

## Restaurant Employees' Food Handling Practices in Irbid City, Jordan

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### Abstract

It has been established that food handlers working in foodservices are the main source of food borne outbreaks. The current study objective is to assess restaurant employees' food handling practices by exploring driving forces behind these practices. The study was accomplished quantitatively covering 245 restaurant employees in Irbid city-Jordan; who provided primary data by completing a designated self-administered questionnaire. A model of nine hypotheses was developed and examined using independent-samples t-tests and one way ANOVA tests. Study's findings revealed a large number of variables influencing restaurant employees' food handling practices including socio-demographic measures (such as age & education), work-related elements (such as restaurant size & HACCP implementation) and culture. This study explores a previously confined researched field - cultural influences on restaurant employees' food handling practices contributing to a wider understanding of safe food handling which in turn should enhance food safety levels. It fructifies many recommendations embodying its findings' implications to enhance food safety levels; these include advocating HACCP implementation and more control on non-Jordanian restaurant employees' food safety competences.

**Keywords:** Restaurant employees, Food handling practices, HACCP, Culture.

### 1. Introduction

Food safety always gains growing attention around the world due to its effects on international economy and its significance to people's health (Burros, 1997). Each year millions of people suffer or die due to foodborne diseases (World Health Organisation (WHO), 2000). It is a critical issue for different food industries; foodborne illnesses cause serious costs to these industries (Käferstein et al., 1997). However, the harmful outcomes of foodborne outbreaks are more severe in developing regions than anywhere else; this due to the missing of proper intervention strategies and poor levels of nutrition in these regions (Ashbolt, 2004). Unfortunately, there are no estimates for foodborne outbreaks in Jordan (Osaili et al., 2013). Nevertheless, the spread of foodborne diseases in Jordan has been reported since long time ago by many studies (Alicata & Dajani, 1955; Nimri, 1993; Nimri, 1994; Youssef et al., 2000; Shehabi et al., 2001; Shakkoury & Wandy, 2005; Al-Momani et al., 2006). It has been established that failure to achieve high levels of food safety is ascribed mainly to food handlers (Clayton & Griffith, 2004; Todd et al., 2007). It was argued by Howes et al. (1996) that 97% of foodborne diseases are caused by food handlers' improper practices in foodservice establishments. Such malpractices were deemed as risk factors causing cross-contamination of food (Redmond et al., 2004; Todd et al., 2007). Moreover, food handlers are expected carriers of biological food hazards (Medus et al., 2006; Todd et al., 2007). They are potential carriers of some food pathogens such as Norovirus, Hepatitis A, Staphylococcus aureus and typhoidal Salmonella; they also may shed other food pathogens such as non-typhoidal Salmonella and E-coli (Adams & Moss, 2008). In the Middle East, many cases of food handlers' infections were evidenced (Arif & Hassoun, 1969; Abu Al Saud, 1983; Khan et al., 1987; Wakid, 2006; Abu-Madi et al., 2008; Simsek et al., 2009; Imam et al., 2016). Further evidences regarding food handlers' infections in Jordan were also provided (Al-Lahham et al., 1990; Khuri-Bulos et al., 1994; Abdel-Dayem et al., 2014).

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The present study investigated a topic which is of vital significance to people's health and prosperity. It covered food handlers working in restaurants that are considered as a main source of foodborne incidences; for example, restaurants participate in a large percentage (22%-50%) of foodborne outbreaks in Europe and USA (Tirado & Schmidt, 2001; Olsen et al., 2001). Restaurants are a part of tourism industry the key mean of building economies of both developed and developing countries (Aziri & Nedelea, 2013). In Jordan, tourism industry is a promising one which contributed to the GDP by 11.8% in 2015 (Jordan Investment Commission (JIC), 2015). Hence, it is a significant sector which always needs more research to improve its products, which ultimately enhances Jordan's competitiveness as a destination in world tourism.

