

Bridging the Food Safety Knowledge–Practice Gap: A Comparative Assessment of Health and Non-Health University Students

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ABSTRACT

Background: Food safety is a serious public health issue all over the world and unsafe food handling practices are a major cause of food borne illness and related health and economic costs. University students are especially at risk for food safety issues when they are now expected to make more decisions about food preparation and consumption.

Aim: The aim of this study was to compare the food safety knowledge and practices of health and non-health university students and to investigate the correlation between the food safety knowledge and practices of university students.

Methodology: The study was a cross-sectional comparative study of undergraduate students of Umm Al-Qura University, Saudi Arabia. The data were obtained through a structured self-administered questionnaire from a total of 300 students, 150 from health science programs and 150 students from non-health science programs. Using SPSS, several inferential statistical techniques were applied to test the study hypotheses.

Findings: The participants demonstrated satisfactory food safety knowledge ($M = 11.84$, $SD = 2.21$) and food safety practices ($M = 3.91$, $SD = 0.67$). Health science students exhibited significantly higher food safety knowledge ($M = 13.21$ vs. 10.47 ; $t = 13.18$, $p < 0.001$) and better food safety practices ($M = 4.24$ vs. 3.58 ; $t = 9.72$, $p < 0.001$) than non-health science students. Food safety knowledge was positively associated with food safety practices ($r = 0.643$, $p < 0.001$), while regression analysis identified food safety knowledge as the strongest predictor of safe food handling behaviors ($\beta = 0.501$, $p < 0.001$).

Conclusion: The study highlighted that academic discipline had an effect on food safety knowledge and practices, with food safety knowledge gained in educational programs related to health being associated with safer food handling practices.

Keywords: Food safety knowledge, Health science students, Food handling behaviors, Knowledge–practice gap, Food safety education, Public health promotion.

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INTRODUCTION

The recent developments in food production systems, regulatory programs, and disease surveillance systems have made tremendous strides, food safety continues to be a huge public health problem worldwide (Organization, 2022). The World Health Organization (WHO) estimates that roughly 600 million people, or almost 10% of the world's population, experience food-borne illnesses each year and that 420,000 people die as a result (Singh & Puniya, 2024). Nearly 30–40% of all foodborne disease related deaths occur in children under 5 years of age. Unsafe food also has a significant economic impact, with it estimated that the health costs of unsafe food in low and middle-income countries cost an estimated US\$110 billion per year (Afsana et al., 2022). A contaminated food may carry over 200 diseases, such as acute gastrointestinal infections, chronic diseases such as neurological disorders and some types of cancer. These figures underscore the importance of food safety as a health problem, but also as a major socio-economic problem that needs continual public health action.

The food safety research of university students is important since they are moving from having food prepared by their families to buying, storing, preparing, and eating their own (Islam et al., 2022). University students may find themselves in situations that expose them to greater risk of food poisoning while studying, such as eating out of schedule, eating at fast food restaurants, eating out of home, shared kitchen facilities and limited cooking skills (Ozanne et al., 2022). These lifestyle changes can make people more likely to get sick from unsafe food handling and food poisoning. Despite having access to health information, recent studies have found that young adults have various levels of knowledge of food safety and hygiene compliance, making them a vulnerable group (Hafiz et al., 2023). The university students are future professionals and future leaders of society and therefore have a critical role in the dissemination of health information and public

health behaviors in society.

Food safety knowledge and practices are essential elements of disease prevention and health promotion. International research has demonstrated that there is a link between food safety knowledge and hygiene behaviour and safer food handling practices (Rifat et al., 2022). There are, however, indications that knowledge is not sufficient for proper conduct. Many people know what they should do to keep food safe, but don't do it in their daily lives. Increasingly the concept has been gaining interest in public health research due to the fact that despite good awareness, compliance with behaviors is often suboptimal (Ali et al., 2023). Theoretical models like the Health Belief Model and the Theory of Planned Behavior indicate that knowledge is not the only factor that determines behaviour, other factors include attitudes, perceived susceptibility, social norms, environmental constraints and personal habits (Fang et al., 2025). Therefore, it is important to understand the knowledge–practice gap to design effective educational intervention to go beyond information giving and to create sustainable behavioral change.

