



## Knowledge of Food Safety Rules among Women and Their Perception and Attitude Towards Their Application in the Celebration Halls in Tripoli, Libya

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Received: 24 December 2021/ Accepted: 14 July 2022

Doi: <https://doi.org/10.54172/mjsc.v37i3.581>

**Abstract:** The government through its respective institutions and centers is responsible for protecting the consumers by assuring the safety of food supplies until consumption. The study sought to assess the knowledge of food safety, discover the incidence of food poisoning, evaluate the perception of meals and waitresses, and know the attitude towards the meals served among a sample of women who attended celebrations in the celebration halls in Tripoli city, Libya. A total of 410 women were selected randomly and data were collected through face-to-face interviews using questionnaire forms. A chi-square test was used for independence. The majority of the participants (41.7%) were between the age of 18 and 25 years. The results showed that the majority of the participants (95.4%) had a good level of food safety knowledge. Also, the results showed a significant association between age and occupation of the participants and food safety knowledge scores ( $P < 0.05$ ). Twenty-four percent of the participants reported that they were exposed to food poisoning after eating dinner in the celebration halls. Only 15% of women always washed their hands before eating the meal in the celebration halls. A significant association was found between hand washing practice and food poisoning exposure ( $p < 0.05$ ). Only 22.4% of participants agreed that the food served inside the celebration hall was safe. It is very clear that the meals served at celebration halls need to be regulated by the respective authorities. In addition, the respective public authorities should be working hard to eliminate the negative perception of individuals about food safety practices in celebration halls.

**Keywords:** Food Safety; Food poisoning; Knowledge; Women; Celebrations hall.

### INTRODUCTION

Governments are intensifying their efforts to raise the level of food safety and to make their citizens aware of the importance of food safety for their health and the state economy. Food safety incidents and consequent consumer notification and disposal of food from shelves, as well as compensation for lawsuits, cost the US economy about \$ 7 billion

(Hussain & Dawson, 2013).

Food, in addition to water and air, is the priority for human life on the earth. However, food is also a source of different hazards causing disease and death (El Sheikha, 2015). Food-borne diseases have been defined as any infectious or toxic disease caused by food consumption (WHO, 2008). The percentage of people in developed countries who

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are exposed to food-borne diseases caused by pathogenic microorganisms is up to 30% per year and is likely to be higher in developing countries (WHO, 2002). The factors responsible for food-borne disease outbreaks which have been mentioned in the literature were cross-contamination, improper cooling, improper storage or holding foods at room temperature for long-durations, contaminated raw food/ingredient, and poor personal hygiene by persons who handle food, despite continuing progress made in food quality and safety (Angelillo et al., 2000).

Unsafe food containing microorganisms such as bacteria, viruses, parasites, or harmful chemicals causes more than 200 diseases and can lead to health problems ranging from diarrhea to cancer (WHO, 2015). There are many reasons making food unsafe such as improper practices of food handlers. Food handlers have a major role in maintaining food safety at all stages of food handling, such as production, processing, storage, and preparation. Mishandling and lack of compliance with food hygiene measures by food handlers can lead to food contamination and thus health and economic problems (Sousa, 2008).

They were the cause of approximately 10 to 20% of outbreaks of food-borne diseases (Yasuda, 2010). Most of the problems of food-borne diseases could be controlled by the efforts of the food handlers, whether in a processing plant, a restaurant, or otherwise (Sousa, 2008). Time, temperature abuse, inadequate heat treatment, and unhygienic handling were causes of an outbreak among guests at a wedding ceremony (Aljouidi et al., 2010). At parties in Libya, meals are cooked on a large scale. Cooking large amounts of food at the same time requires many food handlers. Employing a large number of food handlers increases the chances of contamination of the final food and the spread of food-borne diseases, causing health and economic burdens on the countries (Akabanda et al., 2017).

According to the available information, there have been no studies on the level of knowledge of food safety for women attending celebrations in commercial halls. In recent decades, Libyan families have been conducting celebrations of various kinds, such as birthday celebrations and wedding ceremonies, etc., in commercial halls instead of doing them in homes and using ready-made meals rather than home-cooked ones. However, this cultural advancement was not accompanied by a strategy by the respective authorities for monitoring and regulating commercial kitchens preparing meals for these celebrations, as well as controlling the serving of meals in the halls in terms of the application of good handling practices and the availability of appropriate conditions in meal handlers. In addition to the lack of documentation of food poisoning occurring in Libyan society, especially in celebration halls, despite the occurrence of food poisoning cases inside them.

Therefore, the study sought to assess the knowledge of food safety, discover the incidence of food poisoning, evaluate the perception of meals and waitresses, and know the attitude towards the meals served among a sample of Libyan women who attended celebrations in the celebration halls in the city of Tripoli.

