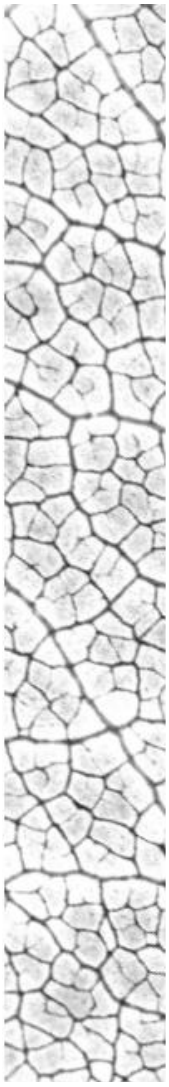

EurAsian Journal of BioSciences
Eurasia J Biosci 14, 3601-3606 (2020)

Food safety knowledge of street food vendors in downtown Amman-Jordan

Sharaf S. Omar [1*]

[1] Department of Nutrition and Food Processing, Faculty of Agricultural Technology, AL-Balqa Applied University, Salt, JORDAN
*Corresponding author: sharaf@bau.edu.jo

Abstract

Background: Foods that are prepared and sold and in the street can be defined as street food, such food still a weak point in food safety, despite street foods provide people with a convenient meal with low cost, they are associated with many food poisoning outbreaks. **Methods**: A total of 120 street vendors participated in this study during the period from May to August 2019. Structured written questionnaires were developed according to the Jordan of Food and Drug Administration street food safety code of practice (JFDA, 2007a). The questionnaire consists from two parts; the first part was designed to collect demographic data about the respondents, the second part used to evaluate food safety knowledge and attitudes of vendors. **Results:** In our study, it was found that 48.3% of food vendors had not received any food safety training courses, and 67.5% had experienced years below 3 years. The mean food safety knowledge score for street food vendors was 54 points, which indicated insufficient knowledge in food safety. street food vendors had weak understanding of food safety attitudes with total mean score 53.2±11. **Conclusions:** Street food vendor training should be given first priority to improve the safety of street food.

Keywords: street food, food safety attitude, food safety knowledge, food safety behavior, vendors, downtown Amman

Omar SS (2020) Food safety knowledge of street food vendors in downtown Amman-Jordan. Eurasia J Biosci 14: 3601-3606.

INTRODUCTION

Food and Agriculture Organization (FAO) defined the street food as “ready-to-eat foods and beverages sold and prepared by vendors or hawkers in streets or other public places” (Food and Agriculture Organization, 1988). According to this definition any food (hot or cold) prepared and sold in the roads near public or privet buildings will be considered as street food. In Jordan, as any other developing countries, street food vendors provide consumers with public meals which characterized by low cost, and more convinced even they had been prepared under very bad hygienic conditions. it was estimated that more than 2.5 billion of people over all the world consume street food daily which support low income families (Dagher, 1992).

International and local agencies emphasize the importance of food safety for public and ready to eat food, In Jordan, the Jordan Food and Drug Administration (JFDA) had established set of regulations focusing on preparing and handling food which are sold in bus it is called “Food Bus” (JFDA, 2018), and many training programs targeting “Food Bus” had been initiated on 2018 but these programs not specialized for street food vendors, most of governmental agencies such as Amman municipality and Ministry of Labor declared that all food handlers related to “Food Bus” should get training certificates before start working, while street food vendors are not involved in such regulations.