Food safety awareness and behavior can also be affected by academic discipline. The students from health-related courses like medicine, nursing, public health, pharmacy, allied health sciences are constantly exposed to concepts of disease prevention, infection control, epidemiology, hygiene and health promotion in their academic trainings (Daniati et al., 2025). This exposure could help to improve their knowledge about food borne illness risks and prevention. Students in non-health related disciplines such as business, engineering, information technology, law and the humanities, on the other hand, might only have a small amount of formal training on food safety (Poonphol et al., 2026). Health literacy and awareness of preventive health behaviors have been found to be higher among students enrolled in health-related programs than in other students in previous research (Jürgensen et al., 2024).

However, there is some conflicting evidence about the extent to which these differences result in actual food safety practices.

Food safety is a critical concern in the Kingdom of Saudi Arabia and is important because of the specific public health situation of the country (Omer et al., 2024). The country is a home to millions of pilgrims every year during Hajj and Umrah, which is one of the biggest mass gatherings in the world. The potential for food contamination and transmission of foodborne disease is greater during these events as large quantities of food are prepared, distributed and consumed (Almaghrabi, 2023). The research during the Hajj has indicated that it is important to maintain high standards of food safety in food establishments and with food handlers to avoid outbreaks and to safeguard public health (Alnafisah et al., 2023). Considering the specific environmental, demographic and logistical conditions of mass gatherings, the need for food safety awareness among future health professionals and the entire university community is further underscored.

Although food safety research is gaining popularity, there is an important research question which is still unanswered. There is moderate to high food safety awareness among students and consumers, as reported by existing studies, but unsafe food handling behaviors are still seen (Ali et al., 2023). This means that, just because knowledge is increased, the safe practice may not be guaranteed. In addition, although many studies have focused on food safety among food handlers, healthcare workers and general consumers, few studies have focused on the understanding of the influence of academic discipline on knowledge and behavior among university students.

Although there have been many studies on this particular issue there are still many gaps that still exist (Omer et al., 2024; Parikh et al., 2022). First, most studies have tended to concentrate on measuring awareness or knowledge rather than on measuring behaviors. Secondly, there are relatively few studies that directly compare

students in health and non-health academic disciplines. Third, there is a scarcity of research on the extent of the food safety knowledge–practice gap among university students in Saudi Arabia. As a result, it is unclear if increased food safety knowledge leads to increased safer food handling practices among health students versus non-health students.

Hence, the objective of the present study was to compare the knowledge of food safety and food safety practices among health and non-health university students, and to investigate the gap between these two groups in terms of food safety knowledge.

The importance of this research is that it can be used to public health education, curriculum planning for universities and the promotion of food safety. The results can be used to develop targeted educational interventions to enhance food safety practices among university students across the various knowledge gaps identified. In addition, the fact that the knowledge and practice gap is persistent could be useful to the university in designing practical and behavior-based training strategies to improve compliance with food safety recommendations. This would help in enhancing food safety awareness and practices among university students can help to mitigate the risk of foodborne illnesses and foster healthier communities.

LITERATURE REVIEW

The Knowledge of Food Safety among University Students and the Academic Discipline

Food safety knowledge is the level of knowledge about the nature of foodborne diseases, personal hygiene, food handling procedures, cross-contamination, temperature control and safe food storage practices (Anieto, 2025). Good food safety knowledge is seen as an essential prerequisite for the prevention of food poisoning and for public health. University students are a special group of students, as they have a higher responsibility for their own food buying, cooking

and storing habits (Ali et al., 2023). Food safety knowledge gaps may make young adults more vulnerable to foodborne illness when they move to an independent living environment.

Educational exposure has been proven to have a significant role in the development of food safety knowledge in previous studies (Bautista-Bernal et al., 2024). Students enrolled in health-related courses tend to have a higher awareness of food safety due to the inclusion of food safety-related concepts in their courses of study (Yazdani et al., 2026). A study showed that formal food safety education significantly improved food safety knowledge among the Saudi dietetics students, as the mean score of food safety knowledge increased from 16.51 to 20.60 after completing a food safety course ($p < 0.001$) (Alghafari & Arfaoui, 2022).

Similarly, there are a number of international studies that have reported that students in health and food-related courses have significantly higher levels of food safety knowledge than students in non-health courses (Abdelsalam et al., 2024; Al. Omoush et al., 2025). The knowledge gained from public health concepts, microbiology, nutrition and clinical sciences helps to deepen the understanding of foodborne risks and preventive measures. In contrast, students in business, engineering, computer science, and humanities programs may not be formally trained in food safety, and thus have less awareness and understanding (Mulat et al., 2024). From these results, it could be concluded that academic discipline is an important factor in the food safety knowledge level of university students.

