Knowledge, Attitudes, and Practices Regarding Food Poisoning among Health Sciences University Students, Dammam, Saudi Arabia

Hasem Alnemari[1], Saad Alotaibi[1], Mohamed Elfatih Hassan[1], Mehwish Hussain[1], Ajiad Alhazmi[1*], Eltigani O.M. Omer[2]

[1]Department of Public Health, College of Public Health, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia
[2]Department of Community Health, College of Applied Medical Sciences, Northern Border University, Arar, Saudi Arabia

Correspondence author: ahalhazmi@iau.edu.sa

Abstract

Food poisoning is a significant global public health issue caused by consuming contaminated food. Knowledge, attitudes, and practices regarding food safety are essential in reducing food-borne diseases. This study aimed to assess knowledge, attitudes, and practices levels related to food poisoning among health sciences students, as well as to identify associated factors with the levels of knowledge, attitudes, and practices. A cross-sectional study was conducted from January to May 2023, surveying students from the Health Sciences Colleges at Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia. An online structured questionnaire was distributed through convenience sampling. Descriptive statistics, Chi-square tests, and logistic regression analysis were utilized. Of the 224 students, predominantly female (60.3%) and aged 20-21 (42.4%). Over half (59.4%) had good knowledge of food poisoning, (64.7%) showed a positive attitude, and (75.4%) demonstrated good practices. KAP levels were generally positive but varied by certain sociodemographic characteristics, particularly in the domains of knowledge and attitudes: Gender (P = 0.014), age (P = 0.004), and academic year (P = 0.014). KAP promotion campaigns are recommended to enhance awareness among students and the community thereby preventive practices.

Keywords: knowledge; attitudes; practices; food poisoning; Saudi Arabia

1. Introduction

Food poisoning (FP) is a food-borne (FB) illness that is usually infectious or toxic in nature and caused by bacteria, viruses, parasites, or chemical substances entering the body through contaminated food (CF). Many FB diseases can lead to long-lasting disability and death (WHO 2022). Researchers have identified more than 250 FB diseases (CDC 2020). Approximately, 600 million people catch illness after eating CF worldwide, and 420,000 of those people die every year, which in turn leads to a loss of 33 million healthy life years (WHO 2022); therefore, it is considered a significant public health issue that needs much attention.

FP occurs by eating or drinking CF with living organisms, e.g. bacteria, viruses, parasites, and prions, or by chemicals, e.g. heavy metals, pesticides, or toxins. The Centers for Disease Control and Prevention (CDC) identifies the key symptoms and onset times associated with various common microbial agents. For example, *Norovirus* is characterized by nausea, vomiting, diarrhea, and abdominal cramps, with symptom onset typically occurring within 12-48 hours post-exposure (this type has short incubation period, categories under food poisoning toxicities, and fever is rarely or uncommon presented in these cases. Other examples are; *Clostridium perfringens, Clostridium botulinum and Staphylococcus aureus*). *Salmonella* infection symptoms include diarrhea, fever, abdominal cramps,

and nausea, which appear 6 hours to 6 days after ingestion of contaminated food. *Escherichia coli* infection usually leads to severe abdominal cramps, bloody diarrhea, vomiting, and sometimes fever, with an onset of 3-4 days, and sometimes it can range from 1 to 10 days. *Campylobacter* species cause gastroenteritis, including a bloody diarrhea, abdominal cramps, fever, nausea, and vomiting, with symptoms manifesting 2-5 days after exposure. *Listeria monocytogenes* infection typically results in fever, muscle aches, headache, stiff neck, confusion, and gastrointestinal distress, with symptoms appearing 1-4 weeks after exposure (all previous examples; *Salmonella* infection, *Escherichia coli, Campylobacter and Listeria monocytogenes* characterized with long incubation period, categories under infectious food poisoning, and fever is differential symptom which presented in all these cases). *Clostridium perfringens* produces symptoms such as abdominal cramps and diarrhea, which typically manifest 6-24 hours post-exposure. On the other hand, *Clostridium botulinum* (botulism) infection leads to neurological symptoms such as blurred or double vision, drooping eyelids, slurred speech, and muscle weakness, with an onset of 12-36 hours, however, the onset may vary. *Staphylococcus aureus* is associated with rapid onset of nausea, vomiting, abdominal cramps, and diarrhea, it infests within 30 minutes to 8 hours after consumption. Finally, *Vibrio* species cause gastrointestinal symptoms such as diarrhea, abdominal cramps, nausea, vomiting, and sometimes fever, with a broad symptom onset window of 4-96 hours. More importantly symptoms and their onset along with the severity can vary significantly among pathogens (CDC, 2024).