Street food became part of Jordanian cultures, and most of street food vendors provide food near historical location in downtown of Amman as Roman Theater, therefore most of the consumers are from tourists besides to local citizens. So, preparing and handling street food under aseptic conditions are one of the most important issues for JFDA and Amman municipality, On other hand, most of the food handlers had poor knowledge about food safety and don’t have awareness about food poisoning (Osaili et al., 2013). The Microbial quality of street food in Bloemfontein were investigated as well as the level of hygiene, the results revealed that street food strongly associated with out-breaks of foodborne diseases (Almanza, et al. 2014; Centers for Disease Control and Prevention. (2000). Other study showed high levels of coliform bacteria in street food and street food has been identified as a common medium for

Received: October 2019
Accepted: April 2020
Printed: September 2020

Table 1. Demographic characteristics for street food vendors

Characteristic	Number (%)	Mean
Gender		
Female	30 (25 %)	
Male	90 (75%)	
Age (years)		
18–23	45 (37.5%)	
24–29	28 (23.3%)	
30–35	22 (18.3%)	
36–41	12 (10.1%)	
42–47	8 (6.6%)	
> 47	5 (4.16%)	20.95 ± 9.5
Education		
Basic (no formal school)	31 (25.8%)	
Primary school	66 (55%)	
Secondary	15 (12.5%)	
University	8 (6.66%)	
Food safety training		
Yes	13 (51.7%)	
No	116 (48.3%)	
Work Experience (years)		
0–1	37 (30.8%)	
1–3	45 (37.5%)	
3–5	20 (16.6%)	
5–8	14 (11.6%)	
> 8	4 (3.33%)	2.75 ± 6.5

transmission of antimicrobial-resistant pathogens. (Ko, 2010; Ande, et al, 2017).

Assessment of food safety knowledge, attitude and practice for street food vendors should be considered as the first priority in governmental agencies, as well as training program and enforcing the governmental rules to improve the awareness of street food vendors.

MATERIALS AND METHODS

Study participants

A total of 120 street vendors participated in this study which were selected from different locations in downtown Amman during May to August 2019. The demographic features of vendors includes gender, age, years of experience, education and food safety training, all these data are presented in **Table 1**. We developed structured written questionnaires according to the Jordan of Food and Drug Administration street food safety code of practice (JFDA, 2007a), previous published researches were reviewed many times to select the most compatible questions within the questionnaire (Bolton et al. 2008). The questionnaire consists from two parts; the first part was designed to collect demographic data about the respondents, the second part used to evaluate food safety knowledge and attitudes of vendors, the questionnaire checklist was prepared to assess the behavior of street vendors. The questions of structured questionnaire were written in Arabic language and peer-reviewed several times and tested randomly by 30-selected street food vendors to justify the time of testing and check the clearance of the questions. depending on pilot testing method, the questionnaire was satisfied.

Food safety knowledge and attitudes questionnaire

The questionnaire was categorized into three main parts, **Tables 2** and **3** show the questionnaire details. part one was designed to cover the demographic information such as sex, age, years of experience, educational level, and training in food safety. Part two was concerned with information on employees' knowledge to assess the vendor awareness about personal hygiene, food poisoning, food with low and high risk, cleaning, sanitation, etc. the questions of this part comprised 20 close-ended questions with three answers: "yes", "no" and "do not know". Answering with "yes" was calculated one point and other options "no" and "do not know" were calculated 0 points. A scale ranged from 0 to 100 was used to assess the overall respondents' knowledge and attitude. Food vendors who recorded ≤ 12 points (≤ 60%) points were considered to have 'insufficient knowledge', while food vendors who obtained ≥ 13 points (≥ 65%) were considered to have good level of food safety knowledge. Part three of the questionnaire was concerned with food safety attitudes. which aimed to evaluate the understanding of food vendors about food safety. This section consist from 15 questions with options: "yes", "no", or "do not know". Answer with for "yes" means gained one point while answering with "no", or "do not" means 0 points. For evaluation, food vendors who answered more than 9 points (> 60%) correctly was considered to have " good attitude", while the food vendor who answered 9 points or less (≤ 60%) correctly was measured to have " bad poor attitude" (Afifi & Abushelaibi (2012). Herztman & Barrash 2007; Campos et al., 2009).

The checklist for food handling behavior

Additional checklist were designed to give more details about the behavior of street food vendors for handling of food the following points were taken in our consideration; street food description, conditions of surrounding environment, level of personal hygiene, storage conditions and licensing (Nurudeen et al., 2014; Omemu & Aderoju 2008).