Hypothesis 1 (H1): There is a significant difference in the knowledge of food safety between health science students and non-health science students.

Food Safety Knowledge among University Students

Public health organizations around the world have been stressing the significance of food safety procedures as one of the commonest

causes of spreading food borne diseases (Almaary, 2023). Inadequate hand hygiene, cooking temperatures, thawing procedures, and food storage practices have been found to be important factors in food contamination and outbreaks. The factors affecting the food safety practices of university students are educational background, lifestyle habits, perceived risk, and prior training (Mkangara, 2023). Convenience foods, communal kitchen facilities or food delivery services are often used by students, which can lead to higher risk of exposure to food safety hazards (Abegaz, 2022). Students who have sufficient knowledge may still be performing unsafe food handling practices because of time constraints, convenience, or lack of practice.

There is evidence from Saudi Arabia that food safety education has a significant impact on behavioural outcomes (Alhuzaimi et al., 2025). After the structured educational intervention, the mean score for practice improved significantly highlighting the need for educational exposure in support of safe food handling practices (Al. Omoush et al., 2025). Health science students are likely to have more opportunities to learn about concepts of prevention and hygiene in their educational programs and thus may be more likely to demonstrate food safety practices than students in non-health related disciplines.

Hypothesis 2 (H2): There is a significant difference in the food safety practices between health science students and non-health science students.

Knowledge–Practice Gap and the Relationship between Food Safety Knowledge and Practices

A knowledge–practice gap is one of the most common results of food safety research. This is a concept that refers to when people have a good knowledge of health-related behaviours but do not always engage in them (Alyousef et al., 2025). The persistence of this gap suggests that knowledge alone is often insufficient to produce behavioral change. The Theory of Planned Behavior (TPB) provides a useful framework for

understanding this phenomenon (Oleg, 2022). TPB also indicates that attitudes, subjective norms, and perceived behavioral control are factors besides knowledge that influence behavior. People can know the importance of safe food handling but not do it due to environment, social factors, habits or lack of convenience (Luu et al., 2023). Therefore, behavioral intentions are a mediator between knowledge and behavior.

Positive relationships between food safety knowledge and food safety practices have been found in previous studies (Barone & Aschemann-Witzel, 2022). A study indicates that before educational intervention, there was a significant positive correlation between food safety knowledge and food safety practices among dietetics students ($r = 0.449$, $p < 0.001$) (Cai et al., 2023). However, other research indicates that increased knowledge is not always accompanied by optimal behaviors, which can complicate food safety decision making (Baba & Esfandiari, 2023). The fact that so many knowledgeable people continue to engage in unsafe practices suggests that it may be worthwhile to explore whether or not knowledge is still a significant predictor of practice among university students.

Hypothesis 3 (H3): Food safety knowledge positively affects food safety practices of university students.

THEORETICAL FRAMEWORK

Theory of Planned Behavior (TPB)

Icek Ajzen's Theory of Planned Behavior (TPB) is one of the most popular behavioral theories used to explain and predict health-related behaviors (Orji, 2022). According to the theory, the key factors that determine behavioral intention are attitude toward the behavior, subjective norms, and perceived behavioral control, which in turn influence an individual's behavior (Hayden, 2022). Attitude is a person's positive or negative appraisal of the behavior, subjective norms are the perceived social norms

of the behavior, and perceived behavioural control is the person's confidence in their ability to perform the behaviour successfully. TPB suggests that people with positive attitudes, who feel that social support is available and that they have some control over the behavior are more likely to perform the desired behavior (Martin & Wada, 2026).

The TPB is an appropriate theoretical framework to explain food safety behavior of university students. These are "voluntary" behaviors which must be learned and committed to, such as proper handwashing, safe food storage, preventing cross-contamination, and following food hygiene guidelines (Nickell & Hinsz, 2023). Learning experiences may help develop students' knowledge of the risks of foodborne disease and reinforce positive attitudes regarding safe food handling. Students attending health-related programs may be more likely to be introduced to concepts about disease prevention, epidemiology, infection control, and health promotion, and therefore have greater intentions to practice safe food handling (Cai et al., 2023). On the other hand, students in non-health majors might have less chance to learn this and to have similar behavioral intentions.

The present study implied that academic discipline could have a role in the food safety knowledge, which in turn could lead to safer food handling practices. The theory thus offered a logical basis for the hypothesized relationships between academic discipline, food safety knowledge, and food safety practices, which include the following: Health science students have more knowledge of food safety than non-health science students, and food safety knowledge positively relates to food safety practices.