According to a recent study by Mshelia *et al*. (2022), 91% of Malaysian University students claimed that bacteria is a cause of FP, 46.2% believed that viruses are a cause, and 52.4% answered that FP is caused by parasites. A study in Taif University (TU), Kingdom of Saudi Arabia, showed that 49% of the participants knew about salmonellosis, 27% knew about hepatitis infections, and 22% knew about *Escherichia coli* (Hayajneh, 2015). FP can have detrimental effects on health. Their symptoms can range from mild to severe; symptoms may last for hours or even take days to develop. In the case of *Salmonella* symptoms, could appear after 6 hours to 6 days. In *Campylobacter,* it could take 2 to 5 days, and in Norovirus, it could take 2 to 12 days after the exposure (Hussien *et al*. 2022). The symptoms that appear may differ, depending on the causative agent. According to a recent study by Mshelia *et al*. 2022), 53.8% of the participants answered that they would see a doctor, if there were symptoms of FP. More importantly, food handlers play an essential role in disseminating infections to others; they should wash their hands thoroughly after defecation and always wash their hands regularly, whether before, during, or after food preparation. According to Hussien *et al.* (2022), 85.6% of the participants believed that cleaning their hands with soap and water prior to preparing food can prevent FP, and 95% of them claimed that they clean their hands with water and soap prior to preparing food.

One study conducted using a large-scale survey among students at Gazi University in Ankara revealed that approximately 37.3% of the students were knowledgeable about food poisoning (Yasemin et al., 2013). Another study in Jordan showed that the participants had low knowledge of food poisoning as 33.9% (Hassan et al. 2014). Very few studies have examined knowledge, attitudes, and practices regarding food poisoning among university students in Saudi Arabia. One notable study from Taif University found that the overall mean score for knowledge, attitudes, and practices was 74.78%. Alarmingly, nearly 50% of the students demonstrated a lack of knowledge about food poisoning. The mean scores for the individual components were 74.95% for knowledge, 67.26% for attitudes, and 80.29% for practices. Among all those studies, there was not a study conducted in Dammam, KSA, regarding the KAP towards food poisoning (Sharif et al. 2010). This study aims to evaluate the status of KAP towards FP, and to identify associated factors with the levels of KAP among Imam Abdulrahman bin Faisal University students (IAU), Dammam, KSA.

2. Materials and methods

2.1. Study design and setting

A quantitative cross-sectional study was conducted from January to May 2023 in Dammam city, an eastern city in Saudi Arabia. To a lesser context, Imam Abdulrahman Bin Faisal University, which is a governmental university and has approximately 45,000 students in various fields including health sciences.

2.2. Participants

The sample size was determined using the following equation (n= z2pq/d2), and was calculated with a (95%) confidence interval and a (5%) margin of error. We did not have statistics regarding food poisoning among health sciences students, as a result, we utilized national statistics related to the FP from the Saudi Ministry of Health (MOH). The prevalence of food poisoning was (7.7%) (MOH, 2022). After employing this figure in the equation, a minimum of 110 individuals were required to conduct the study. However, a sample of 241 was drawn from a population of 4,200 male and female health colleges students from IAU using a convenience sampling method, representing all classes (Preparatory College, Applied Medical Science, Clinical Pharmacy, Dentistry, Medicine, Nursing, and Public Health).

