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Original article

Cross-cultural differences in food safety knowledge, attitudes and practices of food handlers working at restaurants in Kuwait

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Summary. This study was conducted to assess the level of food safety knowledge, attitudes and practices among 273 Filipinos, Egyptians and Indians food handlers in Kuwait restaurants. The information was obtained through face to face interviews and questionnaires covering four sections: demographic characteristics, food safety knowledge, attitudes and practices. The results show that Filipinos, Egyptians and Indians food handlers had sufficient food safety knowledge particularly in the personal hygiene area. Filipinos were the best answering questions related to cross contamination and sanitation ($p < 0.05$). Egyptians and Indians lacked the knowledge about cross-contamination and sanitation, time and temperature control for food, and food pathogens. For attitudes, results show that Filipinos had excellent positive attitudes followed by Indians then Egyptians ($p < 0.05$). The three nationalities generally show very good practices mainly in personal hygiene. However, only 56 % of Egyptians and 57% of Indians avoided keeping cooked food in the temperature danger zone until served ($p < 0.05$). The study recommends that some aspects associated to cross-contamination, food pathogens and time and temperature control need to be stressed especially for Egyptians and Indians food handlers. Continuous food safety training for food handlers in Kuwait should become compulsory to reinforce food handlers in the areas which seem to be lacking. (www.actabiomedica.it)

Key words: knowledge, attitudes, practices, food handlers, Kuwait

Introduction

Food service establishments have been known to be the sources of foodborne outbreaks. About 48.7% of foodborne diseases were associated with catering food establishments (1). Approximately 70% of foodborne outbreaks in the UK were associated to the food service sector (2). Food handlers were the main contributors to foodborne outbreaks in the food service sector (2, 3). Nearly 97% of all foodborne illnesses were associated with inappropriate food handling (4). Numerous studies have been carried out in several countries to assess the level of knowledge, practices, and attitudes among food handlers. Generally, the most common causes for foodborne outbreaks related to labors were lack of personal hygiene, inappropriate holding temperatures and inadequate holding times, cross contamination and unsuitable food storage (3).

In Kuwait, the act of consuming food in restaurants is escalating. In 2015, it was estimated that Kuwaitis spends around 6 million dollars per day in restaurants (5). In 2016, it was estimated that there were more than 5,000 restaurants in Kuwait, visited by over 650,000 people daily (6, 7). The number of restaurants in Kuwait is expected to grow exponentially in the near future. As a result, the demand for labor force in the food sector will grow and lead to an increase in immigrant employees.

The rapid increase in number of food establishments in Kuwait may increase the risk of exposure to food-borne illnesses. In July 2018, 149 people were infected from eating falafel in a restaurant in Hawally area in Kuwait (8). In 2018, 45 American soldiers were infected with salmonella after eating from food vendors in Camp Arifjan in Kuwait (9). In November 2018, public hospitals in Kuwait received about 130 construction workers with suspected food poisoning (10).

To our knowledge, only one study has been carried out to evaluate food safety knowledge, attitude and practices of food handlers in Kuwait (11). However, there is a lack of previously published information showing the impact of cultural differences on food safety knowledge, attitude and practices of food handlers in Kuwait. This current study is designed to determine how food safety knowledge, attitude and practices may differ among persons of three different cultures in the foodservice industry. The three cultures were Filipinos, Egyptians and Indians which make up the majority of the industry's employees in Kuwait.

Materials and methods

This study was conducted among 273 food handlers from three different cultures (Filipinos, Egyptians and Indians) having either direct or indirect contact with food in Kuwait restaurants. Surveys were distributed to participants from June 2018 to September 2018. Data was collected through written questionnaires and face to face conversations to ensure responses accuracy. Participation in the study was voluntary and approximately 30 minute period was allowed to answer the questions.

Questionnaires consisted of 75 questions, both in Arabic and English, which were divided into four parts including demographics (10 questions), food safety knowledge (30 questions), food safety practices (20 questions) and food safety attitudes (15 questions). The study was approved from the ethical committee of the ministry of health and the health sciences center ethical committee, Kuwait.

