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ISSN (Online) : 2455 - 3662

SJIF Impact Factor :5.148

EPRA International Journal of Multidisciplinary Research

Monthly Peer Reviewed & Indexed
International Online Journal

Volume: 5 Issue: 4 April 2019



Published By :EPRA Publishing

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ASSESSMENT OF FOOD HANDLERS' KNOWLEDGE ON FOOD SAFETY MANAGEMENT IN SELECTED STAR-RATED HOTELS IN ELDORET TOWN, KENYA

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ABSTRACT

Background:

Food safety is a critical issue facing the foodservice industry today, affecting both developed and developing countries alike. More than 200 known diseases are transmitted through food and it has been estimated that each year 1.8 million people die as a result of diarrheal diseases, most of which can be attributed to contaminated food or water. Up-to 70% of diarrheal diseases may be caused by contamination through unhygienic food handling practices, infected food handlers and lack of appropriate knowledge on foodborne diseases by food handlers. Therefore food handlers play a major role in food safety management and an understanding of their knowledge on food safety management is of paramount importance.

Aim:

The purpose of this study was to assess food handlers' knowledge on Food Safety Management (FSM).

Method:

The study adopted a cross-sectional descriptive research design. Eight star-rated hotels were purposively selected and all 90 food handlers in the hotels were recruited into the study through census. Data was collected by use of self-administered structured questionnaires and analyzed with the help of Statistical Package for Social Sciences (SPSS) version 21 and excel and presented in percentages, tables, and figures.

Findings/Results:

The findings of this study revealed that food handlers had adequate knowledge on most aspects of food safety management, especially on personal hygiene. However, knowledge on food contamination, causes of food-borne illness, and temperature control was a bit inadequate and needs improvement.

Conclusion:

It was concluded that generally there is adequate knowledge on food safety management among the food handlers although improvement is needed in some aspects. The study recommended training on FSM to cover more issues regarding food safety and should target all food handlers at all job levels and a thorough orientation plan on FSM to all new employees who handle food.

KEY WORDS: *Food handlers, Food safety management, Star-rated hotels, Eldoret, Kenya.*

1.0 .BACKGROUND

Food safety is entails the actions aimed at ensuring that all food is as safe as possible and there are five key principles of food hygiene (five keys to safer food) which should be observed by all food handlers. These five keys to safer food include: keep clean, separate raw and cooked; cook thoroughly, keep food at safe temperature; use safe water and raw materials (WHO, 2006). Food safety is a vital issue both in developed and developing countries given that food borne illnesses contribute to millions of illnesses and thousands of deaths annually. It is becoming a key public health priority because a large number of people take their meals outside the home as a result, they are exposed to food borne illnesses that originate from food stalls, restaurants and other food outlets (Rahman *et al.*, 2012). Mitchell *et al.*, (2007) indicate that public exposure to unsafe food handling practices is likely to increase as the popularity of dining out and “take out” grows and therefore Bas *et al.*, (2006) argue that this consumer lifestyle emphasizes the need for better and more effective ways of controlling food hygiene. Furthermore, Wallace (2014) states that food safety remains a key public health challenge in the 21st century, both in developed and developing countries and empirical data shows that there are weaknesses in the way that food safety is managed, even in large food businesses. A report by WHO and FAO (2005) indicates that human resource capacity in Kenya is inadequate in terms of knowledge in food safety management tools and very little research work and surveillance of food-borne diseases has been done in Africa and Kenya in particular (WHO, 2008). Ko (2011) notes that a lack of food poisoning knowledge is apparent among food service employees and suggests that further research should be done on catering employees’ knowledge, attitude, and behavior toward food poisoning.

Many studies have been carried out to establish food safety knowledge among food handlers with varied results (Hsu & Huang, 1995; Henroid & Sneed, 2004; Sneed *et al.*, 2004; Isara *et al.*, 2009; Fawzi & Mona, 2009; Soeres *et al.*, 2012; Webb & Morancie

(2015). All these studies have focused on food handlers’ food safety knowledge in various food establishments such as restaurants, temporary food facilities, and institutional foodservices and very little research if any, has been done on star-rated hotels. The purpose of this study was to assess foodservice employees’ food safety management knowledge in selected star-rated hotels in Eldoret Town, Kenya and determine if the level of a food service operation plays a role in food safety management.