CONCEPTUAL FRAMEWORK

The theoretical model of this study is based on the TPB and posits that academic discipline impacts food safety knowledge which in turn impacts food safety practices (Nickell & Hinsz, 2023). Academic discipline is divided in two

types: health science students and non-health science students. Students in health-related fields (public health, medicine, nursing, and pharmacy) have more exposure to health education, disease prevention and hygiene-related concepts than students in non-health related fields (business, engineering, arts, and computer science) (Luu et al., 2023). It was expected that this educational exposure will improve their food safety knowledge. Moreover, it is believed that increased food safety knowledge will lead to safer food handling and hygiene practices, such as hand washing, food storage, food temperature control, and avoiding cross-contamination (Baba & Esfandiari, 2023). It is, assumed that academic discipline indirectly affects food safety practices by the impact it has on food safety knowledge. The model is used as a basis to investigate the differences between health and non-health students, and the relationship between knowledge and food safety behaviors. Figure 1 presents the conceptual framework of the study.

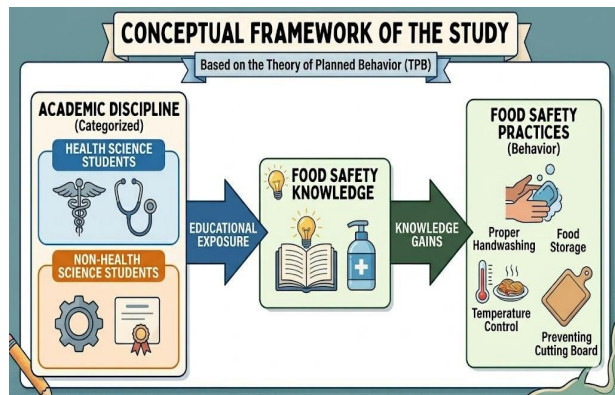


Figure 1: Conceptual framework of the study

METHODOLOGY

Study Design

The present study used a quantitative cross sectional comparative research design to compare the differences in food safety knowledge and food safety practices of health and non-health university students. The cross sectional approach was deemed suitable since data was gathered at one time and a comparison

made between the two academic groups. The design also enabled the researchers to determine the association between food safety knowledge and food safety practices, and to measure the food safety knowledge–practice gap among the university students.

Study Setting

This study was carried out at Umm Al-Qura University in Makkah, Saudi Arabia in the academic year 2025-2026. The university was chosen because it has students from a variety of disciplines, such as health-related and non-health-related. The university was one of the biggest universities in Saudi Arabia, and it offered a suitable environment for studying the differences in food safety knowledge and practices among academic disciplines.

Study Population

The target population was undergraduate students of different academic programs at Umm Al-Qura University. The participants were divided into two groups based on specialization. Students in Public Health, Medicine, Nursing, and Pharmacy programs were included in the health sciences group. These disciplines were selected because their curricula include courses related to disease prevention, infection control, epidemiology, public health, and health promotion. The non-health sciences group consisted of students from Business Administration, Engineering, Information Technology and Humanities courses. Typically, these disciplines offer little exposure to the concepts of food safety and public health. Incorporating students from both academic categories allowed for a complete comparison of food safety knowledge and food safety practices. Table 1 shows the distribution of participants by academic discipline.

Table 1: Distribution of Participants by Academic Discipline

Academic Category	Academic Program	Planned Sample (n)
Health	Public Health	40

Sciences		
Health	Medicine	40
Sciences		
Health	Nursing	35
Sciences		
Health	Pharmacy	35
Sciences		
Non-Health	Business	40
Sciences	Administration	
Non-Health	Engineering	40
Sciences		
Non-Health	Information	35
Sciences	Technology	
Non-Health	Humanities	35
Sciences		
Total	—	300

Inclusion and Exclusion Criteria

The inclusion criteria were set to ensure that the participants were representative of the target population and could give reliable answers. Table 2 shows the inclusion and exclusion criteria of the study.