2.3. Data collection methods and instruments

A questionnaire composed of 4 sections and 41 questions was made available for the students online and distributed to students via email. The first section contains the demographic data section, which consists of 7 questions (i.e. gender, age, marital status, college, academic year, and family income). The second section is the knowledge section, that contains 12 questions, dealing with FP contributing factors, causative agents, effects/complications, preventions, and high risky foods). The third section is the attitudes section, which contains 10 questions that help assessing the attitudes of the students in 5 levels ranging from strongly agree to strongly disagree. The forth section includes 12 items related to practices towards FP. Participant's score of >80% is considered good knowledge, attitude, or practice, and <80% a score is considered poor.

2.4. Data analysis

The data were coded and analyzed by SPSS statistical computer program. Descriptive statistical analysis was used to calculate general statistics, Chi-square test was used to determine whether any associations exist between variables. Furthermore, binary logistic regression analysis was employed to gain detailed figures pertaining to factors associated with the knowledge, attitudes, and practices that identified initially from the Chi-square test. The statistical significance was set at $P < 0.05$.

3. Results and discussion

3.1. Sociodemographic characteristics of the participants

Of the 224 participants, (17.4%) were from the preparatory year, females were (60.3%), age range 20-21 formed (42.4%), the majority (95.5%) were not married, the students of the College of Applied Medical Science formed (21.4%), (21.0%) from the college of Public Health, the 2nd year students were (31.3%) of the participants. Finally, a family income of 10,000-20,000 SAR participants formed (37.5%) of the total Table 1.

Most of the respondents in the study are females, aged 20-21, single, from the College of Applied Medical Science, in 2nd academic year, and a family income of 10,000-20,000 SAR. The results revealed that most of the students are females, this is similar to a study conducted in a Palestinian University (Hussien *et al*., 2022), however, it is not similar to a study in Majmaah University (Banawas, 2019). Also, the results showed that most of the students are in the 2nd academic year, on the contrary, the students in the Palestinian University were from the 4th academic yr (Hussien *et al*., 2022).

3.2. Knowledge about FP

Table 2 presents knowledge items based on respondents' answers. Overall, the majority of respondents (92.9%) identified unhygienic practices and raw or undercooked meat as contributing factors to food poisoning (FP). However, nearly one-third of respondents believed that refrigerator temperature alone is sufficient to prevent FP. The most commonly recognized causative agents of FP included bacteria (94.2%), toxins (87.5%), parasites (85.7%), and pesticides (73.7%). In terms of effects or complications, diarrhea was the most frequently cited consequence of FP (94.0%), followed by abdominal pain (90.6%) and high fever (87.1%). For FP prevention, proper cooking and hand washing were the most widely acknowledged methods. Undercooked poultry was identified as a high-risk food by

Table 1. Sociodemographic characteristics of the study participants.

Demographic characteristics		n	%
Gender	Male	89	39.7
	Female	135	60.3
Age	Up to 19	79	35.3
	20-21	95	42.4
	22 and older	50	22.3
Marital Status	Not married	214	95.5
	Married	10	4.5
College	Preparatory year	39	17.4
	Applied Medical Science	48	21.4
	Clinical Pharmacy	22	9.8
	Dentistry	14	6.3
	Medicine	35	15.6
	Nursing	19	8.5
	Public Health	47	21.0
Academic Year	First	39	17.4
	Second	70	31.3
	Third	45	20.1
	Fourth	50	22.3
	Fifth	16	7.1
	Sixth	3	1.3
	Seventh	1	0.4
Family Income (SAR)	<10,000	42	18.8
	10,000-20,000	84	37.5
	21,000-30,000	40	17.9
	31,000-40,000	19	8.5
	41,000-50,000	17	7.6
	>50,000	22	9.8

over 90% of participants, while 82.6% considered undercooked meat a high-risk food. Fruits and vegetables, dairy products, and raw eggs were considered high-risk foods by 40.6%, 52.2%, and 63.8% of respondents, respectively.