## MATERIALS AND METHODS

**Experiment design and data collection:** Four hundred and ten women who attend parties in celebration halls were selected randomly from different areas in Tripoli city, Libya. The study was carried out in the period from January to June 2019. A face-to-face questionnaire was used in the Arabic language containing three demographic questions, 11 questions about the knowledge of food safety, four questions about exposure to food poisoning, 12 questions about the perception of meals and waitresses, and nine questions about the attitude towards meals safety. The interview did not exceed 20

minutes. Knowledge scores were calculated by giving one point for the correct answer and 0 points for the incorrect answer. Food safety knowledge scores range from 0 to 11; 0 indicates that there is no correct answer to any question, while 11 indicates that all answers are correct. Results from 0 to 5 represent poor knowledge of food safety, while 6 to 11 represent good knowledge of food safety.

**Pilot study:** The Primary study was conducted by presenting questionnaire forms to 27 women to ensure the validity and reliability of the questionnaire.

**Statistical analysis:** Data were analyzed using SPSS (Statistical Package Social Sciences, version 22). Descriptive statistics were conducted to determine frequencies, percentages, mean and standard deviation. Chi-square test was used to determine the association between variables of sample demographic characteristics and food safety knowledge scores of the participants and between variables of sample demographic characteristics and exposure to food poisoning of the participants, and also between variables of sample demographic characteristics and handwashing practice of the participants. The association between food safety knowledge scores and exposure to food poisoning, as well as the association between handwashing practice and exposure to food poisoning were determined. A significance level of  $P \leq 0.05$  was used to establish significance.

## RESULTS

**Demographic characteristics of a study sample:** Table (1) presents the demographic characteristics of the sample. Approximately 42% of the participants in this study were between the ages of 18 and 25, and a high percentage of them (44.4%) were employees. The highest educational level of the participants (69.8%) was a university education.

**Table (1).** Demographic characteristics of a sample of women in Tripoli, Libya (N= 410).

Demographic characteristics	Category	Number of participants	% of participants
<b>Age</b>			
	18- 25	171	41.7
	26-35	119	29.0
	36-45	73	17.8
	46-55	36	8.8
	>55	11	2.7
<b>Occupation</b>			
	Student	142	34.6
	Laborer	37	9
	Employee	182	44.4
	Retired	2	0.5
	Housewife	47	11.5
<b>Education level</b>			
	Uneducated	3	0.73
	Basic education	10	2.43
	Secondary education	67	16.34

**Knowledge of food safety:** The results show that the majority of the participants have a good level of food safety knowledge scoring between 6-11 of the total score, with a percentage of 95.4% (391). Only 4.6% (19) of participants have a poor level of food safety knowledge, with total food knowledge scores between 0-5, as in Table (2). The mean of the food safety knowledge score of the participants was calculated to be  $8.5 \pm 0.71$ , with the scores ranging from 0 -11.

**Table (2).** Food safety knowledge levels among the women's sample in Tripoli, Libya (N=410)

Scores	Level	N*	%
0 –5	Poor	19	4.6
6 – 11	Good	391	95.4
Total	-	410	100

\*N = number of participants

Table (3) presents the knowledge of a sample of women in Tripoli, Libya regarding food safety. Results show that the majority of the participants (83.2%) were aware that food poisoning occurs due to pathogenic microorganisms. More than 80% of participants in

this study are aware of the correct answer that food poisoning can occur by spraying insecticides at meal preparation locations. A total of 62.0% of the participants were knowledgeable that food poisoning could occur due to the detergents used in the kitchen. More than 68 % of the participants knew that food poisoning could occur due to cookware used to cook meals and packages used to store them in the freezer. A high percentage of the sample (89%) were aware that food poisoning causes serious illnesses that end in the hospital and sometimes in death. More than 64 % of women participating in the study correctly answered that the number of pathogenic bacteria rapidly increases at room temperature. More than half of the partici-

pants (52.0 %) knew that any food must be disposed of if left at room temperature for more than two hours or one hour at a temperature higher than 32 °C. A high percentage of participants (91.0%) realized that food poisoning could cause health and economic effects on society. Over eighty-six percent of participants were aware that children, pregnant women, and the elderly are likely more prone to the risk of food poisoning. The results showed that the majority of the participants (94.4%) gave correct answers that you should always wash your hands after coughing or sneezing. The results also showed that 86% were aware that handwashing with water only is not sufficient to remove the bacteria before touching the food.