2.0 MATERIALS AND METHODS

The study was carried out in Eldoret Town, Kenya. A cross-sectional descriptive research design was adopted for the study. 90 food handlers from eight star-rated hotels were chosen through census to participate in this study. The food handlers comprised of cooks/chefs, waiters, assistant cooks, store keepers, purchasing officers, food and beverage managers, and bar tenders. The eight hotels were purposively selected. Data was gathered by used of self-administered structured questionnaires between December 2014 and April 2015. The questionnaire solicited information on food handlers’ knowledge on food safety management in terms of personal hygiene, temperature control, cross contamination, and causes of foodborne illness. Content validity was ensured by carrying out a pilot study while Cronbach’s alpha reliability coefficient test was used to test the reliability of the constructs under study and the value of 0.84 was obtained. Data was analyzed with the help of Statistical Package for Social Sciences (SPSS) version 21 and excel then presented in descriptive statistics in terms of percentages, tables and figures.

3.0 RESULTS/FINDINGS

3.1 Knowledge on circumstances for double hand washing technique

The findings as described on table 3.1 shows that 90% of the respondents had adequate knowledge on the various circumstances for double hand washing technique except for after coughing/sneezing and after smoking.

Table 3.1: Circumstances for double hand washing

Variables	Yes(%)	No(%)
Before handling food	89(98.8)	1(1.1)
After vising the toilet	85(95.5)	4(4.5)
After coughing or sneezing	79(88.8)	10(11.2)
After smoking	75(85.2)	13(14.8)
After handling raw to working with cooked food	81(91)	8(8.9)
After touching food waste	84(95.4)	4(4.5)

3.2 Knowledge on sources of food contamination

Over 95% of the respondents were knowledgeable about the different sources of food

contamination though 11.3% of the respondents did not know that improper cooking temperatures can cause food contamination as shown in table 3.2.

Table 3.2 Sources of food contamination

Variables	Yes(%)	No(%)
Food handlers	84(95.4)	4(4.5)
Contaminated surfaces	86(96.6)	3(3.4)
Cross contamination	84(95.4)	4(4.5)
Improper cooking	78(86.7)	10(11.3)
Poor handling	87(97.8)	2(2.2)
Improper storage	88(98.9)	1(1.1)

3.3 Knowledge on possible vehicles for food contamination

A large percentage of the respondents had knowledge on the vehicles for food contamination (over 90%). However, 29.5% of the respondents did

not know that food can be a vehicle for food contamination as presented in table 3.3. This can be attributed to lack of training on FSM since some of the respondents indicated that they have never received such kind of training.

Table 3.3: Possible vehicles for food contamination

Variables	Yes(%)	No(%)
Fingers	83(95.4)	4(4.5)
Flies	86(97.7)	2(2.3)
Food	62(70.5)	26(29.5)
Feaces	81(93.1)	6(6.9)

3.4 Knowledge on likelihood of stages in the food flow to cause food contamination

Table 3.4 shows the respondents' knowledge on the potential areas of contamination in the food flow. The largest percentage of the respondents reported that the use of leftovers (65.1%) and storage (64.4%) were

the very likely stages to cause food contamination. 30.2% and 26.4% of the respondents indicated that purchasing and receiving are less likely to cause food contamination.

