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Original Research Article

Assessment of Food Safety, Knowledge and Practices among Students and Staff at Zarqa University, Jordan

Wesal Y. Alraei[1]*, Thana' Y. Aljaraedah[1], Jafar M. F. El-Qudah[1], Hashem A. Abu-Harirah[2], Razan J. Rahahleh[1], Mohammad R. Alsadi[3]

[1]*Department of Diet Therapy Technology and Dietetics, Faculty of Allied Medical Sciences, Zarqa University, Al-Zarqa, Jordan.*
[2]*Department of Medical Laboratory Sciences, Faculty of Allied Medical Sciences, Zarqa University, Al-Zarqa, Jordan*
[3]*Faculty of Nursing, Zarqa University, Al-Zarqa, Jordan*

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ABSTRACT

The food safety matter is an issue that is discussed widely, but cases of food poisoning in particular, are still ongoing. This may be associated with person's level of knowledge and practices on food safety. This current study aimed to evaluate knowledge and practices levels related to food safety and to examine the relationship of some demographic characteristics with knowledge and practices levels related to food safety, as well as the relationship between food safety knowledge and practices among the students and staff members of Zarqa University, Jordan. The study was conducted via a Google form that was set up for this study. 406 subjects participated in the study, where 37.7% were males and 62.3% of the participants were females. Results showed that 90.6% and 75.1% of the participants had a good knowledge and a high level of practices related to food safety, respectively. The findings also showed a significant relationship between age, marital status and the knowledge scores related to food safety, and a significant relationship ($P< 0.05$) between age, gender, marital status and practices related to food safety ($P< 0.05$). Further, a small significant positive relationship between food safety knowledge and food safety practices was found ($P< 0.05$). Overall, it was found that there is a good knowledge level related to food safety and high food safety practice level among the participants. As a result; to achieve an advanced level of knowledge continuing education programs, are required to increase understanding food safety.

***Keywords*:** Food safety, knowledge, cross-sectional study, Food safety practices, diet quality, Jordan.

Introduction

Food safety field facing many challenges not only in developed countries but also in developing countries, moreover, food safety is a major aspect of epidemiology and community health due to its direct association with foodborne illnesses and diseases worldwide.[1,2] Food safety relates to the procedure used in preparing, handling, and storing food to reduce and prevent contamination and thus reduce foodborne illnesses.[3] World Health Organization (WHO) reported that nearly 1 out of 10 individuals worldwide gets sick after consuming contaminated food and more than 91 million people in developing countries are affected. [4] Furthermore, it is estimated that there are 1.8 deaths each year from diarrheal diseases.[5-6]

The World Health Organization has defined the factors related to foodborne illnesses including, cross-contamination from different foods, poor personal sanitation and hygiene; inadequate food cooking; improper temperature (temperature-time) during storage; and buying food from unreliable suppliers.[7]

*Corresponding author. E mail: walraei@zu.edu.jo
Tel: +962778460061

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Official Journal of Natural Product Research Group, Faculty of Pharmacy, University of Benin, Benin City, Nigeria.

Therefore, reducing the incidence of foodborne illnesses is done through safe food procurement, adequate cooking and preparation, as well as proper handling in households. [8] However, the occurrence of foodborne diseases is more common in developing countries than in developed countries as a result of lack of potable drinking water, poor hygiene, inappropriate contaminated food storage places, and insufficient food safety education. [9]

Food can become a possible cause of illness if ingredients of food are not handled, prepared, stored, and processed in a proper way. In this regard, consumer knowledge, awareness and attitude are considered the basics that predict the level of food safety as consumer behavior is highly controlled by the current food handling procedures, food knowledge and safety, and general hygiene.[10, 11]

Food safety and quality are two of the most important concerns of any university, and this makes a lot of sense given the fact that any university may have tens of thousands of students and staff. [12] Studies evaluating food safety knowledge are important for an efficient and integrated food safety education program, and are important for responsible authorities to develop food safety policies.[13, 14] In Arabic-speaking countries, including Jordan, few studies are available regarding the index of healthy eating. [15] There are no studies regarding knowledge and practice related to food safety of all groups of society in Al-Zarqa governorate, including Zarqa University students and staff members. As well as the development of an effective educational program for a particular group in the community is accomplished by revealing low-level practices and knowledge regarding food safety when addressed in the educational program.

