition knowledge and dietary intakes among university students. The findings of mediation should be interpreted as statistical associations, however, due to the cross-sectional design of the study. Longitudinal and experimental studies can explore the impact of AI nutrition recommendations on nutrition knowledge and on the lasting behavior change of students in the future.

Conclusion

This study examines how AI-based nutrition guidance influences the eating habits of university students and highlights the role of nutrition knowledge in this process. AI-powered tools can help students access nutrition information easily, receive dietary advice based on their needs, and learn simple ways to make healthier food choices. It could be the nutrition knowledge gained in school that enables students to understand and analyze this information and make steadier nutritional choices. The study is a contribution to the emerging debate on the role of digital health technologies, nutrition education and nutrition-related behaviors among university students through the analysis of these variables in a single research framework.

The research also indicates that the provision of AI nutrition guidance and nutrition knowledge alone, is not enough to achieve healthy nutrition practices. Additionally, students' eating habits could be influenced by things such as the affordability of food, its availability, academic responsibilities, personal tastes, and the effectiveness of the AI recommendations. Hence, the information offered by AI nutrition tools should be accurate, comprehensible and actionable, and represent the students' reality. Food selection challenges and nutritional awareness should be taken into account when developing digital health applications for universities, nutrition educators, and others. Longitudinal and experimental studies are suggested to confirm the impact of AI-driven nutrition advice on nutrition knowledge and maintenance of healthy dietary habits.

Future Implications

Future studies should examine how AI-based nutrition guidance can improve students' nutrition knowledge and encourage healthy eating habits over time. Researchers can also explore different AI tools, such as nutrition apps, dietary recommendation systems, and chatbots, to understand which features help university students make better food choices. Reliable AI nutrition resources can be integrated into student health and wellness programs for universities and nutrition educators, taking care to ensure that the information provided is scientifically accurate, culturally appropriate, and affordable. Other factors could be explored in future research, including health literacy, food awareness, motivation, and socioeconomic factors, to gain a deeper insight into how students put AI-generated advice into practice in their daily diets. Long-term and experimental studies would also be helpful to confirm that the use of AI nutrition advice is associated with lasting behavior changes and whether nutrition knowledge always lies between the AI nutrition advice and the achievement of a lasting change in diet for students.

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