**Table (3).** Food safety knowledge among women's sample in Tripoli, Libya (N=410).

Statement	Correct answer N* (%)	Incorrect answer N* (%)	Do not know N* (%)
Food poisoning occurs due to pathogenic microorganisms.	341 (83.2)	12 (2.9)	57 (13.9)
Food poisoning can occur by spraying insecticides at meal preparation locations.	338 (82.4)	32 (7.8)	40 (9.8)
Food poisoning can occur due to the detergents used in the kitchen.	254 (62.0)	100 (24.4)	56 (13.6)
Food poisoning can occur due to cookware used to cook meals and packages used to store them in the freezer.	280 (68.3)	79 (19.3)	51 (12.4)
Food poisoning causes serious illnesses that end in the hospital and sometimes in death.	365 (89.0)	21 (5.1)	24 (5.9)
The number of pathogenic bacteria rapidly increases at room temperature.	264 (64.4)	52 (12.7)	94 (22.9)
Any food must be disposed of if left at room temperature for more than two hours or one hour at a temperature higher than 32C.	215 (52.0)	80 (20.0)	115 (28.0)
Food poisoning can cause health and economic effects on society.	373 (91.0)	8 (2.0)	29 (7.1)
Children and pregnant women and the elderly are likely more prone to the risk of food poisoning.	356 (86.8)	30 (7.3)	24 (5.9)
You should always wash your hands after coughing or sneezing.	387 (94.4)	7 (1.7)	16 (3.9)
Handwashing with only water is sufficient to remove the bacteria before touching the food.	313 (76.3)	86 (21.0)	11 (2.7)

\*N = number of participants.

The association between demographic characteristics and level of food safety knowledge among women was examined by using the X<sup>2</sup> chi-square test. The results showed (Table 4) that there was a significant association be-

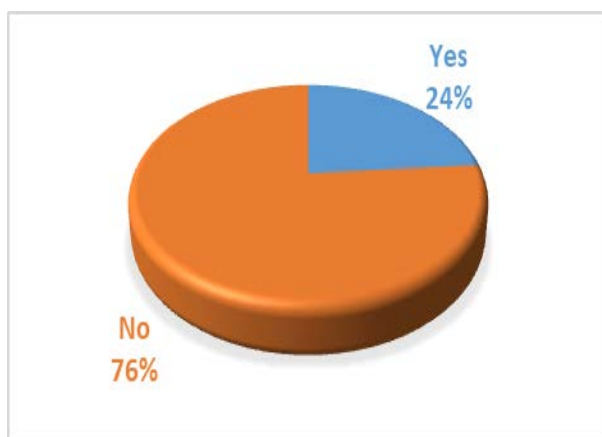
tween food safety knowledge scores and age and also between food safety knowledge scores and occupation (P<0.05). The findings also disclosed there was no statistically significant association between food safety

knowledge scores and education level ( $P > 0.05$ ).

**Table (4).** Association between demographic characteristics and food safety knowledge level among the women's sample in Tripoli, Libya (N= 410).

Variable	Total Knowledge scores		P-value
	Poor	Good	
Age			
18- 25	10	161	0.012
26-35	3	116	
36-45	1	72	
46-55	5	31	
>55	0	11	
Occupation			
Student	5	137	0.012
Laborer	5	32	
Employee	5	177	
Retired	0	2	
Housewife	4	43	
Education level			
Uneducated	0	3	0.169
Basic education	0	10	
Secondary education	6	61	
University education	13	273	
High education	0	44	

**Exposure to food poisoning:** The results in Figure (1) showed that 24% of the participants in the study reported that they were exposed to food poisoning after dinner in the celebration halls.



**Fig (1).** Exposure to Food poisoning as reported by the women's sample in Tripoli, Libya (N= 410).

Table (5) shows the symptoms of food poi-

soning reported by the women sampled in this study. More than half of participants who were exposed to food poisoning said that they developed diarrhea with other common symptoms, including vomiting (36%), abdominal pain (36%), nausea (25%), and fever (7%). While 20% of participants suffered from all the symptoms previously mentioned.

**Table (5).** Symptoms of food poisoning were reported by the women's sample in Tripoli, Libya (N=97).

Symptoms	Number of participants	% of participants
Vomiting	36	37.1
Nausea	25	25.8
Abdominal pain	36	37.1
Diarrhea	51	52.6
Fever	7	7.2
All mentioned above	20	20.6

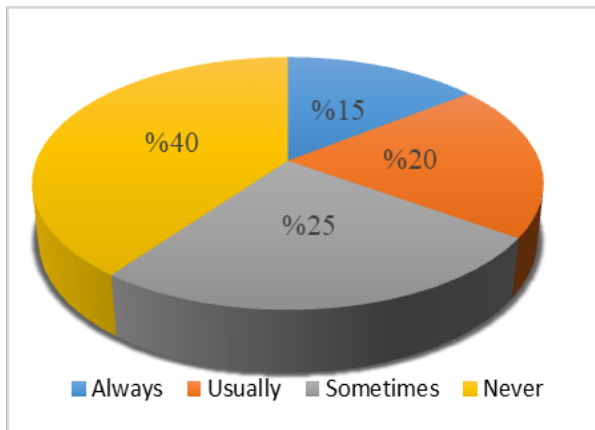
Table (6) displays the type of food that likely caused food poisoning as mentioned by the women's sample. More than half, 54.6% and 51.5% of the participants, reported that chicken and meat were the likely food that caused poisoning, respectively. While 8.2% and 4.1% of the sample mentioned vegetables and rice, respectively. The statistical results showed an insignificant association between exposure to food poisoning of the participants and age ( $P=0.916$ ), occupation ( $P=0.541$ ), and education level ( $P=0.348$ ).