Table 2: Inclusion and exclusion criteria of the study

Inclusion Criteria	Exclusion Criteria
Registered undergraduate student at Umm Al-Qura University	Postgraduate students
Enrolled in either a health or non-health academic program	Visiting or exchange students
Aged 18 years or older	Incomplete questionnaires
Willing to participate voluntarily	Questionnaires with substantial missing data
Provided informed consent	Participants who withdrew from the study

Sample Technique and Size

Stratified random sampling was used to make sure that there were enough health and non-health students. The target population was subdivided into two strata: academic disciplines. The first stratum was made of health science students while the second stratum was made of non-health science students. Participants were then selected from each stratum using random sampling procedures. Stratified sampling was

also used to increase the representativeness of the sample and to ensure equal participation of both academic groups, which further improved the validity of the comparisons. The sample size was calculated by Cochran's formula for cross-sectional studies with 95% confidence level and a margin of error of 5%. The following formula was used: where n is the desired sample size, Z is the standard normal deviation for a 95% confidence interval (1.96), p is the estimated population proportion (0.50), and d is the acceptable margin of error (0.05). A minimum sample size of about 300 was calculated to give

adequate statistical power for comparative and correlational analyses. Thus, a total of 300 students were recruited, 150 from health science programs and 150 students from non-health science programs.

Research Instrument

A structured, self-administered questionnaire was used for data collection, based on previously validated food safety studies. The questionnaire aimed to evaluate the demographic aspects, food safety knowledge, food safety practices, and food safety risk perception of participants. This instrument was divided into four sections. Table 3 shows that the first part collected demographic data such as age, sex, academic discipline and academic year. The second section assessed food safety knowledge by asking questions about food borne diseases, personal hygiene, food contamination, safe food storage, temperature control and food handling procedures. The third section evaluated food safety practices by evaluating the participants' normal food handling practices. The last part examined the food safety risk perception and participants' knowledge about foodborne disease risks and food safety hazards.

Table 3: Structure of the Research Instrument

Section	Variable	Number of Items	Scale
A	Demographic Information	4	Nominal

B	Food Safety Knowledge	15	Correct/Incorrect
C	Food Safety Practices	15	5-Point Likert Scale
D	Food Safety Risk Perception (Optional)	5	5-Point Likert Scale

Data Analysis

The collected data were coded, entered, cleaned, and analyzed by the Statistical Package for Social Sciences (SPSS) version 29. Descriptive statistics were then computed to describe the demographic characteristics and study variables of the participants. The distribution of food safety knowledge and food safety practices among the participants was described in terms of frequencies, percentages, means, and standard deviations.

Several inferential statistical techniques were used to test the study hypotheses. To compare the food safety knowledge scores of health science students and non-health science students (H1), an independent samples t-test was performed. The food safety practice scores of the two groups were compared using a second independent samples t-test (H2). The food safety knowledge and food safety practices were correlated by Pearson's correlation analysis (H3). Further, multiple linear regression was performed to determine significant predictors of food safety practices. The food safety practices were the dependent variable, while the food safety knowledge, academic discipline, age, gender and academic year were independent variables. A p value < 0.05 was considered statistically significant.

RESULTS

Reliability Analysis

The reliability of the measurement scales was checked for the main analyses using Cronbach's alpha coefficient. Results in Table 4 showed good internal consistency for all constructs (alpha values > 0.70).

Table 4: Reliability Statistics

Construct	Number of Items	Cronbach's Alpha
Food Safety Knowledge	15	0.847
Food Safety Practices	15	0.881
Food Safety Risk Perception	5	0.813

The reliability analysis showed that all the measurement scales had acceptable internal consistency. The Cronbach's alpha coefficient was 0.847 for the food safety knowledge scale and 0.881 for the food safety practices scale. The highest Cronbach's alpha coefficient was obtained for the food safety practices scale (0.881), and the lowest was for the food safety knowledge scale (0.847). Similarly, food safety risk perception scale showed good reliability ($\alpha = 0.813$). All the coefficients were above the recommended value of 0.70, and the scales were therefore reliable for subsequent statistical analyses. These results showed that the items on the questionnaire were consistently measuring the intended constructs and that there was confidence in the accuracy and stability of the data collected.

Assessment of Normality

Skewness and Kurtosis statistics were used for normality testing as presented in Table 5.

Table 5: Assessment of Normality

Variable	Skewness	Kurtosis
Food Safety Knowledge	-0.542	0.481
Food Safety Practices	-0.328	-0.217
Food Safety Risk Perception	-0.471	0.392

The results showed that the skewness and kurtosis values of all variables were within the acceptable range of ± 2.0 . The results indicated that the data were normally distributed and fulfilled the assumptions for parametric statistical analysis. Because there were no

extreme deviations from normality, independent samples t-tests, Pearson correlation analysis, and multiple regression analysis were appropriate. Therefore, the data were deemed appropriate for the inferential statistical methods used in this research.