Regarding the question 'What is the cause of FP?" 39% of the students are not aware that viruses can cause FP, similarly, the students of Putra Malaysia lacked knowledge that viruses are a cause of FP (Mshelia et al., 2022), and almost half of the students lack the knowledge that prions and heavy metals can actually cause FP. The same can be said regarding the question "Which of the following is a high-risk food?" almost half of the students believe that dairy products aren't a high-risk food, on the contrary, students in the University of Putra Malaysia consider that dairy products are a high-risk food (Mshelia et al., 2022). Regarding the same question, more than half of the students believe that fruits and vegetables aren't a high-risk food, which is similar to the students of the university of Putra Malaysia (Mshelia et al. 2022). In general, when compared with other relevant studies, the results showed health college students in IAU student's percentage score of knowledge of FP to be considerably higher than the university of Putra Malaysia, Taif University, north of Jordan University students (Mshelia et al., 2022; Sharif and Al-Malki, 2010, and Osaili et al., 2011), but compared to Majmaah University, it is slightly lower (Banawas 2019).

Table 2. Knowledge of food poisoning among the students.

Knowledge items	Answer			
	Yes		No	
	n	%	n	%
Contributing factors				
Pathogenic microorganisms are significant contributing factors to FP	203	90.6	21	9.4
Unhygienic practices could cause FP	208	92.9	16	7.1
Refrigerator temperature is enough to stop FP	70	31.3	154	68.8
Well-cooking could kill the contributing microbes toward FP	200	89.3	24	10.7
Raw or half-cooked meat poses a high risk to FP	208	92.9	16	7.1
Unpeeled or unwashed fruits are risk factors for FP	205	91.5	19	8.5
Raw unwashed vegetables can lead to FP	193	86.2	31	13.8
Drinking raw milk is a highly risky contributing factor to FP	152	67.9	72	32.1
Causing agents of FP				
Bacteria	211	94.2	13	5.8
Viruses	136	60.7	88	39.3
Parasites	192	85.7	32	14.3
Prions	131	58.5	93	41.5
Heavy metals	118	52.7	106	47.3
Pesticides	165	73.7	59	26.3
Toxins	196	87.5	28	12.5
Effects/complications of FP				
Diarrhea	210	93.8	14	6.3
High fever	195	87.1	29	12.9
Vomiting	199	88.8	25	11.2
Abdominal pain	203	90.6	21	9.4
Fatigue	180	80.4	44	19.6
Dehydration	176	78.6	48	21.4
Prevention of FP				
Hand washing	214	95.5	10	4.5
Proper cooking	216	96.4	8	3.6
Separating raw and cooked food	196	87.5	28	12.5
Appropriate refrigeration	200	89.3	24	10.7
Eating in hygienic places	196	87.5	28	12.5
High risk foods				
Dairy products	117	52.2	107	47.8
Undercooked meat	202	90.2	22	9.8
Undercooked poultry	185	82.6	39	17.4
Raw eggs	143	63.8	81	36.2
Fruits and vegetables	91	40.6	133	59.4

Table 3 shows selected knowledge items and their associations with sociodemographic variables. Age, college, and academic year were significantly associated with knowledge of refrigerator temperature as a sole factor in preventing food poisoning (FP). College was also associated with knowledge of dairy products as a high-risk food for FP (P = 0.004). For raw eggs, (53.9%) of males identified it as a highly risky food compared with (70.4%) of females, and this difference is statistically significant at (P = 0.012). Additionally, family income was found to be associated with knowledge regarding the risks of fruits and vegetables.

Table 3. Selected knowledge items and their association with sociodemographic characteristics.