Table 1 shows demographic characteristics of the participants which include gender, age, nationality, education, work experience, job responsibility, staff type and whether the participant has a health card. The food safety knowledge (Table 2) included 30 questions divided into four parts: personal hygiene (8 questions), cross-contamination and sanitization (11 questions), time and temperature control (7 questions), and food-borne pathogens (4 questions). Each question consisted of three possible answers: "yes", "no" and "do not know". Table 3 represents the food safety attitude which was designed to measure the participants' attitude regarding safe food handling and prevention of foodborne illnesses. A 5-point Likert scale was used to rate each of the fifteen food safety attitude questions. Table 4 lists 20 yes/no questions which represents the food safety practices of the participants. The questions included topics associated to hand washing, personal hygiene and time and temperature control.

The reliability of the questionnaire was determined by carrying out a pilot study on 30 food handlers. The reliability coefficient of the questionnaire test was 0.88.

Statistical analysis

The statistical analysis of data was carried out using SPSS software for Windows, version (24.0). The descriptive statistics were used for summarizing the demographic characteristics, knowledge, practices and attitudes scores of the respondents. The association between knowledge, practices, and attitudes for the three cultures was assessed using chi square test. The p-value of < 0.05 was applied and considered to be statistically significant.

Results and Discussion

Demographic characteristics of respondents

The socio-demographic characteristics of 273 food handlers working in restaurants in Kuwait are represented in Table 1. The majority of respondents were Egyptians (38%), followed by Filipinos (34%) and Indians (28%). There were almost equal proportions of Filipinos' males and females (45 and 47, respectively). On the other hand, Egyptians and Indians' males were predominant. The most common age group

Table 1. Demographics of the sample (n=273)

	Filipinos	Egyptians	Indians	Total
	92 (34%)	105 (38%)	76 (28%)	273
Gender				
Male	45 (21%)	97 (46%)	69 (33%)	211
Female	47 (76%)	8 (13%)	7 (11%)	62
Age				
< 25 years	18 (25%)	25 (34%)	30 (41%)	73
25-35 years	54 (36%)	62 (41%)	35 (23%)	151
35-45 years	17 (46%)	11 (30%)	9 (24%)	37
> 45 year	3 (25%)	7 (58%)	2 (17%)	12
Educational Level				
No education	0 (0%)	17 (49%)	18 (51%)	35
Primary School	5 (14%)	20 (57%)	10 (29%)	35
Secondary School	17 (21%)	45 (56%)	18 (23%)	80
College	70 (57%)	23 (19%)	30 (24%)	123
Work experience				
< 1 year	5 (19%)	11 (42%)	10 (38%)	26
1-5 years	47 (37%)	43 (34%)	36 (29%)	126
6-10 years	28 (37%)	29 (38%)	19 (25%)	76
> 10 years	12 (27%)	22 (49%)	11 (24%)	45
Job responsibility				
Food preps	38 (32%)	48 (40%)	33 (28%)	119
Cleaning	4 (11%)	22 (63%)	9 (26%)	35
Food server	35 (51%)	15 (22%)	18 (26%)	68
Others	15 (29%)	20 (39%)	16(31%)	51
Staff type				
Permanent	87 (37%)	81 (34%)	67 (29%)	235
Part-time	5 (13%)	24 (63%)	9 (24%)	38
Do you have a medical examination card?				
Yes	91 (35%)	103 (39%)	68 (26%)	262
No	1 (9%)	2 (18%)	8 (73%)	11

(n) % - (number of respondents) percentage of respondents.