2.4. Statistical analysis

the statistical package for social science (SPSS) version 11.0 were used to analyze the data obtained from the questionnaires, mean and standard deviation were used for descriptive analysis. Scores were calculated according to different demographic characteristic, as income, the educational level, age, sex, work experience, and food safety training. Data which are not distributed evenly with two categories such as gender (male or female) were analyzed using Wilcoxon rank sum test, in case of more than two categories such as age, income and educational level the Kruskal-Wallis rank sum test was used. To compare between different parameters one way ANOVA test was

Table 2. Food safety knowledge of street food handlers and demographic characteristics

Characteristic	Score (%)		Mean ±SD	Range
	≤ 12 (≤ 60%)	≥ 13 (≥ 65%)		
Gender				
Female	20 (16.6%)	10 (8.33%)	55.4±13	20–90
Male	59 (49.1%)	31(25.8%)	53.0±14	14–80
Age (years)				
18–23	30 (25%)	15 (12.5%)	53±16	29–88
24–29	18 (15%)	10 (8.3%)	55±14	28–89
30–35	15 (12.5)	7 (5.83%)	58±10	30–80
36–41	7 (5.8%)	5 (4.16%)	50±14	29–77
42–47	6 (5%)	2 (1.66%)	56±12	34–81
> 47	3 (2.5%)	2 (1.66%)	57±11	27–88
Education				
Basic (no formal school)	22 (18.3%)	9 (7.5%)	56±15	28–86
Primary school	35 (29.1%)	31 (25.83%)	58±15	26–89
Secondary	8(6.66%)	7 (5.83%)	59±11	28–82
University	3(2.5%)	5 (4.16%)	67±15	26–89
Food safety training				
Yes	4 (3.33%)	9 (7.5%)	64±16	43–89
No	96 (80%)	20 (16.6%)	44±10	22–89
Work Experience (years)				
0–1	29 (24.1 %)	8 (6.66%)	45±10	33–73
1–3	33 (27.5%)	12 (10%)	50±12	30-78
3–5	12(10%)	8 (6.66%)	55±13	28–78
5–8	10 (8.33%)	4 (3.33%)	58±16	22–94
Total	79.0 (65.7%)	41.0 (34.13%)	54.2±14	14-90

Table 3. Responses of Street food vendor's knowledge aspect Questions on Food handler's knowledge aspect

Questions on Food handler's knowledge aspect	Yes (%)	No (%)	Don't know
1) Washing hands every half hour or when necessary reduce food contamination	80 (66.6)	20 (16.6)	0 (0.0)
2)Wearing gloves is necessary when handling raw or finished product.	60 (50)	30 (25)	10 (8.3)
3) Cleaning then sanitation for food utensils and surfaces will decrease food contamination.	44 (36.6)	41 (34.1)	12 (10)
4) Reheating of previously prepared food will decrease the risk of food contamination.	52 (43.3)	39 (32.5)	9 (7.5)
5) Hot-holding of cooked food should be at 65C	32 (26.6)	28 (23.3)	40 (33.3)
6) Cold-holding of cold food should be at 5C	20 (16.6)	25 (20.3)	45 (37.5)
7) Using disposable tissues instead of clothes during preparing and handling food will decrease cross-contamination.	30 (25)	40 (33.3)	30 (25)
8) using different colors for utensils and equipments will decrease the risk of contamination	37 (30.8)	42 (35)	21 (17.5)
9)Freezing and refrigeration will kill viruses and bacteria	19 (15.8)	26 (21.6)	55 (45.8)
10) Salmonella can be transmitted by food	34 (28.3)	9 (7.5)	48 (40)
11) sanitation and disinfectant are similar to each other	77 (64.1)	12 (10)	11 (9.1)
12) The lower shelves in the refrigerator is suitable to store meat and poultry	71 (59.1)	19 (15.8)	10 (8.3)
13) Keep fresh sliced vegetables and fruits at room temperature will increase the risk of food spoilage	45 (37.5)	43 (35.8)	12 (10)
14) All food spoilage will cause food poisoning	31 (25.8)	39 (32.5)	30 (25)
15) Sanitizing is better than washing hands	77 (64.1)	11 (9.1)	2 (1.6)
16) Freezing kill parasites	43 (35.8)	13 (10.3)	70 (58.3)
17) spoiled food don't necessary cause illness	35 (29.1)	10 (8.3)	55 (45.3)
18) Food with off colors and odor will cause food poisoning	79 (65.8)	21 (17.5)	0 (0)
19) workers can carry microbes but don't show symptoms	40 (33.3)	12 (10)	48 (40)
20) we carry pathogenic microbes in our nasal cavity and throats	8 (6.6)	28 (23.3)	64 (53.3)