Materials and Methods

Study design and participants

A cross-sectional study was designed and carried out to measure knowledge and practice related to food safety among students and staff members of Zarqa University, Jordan (32.05986770638822, 36.156714325842884). The study was conducted during the months of December 2022 and January 2023, and the survey was carried out randomly, representing all colleges and departments of the university. The sample size was 406 participants (students and staff members) aged from 18 to 50 years. The Ethical Committee at Zarqa University, approved the study protocol and all procedures, (79/1/21/7).

Questionnaire

In order to assess the knowledge and practices related to food safety among Zarqa University students and staff, the questionnaire contained questions that was developed according to previous studies.[5,7,14,16-17] A pilot study was performed by 10 students to obtain an initial validation of the questionnaire. The average completion time of the online Google form was five minutes. It consisted of three sections. Firstly, demographic section containing questions about age, gender, education, marital status and attendance of food safety training. Secondly, this section consisted of 22 questions regarding food safety knowledge. While the third section consisted of 15 questions regarding food safety practices. Food safety knowledge part contained questions with two possible choices; true and false, giving 0 for the incorrect answer and 1 for the correct answer. The score scale of this part varies from 0 to 22. Scores from 0 to 10 represent poor knowledge level of food safety, 11 to 18 represents good level, whereas scores from 19 to 22 represent an excellent level. In food safety practice's part, responses were rated by giving 1, 2, 3, and 4 points for "rarely", "sometimes", "often", and "always", respectively but the scale was reversed for the negative statements during record. The grading scale for this part ranges from 15 to 60. Scores on food safety practices vary from 15 to 60, scores from 15 to 29 mean a low food safety practices level, scores from 30 to 45 is considered as moderate level, while scores from 46 to 60 means a high level of practice.

Questionnaire validation and reliability

To check the validity and reliability of the questions, the questionnaire was examined by Prof. Jafar M. F. El-Qudah, Professor at the Department of Diet Therapy Technology and Dietetics, Zarqa University and Dr. Wesal Y. Alraei assistant Professor at the Department of Diet Therapy Technology and Dietetics, Zarqa University.

Statistical analysis

Statistical analyses were done using the statistical package for the social science (SPSS) statistics software version 24. Data are displayed as means and standard deviations, percentages, and frequencies. Chi squares test was used to investigate the correlation between participant's characteristics variables and knowledge of food safety and between the participant's characteristics variables and the participant's food safety practices. Also, to examine the relationship between knowledge and practice related to food safety by Bivariate correlation coefficient analysis. The level of significance was determined as $p < 0.05$.

Results and Discussion

Demographic characteristic among participants

The demographic characteristics of the study participants are shown in Table 1. Among the 406 respondents (students and staff), 153 (37.3%) were males while 253 (62.3%) were females. Most of the study participants (86.2%) were aged between 18 and 29 years. The highest percentage of respondents was students 219 (53.9%), and 83% of respondents were married. The majority of participants (81%) of the total respondents did not attend food safety training whereas 77 (19 %) of respondents attended the food safety training.

Table 1: Demographic characteristic of participants (N=406)

Characteristics	N	(%)
Gender		
Male	153	37.7
Female	253	62.3
Age (years)		
18-29	350	86.2
30-39	29	7.1
40-50	27	6.7
Educational level		
Secondary or less	36	8.9
B.Sc. student	219	53.9
B.Sc.	96	23.6
Postgraduate	55	13.5
Marital status		
Single	338	83.3
Married	68	16.7
Have attended training on food safety		
Yes	77	19
No	329	81

Table 2: Knowledge levels related to food safety among study participants

Scores	Level	n[a]	%	Mean ± SD
0-10	Poor	25	6.2	9.36 ± 0.90
11-18	Good	368	90.6	14.09 ± 1.84
19-22	Excellent	13	3.2	19.30 ± 0.48

n [a] = number of respondents

Knowledge related to food safety among study participants

Table 2. shows participant's knowledge level related to food safety (students and staff of Zarqa University). 90.6% of the study participants have a good knowledge level related to food safety with a score ranging between (11-18), and 6.2% of respondents have a poor knowledge level related to food safety with scores ranging between (0-10), while only 3.2 % of participants have an excellent level with a score that ranged between (19-22). Similar results were obtained in Saudi Arabia, where (64.9%) of the participants obtained a high score indicating a good knowledge level regarding food safety, followed by a poor level of (18.7%), while (16.6%) of the participants scored an excellent level of knowledge. [18] Furthermore, our results are compatible with what was found in Libya, where it was found that (83.4%) obtained a score indicating a good knowledge level regarding food safety, 13.9% have a poor level, while only 2.7% have an excellent knowledge level of food safety.[14] In contrast, it was reported that the knowledge level of food safety was poor in Ontario, Canada.[19]