Table 2. Food safety knowledge of Filipinos, Egyptians and Indians food handlers in restaurants in Kuwait (n = 273)

		Filipinos			Egyptians			Indians			p
Category	Questions	Yes	No	Don't know	Yes	No	Don't know	Yes	No	Don't know	
Personal hygiene	1- Is it essential to wash hands before the start of preparing foods?	**92 (100%)**	0 (0%)	0 (0%)	**105 (100%)**	0 (0%)	0 (0%)	**75 (99%)**	0 (0%)	1 (1%)	0.274
	2- Is it essential to wash hands after using the toilet?	**92 (100%)**	0 (0%)	0 (0%)	**105 (100%)**	0 (0%)	0 (0%)	**75 (99%)**	0 (0%)	1 (1%)	0.274
	3- Is it essential to wash hands after handling raw meat?	**92 (100%)**	0 (0%)	0 (0%)	**101 (96%)**	0 (0%)	4 (4%)	**73 (96%)**	0 (0%)	3 (4%)	0.161
	4- Is it essential to wash hands after touching any part of the body?	**92 (100%)**	0 (0%)	0 (0%)	**100 (95%)**	2 (2%)	3 (3%)	**73 (96%)**	0 (0%)	3 (4%)	0.158
	5- Is it essential to wash hands after cleaning tables?	**90 (98%)**	2 (2%)	0 (0%)	**102 (97%)**	1 (1%)	2 (2%)	**74 (97%)**	0 (0%)	2 (3%)	0.404
	6- Is it essential to wash hands after handling the garbage?	**90 (98%)**	2 (2%)	0 (0%)	**104 (99%)**	1 (1%)	0 (0%)	**75 (99%)**	0 (0%)	1 (1%)	0.352
	7 - Is it essential to wear gloves before touching ready to eat foods?	**91 (99%)**	1 (1%)	0 (0%)	**101 (96%)**	3 (3%)	1 (1%)	**68 (89%)**	7 (9%)	1 (1%)	0.064
	8- Is it essential to wash hands at least for 20 seconds?	**75 (82%)**	14 (15%)	3 (3%)	**64 (61%)**	29 (28%)	12 (11%)	**50 (66%)**	22 (29%)	4 (5%)	0.013
Cross contamination and sanitation	9- Is it essential to use a different knife to cut raw meat or poultry and vegetables?	**87 (95%)**	5 (5%)	0 (0%)	**71 (68%)**	29 (28%)	5 (5%)	**52 (68%)**	21 (28%)	3 (4%)	0.000
	10- Is it important to wash the knife used to cut raw meat or poultry with hot water before using it to cut vegetables?	75 (82%)	**8 (9%)**	9 (10%)	71 (68%)	**13 (12%)**	21 (20%)	45 (59%)	**18 (24%)**	13 (17%)	0.009

(continued)

Table 2 ***(continued)*****.** Food safety knowledge of Filipinos, Egyptians and Indians food handlers in restaurants in Kuwait (n = 273)

	11- Is it essential to wash the knife used to cut raw meat or poultry with water and soap before using it to cut vegetables?	**83 (90%)**	8 (9%)	1 (1%)	**74 (70%)**	27 (26%)	4 (4%)	**47 (62%)**	25 (33%)	4 (5%)	0.001
	12- Is it essential to use different cutting boards to cut raw meat or poultry and to cut vegetables?	**86 (93%)**	6 (7%)	0 (0%)	**95 (90%)**	8 (8%)	2 (2%)	**64 (84%)**	4 (5%)	8 (11%)	0.005
	13- Is it essential to wash the cutting board used to cut raw meat or poultry with hot water before using it to cut vegetables?	80 (87%)	**11 (12%)**	1 (1%)	73 (70%)	**29 (28%)**	3 (3%)	45 (59%)	**23 (30%)**	8 (11%)	0.000
	14- Is it essential to wash the cutting board used to cut raw meat or poultry with water and soap before using it to cut vegetables?	**74 (80%)**	14 (15%)	4 (4%)	**69 (66%)**	32 (30%)	4 (4%)	**47 (62%)**	22 (29%)	7 (9%)	0.034
	15- Is it essential to change the cutting board between cutting raw meat or poultry and vegetables?	**86 (93%)**	6 (7%)	0 (0%)	**67 (64%)**	32 (30%)	6 (6%)	**44 (58%)**	21 (28%)	11 (14%)	0.000
	16- Is it essential to wash food contact surface with water and soap and followed by the application of a sanitizer?	**77 (84%)**	15 (16%)	0 (0%)	**70 (67%)**	30 (29%)	5 (5%)	**42 (55%)**	24 (32%)	10 (13%)	0.000
	17 - Is it essential to store leftover foods and raw foods separately in the refrigerator?	**80 (87%)**	12 (13%)	0 (0%)	**83 (79%)**	15 (14%)	7 (7%)	**65 (86%)**	7 (9%)	4 (5%)	0.127