Table 3.4: Likelihood of stages in the food flow to cause food contamination

Variables	Don't know(%)	Less likely(%)	Likely(%)	Very likely(%)
Purchasing	8(9.3)	26(30.2)	23(26.7)	29(33.7)
Receiving	6(6.9)	23(26.4)	32(36.8)	26(29.9)
Storing	9(10.3)	8(9.2)	14(16.1)	56(64.4)
Pre-preparation	10(11.5)	17(19.5)	22(25.3)	38(42.2)
Preparation	7(7.8)	16(17.8)	27(30)	37(43.7)
Serving	10(11.6)	21(24.4)	29(33.7)	26(30.2)
Use of leftovers	12(14)	8(9.3)	10(11.6)	56(65.1)

3.5 Knowledge on causes of food-borne illnesses

In relation to knowledge on causes of food-borne illnesses table 3.5 shows that 84% of the

respondents agreed that bacteria, parasites and viruses can cause food contamination leading to food-borne illnesses. Likewise 73% of the respondents agreed that pesticide residues can also cause food contamination.

However, 23.3% of the respondents disagreed that food additives can cause food contamination.

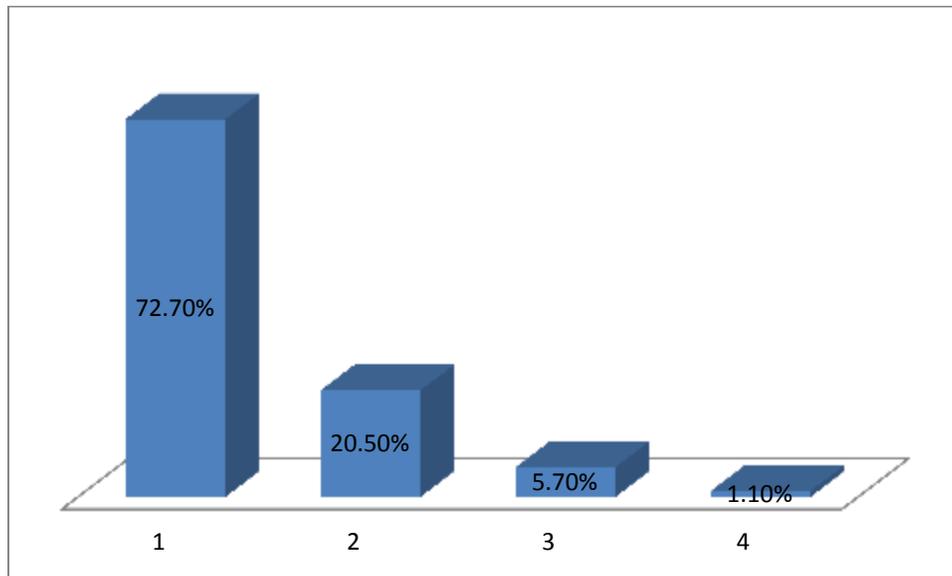
Table 3.5 Causes of food-borne illnesses

Variables	Disagree(%)	Neutral(%)	Agree(%)
Pesticide residues	11(12.9)	12(14.1)	62(73)
Bacteria, parasites, and viruses	11(12.6)	3(3.4)	73(84)
Food additives	20(23.3)	25(29)	41(47.7)

3.6 Knowledge on duration for medical check-up

The respondents’ knowledge on the duration for routine medical check-up for food handlers is

presented in figure 3.1. The results show that the largest percentage of the respondents reported that routine medical check-up should be done after three months (72.7%).