Demographic Characteristics

The demographic analysis revealed that females numbered slightly more than males. The majority of the respondents (78%) were aged between 21 and 23 which suggest that they were in the middle of their undergraduate studies. There were an equal number of health science and non-health science students, providing equal group comparisons. In addition, students from different academic years were involved in the study, which resulted in a wide sample and greater representativeness of the results at all levels of university education. Table 6 shows the demographic profile of the participants.

Table 6: Demographic Characteristics of Participants (N = 300)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	136	45.3
	Female	164	54.7
Age	18–20 Years	102	34.0
	21–23 Years	138	46.0
	≥24 Years	60	20.0
Academic Category	Health Sciences	150	50.0
	Non-Health Sciences	150	50.0
Academic Year	First Year	48	16.0
	Second Year	70	23.3
	Third Year	76	25.3
	Fourth Year	68	22.7
	Fifth Year and Above	38	12.7
	Total	300	100.0

Food Safety Knowledge Scores

The results in Table 7 showed that the overall food safety knowledge level of the participants

was relatively high. The mean score of 11.84 indicated that students had some knowledge of the important concepts of food borne diseases, food contamination, safe storage of food and personal hygiene. The moderate standard deviation suggested that there were some variations among the respondents, which might mean that there were differences in the knowledge of the respondents according to academic disciplines. In general, the results showed that the knowledge of the students of the university on food safety was satisfactory, but there were still gaps in the knowledge.

The results in Table 7 also showed that the respondents had generally positive attitudes towards food safety practices. Students' mean score showed that they were often practicing recommended food handling practices such as handwashing, food storage, cleaning, etc. However, the standard deviation suggested that some respondents reported lower adherence to food safety recommendations. These results indicated that while students generally practiced safe food handling behaviors, there remained opportunities for further improvement in behavioral compliance and implementation.

Table 7: Descriptive Statistics of Food Safety Knowledge and Practices

Variable	N	Minimum	Maximum	Mean	SD
Food Safety Knowledge	30	5	15	11.84	2.21
Food Safety Practices	30	2.10	5.00	3.91	0.67

Comparison of Food Safety Knowledge and Practices Between the Two Groups

Table 8 showed that there was a significant difference between food safety knowledge of health science students and non-health science students based on the independent samples t-test. The knowledge scores for health science students were significantly higher than for non-health students. The finding indicated that the exposure

to health-related education had positive impact on students' understanding of food safety concepts. For students in the health field, subjects like public health, nutrition, microbiology and disease prevention may have improved the knowledge they learned. Therefore, the results provided strong support for Hypothesis 1.

The results in Table 8 also showed that there was a significant difference between the two groups of students in terms of food safety practices. The food safety behaviors of the health science students were significantly higher than those of the non-health science students. These findings indicated that academic exposure increased food safety knowledge, as well as the adoption of safer food handling practices. Students in health-related programs seemed to be more conscious of the implications of unsafe food handling and were thus more likely to adhere to guidelines. Thus, Hypothesis 2 was confirmed.

Table 8: Independent Samples t-Test for Food Safety Knowledge and Practices

Variable	Group	N	Mean	SD	t	p
Food Safety Knowledge	Health Sciences	15	13.2	1.5	13.1	<0.001
	Non-Health Sciences	15	10.4	2.0		
Food Safety Practices	Health Sciences	15	4.24	0.4	9.72	<0.001
	Non-Health Sciences	15	3.58	0.6		

Relationship between Food Safety Knowledge and Food Safety Practices

The correlation analysis in Table 9 revealed that there was a strong positive correlation between food safety knowledge and food safety practices. The correlation coefficient indicated that students with higher levels of food safety knowledge were more likely to engage in

appropriate food handling behaviors. This finding underpinned the hypothesis that knowledge is a significant factor in food safety practices. The strength of the relationship also indicated that educational efforts to enhance food safety knowledge could play a role in increasing food safety behaviors among university students. Thus, Hypothesis 3 was accepted.

Table 9: Pearson Correlation Matrix

Variable	Food Safety Knowledge	Food Safety Practices
Food Safety Knowledge	1	
Food Safety Practices	0.643**	1

Multiple Regression Analysis

The model summary in Table 10 demonstrated that the independent variables collectively explained 52.0% of the variation in food safety practices, and the overall regression model was statistically significant ($R^2 = 0.520$, $F = 63.84$, $p < 0.001$).