(continued)

Table 2 ***(continued)*****.** Food safety knowledge of Filipinos, Egyptians and Indians food handlers in restaurants in Kuwait (n = 273)

	18- Is it essential to use protective clothes (cap, mask, gloves)?	**90 (98%)**	2 (2%)	0 (0%)	**100 (95%)**	2 (2%)	3 (3%)	**73 (96%)**	2 (3%)	1 (1%)	0.577
	19- Is it safe coming to work when sick (fever, coughing, cold, diarrhea, etc.)?	12 (13%)	**80 (87%)**	0 (0%)	19 (18%)	**82 (78%)**	4 (4%)	6 (8%)	**66 (87%)**	4 (5%)	0.078
Time and temperature control	20- Is it essential to thaw frozen raw meat or poultry on the kitchen counter in an open container?	38 (41%)	**47 (51%)**	7 (8%)	58 (55%)	**27 (26%)**	20 (19%)	24 (32%)	**33 (43%)**	19 (25%)	0.000
	21- Is it essential to thaw frozen raw meat or poultry in the refrigerator?	**69 (75%)**	18 (20%)	5 (5%)	**65 (62%)**	26 (25%)	14 (13%)	**48 (63%)**	15 (20%)	13 (17%)	0.114
	22- Is it essential to thaw frozen raw meat or poultry under running water?	31 (34%)	**59 (64%)**	2 (2%)	51 (49%)	**42 (40%)**	12 (11%)	22 (29%)	**40 (53%)**	14 (18%)	0.000
	23- Is it essential to keep the refrigerator operating temperature between 1-5 °C?	**78 (85%)**	10 (11%)	4 (4%)	**81 (77%)**	5 (5%)	19 (18%)	**58 (76%)**	5 (7%)	13 (17%)	0.023
	24- Is it essential to keep the freezer operating temperature -18 °C?	**75 (82%)**	10 (11%)	7 (8%)	**82 (78%)**	5 (5%)	18 (17%)	**61 (80%)**	6 (8%)	9 (12%)	0.194
	25- Is it essential to store leftover food in the refrigerator?	**44 (48%)**	43 (47%)	5 (5%)	**50 (48%)**	27 (26%)	28 (27%)	**36 (47%)**	18 (24%)	22 (29%)	0.000
	26- Is it essential to store leftover food on the shelf in the kitchen?	16 (17%)	**74 (80%)**	2 (2%)	20 (19%)	**81 (77%)**	4 (4%)	**13 (17%)**	55 (72%)	8 (11%)	0.152
Foodborne pathogens	27- Is *Salmonella* species related to foodborne diseases?	**74 (80%)**	2 (2%)	16 (17%)	**35 (33%)**	7 (7%)	63 (60%)	**40 (53%)**	3 (4%)	33 (43%)	0.000
	28- Is *Staphylococcus aureus* related to foodborne diseases?	**60 (65%)**	3 (3%)	29 (32%)	**21 (20%)**	8 (8%)	76 (72%)	**33 (43%)**	4 (5%)	39 (51%)	0.000

(continued)

Table 2 ***(continued)*****.** Food safety knowledge of Filipinos, Egyptians and Indians food handlers in restaurants in Kuwait (n = 273)