**Table (6).** The type of food likely caused poisoning as mentioned by women's sample in Tripoli, Libya (N=97).

Food	Number of participants	% of participants
Chicken	53	54.6
Meat	50	51.5
Vegetable	8	8.2
Rice	4	4.1
Others	3	3.1
Do not know	7	7.2

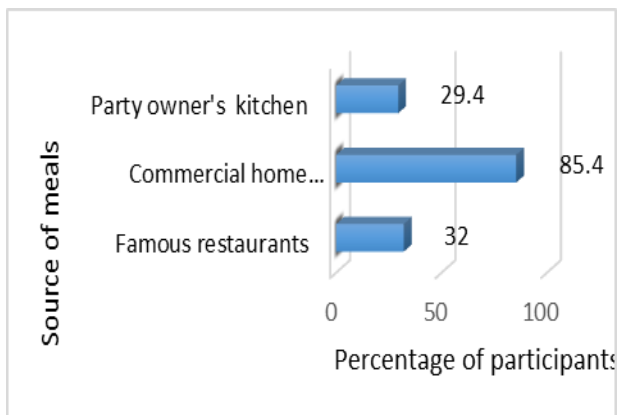
Figure (2) illustrates the practice of hand-washing of participants in the study before eating the meal in the celebration halls. Only 15% of women washed their hands always

before eating the meal in the celebration halls while 40% of them did not wash their hands. Using a chi-square test, there was no significant association ( $P > 0.05$ ) between the hand-washing practice of participants and age ( $P=0.495$ ), occupation ( $P=0.178$ ), and education level ( $P=0.651$ ). Also, the statistical results showed that there was a significant association ( $P < 0.05$ ) between hand wash practice and exposure to food poisoning ( $P=0.007$ ).



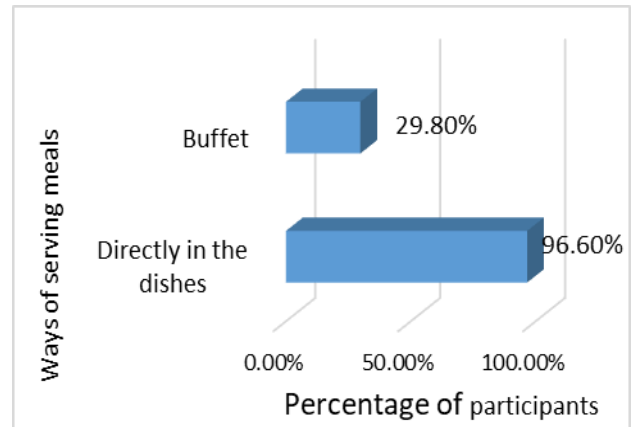
**Fig (2).** Washing hands practice before eating the meal in the celebration halls among the women's sample in Tripoli, Libya (N= 410).

**Perception of meals and waitresses:** Figure (3) shows a source of meals served at celebration halls as reported by participants. About 85% of participants indicated that commercial home kitchens were the source of meals at celebration halls.



**Fig. 3.** Source of meals served at the celebration halls (N= 410).

Figure (4) shows how meals are served in the celebration halls as reported by participants. The responses by the women in the study showed that direct serving within dishes was the usual way of serving meals in the celebration halls (96.6%) while using a buffet was lower (29.8%).



**Fig (4).** Ways of serving meals at celebration halls (N= 410).

As shown in Table (7), more than 13 % of the participants knew that the meals served in the halls were frozen and not fresh. In this study, 14.6% of participants knew that meals were heated sufficiently and appropriately before serving. A low percentage (7.8%) of the participants knew that meals were heated directly without thawing them. Also, a low percentage of a sample (6.1%) knew how much time that the meal is left after heating before serving it in the hall. More than the third (35.4%) of participants confirmed that in the case of a buffet, hot food was available on food warmers to keep it hot. Less than a quarter (21.7%) of participants also confirmed that in the case of the buffet, the cold food was inside bowls with ice to keep it cool. The majority of participants (96.7%) responded that they knew if dishes were washed before using or not. Of all participants, around 64% reported that the waitresses were wearing a special uniform. While 28.5% of participants affirmed that the waitresses wore headcovers. A low percentage (18.5%) mentioned that the waitresses wear gloves.