used. Results with 95% confidence limits (P-value < 0.05) were considered to be statistically significant.

RESULTS

Demographic characteristic

The demographic features of 120 street food vendors are summarize in **Table 1**. The rang of respondents age was from 18-47 years (the mean 20.95 ± 9.5), around 45% between 18 and 23 years; most of the street food vendors were male (90%), this is related to the Jordanian cultures and habits which prevent female from working in public areas. The educational level for street food vendors were not satisfied, around 55% from them had attained primary level; Jordan as any other developing countries most of families had low monthly income, so the members of these families especially male members left school to help their families. around 48.3% of food vendors had not received any food safety training courses. and most of them 67.5% had experienced years below 3 years.

Food safety knowledge of street food vendors

In our study, it was found that the mean food safety score for street food vendors was 54 points, which indicated insufficient knowledge in food safety. In particular, 65.7% of street food vendors had scores below 12 points, while 34.13% had scores more than 13 points, it means the number of street food vendors who had insufficient food safety knowledge is much more than those had good food safety knowledge. There was significant difference for age (p = 0.001) and gender (p = 0. 01) among street food vendors, it was noticed that the vendors aged between 18–23 years had the highest score 15 points (12.5%) in food safety knowledge, while

Table 4. Food safety attitudes of street food handlers and demographic characteristics

Characteristic	Score (%)		Mean ±SD	Range
	≤ 9 (≤ 60%)	> 9 (> 60%)		
Gender				
Female	25 (20.3.6%)	5 (4.16%)	52.4±11	30–90
Male	58 (48.3%)	32 (26.6%)	54.0±12	33–80
Age (years)				
18–23	35 (29.1%)	10 (8.33%)	50±17	25–83
24–29	20 (16.6%)	8 (6.66%)	56±13	20–86
30–35	17 (14.1)	5 (4.16%)	55±10	35–88
36–41	8 (6.66%)	4 (3.33%)	52±14	26–74
42–47	5 (4.1%)	3 (2.5%)	44±12	24–78
> 47	4 (3.33%)	1 (0.83%)	53±10	37–80
Education				
Basic (no formal school)	20 (16.6%)	11 (9.16%)	45±15	30–84
Primary school	45 (37.5%)	21 (17.5%)	52±16	16–79
Secondary	7 (5.83%)	9 (7.5%)	49±12	28–82
University	2(2.5%)	6 (4.16%)	68±15	26–89
Food safety training				
Yes	4 (3.33%)	9 (7.5%)	62±10	40–88
No	90 (75%)	26 (21.6%)	48±16	25–87
Work Experience (years)				
0–1	30 (25.0 %)	7 (5.80%)	46±10	38–83
1–3	30 (25.0%)	15 (8.33%)	55±12	30-87
3–5	12(10%)	8 (6.66%)	55±13	28–78
5–8	11 (9.16%)	3 (2.5%)	57±16	21–90
Total	83.0 (68.6%)	37.0 (30.76%)	53.2±11	30-90

those aged more than 42 years had the lowest score 2 points (1.66%).