	29- Is *Shigella* related to foodborne diseases?	**58 (63%)**	7 (8%)	27 (29%)	**25 (24%)**	9 (9%)	71 (68%)	**33 (43%)**	4 (5%)	39 (51%)	0.000
	30- Is *Hepatitis* A virus related to foodborne diseases?	**74 (80%)**	8 (9%)	10 (11%)	**58 (55%)**	7 (7%)	40 (38%)	**52 (68%)**	14 (18%)	10 (13%)	0.000

The responses in bold are the correct answer.
(n) % - (number of respondents) percentage of respondents.

was between 25-35 years (Filipinos: 36%, Egyptians: 41%, Indians: 23%). Fifty seven percent of Filipinos had College degrees, followed by Indians (24%), then Egyptians (19%). The majority of food handlers had 1-5 years of experience in the food sector (Filipinos: 37%, Egyptians: 34%, Indians: 29%). Most workers who worked on food preparations or cleaning were Egyptians (40% and 63%, respectively), while most food servers were Filipinos (51%). Most participants were permanent staff that had medical examination cards by the Ministry of Health, Kuwait.

Food safety knowledge

Table 2 represents food safety knowledge of Filipinos, Egyptians and Indians food handlers working in restaurants in Kuwait. All nationalities were able to identify seven cases where hand washing is needed (Questions 1-7). However, no associations ($p > 0.05$) were detected between the different nationalities and the seven questions. Most Filipinos (82%) knew the importance of washing hands for at least 20 seconds (Question 8). Followed by Indians (66%) and Egyptians (61%) ($p < 0.05$). Similar results were found in previous studies where participants get obtained correct answers for good personal hygiene questions (12, 13).

Filipinos were the best answering questions related to cross contamination and sanitation (Questions 9, 11, 12, 13, 14, 15, 16) ($p < 0.05$). However, there were no associations ($p > 0.05$) between the three nationalities and questions regarding storing leftover and raw foods, wearing protective clothes and the safety of coming to work when sick. Only 9% of Filipinos, 12% of Egyptians and 24% of Indians answered correctly the question related to washing the knife with hot water (Questions 10). Results from previous studies agree with the current study showing that food handlers had deficiency of knowledge in areas related to cross-contamination and sanitization (12, 14). Therefore, risks of foodborne diseases are likely to occur.

Filipinos were best of knowing the significance of the essential time and temperature control required for inhibiting microbial growth in foods (Questions 20-26). Only 44% of Filipinos, 48% of Egyptians and 47% of Indians declared that they store leftover food in the refrigerator. This result has been supported by prior studies which stated that a lack of knowledge among food workers exists about correct refrigeration and freezing temperatures, defrosting of frozen meat, cooking temperatures, holding temperature of ready-to-eat meals, and reheating temperature of leftovers food (12, 13, 14). According to the World Health Organization (15), one of the reasons for foodborne outbreaks is time-and-temperatures control mistreatment during food handling.

Egyptians were found to have the least knowledge about foodborne pathogens (Questions 27-30). Only 33% of Egyptians food handlers knew about Salmonella, 20% about Staphylococcus aureus, 24% about Shigella and 55% about Hepatitis A virus. On the other hand, 80% of Filipinos knew about Salmonella, 65% about Staphylococcus aureus, 63% about Shigella and 80% about Hepatitis A virus. These results are supported by other studies which also stated that their respondents showed poor knowledge about foodborne pathogens (13, 14). This indicates that there is a need to improve food safety knowledge among Egyptians food handlers particularly in areas related to foodborne pathogens.

Table 3. Food safety attitudes of Filipinos, Egyptians and Indians food handlers in restaurants in Kuwait (n = 273)