**Table (7).** Women's perception of meals and waitresses at the celebration halls in Tripoli, Libya (N=410).

Statement	Yes N*(%)	No N*(%)	Some-times N*(%)	Do not know N*(%)
Meals served in the halls were frozen and not fresh.	55 (13.4)	71 (17.3)	138 (33.7)	146 (35.6)
Meals were heated sufficiently and appropriately before serving.	60 (14.6)	106 (25.9)	170 (41.5)	74 (18.0)
Meals heated directly without thawing them.	32 (7.8)	62 (15.1)	95 (23.2)	221 (53.9)
You knew how much time the meal left after heating before serving it in the hall.	25 (6.1)	146 (35.6)	53 (12.9)	186 (45.4)
In the case of a buffet, hot food was available on food warmers to keep it hot.	145 (35.4)	81 (19.7)	102 (24.9)	82 (20.0)
In the case of a buffet, the cold food was inside bowls with ice to keep it cool.	89 (21.7)	120 (29.3)	99 (24.1)	102 (24.9)
You know if dishes were washed before using or not.	78 (19.0)	119 (29.0)	48 (12.0)	165 (40.0)
Waitresses wore a special uniform.	262 (63.9)	35 (8.5)	97 (23.7)	16 (3.9)
Waitresses wore a head cover.	117 (28.5)	124 (30.0)	142 (35.0)	27 (6.50)
Waitresses wore gloves.	76 (18.5)	188 (45.9)	109 (26.6)	37 (9.0)

\*N = number of participants

**Attitude towards meal safety:** Table (8) illustrates the attitude of a sample of women towards meals safety served in celebration halls. The results show that only 22.4% of participants agreed that the food served inside the celebration halls is safe. Also, 21.5% of participants agreed that the meal served in the celebration halls is regulated by the respective authorities in the country. More than a quarter of participants (26.1%) agreed that the kitchens inside the celebration halls are monitored by the competent authorities in the country. A high percentage of participants (71.0%) agreed that the celebration owner is responsible for the safety of the meal served inside the celebration halls. While more than half of the participants (57.0%) agreed that the celebration hall owner is responsible for the safety of the meal served in the hall. From the answers above, participants need to be educated about laws relating to food safety responsibility. Less than the third (32.0%) of participants agreed that the celebration hall owner employs workers in the kitchens and waitresses without health certificates. Approximately 43 % of the tested sample agreed

that commercial kitchens have licenses to prepare ready-to-eat meals for celebrations. It should also be noted that 44.0 % of participants agreed that private commercial kitchens owners use temporary laborers. Also, 30.5% of the participants agreed that private commercial kitchens use workers without health certificates.

**Table 8.** Attitude towards meals safety served in celebration halls among women's sample in Tripoli, Libya (N=410).

Statement	Agree	Neutral	Disagree
Food served inside the celebration hall is safe.	92 (22.4)	241 (58.8)	77 (18.8)
Meal served in the celebration hall is controlled by the competent authorities in the country.	88 (21.5)	105 (25.6)	217 (52.9)
The Kitchens inside the celebration hall are monitored by the competent authorities in the state.	107 (26.1)	89 (21.7)	214 (52.2)
The celebration owner is responsible for the safety of the meal served inside the celebration hall.	291 (71.0)	47 (11.4)	72 (17.6)
The celebration hall owner is responsible for the safety of the meal served in the hall.	233 (57.0)	69 (17.0)	108 (26.0)
The celebration hall owner employs workers in kitchens and waitresses without health certificates.	131 (32.0)	120 (29.0)	159 (39.0)
Commercial kitchens have licenses to prepare ready-to-eat meals for celebrations.	175 (42.7)	126 (30.7)	109 (26.6)
Private commercial kitchens owners use temporary laborers.	181 (44.0)	142 (35.0)	87 (21.0)
Private commercial kitchens use workers without health certificates.	125 (30.5)	120 (29.3)	165 (40.2)

\*N = number of participants.

## DISCUSSION

**Knowledge of food safety:** The study aimed to assess the knowledge of food safety, discover the incidence of food poisoning, evaluate the perception of meals and waitresses, and to know the attitude towards the meals served among a sample of women who attended celebrations in the celebration halls in Tripoli city, Libya. The results showed that the majority of the participants (95.4%) had a good level of food safety knowledge. Similarly, 77.7% and 14.1% of university students who participated in the study had a good and excellent level of food safety knowledge, respectively (Abuhlega et al., 2020).