Table 10: Model Summary

R	R ²	Adjusted R ²	F	p
0.721	0.520	0.512	63.84	<0.001

The multiple regression analysis in Table 11 showed that the model was statistically significant and accounted for 52.0% of the variance in the dependent variable. The strongest predictor of food safety practices was food safety knowledge followed by academic discipline and academic year. There was a significant difference between food safety behaviors among students with high and low levels of food safety knowledge and among students in health-related programs and those in non-health-related programs. On the other hand, age and gender were not found to significantly affect the food safety practices. The results indicated that educational exposure and knowledge acquisition play an important role in improving safe food handling practices among university students.

Table 11: Multiple Regression Analysis Predicting Food Safety Practices

Predictor	B	SE	β	t	p
Constant	1.142	0.217	—	5.26	<0.001
Food Safety Knowledge	0.372	0.041	0.501	9.07	<0.001
Academic Discipline	0.294	0.056	0.288	5.25	<0.001
Age	0.062	0.038	0.074	1.63	0.104
Gender	0.051	0.044	0.051	1.16	0.248
Academic Year	0.119	0.037	0.142	3.22	0.001

Hence the following hypothesis have been accepted,

H1-Health science students demonstrated significantly higher food safety knowledge than non-health science students. Accepted

H2-Health science students demonstrated significantly better food safety practices than non-health science students. Accepted

H3-Food safety knowledge positively influenced food safety practices among university students. Accepted

DISCUSSION

The problem of food safety is a serious public health concern globally, as the prevalence of unsafe food handling practices still significantly drives food borne illnesses, health care costs, and preventable deaths (Singh & Puniya, 2024). The present study compared food safety knowledge and food safety practices among two groups of university students: health and non-health students and explored the relationship between food safety knowledge and food safety practices. The results showed that the general knowledge of food safety and food safety practices of the participants were satisfactory ($M = 11.84$, $SD = 2.21$) and ($M = 3.91$, $SD = 0.67$) respectively. In addition, the health science students scored significantly higher on the knowledge measure ($M = 13.21$) than the non-health science students ($M = 10.47$; $t = 13.18$, $p < 0.001$). Similarly, the food safety practices of health science students ($M = 4.24$) were significantly higher than those of non-health science students ($M = 3.58$; $t =$

9.72, $p < 0.001$). Further, there was a strong positive correlation between food safety knowledge and food safety practices ($r = 0.643$, $p < 0.001$), suggesting that the higher the level of food safety knowledge, the higher the level of food safety practices.

The finding that students generally possessed satisfactory food safety knowledge is consistent with previous studies conducted in Saudi Arabia and other countries. A survey of university students in Saudi Arabia found that students had good knowledge of hygiene, cleanliness and cross-contamination prevention but were weak in temperature control and food storage (Alghafari & Arfaoui, 2022). The authors found that the overall level of awareness was satisfactory, but there were significant gaps in key food safety knowledge. Similarly, a survey of university students in Jordan revealed that the students had moderate food safety knowledge, with significant differences in knowledge by discipline and grade level (Abughoush et al., 2023). This indicates that the students at universities have a general knowledge of basic food safety principles, but there are still some deficiencies in food safety management.

The key result of the current study was that there was a significant difference between students from health and non-health science programs. The food safety knowledge and food safety practices for health science students were higher than for non-health students. This finding can be attributed to exposure to curricula and professional training (Al. Omoush et al., 2025). Medicine, nursing, public health, and pharmacy students are regularly taught topics like microbiology, epidemiology, nutrition, infection prevention, disease transmission and health promotion (Abegaz, 2022). This educational experience may help to raise awareness of foodborne pathogens and the risks associated with unsafe food handling practices. Students in business, engineering, information technology and humanities programs, however, are generally not formally taught about food safety in any great detail (Mkangara, 2023).

The present findings are strongly supported by recent empirical evidence. In a study conducted among the university, the students in the health-related disciplines had significantly higher scores in the knowledge subscale related to food safety compared to the other non-health related disciplines, and statistically significant differences were found between the two groups (Manochaiwuthikul et al., 2025). Similarly, a Saudi Arabian intervention study revealed that food safety and hygiene education had a significant effect on knowledge, attitudes, and practices of dietetics students, highlighting the crucial importance of formal education on food safety competence (Alghafari & Arfaoui, 2022). Students who had finished the food safety course showed significant gains in knowledge and practice scores. The results across countries are consistent, indicating that academic discipline is one of the most consistent predictors of food safety literacy among university students (F. Alves, 2024).