The score mean of the participants with food safety knowledge was 13.97 which is compatible with what was obtained in Libya that it was 14.4 out of a total score of 23.[14] Moreover, similar finding was obtained by other researchers but with relatively lower values, where mean of food safety knowledge scores was 12.12 for males and 12.28 for females out of a total score of 21.[20] Knowledge about food safety among participants is presented as percentages of correct and incorrect answers given by Zarqa University students and staff, as shown in Table 3.

Practices levels regarding food safety among study participants

The practice levels related to food safety of the study participants (students and staff of Zarqa University) presented in Table 4. 75.1% of

the study participants have a high-level regarding food safety practices with scores ranging from 46-60 followed by 24.4 % of participants that have a moderate level ranging from 30-45, while only 0.5% of them have a low level related to practices of food safety with scores ranging from 15-29. Similar result was reported in a study that was published in 2022, where they found that (71.9%) of the study respondents had a high level and 28.1% of them have a moderate practices level regarding food safety in Malaysia. [20] On the contrary, a study in Libya found that (87.5 %) of study respondents had a moderate level regarding food safety practices, followed by (9.8 %) with a high level, and (2.7 %) have a poor practices level regarding food.[14]

Regarding the food safety practices scores, mean value of total practices scores was 48.14 which is in the high-level score range (46-60). A higher mean value of practices 62.5 out of a total score of 64 among the respondents in a research that was conducted in Saudi Arabia.[16] Furthermore, our results are in compatible with what was found in a research where that the practices score mean related to food safety of the participants was 45.10 and that the scores ranged between15-60 which showed a level above moderate.[17] On the other hand, a study conducted in Nigeria reported that the mean of practices level was 21.41 out of a total score of 40.[21] Table 5 shows the food safety practices among participant's that presented as percentages answered by the students and staff of Zarqa University in the questionnaire.

Association among students' characteristics and knowledge level related to food safety

The association among students' characteristics and knowledge level related to food safety (Table 6). There was a significant association between the knowledge scores related to food safety and marital status, and also between the knowledge scores related to food safety and age (P< 0.05), while there was no significant association between knowledge score regarding food safety and other characteristics investigated in this study (P> 0.05). Our result was similar to a study who reported a significant relationship between the age and knowledge score regarding food safety. [14] On the contrary, it was reported that marital status has no significant effect on knowledge level related to food safety.[3] it was also found that there is no significant effect of education levels on knowledge related to food safety and this is similar to the result of this study. [12] Further, it was mentioned that there is no significant relationship between knowledge scores related to food safety and gender in many different research that was conducted recently in different countries. [5, 17, 22-23]

Association among participant's characteristics and practices level related to food safety

The association among study participant's characteristics and practices level related to food safety is shown in Table 7. It was found that there was a significant relationship (P<0.05) between food safety practices scores and marital status, gender, and age. While it was found that there is no significant relationship (p> 0.05) between educational level and attendance of food safety training and practices level of food safety. This result was comparable to another results, where they reported that marital status, gender, and age have a positive significant impact (p < 0.05) on food safety practices.[3] Moreover, it was reported that there was a non-significant (p > 0.05) association between the practices level related to food safety and the educational level of the respondents. [18] On the contrary, different researchers had reported that gender and age had no impact on food safety practices among participants in Bulgaria and Saudi Arabia, respectively.[5, 14]

Table 3: Knowledge of food safety among study participants (N = 406)