## 2. Background

Recognising the role of food handlers' practices in achieving food safety, inspired many studies of food handling behaviour. These studies can be grouped into three categories. First, studies identifying factors affecting food handlers' practices including demographics and organisational factors (for example, Klontz et al., 1995; Green & Selman, 2005; Tessema, et al., 2014). Second, studies investigating the behavioural aspects impact on food handlers' practices employing Social Cognition Models (SCMs) including Theory of Planned Behaviour (TPB), Health Beliefs Model (HBM) and the Theory of Reasoned Action (TRA). Examples of studies within the second group include Angelillo et al. (2000), O'Boyle et al. (2001) and Clayton and Griffith (2008). The third group of studies explored the role of food safety knowledge in improving food handlers' practices. Examples of these studies are: Walker et al. (2003), Bas et al. (2006), Pragle et al. (2007), Howells et al. (2008), Sanlier and Konaklioglu (2012), Soares et al. (2012), Sharif et al. (2013), Kubde et al. (2016) and Akabanda et al. (2017); the majority in this group employed the Knowledge Attitudes Practice (KAP) model. It suggests that increasing of individuals' knowledge, will change their attitudes toward certain behaviour and so ultimately generates a behavioural alteration (Rennie, 1995). Previous studies of food handlers' practices provided indications to possible socio-demographic factors affecting these practices including: age and gender of food handlers (Altekruse et al., 1999; Patil et al., 2004; Green & Selman, 2005; Sanlier, 2009) and education (Angelillo et al., 2000).

Besides demographics, some organisational factors influence on food handlers' practices was supported. Sagoo et al. (2003) found that premises implementing HACCP as a food safety system were able to achieve higher levels of hygiene. Another important organizational factor which may affect food handlers' practices is restaurant size. This variable had not been studied previously; however, this expectation was supported by Worsfold (2001) who argued that small food organisations have limited potentialities to control food safety. Limited resources and knowledge prevents small establishments from ensuring safe food handling and application of systems controlling food safety (Panisello & Quantick, 2001). Accordingly, this issue was one of this study's interests as larger restaurants tend to have more resources, better facilities and professional employees, which should ameliorate their handling behaviour of food.

The majority of researches have explored potential factors affecting food handlers' practices were carried out in the western countries. Therefore, the current study considers culture as a key variable which was examined to yield a wider understanding of food handlers' practices. It was argued by many cultural scholars (such as Hall & Hall, 1990; Trompenaars & Hampden-Turner, 1997; Hofstede & Hofstede, 2005) that culture significantly influences the formulation of individuals' behaviours. Nevertheless, studies that examined the influence of culture on food handlers' practices (such as Burger et al., 1999; Toh & Birchenough, 2000) were limited in their discussion to the impact of subcultures (such as ethnicity) within the national one. To expand on previous studies, this study examines culture's influence on restaurant employees' food handling practices across different types of culture (national, occupational & organisational). Each level of culture provides a different experience which influences many individuals' decisions (Hofstede, 1991). Organisational culture consists of practices mainly, while national one contains more values than practices in its composition (Hofstede & Hofstede, 2005); therefore, organisational culture (measured in this study according to restaurant type) is expected to have the most vigorous influence on food handlers' practices. Finally, the occupational culture's influence on food handlers' practices was examined in the current study. Such examination was carried out depending on the comparison between food service and kitchen employees; the former serve food only whilst kitchen employees are in direct contact with it through different food preparation stages. Also, due to kitchen nature, it includes more food hazards sources than the service area (such as stores of raw materials, different utensils used in handling foods & different drains and sinks); it is of interest of this study to determine whether employees at kitchen do report higher commitment to safe food handling than food servers.