The mean of the food safety knowledge score of the participants was  $8.5 \pm 0.71$ , with the scores ranging from 0 -11. While the mean of the food safety knowledge score of the university students was a little lower ( $20.14 \pm 3.761$  with scores ranging from 0 -29) (Abuhlega et al., 2020). The results of this study showed that the majority of the participants (83.2%) were aware that food poisoning occurs due to pathogenic microorganisms. Similarly, a high percentage of the

sample of schools' boys (69.1%) were aware that food poisoning occurs due to pathogenic microorganisms (Almansour et al., 2016). While only 39.9% of the sample of consumers were aware of the role played by microorganisms (Langiano et al., 2012). Food poisoning is caused by the consumption of food or water contaminated with bacteria, viruses, or toxins of a biochemical or chemical nature such as ciguatera or pesticides. Biochemical or chemical agents in food can cause transient neurological symptoms or lead to death (CHP, 2017). More than 80% of participants in this study are aware of the correct answer that food poisoning can occur by spraying insecticides at meal preparation locations. A total of 62.0% of the participants were knowledgeable that food poisoning could occur due to the detergents used in the kitchen. More than 68 % of the participants knew that food poisoning could occur due to cookware used to cook meals and packages used to store them in the freezer. According to the information available, there are no studies carried out about the individuals' knowledge of the previous three questions. The result of this study also showed that a high percentage of the sample (89%) were aware that food



poisoning causes serious illnesses that end in the hospital and sometimes in death. Similarly, most of the food handlers and dietetic students (89.6%) knew that food poisoning can lead to death (Yusof et al., 2018). Also, 70.7% of the sample gave a correct answer to a similar question (Almansour et al., 2016). More than 64 % of women participating in the study correctly answered that the number of pathogenic bacteria rapidly increases at room temperature. Similarly, 75% of the U.S. department of agriculture's expanded food and nutrition education Program participants gave a correct answer to a question that bacteria responsible for causing foodborne illness grows at room temperature (Meer & Misner, 2000).

While only 56.3% of participants in the study conducted among school students correctly answered the same question (Meer & Misner, 2000). More than half of the participants (52.0 %) knew that any food must be disposed of if left at room temperature for more than two hours or one hour at a temperature higher than 32C. In a study carried out by (Association & Foods, 1999), 69% of a sample were knowledgeable that keeping food at room temperature or contamination of food after cooking causes food poisoning. A high percentage of participants (91.0%) realized that food poisoning could cause health and economic effects on society. Similarly, 97.8% of the sample of veterinary medicine students also realized the previous fact (Stratev et al., 2017). In their study, over eighty-six percent of participants were aware that children, pregnant women, and the elderly are more likely prone to the risk of food poisoning. Similarly, a high percentage of correct answers (95.6%) was also found among a sample of veterinary medicine students (Stratev et al., 2017), while approximately 70% of respondents of institutional food handlers knew that the elderly are likely more prone to the risk of food poisoning (Akabanda et al., 2017). In the current study, the results showed that the majority of the participants (94.4%) gave correct answers

that you should always wash your hands after coughing or sneezing. Similarly, 92.0 % of a sample of school students gave a correct answer to a similar question (KojoPrah et al., 2017). In this study, the results also showed that 86 % were aware that handwashing with water only is not sufficient to remove the bacteria before touching the food. Similarly, 78.2% of a sample of school students gave correct answers to a similar question (Norazmir et al., 2012), while the percentage was lower (45.4%) among a sample in a study conducted on the same category (KojoPrah et al., 2017). The outcome of this study also showed that a significant association was found between food safety knowledge scores and age and also between food safety knowledge scores and occupation, while there was no statistically significant association between food safety knowledge scores and education level. On the contrary, in the study conducted on a sample of mothers, a significant association was found between food safety knowledge and the education level of mothers (Ayaz et al., 2018).

**Exposure to food poisoning:** The result of this study showed that 24% of the participants reported that they were exposed to food poisoning after having dinner in the celebration halls. Outbreaks of food poisoning at wedding parties or other parties are not rare events and occur in developing and developed countries (Al-Bassam et al., 2001; Ayaz et al., 2018; Gaulin et al., 2002; RE, 1996) The result also showed that more than half of the participants who were exposed to food poisoning mentioned they developed diarrhea with other common symptoms, including vomiting (36%), abdominal pain (36%), nausea (25%), and fever (7%), while 20% of participants suffered from all the symptoms previously mentioned. Similar symptoms were reported by (Jiang et al. 2003), who found that 85 of the 280 guests (45 males and 40 females) developed symptoms of food poisoning after eating lunch at the wedding party, including watery diarrhea (100.0%), ab-

dominal pain (83.5%), vomiting (32.9%), nausea (29.4%), dizziness (16.5%), and fever (10.6%). In a similar study, it was mentioned that 88 guests became sick after having a meal at the wedding ceremony (21.6% males and 78.4% females) and they developed diarrhea, with other common symptoms of colicky abdominal pain (94.3%), fever (86.4%), vomiting (64.8%), headache (48.9%), and nausea (30.7%) (Aljoudi et al., 2010).