Question/statement	Correct Answer % (N)	Incorrect Answer % (N)
Q1. Food poisoning can cause illnesses that lead to hospitalization and sometimes death	96.1 (390)	3.9 (16)
Q2. The most susceptible to food poisoning are children, pregnant women and the elderly	87.4 (355)	12.6 (51)
Q3. Consuming a bulging can content, can be poisonous and might lead to death	94.8 (385)	5.2 (21)
Q4. Ungroomed and dirty nails can simply spread bacteria	95.6 (388)	4.4 (18)
Q5. You can avoid food poisoning by cleaning up the kitchen sink drain weekly	39.2 (159)	60.8 (247)
Q6. We can avoid or reduce food poisoning from eating dirty vegetables and fruits by washing them	80 (325)	20 (81)
Q7. The maximum temperature of refrigerators for food safety should be 4°C	75.1 (305)	24.9 (101)
Q8. The recommended freezer temperature to prevent food poisoning is zero °C	44.1 (179)	55.9 (227)
Q9. Is it not possible to stock chicken, fish and meat together in the same fridge or freezer	35.7 (145)	64.3 (261)
Q10. Uncovered, abraded wounds on fingers and hands can cause cross contamination of food	89.4 (363)	10.6 (43)
Q11. Good smelling leftover food is still safe to eat	71.4 (290)	28.6 (116)
Q12. To determine how safe a food is, you must first sniff it and check the expiration date	37.7 (153)	62.3 (253)
Q13. After sneezing or coughing, you must wash your hands	95.1 (386)	4.9 (20)
To reduce and prevent food poisoning, none of these people should prepare food for other people		
Q14. A person suffering from diarrhea	47.3 (192)	52.7 (214)
Q15. A person who smokes	78.8 (320)	21.2 (86)
Q16. A person with a temporary rise in body temperature (fever)	60.1 (244)	39.9 (162)
Q17. A person with vomiting	62.3 (253)	37.7 (153)
Q18. A person suffering from a sore throat	58.6 (238)	41.4 (168)
Eating any of these foods may increase your chances of getting food poisoning		
Q19. Dry food that was kept near to the oven	43.8 (178)	56.2 (228)
Q20. Fruit salad that was kept at room temperature	43.1 (175)	56.9 (231)
Q21. Sliced melon	21.2 (86)	78.8 (320)
Q22. Canned vegetables consumed without pre-heating	40.4 (164)	59.6 (242)

N = number of total respondents

Correlation between practice scores related to food safety and knowledge scores regarding food safety among the participants

The correlation between the knowledge scores related to food safety and practices scores of food safety among study participants are shown in Table 8. The result showed a weak positive correlation between knowledge and practice related to food safety [r = 0.192, n =406, P<0.05]. Our results are in compatible with different research that were published recently. [3, 20] In addition, it was reported that there was a moderate to weak correlation between knowledge scores of food safety and practices scores of food safety in a research that was conducted in Lebanon.[24] Whereas a small non-significant positive correlation was found in a cross-sectional study conducted in Libya.[14, 17]

Table 4: Practices levels related to food safety among study participants

Scores	Level	n[a]	%	Mean ± SD
15-29	Low	2	0.5	22.5 ± 2.12
30-45	Moderate	99	24.4	41.96 ± 2.91
46-60	High	305	75.1	50.31 ± 2.71

n [a] = number of respondents

Table 5: Food safety practices among study participants (N = 406)

Practices	Never % (N)	Sometimes % (N)	Often % (N)	Always % (N)
1. Do you read date of expiration found on food packages before purchasing?	2.2 (9)	11.1(45)	20(81)	66.7(271)
2. Do you read usage and storage instructions of canned foods?	6.7(27)	25.6(104)	30.5(124)	37.2(151)
3. Do you wash and clean your hands before meals preparing at home?	1.7(7)	3(12)	14.5(59)	80.8(328)
4. Do you keep food without refrigeration for more than two hours?	27.3(111)	41.4(168)	23.4(95)	7.9(32)
5. Do you taste foods to see if they are safe?	26.4(107)	27.3(111)	20.9(85)	25.4(103)
6. Do you wash vegetables and fruits before consuming?	1.5(6)	4.2(17)	10.1(41)	84.2(342)
7. Do you wash your hands before eating in the cafeteria?	5.7(23)	14.3(58)	24.1(98)	55.9(227)
8. Do you wash knives, dishes, and cutting boards designed for raw meat cutting before cutting other foods?	1.5(6)	2.5(10)	10.1(41)	86(349)
9. Do you defrost frozen food outside the refrigerator?	2.2(9)	11.6(47)	25.9(105)	60.3(245)
10. Do you use a tissue or a paper towel to dry your hands?	2(8)	8.6(35)	22.2(90)	67.2(273)
11. Do you wash eggs before frying or cooking?	42.9(174)	22.9(93)	15(61)	19.2(78)
12. Do you use a bandage on wound and wear gloves when preparing food for other people?	5.2(21)	13.8(56)	28.1(114)	53(215)
13. Do you store meat or raw chicken away from the rest of the food?	4.4(18)	12.1(49)	21.7(88)	61.8(251)
14. Do you refrigerate perishable food in the refrigerator once you buy it?	19.7(80)	8.6(35)	17.2(70)	54.4(221)
15. Do you always eat well-done meat?	1(4)	3.4(14)	6.7(27)	88.9(361)