From the previous discussion of literature, it can be seen clearly that there is a significant advancement in research of food handlers in the West; whereas there is a paucity of these researches within the Jordanian context. The majority of studies addressing food safety in Jordan followed a microbiological approach reporting foodborne outbreaks; examples include Al-lahham et al. (1990), Khuri-Bulos et al. (1994), Nasseredin and Yamani (2005) and Abdel-Dayem et al. (2014). Nevertheless, few studies were found investigating food handlers' practices in Jordan (FAO/WHO, 2005; Osaili et al., 2011; Sharif et al., 2013; Osaili et al., 2013). All of these studies were focusing on the food handlers' knowledge and its association with their practices; however, only the last two studies were undertaken on professional food handlers. This study bridges the gap of food handling research in Jordan by assessing socio-demographic and work-related factors' impact on food handlers' practices. Furthermore, the study examines some factors that do not appear to be studied previously not even in developed countries, such as the influences of culture on food handlers' practices and so contributing to a better understand of these practices, which is expected to develop food safety.

### 3. Model testing

To achieve the current study's aim through a clear scientific road map, a conceptual model was built depending on the light of previous literature. The model interrelates measurable variables (dependant & independent) using a series of research hypotheses:

H<sub>1</sub>: There is a significant difference in food handling practices of restaurant employees from different age groups.

H<sub>2</sub>: There is a significant difference in food handling practices of female and male restaurant employees.

H<sub>3</sub>: There is a significant difference in food handling practices of more and less educated restaurant employees.

H<sub>4</sub>: There is a significant difference in food handling practices of restaurant employees who work in restaurants of different sizes.

H<sub>5</sub>: There is a significant difference in food handling practices of employees who work in different types of restaurants.

H<sub>6</sub>: There is a significant difference in food handling practices of employees who work in restaurants implementing HACCP and those do not implement any food safety system.

H<sub>7</sub>: There is a significant difference in food handling practices of Jordanian and Non-Jordanian restaurant employees.

H<sub>8</sub>: There is a significant difference in food handling practices of restaurant employees working in kitchens and those working in food service.

### 4. Methodology

A research design was constructed to essay the developed hypotheses effectively. This design was epitomised quantitatively by practically employing different research methods and techniques. Details of these methods and techniques are discussed in the following subsections.

#### a. Sampling:

According to the statistics of Jordanian Ministry of Tourism and Antiques (JMTA) of 2016, there are 584 employees working in tourists restaurants within Irbid-Jordan (JMTA, 2016). However, there was not a framework available for these employees (study's population). Accordingly, it was difficult to use a probable sampling technique in selecting the research sample's subjects. Instead, all 35 tourist restaurants working in Irbid district (Jordan) were selected within which, employees who may have a contact opportunity with food were accessed conveniently.

#### b. Data collection:

To collect primary data, a self-completed questionnaire was constructed. It is composed of two main parts. The first part assesses respondents' commitment to safe food handling practices. This part employed a five point Likert-scale where 1= 'Never', 2= 'Occasionally' 3= 'Sometimes' 4= 'Frequently' and 5= 'Whenever it is necessary'. The second part of study's tool was developed to define participants' socio-demographic and work-related characteristics. Following questionnaire designing, a pilot test was undertaken on 10 employees working in 5 restaurants in Irbid city. Fortunately, no changes to the questionnaire were needed. Thence, 255 questionnaires were completed by restaurants' employees in Irbid city during the year 2016.

Questionnaires' distribution was accomplished with the assistance of restaurants' administrations. 10 hospitality management students at Al-Hussein Bin Talal University (AHU) participated as research fieldworkers. During their study of research method course at AHU, students were educated about good surveying practices and research ethics. Ten of the collected questionnaires were found incomplete properly which may affect their usability. Accordingly, they were excluded from data analysis.

### c. Data analysis:

After questionnaires completion, collected data were coded and included within a data file of Statistical Package for the Social Sciences (SPSS) version 22. Data were then analysed using descriptive statistics to form sample profile. Subsequently, some parametric analyses were implemented to test study's hypotheses. These include one way ANOVA and independent sample t-test. Furthermore, the reliability of questionnaire's scales was assessed using Cronbach's alpha analysis (Hair et al., 2006); results confirmed that all scales have a good level of internal consistency with Cronbach's alpha > 0.7 (Cavana et al., 2000).