	Strongly agree (%)			
Questions	Filipinos	Egyptians	Indians	p
1- One of my job responsibilities is handling the food safely	80%	59%	70%	0.000
2- I believe food safety knowledge is important to me	84%	58%	67%	0.001
3- I think participating in food safety training will benefit my food safety and food handling knowledge	87%	66%	80%	0.012
4- I think employers should train staff on personal hygiene regularly	78%	55%	63%	0.012
5- Food handlers should not come to work when sick	82%	64%	78%	0.001
6- I believe personal protective equipment and clothes reduces the risk of food contamination	82%	66%	75%	0.082
7- I think food handlers with wounds or cuts on hands should not handle foods	83%	69%	74%	0.010
8- I believe proper food storage is crucial to food safety	77%	69%	72%	0.154
9- Knowing the temperature danger zone is vital to reduce food safety risks	83%	69%	68%	0.038
10- I separate raw foods and cooked foods from each other during storage	85%	43%	62%	0.000
11- Defrosted foods should not be frozen more than once	74%	57%	63%	0.250
12- I think checking the temperature settings of chillers or freezers regularly is necessary	77%	43%	64%	0.000
13- I am ready to correct any wrong food handling practices that I have been doing	74%	60%	71%	0.070
14- I believe that preparing safe food takes precedence over preparing tasty food	64%	70%	71%	0.200
15- Food-borne diseases are a serious issue	78%	71%	71%	0.119

Food safety attitudes

Table 3 represents food safety attitudes of Filipinos, Egyptians and Indians food handlers. Filipinos food handlers showed superiority on answering the food safety attitudes questions followed by Indians then Egyptians ($p < 0.05$). Most Filipinos (87%) believe that contributing in food safety training will benefit their food safety and food handling knowledge. On the other hand, only 66% of Egyptians believe on the importance of food safety training. Filipinos food handlers strongly believe that knowing the temperature danger zone is vital to reduce food safety risks (83%). In contrary to Filipinos, only 69% of Egyptians and 68% of Indians understand the vitality of the temperature danger zone to reduce food safety risks. Eighty fife percent of Filipinos food workers strongly agree on separating raw from cooked foods during storage. While only 43% of Egyptians and 62% of Indians acknowledge the importance of separating raw and cooked foods. These results are different from the observations made by Al-Shabib et al. (2016), where about 85% of their participants showed confidence in correct procedures of food refreezing and defrosting (13).

Attitude is a critical aspect that may influence food safety behavior and practices of food workers, thus decrease the prevalence of foodborne diseases (12, 13). Food handlers with positive attitudes are more likely to translate them into positive practices (14). Sani and Siow (2014) stated that repetitive thawing and refreezing of foods increases microbial growth and the risk of food-borne illnesses.

Table 4. Food safety practice of Filipinos, Egyptians and Indians food handlers in restaurants in Kuwait (n = 273)