Sociodemographic Variable	Selected knowledge items			
	Refrigerator Temperature Prevents FP	Fruits/Vegetables as High-Risk Foods	Raw Eggs as High-Risk Foods	Raw eggs are high risk foods for FP
	Yes	Yes	Yes	Yes
Sex	-	-	-	Males: 53.9%, Females: 70.4% (P = 0.012)
Age	≤21: 35.1%, >21: 18.0% (P = 0.022)	-	-	-
College	Preparatory year: 53.8%, Applied Medical Science: 29.2%, Clinical Pharmacy: 4.5%, Dentistry: 35.7%, Medicine: 22.9%, Nursing: 10.5%, Public Health: 40.4% (P = 0.001)	-	Preparatory year: 43.6%, Applied Medical Science: 39.6%, Clinical Pharmacy: 50.0%, Dentistry: 71.4%, Medicine: 62.9%, Nursing: 26.3%, Public Health: 70.2% (P = 0.001)	-
Academic Year	1st year: 53.8%, 2nd year: 37.1%, 3rd year: 20.0%, 4th year: 18.0%, 5th-7th year: 25.0% (P = 0.002)	-	-	-
Family Income	-	<10000: 38.1%, 10000-20000: 46.4%, 21000-30000: 40.0%, 31000-40000: 15.8%, 41000-50000: 23.5%, >50000: 59.1% (P = 0.045)	-	-

3.3. Attitudes towards FP

Table 4 presents a descriptive of five-points scale related to the students attitudes. Concerning the statement of "Cooked eggs are healthier and more nutritious than raw eggs", half of the participants agreed, while the second half either was neutral or disagreed with the statement. Ninety-three percent of the students agreed that washing hands with soap and water before preparing food is necessary to prevent FP. About one-quarter of the students disagreed with the risk of FP as a result of directly eating plant products.

This study's results reveal that students are conflicted regarding the statement "Cooked eggs are healthier and more nutritious than raw eggs.", almost half of the students have a poor attitude towards this statement, similarly with the students of Majmaah university regarding the same statement (Banawas 2019).

Table 4. Attitudes towards FP among the students.

Attitudes items	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	n	%	n	%	n	%	n	%	n	%
Washing hands with soap and water before preparing food is necessary to prevent FP	177	79.0	32	14.3	14	6.3	1	0.4	0	0.0
Will make sure to always wash hands with soap before eating	148	66.1	44	19.6	10	4.5	17	7.6	5	2.2
Will make sure that where eating is clean	142	63.4	53	23.7	16	7.1	6	2.7	7	3.1
Will choose a restaurant where food handlers wear gloves when handling food	143	63.8	33	14.7	32	14.3	10	4.5	6	2.7
I care if I see food handlers smoking during food preparation and handling	134	59.8	38	17.0	30	13.4	15	6.7	7	3.1
Food handlers without clinical symptoms, can contaminate food with pathogenic microbes which cause FP	107	47.8	49	21.9	48	21.4	14	6.3	6	2.7
I will go to see a doctor, if I have any signs of FP	101	45.1	50	22.3	47	21.0	21	9.4	5	2.2
There is a risk of disease from eating unwashed vegetables and herbs picked up directly from the plant	87	38.8	51	22.8	29	12.9	26	11.6	31	13.8
FP could be prevented by rinsing vegetables/fruits with water	86	38.4	87	38.8	38	17.0	11	4.9	2	0.9
Cooked eggs are healthier and more nutritious than raw eggs	66	29.5	46	20.5	63	28.1	27	12.1	22	9.8

3.4. Practice towards FP

Table 5 highlights the practices towards FP among the study participants. The analysis of the data in this study revealed that, (96.0%) of respondents clean their hands with water and soap before preparing food while (87.9%) do the same when preparing food. Moreover, (50%) answered the statement of eating cooked food preserved for >6 hours at room temperature as (Yes). In this regard, our finding is slightly lower than Majmaah university (Banawas 2019), but slightly higher than the study conducted in Palestine (Hussien et al., 2022).

3.5 Association between sociodemographic variables and knowledge, attitudes, and practices

Table 6 shows associated factors with the scores in the three domains, knowledge, attitudes, and practices. Knowledge score was associated with college, on the other hand, attitudes are associated with sex and age. However, no significant relationship was found between practices and all studied variables. In addition, even though (51.7%) and (64.4%) from males and females accordingly showed good knowledge scores, it revealed to have a borderline p value of (0.057), hence, this difference is not significant. Similarly, with the college at (P = 0.052).