## 6. Results

### a. Participants

The majority of study's participants were males (81.6%), bringing to light reluctance of females to work in restaurants. The sample was biased towards Jordanian employees (87.3%). Also, the sample involves more younger employees than older ones; most respondents (82%) being aged less than 35 years, indicating a tendency of employing young individuals in Jordanian restaurants. Furthermore, it was found that most of the participating employees (62%) did not have a degree. In general, demographics of this study's sample are closely resembling demographic distributions of Jordanian tourism industry (JMOTA, 2016); which confirm sample's representativeness to study's population. They are also consistent with what had been found in previous studies of employees working in Jordanian restaurants (Al-lahham et al., 1990; Osaili, 2013). The largest percentage of participating employees (n=108; 44.1%) worked in fast food restaurants with 57 (23.3%) in fine dining restaurants and 80 (32.7%) in coffee shops. The sample was divided into two fairly equal subgroups according to the nature of the work: food service (n=106; 43.3%) and kitchen (n=139; 56.7%). Amazingly, only 51.8% of the respondents worked in restaurants applying HACCP and the remainder (48.2%) worked in restaurants that do not apply any food safety system. The most prominent group of participants (62.4%) worked in small restaurants with 50 or fewer seats.

### b. Hypotheses testing:

To assess restaurant employees' commitment to safe food handling practices, the differences of their commitment were measured across various groups of employees. These groups were formulated based on proposed variables mentioned in this study's hypotheses. Significance and magnitude of differences in employees' food handling practices were analysed using tests of variance including independent sample t-test and one way ANOVA as discussed below.

### Cultural effects:

Different culture types were categorised into three variables; national culture (nationality), organisational culture (restaurant type) and occupational culture (place of work including kitchen employee or foodservice employee). Three hypotheses (5,7 & 8) were developed and examined to explore the influence of different cultures on restaurant employees' food handling practices using independent sample t-tests and one way ANOVA analyses.

**Table 1 Independent sample t-tests for nationality and place of work**

<i>Variable</i>	<i>Group</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>Eta square</i>
<b>Nationality</b>	Jordanian	214	3.50	1.08	3.08	0.002	0.037
	Non-Jordanian	31	2.87	0.88			
<b>Place of work</b>	Foodservice	106	3.73	1.10	-4.079	0.000	0.064
	Kitchen	139	3.18	1.00			

**Table 2 One-way ANOVA test for type of restaurants**

Variable	Group	N	Mean	SD	F	df	p	Eta square
Restaurant type	Fast food	108	3.74	1.05	9.222	2	0.000	0.070
	Fine dining	57	3.22	1.03				
	Coffee shop	80	3.12	1.03				

Since most of the respondents were Jordanian nationals and the remainder were very small groups from Egypt and Syria, only two nationality subgroups were employed: Jordanian ( $n = 214$ ) and non-Jordanian ( $n = 31$ ) to explore the national culture influence on restaurant employees' food handling practices. Results presented in the tables above reveals highly significant differences in food handling practices ( $t=3.08$ ,  $p=0.002$ ) between Jordanian (Mean=3.50, SD=1.08) and non-Jordanian (Mean=2.87, SD=0.88) restaurant employees; also between restaurant employees working in foodservices (Mean=3.73, SD=1.10) and at the kitchen (Mean=3.18, SD=1.00); ( $t=-4.079$ ,  $p=0.000$ ) indicating the impact of occupational culture on food handling practices. Within the organisational level of culture, significant differences were also apparent amongst employees working in different types of restaurants:  $F(2,243)=9.222$ ,  $p \leq 0.001$ . Accordingly, hypotheses 5,7 and 8 are accepted. Observing the magnitude of the Eta squared values in Table 1 and 2, reveals that organisational culture variable (restaurant type) has by far the strongest influence (7%) when compared with the other cultural strata examined here. Impact of socio-demographics and work-related elements