The majority of street food vendors who had received food safety training and had high educational level gave higher food safety knowledge scores (67±15; 64±16) than those who had not received any food safety training courses or had low educational level. In general, as the educational levels increase the food safety knowledge will increase and the risk of food poisoning will decrease (Ansari-Lari et al. 2010; Bas et al., 2006). Number of experienced years play a good rule in improving food safety knowledge for food vendors, about fourteen participants had five to eight years as experience working in food service, the food safety knowledge score for them was 58±16 (Belot & James, (2009).

The majority of food venders (80%) knew that Washing hands every half hour or when necessary will reduce food contamination, also 60% of them believed that wearing gloves and mask and any other protective clothes during processing will decrease the cross contamination when handling raw or finished product. around 70% of street food vendors dont know that freezing will kill parasite, and 64% are not sure whether they carry pathogenic bacteria in their nasal cavity and throats or not. So the governmental agencies should provide training courses in food safety especially to street food vendors and everyone should be certified before start working (Codex Alimentarius Commission, 2004; Clayton& Griffith (2004).

Food safety attitudes of street food vendors

Food vendors attitudes toward food safety are found in **Table 4**. street food vendors had weak understanding of food safety attitudes with total mean score 53.2±11. where 83.0 (68.6%) had scores ≤ 9 points (≤ 60%) and 37.0 (30.76%) had scores > 9 points (> 60%). Regarding to the educational level and number of experienced years, it was clear that there is a direct relation between them and the improvement of food safety attitudes (FAO/WHO Regional Meeting on Food Safety for the Near East. 2005); Hilton, J. (2012).

There is direct relationship between positive food safety attitudes and the incidence of food poisoning. The responses of street food vendor's attitudes aspects are shown in **Table 4**. it was noticed that more than half of food vendors believe that the disposable tissues should be discarded after each use, and 70 vendors (58.3 %) considered long fingernails are good source of food borne pathogen and wearing face mask and gloves will reduce cross contamination About 37 vendors (30.8%) are not sure whether segregation between cooked and raw food during preparing and handling the items is important or not. The majority of food vendors 71 (59.1 %) were aware that the upper shelves in the refrigerator are suitable to keep cooked and highly perishable food. and they were mindful of the fact that Cover food ingredients after using will decrease cross contamination (Codex Alimentarius Commission. 1999; Mitchell et al., 2017; Sharif and Al-Malki, (2010).

The behavior of the street food Vendors

According to the environmental conditions surrounding the vending sites (**Table 6**), we are aware that such conditions will affect negatively the food safety and will increase the incidence food poisoning. So the governmental agencies should prepare suitable sites for food vending machine before giving the food vendors the license to work as street food vendors. According to the result in **Table 6**, Potable water isn't available and away from site of food preparation, also the facilities for hand washing and utensil cleaning are not available,

Table 5. Responses of Street food vendor's attitudes aspect

Questions on Food handler's attitudes aspect	Yes (%)	No (%)	Don't know
1) Long fingernails is good source of food borne pathogen	70 (58.3)	20 (16.6)	10 (8.3)
2)wearing face mask and gloves will reduce cross contamination	70 (58.3)	20 (16.6)	10 (8.3)
3) Keep food at room temperature for more than 3 hours will accelerate its spoilage .	42 (35)	43 (35.8)	12 (10)
4) thawing of frozen food should be done at refrigerator.	52 (43.3)	34 (28.3)	14 (11.6)
5) health certificate for food vendors should be rechecked every 6 months	30 (25)	30 (25)	40 (33.3)
6) Sanitizing the equipments and utensils should be done directly after finishing the mission.	45 (37.5)	25 (20.3)	20 (16.6)
7) keep all the equipments clean during storage.	30 (25)	30 (25)	40 (33.3)
8) Separate between cooked and raw food during preparing and handling them.	21 (17.5)	42 (35)	37 (30.8)
9)Post process contamination will occur easily during handling food without gloves.	55 (45.8)	26 (21.6)	19 (15.8)
10) Different foods have different shelf life.	48 (40)	9 (7.5)	34 (28.3)
11) Cover food ingredients after use will decrease cross contamination.	77 (64.1)	11 (9.1)	12 (10)
12) the upper shelves in the refrigerator is suitable to keep cooked and high perishable food.	71 (59.1)	10 (8.3)	19 (15.8)
13) Washing hands then sanitizing should be done every half hour.	45 (37.5)	12 (10)	43 (35.8)
14) don't use hand towel to dry the dish	39 (32.5)	31 (25.8)	30 (25)
15) disposable tissues should be discarded after each use.	55 (45.8)	33 (27.5)	12 (10)