In this study, more than half, 54.6% and 51.5% of the participants mentioned that chicken and meat were the likely food that caused poisoning, respectively, while 8.2% and 4.1% of participants reported that vegetables and rice were the cause, respectively. In another study, the cold dish (wine preserved chicken, slices of pork tongue, slices of abalone, shrimp balls, and shellfish) was considered a likely cause of the food poisoning outbreak (Jiang et al., 2003), while others reported that the cause of food poisoning at the wedding party was eating meat and rice contaminated with salmonella (Aljoudi et al., 2010). The results of this study also showed that only 15% of women always washed their hands before eating the meal in the celebration halls. The outcome of this study also showed that there was a significant association between handwashing practice and exposure to food poisoning of the participants. The preparation and eating of food with contaminated hands cause transmission of pathogenic microorganisms from the food to the human body and therefore the development of diseases (Iyasu et al., 2017). Forty-four of the respondents consistently forgot to wash their hands properly before meal preparation (Association & Foods, 1999). In another study that assessed the practice of handwashing, 43% of respondents in the study reported they did not always wash their hands before preparing food (Food and Drink Federation, 2001).

**Perception of meals and waitresses:** The results showed that about 85% of participants indicated that commercial home kitchens

were the source of meals at celebration halls. The previous point should be taken into account, as these kitchens are mostly out of the authorities' control. It was reported that around 10-20% of all food poisoning outbreaks in celebrations were related to catering services because they very often work outdoors and their facilities are relatively poor (Jiang et al., 2003). To prevent food poisoning outbreaks, caterers and restaurateurs need to ensure that food handlers have received adequate training and use appropriate practices of food handling when serving food to large groups of people (Sloan-Gardner et al., 2014). The results also showed that the responses of the women in the study showed that serving directly in the dishes was the dominant way of serving meals in the celebration halls (96.6%) while using a buffet was lower (29.8%). Catering buffet meals need special care. Therefore, attention should be paid to controlling food temperature so that hot food should be kept at an internal temperature of 60 °C or warmer, and cold food should be kept at 4 °C or colder as well as the safe handling of food in terms of cleanliness, separation, cooking and chilling. It was reported that 56% of people (125/225) became ill following the buffet lunch at the restaurant which was significantly associated with the consumption of curried prawns and Caesar salad (Sloan-Gardner et al., 2014).

In the present study, more than 13 % of the participants knew that meals served in the halls were frozen and not fresh. In this study, 14.6% of participants knew that meals were heated sufficiently and appropriately before serving. A low percentage (7.8%) of the participants knew that meals were heated directly without thawing them. Also, a low percentage of a sample (6.1%) knew how much time the meal was left after heating before distributing it in the hall. It is clear from the above results that the lack of knowledge of the previous details about meals may be due to embarrassment or lack of attention to these details.

More than a third (35.4%) of participants confirmed that in the case of a buffet, hot food was available on food warmers to keep it hot. Less than a quarter (21.7%) of participants also confirmed that in the case of a buffet, the cold food was inside the bowls with ice to keep it cool. The majority of participants (96.7%) responded that they knew if dishes were washed before they use or not. Of all participants, around 64% reported that the waitresses wore a special uniform. While 28.5% of participants affirmed that the waitresses wore a headcover. A low percentage of a sample (18.5%) mentioned that the waitresses wore gloves. From the results above, it is very clear that the meals served in celebration halls need to be regulated and monitored by responsible sectors besides, the results show that the improper practices of waitresses related to uniforms, head cover, and gloves may reflect a lack of their knowledge about food safety rules. In line with these results, it was reported that catering employees did not receive enough education about food safety rules that qualify them to apply them in the workplace (Hertzman & Barrash, 2007).

**Attitude towards meal safety:** The results showed that only 22.4% of participants agreed that the food served inside the celebration halls is safe. Also, only 21.5% of participants agreed that the meal served in the celebration halls is regulated by the respective authorities in the country. More than a quarter of a sample (26.1%) agreed that the kitchens inside the celebration halls are monitored by the respective authorities in the country. It is worth mentioning that intensive efforts should be made to raise the confidence level of an individual in the food available anywhere served to the public. Similarly, it was found that the confidence of people in food safety systems began to be lower (Shen et al., 2015).

The results also showed that a high percentage of participants (71.0%) agreed that the celebration owner is responsible for the safety of the meal served inside the celebration

halls. While more than half of the participants (57.0%) agreed that the celebration hall owner is responsible for the safety of the meal served in the hall. From the answers above, participants need to be educated about laws relating to food safety responsibility. Educating people, including women, about all food safety issues is one of the responsibilities of food safety agencies (Zeeshan et al., 2017).

The outcome of this study also showed that less than a third (32.0%) of participants agreed that the celebration hall owner employs workers in the kitchens and waitresses without health certificates. Approximately 43 % of the participants agreed that commercial kitchens have licenses to prepare ready-to-eat meals for celebrations. It should also be noted that 44.0 % of participants agreed that private commercial kitchen owners use temporary laborers. Also, 30.5% of the participants agreed that private commercial kitchens use workers without health certificates. The answers above illustrate the important role that the respective authorities should play in eliminating the negative perception of individuals about food safety practices in the celebration halls by preventing all negative practices related to the conditions of employment of workers, and the license of the catering profession.