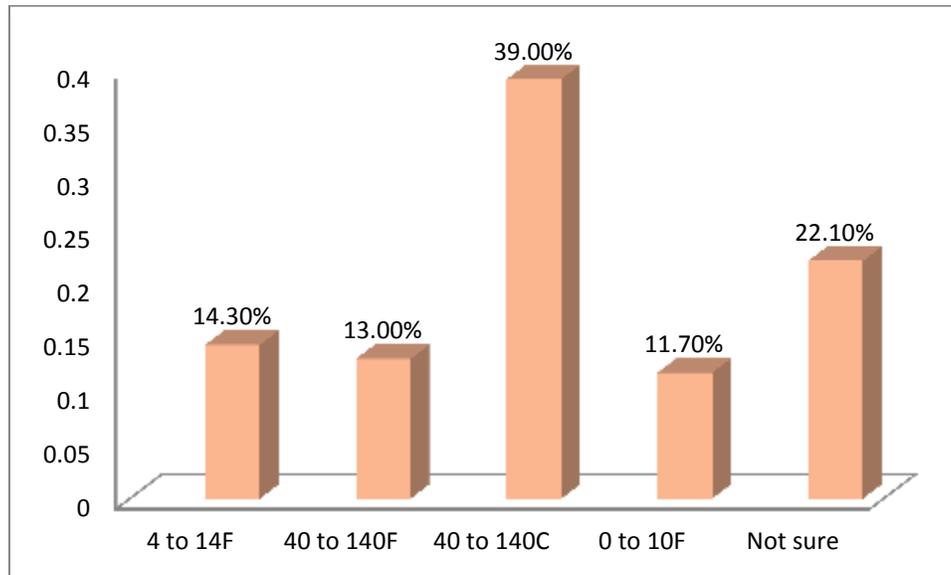
Key: 1 = six months 2 = three months 3 = one year 4 = don't know

Figure 3.1: Duration for medical examination

3.7 Knowledge on danger zone

Only 13% of the respondents had the correct knowledge on danger zone as illustrated in figure 3.2. Danger zone is the temperature range that is conducive

for bacterial growth in which food should not be allowed to stand for long. This zone is between 40°F and 140°F or 5°C to 65°C.

Figure 3.2: Knowledge on Danger zone

4.0 DISCUSSION

Food safety is receiving more attention worldwide with a rising incidence of foodborne diseases, concern over new potential hazards, and growth in agricultural trade (The World Bank, 2000). As a result, many studies have been carried out to establish food safety knowledge among the stakeholders and some studies have found that there is inadequate food safety knowledge among all job categories with the highest knowledge score being seen in personal hygiene and lowest knowledge score being seen in food preparation, purchasing, and storage (Fawzi & Mona, 2009; Ko, 211).

Furthermore, several studies on food safety knowledge have been done in different parts of the world focusing on foodservice employees at different levels of food establishments such as street food vendors, restaurant foodservice employees, hospital foodservice employees, and university cafeteria foodservice employees with varied contradicting results (Kitagwa, 2012; Hume, 2005; Egan *et al.*, 2006; Seaman & Eves, 2009). The findings from this study revealed that generally there is adequate knowledge on food safety management among the food handlers especially in regard to personal hygiene apart from use of double hand washing technique after coughing

/sneezing and smoking, in the star-rated hotels. However, inadequate knowledge was found on vehicles for food contamination, likelihood of different stages in the food flow to cause food contamination, causes of food-borne illness, duration for routine medical examination for food handlers, temperature control, and danger zone. This finding is consistent with other studies which have found that there is adequate knowledge on food safety among food handlers (Isara *et al.*, 2009; Henroid & Sneed, 2004; Webb & Morancie, 2014). The study however differed with some studies which found that there was inadequate knowledge among food handlers (Hsu & Huang, 1995; Sneed *et al.*, 2004 & Ko, 2011; Cuprasitrut *et al.*, 2011; Soeres *et al.*, 2012). Knowledge regarding circumstances for double hand washing technique was found to be adequate except for after coughing/sneezing and smoking. Negligence on the part of the food handlers can be the cause of this lack of hand washing as required since food handlers are the most frequently reported barriers to food safety practices (Panchal *et al.*, 2012). According to Shojoei *et al.*, (2006) research findings from the food industry suggest that hands play the role of a vehicle in the transmission of enteric pathogens especially those who do not wash hands after visiting the restrooms pose the

risk of carrying high loads of microbes such as *E. Coli* and *S. Aureus* on their hands.