Table 6. Environmental conditions surrounding the vending sites in downtown Amman

Characteristic	Yes (%)	No (%)
Environmental conditions		
1)Environment surround the vending machine is clean	33.2	66.8
2)Potable water is available and close to the site	0	100
3)Facilities for hand washing and utensil cleaning are available and close to the site	0	100
4)Facilities for disposing the wastes are available	48.4	55.8
5)The vending site is away from the rubbish	42.5	57.5
6)The vending site is away from the waste water	76.5	23.5
7) The vending site is away from animals	87.3	12.7
8) The vending site is away from flies	12	88
9) The vending site is away from toilet facilities and open drains	95	5
10) The vending site is away from bus station	40.3	59.7
Personal hygiene		
1)Food vendors washed their hands periodically	20.2	79.8
2)Food vendors sanitize their hands after handling finished product	15	85
3) Food vendors wore face mask during handling food	10	90
4)Food vendors wore gloves during handling food	30	70
4) Food vendors smoked during food preparation	88	12
5)Food vendors used utensils without cleaning along the day	66	44
6) Food endors had a license	35	65
7) Food vendors used ice box to keep food along the day	9	91

such conditions will significantly increase the cross-contamination (Martins J. 2016).

The personal hygiene of street food vendors is poor, major of food vendors (88%) smoked during food preparation, around 66% of food vendors used utensils without cleaning along the day since the facilities for cleaning as well as the potable water are not available for them. According to above discussion, the governmental agencies should develop restriction rules and make polices to control the behaviors of street food vendors (McSwane et al., 2003).

CONCLUSION

In general, the food safety knowledge of street food vendors in downtown was not satisfied, this could be associated with low level of education and absence of training in food safety. The governmental agencies should establish policies and legislation rules to control street food sectors. Assessment of food safety knowledge, attitude and practice for street food vendors should be considered as the first priority in governmental agencies, as well as training program and enforcing the governmental rules to improve the awareness of street food vendors.

ACKNOWLEDGEMENT

This research was supported by a Grant from Deanship of Scientific Research at Al-Balqa Applied University. Salt, Jordan.

REFERENCES

Afifi, H. S. & Abushelaibi, A. A. (2012). Assessment of personal hygiene knowledge, and practices in Al Ain, United Arab Emirates. Food Control, 25(1), 249 253.

Almanza, B. A, Namkung, Y., Ismail, J. A. & Nelson, D. C. (2007). Clients safe food-handling knowledge and risk behavior in a home-delivered meal program. Journal Of The American Dietetic Association, 107(5), 816 21.

Ande, O. T., Huising, J., Ojo, A. O., Azeez, J., Are, K. S., Olakojo, S. A.,... & Ojeniyi, S. O. (2017). Status of integrated soil fertility management (ISFM) in southwestern Nigeria. International Journal of Sustainable Agricultural Research, 4(2), 28-44.

Ansari-Lari, M., Soodbakhsh, S. & Lakzadeh, L. (2010). Knowledge, attitudes and practices of workers on food hygienic practices in meat processing plants in fars, Iran. Food Control, 21, 260-263.