N = number of total respondents

Table 6: Association among participant's characteristics and knowledge level related to food safety

Variable	Total knowledge scores			P- value
	Poor	Good	Excellent	
Gender				
Male	5 (3.3%)	144(94.1)	4(2.6)	0.141
Female	20(7.9)	244(88.5)	9(3.6)	
Age				
18-29	22(6.3)	322(92)	6(1.7)	
30-39	2(6.9)	21(72.4)	6(20.7)	0.00
40-50	1(3.7)	25(92.6)	1(3.7)	
Educational level				
Secondary	2(5.6)	32(88.9)	2(5.6)	
Student	15(6.8)	198(90.4)	6(2.7)	0.833
BS.c	6(6.3)	88(91.7)	2(2.1)	
Postgraduate	2(3.6)	50(90.9)	3(5.5)	
Marital status				
Single	23(6.8)	309(91.4)	6(1.8)	0.001
Married	2(2.9)	59(86.8)	7(10.3)	

Food safety training				
Yes	4(5.2)	68(88.3)	5(6.5)	0.181
No	21(6.4)	300(91.2)	8(2.4)	

Table 7: Association among study participant's characteristics and knowledge level regarding food safety

Variable	Total practice scores			P- value
	Poor	Good	Excellent	
Gender				
Male	2(1.3)	58(37.9)	93(60.8)	0.00
Female	0(0)	41(16.2)	212(83.8)	
Age				
18-29	1(0.3)	92(26.3)	257(73.4)	
30-39	0(0.0)	4(13.8)	25(86.2)	0.028
40-50	1(3.7)	3(11.1)	23(85.2)	
Educational level				
Secondary	1(2.8)	4(11.1)	31(86.1)	
Student	0(0.0)	58(26.5)	161(73.5)	0.080
BS.c	0(0.0)	25(26.0)	71(74.0)	
Postgraduate	1(1.8)	12(21.8)	42(76.4)	
Marital status				
Single	0(0.0)	89(26.3)	249(73.7)	0.001
Married	2(2.9)	10(14.7)	56(82.4)	
Food safety training				
Yes	0(0.0)	21(27.3)	56(72.7)	0.649
No	2(0.60)	78(23.7)	249(75.7)	

Table 8: Association between participant's food safety practice and food safety knowledge scores

		Knowledge	Practices
Knowledge correlation	**pearson**	1	0.192**
	Sig. (2-tailed)		0.000
	N	406	406
Practices correlation	**pearson**	0.192**	1
	Sig. (2-tailed)	0.000	
	N	40	406

**. Correlation is significant at level 0.01 (2-tailed).

Conclusion

The results showed that the high percentage of the study participants (students and staff) of Zarqa University have a good and high level of practice and knowledge related to food safety, respectively. Moreover, there was a significant relationship between marital status and age of the respondents and knowledge scores of food safety. Furthermore, there was a significant relationship between age, gender and marital status of the participant and practices scores regarding food safety. The participants showed a good knowledge level regarding food safety, and to improve their safety knowledge to an excellent level, an effective education program is required. The outcomes of the current study could be taken into account in the design of public health interventions in Jordan.

Conflict of Interest

The authors declare no conflict of interest.

Authors' Declaration

The authors hereby declare that the work presented in this article is original and that any liability for claims relating to the content of this article will be borne by them.

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References

1. Rahmat S, Cheong CB, Abd Hamid MS. Challenges of developing countries in complying quality and enhancing standards in food industries. Procedia Soc Behav Sci. 2016; 224:445-51.
2. Sayuti Y, Albattat A, Ariffin A, Nazrin N, Silahudeen TN. Food safety knowledge, attitude and practices among management and science university students, Shah Alam. Manag. Sci. Lett. 2020; 10(4):929-36.
3. Ashkanani F, Husain W, A Al Dwairji M. Assessment of food safety and food handling practice knowledge among college of basic education students, Kuwait. J. Food Qual. 2021; 25:1-0.
4. World Health Organization. WHO estimates of the global burden of foodborne diseases: foodborne disease burden epidemiology reference group 2007-2015. WHO; 2015.
5. Stratev D, Odeyemi OA, Pavlov A, Kyuchukova R, Fatehi F, Bamidele FA. Food safety knowledge and hygiene practices among veterinary medicine students at Trakia University, Bulgaria. J. Infect. Pub. Health 2017; 10(6):778-82.