More than half of the participants (59.4%) have a good level of knowledge of FP, this is considerably higher than a study conducted in Malaysian University (Mshelia et al., 2022). The students' overall mean percentage score

Table 5. Practices towards FP among the students.

Practices items	Answer			
	Yes		No	
	n	%	n	%
Cleaning hands with water and soap prior to preparing food?	215	96.0	9	4.0
Cleaning hands with water and soap before eating?	197	87.9	27	12.1
Eating unwashed fruits/vegetables?	33	14.7	191	85.3
Rinsing fruits and vegetables with water prior to eating?	211	94.2	13	5.8
Eating raw dairy products?	45	20.1	179	79.9
Drinking unpasteurized camel's milk?	34	15.2	190	84.8
Eating raw eggs?	31	13.8	193	86.2
Eating raw poultry products?	26	11.6	198	88.4
Eating uncooked meat?	20	8.9	204	91.1
Eating half-cooked meat?	56	25.0	168	75.0
Eating cooked food preserved for >6 hours at room temperature?	112	50.0	112	50.0
Cleaning hands after touching any animal?	196	87.5	28	12.5

in knowledge is (79.7%). Such results are consistent with the study conducted at Majmaah University (Banawas 2019). As much as (64.7%) of the students have a good level of attitude towards food poisoning, this is slightly lower than a study conducted in Malaysian university (Mshelia et al., 2022). However, when comparing with Majmaah university and Taif university, it is considerably higher (Mshelia et al., 2022, Banawas 2019, and Sharif and Al-Malki, 2010).

According to the findings, (75.4%) of the students had a good level of practices regarding food poisoning. This result is similar to a study conducted in 2024 among university medical students in Vietnam (Duc Cap Minh, 2024). However, The current study's findings on good practices are significantly higher than those reported in a study of Malaysian university students (Mshelia et al., 2022). The students overall mean percentage score in the practice domain is at (83.9%). When comparing this study's result with previous studies, the results show that health college students in IAU student's percentage score of practice of food poisoning is considerably higher than Majmaah University and Taif university (Banawas 2019), (Sharif and Al-Malki 2010).

Table 7 identifies specific variables associated with good scores in knowledge and attitudes. In terms of good knowledge, 4th year students had an odds ratio of 6.549 (95% CI: 2.500-17.157) in the univariate analysis while an odds of 10.508 (95% CI: 2.690-41.051) in the multivariate analysis when compared with the 1st year students. For good attitudes, males as well as people aged 22 and over revealed to have a significant positive association both at the crude and adjusted results.

Older students such as those at the fourth year tend to have good knowledge because they are senior students and might have covered various courses pertaining to food safety. However, students at the fifth year and above results were not significant, one of the possible reasons is that the number of these students is relatively small when compared with other categories under the same variable. On the other hand, males are less likely to have good attitudes towards FP than males at an odds ratio of 0.357. It is maybe due to that females are known to prepare food as a part of their routine so that they are familiar with the food handling strategies such as hand washing, materials washing e.g., fruits and vegetables etcetera. Considering people aged to or more than 22 years, they are mature category and logically will have good attitudes when compared with the younger ones. Similar findings related to the predictors of good knowledge was obtained in a study conducted in Vietnam among medical students by (Duc Cap Minh, 2024), in which academic year played a crucial role in knowledge score whereas sex in the attitudes score. However, the effect of age was not investigated in such study. Another study conducted in Palestine revealed the same findings pertaining to the academic year with the knowledge score, and sex in addition to age with the attitude score (Hussien *et al*., 2022).

The limitations of this study include the number of stratified percentages for each college was not equal. However, the study used a methodology that hinders the ability to generalize results to overall IAU health sciences students.