Bas, M., Ersun, A. S. & Kivanc, G. (2006). The evaluation food businesses in Turkey. Food Control, 17, 317-322.

Belot, M. & James, J. (2009). Healthy school meals and educational outcomes. Economic & social research council. ISER working paper series. www.iser.essex.ac.uk. New Food, 5(3),80-2.

Bolton, D. J., Meally, A., Blair, I. S., McDowell, D. A., & Cowan, C. (2008). Food safety knowledge of head chefs and catering managers in Ireland. Food Control, 19, 291e300.

Campos, A., Karina, C. Cardonha, M. and Soares, P (2009). Assessment of personal hygiene and practices of food handlers in municipal public schools of Natal, Brazil. Food Control, 20,807-810.

Centers for Disease Control and Prevention. (2000). Surveillance for foodborne disease outbreak United States, 1993-1997.

Clayton, D. A. & Griffith, C. J. (2004). Observation of food safety practices in catering using notational analysis. British Food Journal, 106(3), 211-227.

Codex Alimentarius Commission, Joint FAO/WHO Standards Programme. (2003). Food hygiene: Basic texts. 2nd Edition.

Codex Alimentarius Commission. 1999. Recommended international code of practice, general principles of food hygiene. Codex Alimentarius Commission, Food and Agriculture Organization and the World Health Organization, Geneva.

Dagher, S. 1992. The traditional foods of the Near East, p. 171–205. In Food and nutrition paper no. 50. Food and Agriculture Organization regional office of the Near East, Cairo, Egypt. (In Arabic.)

FAO/WHO Regional Meeting on Food Safety for the Near East. 2005. “Practical Actions to Promote Food Safety”. Final report. 5-6 March. Amman, Jordan.

Food and Agriculture Organization. 1988. Street foods. Report of an FAO expert consultation, Jogjakarta, Indonesia, 5 to 9 December 1988. Food and nutrition paper no. 46. Food and Agriculture Organization, Rome

Herztman, J. & Barrash, D. (2007). An assessment of food safety knowledge and practices of catering employees. British Food Journal, 109(7), 562-576.

Hilton, J. (2012). Reducing foodborne disease: Meeting the targets. Nutrition & Food Science, 32(2), 46-50.

JFDA. (2007a). Street food safety code of practice (JFDa, 2007). Administration JF DA (ed.). Amman: JFDA.

JFDA. (2018). bus food safety code of practice 2018. Administration JFDA (ed.). Amman: JFDA.

Ko, W. H. (2010). Evaluating food safety perceptions and practices for agricultural food handler. Food Control, 21, 450-455.

Martins J. 2016.Socio-economic and hygiene features of street food vending in Gauteng. SAJCN, 19 (1).

McSwane, D., Rue, N., & Linton, R. (2003). Essentials of food safety and sanitation. Third Edition. Pearson Education. New Jersey.

Mitchell, R. E., Fraser, A. M. & Bearon, L. B. (2017). Preventing food-borne illness in food service establishments: Broadening the framework for intervention and research on safe food handling behaviors. International of Environmental Health Research, 17(1), 9-24.

Nurudeen A, Lawal O, Ajayi A. 2014. A survey of hygiene and sanitary practices of street food vendors in the Central State of Northern Nigeria; 6 (5): 174-181.

Omemu, A. M., & Aderoju, S. T. (2008). Food safety knowledge and practices of street food vendors in the city of Abeokuta, Nigeria. Food Control, 19, 396e402.

Osaili, T. M., Obeidat, B. A., Abu Jamous, D. O. & Bawadi, H. A. (2013). Food safety knowledge and practices among college female students in North Of Jordan. Food Control, 22(2), 269 276.

Sharif, L and Al-Malki, T. (2010). Knowledge, Attitude and Practice of Taif University Students on Food Poisoning. Food Control, 21, 55-60.