6. Kyuchukova S. The responsibility of the students with medical specialties for their own health-reality and opportunities for prevention. Trakia J. Sci. 2018; 16(1):24-8.
7. Osaili TM, Obeidat BA, Jamous DO, Bawadi HA. Food safety knowledge and practices among college female students in north of Jordan. Food Cont. 2011; 22(2):269-76.
8. Islam MN, Hassan HF, Amin MB, Madilo FK, Rahman MA, Haque MR, Aktarujjaman M, Farjana N, Roy N. Food safety and handling knowledge and practices among university students of Bangladesh: A cross-sectional study. Heli. 2022; 8(12): 11987.
9. Udo ES, Okon UE, Offor OS. Food safety knowledge and practices of students in public universities in akwa ibom state, nigeria. AKSU J. Agri. Eco., Ext. RuR. Develop. 2019; 2 (1): 51 – 57.
10. Ullah A, Ahmad W, Saeed F, Sohaib M, Shahbaz HM, Arshad MS, Anjum FM. Determinants of Food Safety Knowledge among University Students in Pakistan: A Cross-Sec. Stud. 2020.
11. Ferk CC, Calder BL, Camire ME. Assessing the food safety knowledge of university of Maine students. J. food sci. edu. 2016; 15(1):14-22.
12. Aldosky HY, Tahir BS, Yousif SA. Assessment of food safety knowledge, attitudes and its quality in student canteens at Duhok University, J. Health Saf. Environ. 2016; 3(4):626-32.
13. Boulos DN, Abouelezz NF. Food Safety Knowledge, Attitude and Self-Reported Practices among Medical Students at Ain Shams University, Egypt. Egypt. J. Community Med. 2020; 38(2).
14. Abuhlega TA. Awareness of Food Safety among 1874 Secondary Students in Tripoli city, Libya. Jordan J. Biol. Sci. 2020; 16(2):39-53.
15. El-Qudah J. Evaluation of Food Consumption, Dietary and Lifestyle Habits in a Sample of Jordanian Adults in Al-Zarqa City. Trop J Nat Prod Res. 2023; 7(2):2402-2407
16. Almansour M, Sami W, Al Rashedy OSh AR, Alfayez AS, Almarri NR. Knowledge, attitude, and practice (KAP) of food hygiene among schools students' in Majmaah city, Saudi Arabia. J Pak Med Assn. 2016; 66(4):442-6.
17. Abuhlega T, Ben Lama F, Elmejrab S. Assessment of food safety knowledge and practices in a sample of University of Tripoli students. J Acad Nutr Diet. 2020; 13(1):1-9.
18. Alsabaagh RR. Assessment of the level of knowledge and practices of food safety-Rafha-Kingdom of Saudi Arabia. Int. J. Res. Method Educ. 2020; 8(42):899-924.
19. Courtney SM, Majowicz SE, Dubin JA. Food safety knowledge of undergraduate students at a Canadian university: results of an online survey. BMC pub. health. 2016; 16:1-6.
20. Norazmir MN, Hasyimah MN, Shafurah AS, Sabariah BS, Ajau D, Norazlanshah H. Knowledge and practices on food safety among secondary school students in Johor Bahru, Johor, Malaysia. Pak J Nutr. 2012; 11(2):110.
21. Lamidi RA. Knowledge and Practices of Food safety among senior secondary school students of Ambassadors College, Ile-Ife, Nigeria. Am J Public Health. 2016; 4(1):1-3.
22. Temitayo IO. Knowledge and Practices of Food Safety among Senior Secondary School Students of International School, Obafemi Awolowo University, Ile-Ife, Nigeria. Texila Int. J. Public Health. 2017; 5(1):163-78.
23. Dehghan P, Pournaghi-Azar F, Azami-Aghdash S, Sohraby Y, Dadkhah H, Mohammadzadeh-Aghdash H. Knowledge and attitude towards health and food safety among students of Tabriz University of Medical Sciences, Tabriz, Iran. J Res. Clinic Med. 2017; 5(2):62-8.
24. Hassan HF, Dimassi H. Food safety and handling knowledge and practices of Lebanese university students. Food Cont. 2014; 40:127-33.