## CONCLUSION

In conclusion, the study found that the majority of women possessed sufficient knowledge of food safety rules. The study also found that twenty-four percent of them reported that they were exposed to food poisoning after eating dinner in the celebration halls, and a high percentage of them considered that the food served inside the celebration hall was unsafe. A low percentage of them always washed their hands before eating the meal in the celebration halls. A significant association was found between handwashing practice and food poisoning exposure. Therefore, to prevent food poisoning in the celebration halls, some steps should be achieved as fol-

lows: (I) Meals source; famous restaurants and commercial home kitchens must be under the control of responsible authorities. (II) Meal handlers in the kitchens which prepare food must be trained on good food safety practices and not allowed to work without a certificate of attending a food safety course. (III) Raise the awareness level of the celebration owner so that he/she brings meals from a place that has a catering license by various means, such as distributing guidance leaflets in the celebration halls. (IV) In the case of a buffet, the hall should be provided with equipment to keep hot food at 60°C or more and cold food at 4°C or less until eaten by guests. (V) Waitresses in the celebration halls must have a health certificate as well as a certificate of attending a course in food safety, especially how to deal with frozen and fresh food ready to eat. (VI) Women who attend the celebrations in the halls should be educated about the importance of washing hands before eating. (VII) Raise the level of awareness of women about the importance of asking officials in the halls and waitresses about the meal in terms of its source, ingredients, and handling conditions.

#### Future studies

- Assessment of the availability of health requirements in commercial kitchens in terms of the building, employees, source of meal ingredients, cooking methods, type of cooking utensils and cookware, storage conditions, and packaging.
- Exploring knowledge and practices of food safety among food handlers in commercial kitchens.
- Evaluation of kitchens in the celebration halls in terms of their readiness to serve meals inside the hall.
- Evaluation of food safety knowledge and practices among waitresses in the celebration halls.

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## معرفة قواعد سلامة الغذاء لدى النساء وتصورهن وموقفهن من تطبيقها في

### قاعات الاحتفالات في طرابلس، ليبيا

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تاريخ الاستلام: 24 ديسمبر 2021 / تاريخ القبول: 14 يوليو 2022

<https://doi.org/10.54172/mjsc.v37i3.581>:Doi

**المستخلص:** الحكومة من خلال مؤسساتها ومراكزها المعنية مسؤولة عن حماية المستهلكين من خلال ضمان سلامة الإمدادات الغذائية حتى الاستهلاك. سعت الدراسة إلى تقييم المعرفة بسلامة الغذاء، واكتشاف حالات التسمم الغذائي، وتقييم تصور الوجبات والنادلات، ومعرفة الموقف من الوجبات المقدمة لدى عينة من النساء اللاتي حضرن الاحتفالات في قاعات الاحتفالات بمدينة طرابلس، ليبيا. تم اختيار ما مجموعه 410 امرأة بشكل عشوائي، وجمعت البيانات عن طريق المقابلات وجهاً لوجه باستخدام استمارات الاستبيان. تم استخدام مربع كاي (Chi-square) من أجل اختبار الاستقلالية. غالبية المشاركات (41.7%) تتراوح أعمارهن بين 18 و25 سنة. أظهرت النتائج أن غالبية المشاركات (95.4%) لديهن مستوى جيد من المعرفة بسلامة الغذاء. كما أظهرت النتائج وجود ارتباط معنوي ( $P < 0.05$ ) بين العمر ونوع التوظيف للمشاركات، ودرجات المعرفة بسلامة الغذاء. أفادت 24% من المشاركات أنهن تعرضن للتسمم الغذائي بعد تناول العشاء في قاعات الاحتفال. خمسة عشر بالمائة فقط من النساء المشاركات يغسلن أيديهن دائماً قبل تناول الوجبة في قاعات الاحتفال. بينت النتائج وجود ارتباط معنوي ( $P < 0.05$ ) بين ممارسة غسل اليدين والتعرض للتسمم الغذائي. وافقت 22.4% فقط من المشاركات على أن الغذاء المقدم داخل قاعة الاحتفال آمن. من الواضح جداً أن الوجبات المقدمة في قاعات الاحتفال تحتاج إلى رقابة من قبل السلطات المسؤولة. إلى جانب ذلك، يجب على الجهات المختصة أن تعمل جاهدة لإزالة التصور السلبي للأفراد حول ممارسات سلامة الغذاء في قاعات الاحتفال.

**الكلمات المفتاحية:** سلامة الغذاء؛ التسمم الغذائي؛ المعرفة؛ النساء؛ قاعة الاحتفالات.