As shown in table 3 below, a statistically significant difference in food handling practices ( $t=-2.326$ ,  $p=0.021$ ) between male (M=3.34, SD=1.05) and female (M=3.75, SD=1.12) restaurants' employees was revealed, as for implementation of HACCP (M=3.66, SD=1.06) as opposed to the lack of implementation of a food safety system (M=3.16, SD=1.03);  $t=3.719$ ,  $p=0.000$ . Accordingly, hypotheses 2 and 6 are accepted. The Eta squared values illustrate that the influence of gender (2.1%) and HACCP Implementation (5.3%) on food handling practices was small (cf. Cohen, 1988).

**Table 3 Independent sample t-tests for gender and HACCP implementation variables**

Variable	Group	N	Mean	SD	t	p	Eta square
Gender	Males	200	3.34	1.05	-2.326	0.021	0.021
	Females	45	3.75	1.12			
HACCP	Applied	127	3.66	1.06	3.719	0.000	0.053
	Not applied	118	3.16	1.03			

One-way ANOVA was employed to test hypotheses 1,3 and 4; the results are provided in Table 4. Statistical significant differences in the scores of food handling practices are apparent amongst age:  $F(3,242)=4.784$ ,  $p \leq 0.01$ , educational level:  $F(2,243)=6.257$ ,  $p \leq 0.01$  and restaurants size:  $F(3,242)=3.433$ ,  $p \leq 0.001$  subgroups. So hypotheses 1,3 and 4 are accepted. The Eta squared values indicate that the actual difference in mean scores between the age subgroups (5.3%), the education subgroups (4.9%) and the restaurants size subgroups (4%) is small.

**Table 4 One-way ANOVA test for age, education and restaurant size**

Variable	Group	N	Mean	SD	F	df	p	Eta square
Age	16-24 years	72	3.09	1.04	4.784	3	0.003	0.056
	25-34 years	129	3.45	1.06				
	35-44 years	38	3.83	1.03				
	45-54 years	6	3.88	1.05				
Education	High school	152	3.23	1.05	6.257	2	0.002	0.049
	Undergraduate	83	3.72	1.03				
	Postgraduate	10	3.73	1.21				
Restaurant size	50 seats or less	153	3.39	1.07	3.433	3	0.18	0.04
	51-100 seats	31	3.67	1.00				
	101-200 seats	17	4.00	0.70				
	> 200 seats	44	3.12	1.15				

## 5. Discussion

All of the current study's hypotheses were confirmed but some of the studied variables had a stronger impact on restaurant employees' food handling practices than others. The current study demonstrated the impact of culture on food handlers' practices with a distinction of organisational culture's influence on these practices over other types of culture. Within socio-demographic characteristics, age had the strongest impact in affecting food handling practices, while, among work-related characteristics, implementation of food safety systems had the largest impact. Although all cultural strata examined had a significant influence on restaurant employees' food handling practices, the magnitude and pattern of this influence varied. Organisational culture had the greatest effect; a link emerged between restaurant type and its employees' food handling practices; employees in fast food restaurants reported the highest level of food handling practices and those working in coffee shops the lowest.

By observation, it was noticed that most of participating fast food restaurants were franchisees and managed according to the style of their foreign mother companies; attributing the dereliction of food handling practices of other restaurants' employees to the Arabic and Jordanian management style which lacks professionalism and effectiveness (Hickson & Pugh, 1995; Ali & Sabri, 2001; Mostafa & Al-Masry, 2008) and which can be described as a traditional style of management (Al-Rasheed, 1994). However, Jordanian employees did report better food handling practices scores than non-Jordanian employees; it may be concluded that food handlers who are Jordanian handle food more safely than non-Jordanians. In general, it is believed that Jordanians tend to concern more about cleanliness especially in food preparation areas (Osaili et al., 2011). It is of some concern that the kitchen staff, who are handling the food directly, reported lower food handling scores than the food service providers.