The other significant finding was the relationship between food safety knowledge and food safety practices. The positive correlation found in this study suggested that students' knowledge was positively associated with safer food handling practices. The results are in line with the behavioral theories that state that knowledge is a prerequisite for informed decision making and behavioral adoption (Orji, 2022). The same results were observed in other studies in Saudi Arabia, Jordan and China, which correlated the improvement in food safety knowledge with the improvement in food safety practices (Abughoush et al., 2023; Alghafari & Arfaoui, 2022).

The findings, however, indicated that there was a knowledge–practice gap, but knowledge clearly had an impact on behavior. The knowledge scores were relatively high, but the practice scores were comparatively low, suggesting that students' knowledge was not fully translated into practice. This observation reinforces the assumption of the Theory of Planned Behavior, which states that knowledge is but one of the

factors that influences behavior (Orji, 2022). Students may know the safe practices for food but are unable to follow them on a regular basis because of other priorities, personal habits, environmental factors and convenience.

There are several behavioral obstacles that could account for this disconnect. University students are typically under high academic loads, have limited time, erratic eating habits and rely on convenience foods for meals (BENJAMEN, 2025). In such situations, food safety measures might not be taken with sufficient knowledge. Students might know that they should wash their hands, refrigerate and control the temperature of food, but they don't do this consistently because they don't feel the risk is high (Asli, 2022). Also, past experience can lead to complacency and make it less likely that food safety recommendations will be followed.

The knowledge–practice gap may also be caused by environmental barriers. Students often live in shared housing, dormitory rooms or rented apartments with less than ideal kitchen facilities, refrigeration space, food storage and hygiene. Budget restrictions can also affect food buying and food storage practices (Ali et al., 2023). It has also been found that knowledge about food safety is often not effectively applied in practice due to environmental conditions and resource constraints, in line with previous studies (Ali et al., 2023; BENJAMEN, 2025). Thus, interventions aimed at knowledge acquisition alone may not be as effective unless they also target behavior and environmental factors that influence food safety practices.

The results of the present study have implications for higher education institutions. Basic food safety courses should be incorporated into general education courses that are available for all students in the university (Kavouras et al., 2022). Communication in everyday life is very important. Humans cannot avoid various forms of communication because with communication humans can build the relationships they need as social creatures. Communication is the process of conveying messages from one person to another with a specific purpose. In every activity, humans use communication. Interpersonal communication

occurs in everyday conversations between individuals(Aji,2023) Gap: A Comparative Assessment of Health and Non-Health University Students

Furthermore, hands-on training, workshops, simulations and awareness campaigns can enable students to apply theory to daily practice (F. Alves, 2024). Food handling behaviors of university students can impact the health and well-being of others and are the

behaviors of future professionals, consumers, parents and community members. Enhancing the food safety knowledge and practices during the university education could then help to decrease the prevalence of foodborne illnesses in the general population (F. Alves, 2024) (Alhuzaimi et al., 2025).

CONCLUSION

The current study showed the significance of food safety knowledge and practices among university students and revealed that the academic background was associated with knowledge and food handling practices. Health-related educational exposure positively influenced the food safety knowledge and safer food handling practices of health science students compared with their non-health science counterparts. The study also found that there is a positive correlation between the food safety knowledge and the food safety practices, suggesting that higher food safety knowledge correlated with better food safety practices. The findings however highlighted that knowledge was not always enough to ensure that safe food handling practices were practiced consistently, suggesting that there was a knowledge–practice gap among university students. In conclusion, the research helped to understand the behaviors of young adults regarding food safety and highlighted the importance of higher education in protecting public health. In order to promote safer food handling practices among students, it is recommended that universities integrate comprehensive food safety education and awareness training programs into all disciplines.

LIMITATIONS AND FUTURE RESEARCH

A major strength of the present research was the comparative design that allowed for direct comparison of food safety knowledge and practices among health and non-health university students. The study was conducted to investigate both knowledge and behavioral aspects at the same time, thus offering a holistic view of the food safety knowledge–practice gap among

young adults. In addition, the presence of students from various academic disciplines provided insights into the impact of educational background on food safety awareness and behaviors. However, the study did have some limitations, including the fact that participants were from a single university, which might make the results less generalizable to students at other universities, in other regions or educational settings. Future studies should recruit students from various universities in various regions to increase the representativeness and external validity of the results. Further, future research is needed to explore factors that could influence the translation of food safety knowledge to safe food handling practices, including food safety attitudes, risk perception, and food preparation environments.

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