Based on the results of this study, we recommend further studies to be conducted on health college students from different universities in Saudi Arabia. Another recommendation is to make use of the KAP promotion campaigns to raise the level of knowledge among students especially in terms of food refrigeration, high risk foods, raw eggs versus cooked eggs facts, and healthy practices related to the food preservation. Altogether will help students gain better knowledge, attitudes, and preventive practice measures towards food poisoning.

Table 6. Association of demographic characteristics with the knowledge, attitudes, and practices scores of FP.

Variables	Domains									
	Knowledge					Attitudes				
	Score				P-value	Score				P-value
	Good		Poor			Good		Poor		
	n	%	n	%		n	%	n	%	
Total	133	59.4	91	40.6		145	64.7	79	35.3	
Sex										
Male	46	51.7	43	48.3	0.057	49	55.1	40	44.9	0.014
Female	87	64.4	48	35.6		96	71.1	39	28.9	
Age										
21 and below	98	56.3	76	43.7	0.083	104	59.8	70	40.2	0.004
22 and over	35	70.0	15	30.0		41	82.0	9	18.0	
College										
Preparatory year	16	41.0	23	59.0	0.052	20	51.3	19	48.7	0.465
Applied Medical Science	26	54.2	22	45.8		30	62.5	18	37.5	
Pharmacy	15	68.2	7	31.8		17	77.3	5	22.7	
Dentistry	9	64.3	5	35.7		10	71.4	4	28.6	
Medicine	24	68.6	11	31.4		23	65.7	12	34.3	
Nursing	9	47.4	10	52.6		12	63.2	7	36.8	
Public Health	34	72.3	13	27.7		33	70.2	14	29.8	
Academic year										
1st year	16	41.0	23	59.0	0.002	20	51.3	19	48.7	0.280
2nd year	39	55.7	31	44.3		44	62.9	26	37.1	
3rd year	25	55.6	20	44.4		31	68.9	14	31.1	
4th year	41	82.0	9	18.0		35	70.0	15	30.0	
5th-7th year	12	60.0	8	40.0		15	75.0	5	25.0	

Table 7. Follow-up of significant associated variables with knowledge and attitudes scores.

Variables	Domain					
	Good knowledge					
	Crude results			Adjusted results		
	OR	OR (95% CI)	P-value	OR	OR (95% CI)	P-value
Academic year						
1st year	Reference			Reference		
2nd year	1.808	0.818-3.998	0.143	2.469	0.929-6.563	0.070
3rd year	1.797	0.755-4.279	0.186	2.801	0.871-9.014	0.084
4th year	6.549	2.500-17.157	<0.001	10.508	2.690-41.051	0.001
5th-7th year	2.156	0.719-6.470	0.171	2.525	0.496-12.845	0.265
Good attitudes						
Sex						
Male	0.498	0.284-0.871	0.014	0.357	0.162-0.748	0.010
Female	Reference			Reference		
Age						
21 and below	Reference			Reference		
22 and over	3.066	1.402-6.706	0.005	6.813	2.076-22.359	0.002

Abbreviations: OR: Odds Ratio; CI: Confidence Interval

4. Conclusion

In general, the overall level of KAP of the students it at a good level. The study results show that most of the students at Imam Abdulrahman bin Faisal university are aware of the causes of food poisoning. It also shows the students are aware of the symptoms that arise from food poisoning. This study also show that the students have good preventive practice towards food poisoning. This study reveals that there is a significant association between the 4th year students with the good knowledge of FP, as well as between the age and gender with the good attitudes towards FP where female students show better attitude levels than their male counterparts. Students who are 22 years and older showed better levels of attitude than those who are 21 years and below. The study recommends broadening the attitude and practice questions to encompass aspects like knowledge of cross-contamination, the importance of cooking temperatures, and specific food storage practices, which will provide a more comprehensive assessment. Our study also recommends addition of more detailed questions regarding high-risk foods, categorized by specific types, preparation methods, and storage conditions, as this will help understand nuances in participant responses and knowledge levels concerning food safety risks.

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Conflict of Interest

The authors have declared that no conflict of interest exists.

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