However, the difference in food handling practices between kitchen and foodservice employees implies the role of occupational culture in affecting food handlers' practices. The difference in employees' food handling practices according to their occupation was also observed in a study by Sharif et al. (2013); which was carried out on employees ( $n=200$ ) working in Jordanian military hospitals. The aforementioned distinction of organisational cultural effect on food handling practices over other cultures can be referred to the uniqueness of its composition which is constructed mainly upon practices more than values (Hofstede & Hofstede, 2005); so this finding might be expected. The commitment to proper food handling practices of females was significantly superior to that of males; older employees also reported significantly better food handling than younger employees, both in line with the findings of Klontz et al. (1995); Altekruze et al. (1999); Patil et al. (2004) and Sanlier (2009). The disparity of females over males in food handling practices was pointed out in some studies (cf, Sharif et al., 2013). Older restaurant employees ( $\geq 45$  years) achieved better food handling (Mean=3.88, SD= 1.05) than those aged 35-44 years (Mean=3.83, SD=1.03) and those aged 24-34 years (Mean=3.45, SD=1.06) and, in turn, the 16-24 years subgroup scored the lowest (Mean=3.09, SD=1.04). The positive influence of employees' age on their food handling practices may be explained by continuous assembly of experiences with the progress of age.

It was evident that employees' education has also a positive effect on their food handling practices; restaurant employees who had a higher education tend to report greater commitment to proper food handling practices than those with a lower level of education; this finding corroborate with previous studies (cf. Angelillo et al., 2000; Sharif et al., 2013). Restaurant employees who worked in establishments applying HACCP reported greater scores of food handling practices than those working in restaurants that did not apply this system (cf. Sagoo et al., 2003). In spite there was not a consistent pattern found when restaurant size was linked to employees' food handling practices, workers in restaurants with 101-200 seats had significantly better food handling practices than employees in smaller restaurants; the latter finding supports Panisello and Quantick (2001) and Worsfold (2001). Larger restaurants are likely to have more abilities and resources to provide better facilities and training for their employees.

## 7. Implications

The current study assessed restaurant employees' food handling practices by identifying a set of factors influencing these practices; it is suggested that Jordanian environment and health authorities take them into consideration in the development and execution of food safety assurance policies. First, they are recommended to advocate the implementation of HACCP in different foodservice establishments by supporting them financially and/or offering free training to their staff. As evidenced by this study's findings, the implementation of HACCP expected to enhance food handling practices within these establishments.

Second, the environment and health authorities are recommended to be more discerning in permitting non-Jordanians food handlers to work in any foodservices in Jordan by stipulating a competence of food safety. Foodservice managers can also benefit from this study's findings. They are recommended to consider all explored socio-demographics and work-related elements affecting employees' food handling practices in their food and beverage operations. They are suggested to recruit individuals with higher education; age, hence experience and to consider these factors when appraising performance; focusing on food safety training, especially for non-Jordanian employees and kitchen staff.

## 8. Limitations and future research

More deductive research is needed to contribute further to the understanding of food handlers' practices as the employment of the self-administered questionnaire, spread by a delivery and collection way, increased the risk of contamination of participants' answers by others' consultation which might have impact the quality of data; cf. Oteri and Ekanem (1989), who noted that food handlers tend to report better practices than their actual ones. In order to check this fact, to probe the reasons behind and re-affirm the qualitative findings, some qualitative research would be advantageous including cross checking, work sampling and observational methods that enable measurement of actual practices of food handlers. Parallel enquiries in other food industries, especially those in which there is high human involvement in food production, in Jordan and even in other Middle Eastern countries, would be sensible; such validation is awaited to enrich the understanding of food handlers' practices, improve food safety levels and so help to promoting the Middle East as a tourist destination where food safety is controlled.

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