Majority of the respondents had adequate knowledge on sources of food contamination and vehicles through which contamination can occur although quite a number did not have adequate knowledge on the fact that improper cooking temperature can cause food contamination and that food can be a vehicle for food contamination. All food handlers should be well trained on sources and vehicles of food contamination. It has been documented that inadequate temperature practices have contributed to several food-borne outbreaks (Panchal *et al.*, 2010). The probable reason for this lack of knowledge on food being a source and vehicle for food contamination is lack of proper training. This therefore means that it is possible for food not to be cooked properly leading to food contamination. Angellilo (2000) suggests a lack of knowledge on common food vehicles that transmit pathogens which explains the reason why a significant number of the food-handlers did not agree that food can be a vehicle for transmitting food contamination.

There was inadequate knowledge on the likelihood of different stages in the food flow to cause food contamination since only two stages were accepted by the respondents to be very likely to cause food contamination: storage and use of leftovers. Purchasing, receiving and serving were reported to be less likely to cause food contamination and yet food flow begins with purchasing through storage, pre-preparation, preparation, service, and ends with the use of leftovers and during each of these stages, food safety should be ensured (Homberg (1983). The findings from this study concur with Fawzi & Mona (2009) whose study revealed that food safety knowledge scores were seen in personal hygiene and lowest in food preparation, purchasing and storage. The most likely explanation for this finding again is lack of proper training since the training in food safety relies too heavily upon attaining a certificate rather than paying attention to achieving competency in food hygiene practices (MacAuslan, 2003).

The food handlers' knowledge on food-borne illness was limited as a large per percentage of the respondents did not seem to be aware that food additives can cause food-borne illnesses. According to Ababio and Lovatt (2015), all food hazards are detrimental to the health of consumers and require monitoring and control in the country although currently microbiological hazards in ready to eat foods and chemical hazards mostly pesticides from agricultural products including fresh vegetables and fruits have been highlighted. There is minimal information on physical contaminants/hazards, food allergy and injuries caused by these. This could be due

to less awareness and or lack of public education of these hazards. It is therefore necessary that awareness be created among the food handlers on the possibility of food additives causing food contamination.

Knowledge on the frequency of undertaking routine medical examination was found to be insufficient since the respondents gave different results concerning when the medical checkup should be done. Interview results revealed that even the managers themselves seemed to differ on the duration of the medical check-up with managers from different hotels giving contradicting responses and even accessing copies of the medical examination certificates from the hotels for purposes of verification was futile. This raises the question whether the food handlers adhere to the requirements for medical examination as required by the ministry of public health in the country. Marriot (1999) says that it is not easy to maintain medical control over food handlers in food establishments due to their rapid turnover and this could explain the contradiction and even lack of evidence of the medical examination licenses from the hotels.

Temperature control is one of the critical areas in food safety management and therefore an understanding of the danger zone is very important to food-handlers. The results from this study showed that the respondents' knowledge on temperature control was adequate. However, knowledge on danger zone was limited which was consistent with a study by Panchal *et al.*, (2014) in Italy which revealed that a very low proportion of food handlers correctly identified the temperature range at which germs proliferate. These results could be attributed to the fact that most managers are not themselves trained on food safety management as Egan *et al.*, (2006) observe that less than 20% of managers in the foodservice industry have been trained in the supervisory role of food safety thereby restricting their ability to assess food safety risks and convey proper hygiene training to their staff. This could mean that food is never kept at the optimum temperature and therefore is predisposed to the growth and multiplication of microorganisms that may cause food-borne illnesses and therefore it is important that that the importance of cooking temperatures should be emphasized to restaurant managers and food handlers through regular training as part of general efforts to reduce the burden of foodborne diseases.

5.0 CONCLUSION

From this study it was concluded that generally there is adequate knowledge on food safety management among the food handlers in star-rated hotels especially in relation to personal hygiene. However, the study shows that there is insufficient knowledge regarding sources and vehicles for food contamination, likelihood of different stages in the

food flow to cause food contamination, causes of food-borne illnesses, duration of routine medical examination, temperature control and danger zone.

6.0 RECOMMENDATION

The study recommends that the management in these hotels should intensify their training on FSM to cover more issues regarding food safety and should target all food handlers at all job levels and a thorough orientation plan on FSM should be given to all new employees who handle food.

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