	Filipinos		Egyptians		Indians		
Questions	Yes	No	Yes	No	Yes	No	p
1- Do you wash your hands before handling foods?	92 (100%)	0 (0%)	105 (100%)	0 (0%)	74 (97%)	2 (3%)	0.073
2- Do you wash your hands after handling foods?	91 (99%)	1 (1%)	105 (100%)	0 (0%)	74 (97%)	2 (3%)	0.245
3- Do you keep your hands and nails clean?	91 (99%)	1 (1%)	105 (100%)	0 (0%)	75 (99%)	1 (1%)	0.525
4- Do you use protective clothing (cap, mask, gloves) while handling foods?	91 (99%)	1 (1%)	105 (100%)	0 (0%)	74 (97%)	2 (3%)	0.245
5- Do you wash the working clothes?	91 (99%)	1 (1%)	102 (97%)	3 (3%)	67 (88%)	9 (12%)	0.003
6- Do you wear jewelry during the handling of foods?	9 (10%)	83 (90%)	13 (12%)	92 (88%)	10 (13%)	66 (87%)	0.767
7- Do you smoke or eat food in food preparation areas?	7 (8%)	85 (92%)	11 (10%)	94 (90%)	6 (8%)	70 (92%)	0.738
8- Do you come to work when sick?	8 (9%)	84 (91%)	13 (12%)	92 (88%)	11 (14%)	65 (86%)	0.493
9- Do you report to your manger about the cut wound in your hands?	80 (87%)	12 (13%)	66 (63%)	39 (37%)	56 (74%)	20 (26%)	0.001
10- Do you clean work surfaces before and after food handling?	90 (98%)	2 (2%)	103 (98%)	2 (2%)	72 (95%)	4 (5%)	0.363
11- Do you wash fruits and vegetables under running water?	87 (95%)	5 (5%)	101 (96%)	4 (4%)	71 (93%)	5 (7%)	0.697
12- Do you clean work surfaces during food handling?	78 (85%)	14 (15%)	95 (90%)	10 (10%)	63 (83%)	13 (17%)	0.288
13- Do you use bare-hands to handle ready-to-eat food (RTE)?	48 (52%)	44 (48%)	42 (40%)	63 (60%)	45 (59%)	31 (41%)	0.031
14- Do you sperate raw foods and cooked foods from each other?	91 (99%)	1 (1%)	99 (94%)	6 (6%)	68 (89%)	8 (11%)	0.028
15- Do you use separate utensils and cutting boards when preparing foods?	92 (100%)	0 (0%)	95 (90%)	10 (10%)	67 (88%)	9 (12%)	0.005
16- Do you check the temperature settings of chillers or freezers regularly?	82 (89%)	10 (11%)	73 (70%)	32 (30%)	55 (72%)	21 (28%)	0.003
17- Do you store leftover food in the refrigerator?	45 (49%)	47 (51%)	76 (72%)	29 (28%)	46 (61%)	30 (39%)	0.003
18- Do you pick foods that fall on the floor and dispose of them?	69 (75%)	23 (25%)	61 (58%)	44 (42%)	49 (64%)	27 (36%)	0.044
19- Do you avoid keeping cooked food in the temperature danger zone of 5-60 °C until served?	76 (83%)	16 (17%)	59 (56%)	46 (44%)	43 (57%)	33 (43%)	0.000
20- Do you reheat food until it is steaming hot before serving?	47 (51%)	45 (49%)	58 (55%)	47 (45%)	25 (33%)	51 (67%)	0.009

(n) % - (number of respondents) percentage of respondents.

Food safety practices

Table 4 shows the food safety practices by 273 food handlers working in restaurants in Kuwait. In general, Filipinos, Egyptians and Indians were found to have good personal hygiene practices. The majority of the three nationalities maintained safe practices such as washing hands before and after handling foods, wearing protective clothing and keeping the cleanliness of work clothes and surfaces. Most participants were not wearing jewelry, smoking or eating during food preparation. These results have been supported with a study by Al Suwaidi et al. (2015), where more than 75% of their participants found to wash their hands before and during food preparation (16). Another study by Al-Shabib et al. (2016) showed that 75.9% of the food workers removed personal items that could contaminate food while working (13). Furthermore, 13% of Filipinos, 37% of Egyptians and 26% of Indians do not report to their manager when having wounds and cuts. Moreover, 52% of Filipinos, 40% of Egyptians and 59% of Indians used bare-hands for ready-to-eat food (RTE). This could promote food contamination if their hands were not properly washed (Nurudeen et al., 2014). This can be related to the low level of education and inappropriate training about safe food-handling practices among food workers.

The majority of the three nationalities showed satisfactory practices in the prevention and control of cross-contamination between raw and cooked foods or utensils during food preparation. However, only 56 % of Egyptians and 57% of Indians avoided keeping cooked food in the temperature danger zone ($p < 0.05$). According to World Health Organization, 45.6%, 23.5% and 12.6% of foodborne outbreaks caused by temperature misuse during food processing, poor refrigeration and inappropriate storage temperatures of leftover meals, respectively (15).

Conclusions

The level of knowledge, attitudes and practices of Filipinos' food handlers in Kuwait restaurants was satisfactory. However, Egyptians and Indians had some limited knowledge aspects that need to be improved. These are particularly related to time and temperature control and cross-contamination. The consequences of lacking knowledge in such areas may increase the risk of food-borne diseases. The need for mandatory training, especially for Egyptians and Indians food handlers, is necessary considering the rapid growth of small and medium-sized restaurants in Kuwait and the increasing need for food handlers to accommodate this growth.

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Conflict of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article

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