

ANALYSIS OF THE RELATIONSHIP BETWEEN KNOWLEDGE AND PRACTICE OF FOOD SAFETY MANAGEMENT IN THE HOSPITALITY INDUSTRY: A CASE OF FOOD HANDLERS IN SELECTED HOTELS IN UASIN GISHU COUNTY, KENYA

D. A. O. Onyango*

University of Eastern Africa, Baraton, P. O. Box 2500-30100, Eldoret, Kenya

D. Kieti & C. I. Mapelu

Moi University, P. O. Box 3900-30100, Eldoret, Kenya

*Corresponding author: Email address - dorothyonyango@yahoo.com

Abstract

More than 200 known diseases are transmitted through food and it is estimated that 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 food-borne diseases by food handlers. The purpose of this study was to analyze the relationship between knowledge and practice of food safety management (FSM) among food handlers in the hospitality industry. The findings of this study revealed that over 95% of the respondents had adequate knowledge on FSM but practice was not adequate. The study therefore did not find any significant relationship between knowledge and practice of food safety management ($r = .147$, $p = .174$). From this study it was concluded that knowledge alone does not translate into practice and therefore recommends that special emphasis should be placed on practical rather than theoretical training on FSM which should target both the food handlers and managers and should be conducted on a regular basis.

Keywords: Food safety management, food handlers, knowledge, practices

Introduction and Literature Review

Food safety is a critical issue facing the food-service industry and the hospitality industry at large. WHO (2006) defines food safety as the actions aimed at ensuring that all food is as safe as possible and recommends that food safety policies and actions need to cover the entire food chain from production to consumption. In fact, consumer responsibility for food safety and sanitation begins with the purchase of food and extends through many separate steps in its handling, storage, preparation, and serving as well as in the related cleanup and the care and use of left overs (Holmberg, 1983).

According to the World Bank report (2000), the risks of food safety fall into four categories namely: microbes through improper handling, parasites through improper cooking, physical which may be intentionally or accidentally added into the food, and chemicals which occur naturally in food and those which are in the environment. Food safety issues are an important challenge to the public health sector because many cases of food-borne illnesses go unreported and unrecog-

nized, yet this type of illness is a significant contributor to the burden of disease in less developed countries and causes death and suffering even in the richest countries of the world (WHO, 2006).

This study was therefore conducted to analyze the relationship between knowledge and practice of food safety management among food handlers in conventional hotels in the hospitality industry. The objectives were to establish food handler's knowledge on food safety management in selected hotels in Uasin Gishu County, Kenya; to investigate food handler's practices of food safety management in selected hotels in Uasin Gishu County, Kenya; and to analyze the relationship between food handler's knowledge and practice of food safety management in selected hotels in Uasin Gishu County, Kenya.

Methods

Mixed research design (descriptive and explanatory) guided this study which was conducted in Uasin Gishu County, Kenya. The study population was 90 food handlers in twelve conventional hotels in Uasin



Gishu County, Kenya who were sampled through census. The twelve hotels were purposively sampled. Data was collected by use of self-administered questionnaires and observation checklist. Quantitative data was analyzed with the help of Statistical Package for Social Sciences (SPSS) version 21 and excel then presented in descriptive and inferential statistics. Pearson Correlation was used to test for relationships. Content analysis of the qualitative data was done and presented in narrative form. The consent of the managers of the participating hotels and the respondents was sought and the respondents participated willingly. Those who were not willing to participate were excluded from the study. Anonymity of the respondents as well as for the participating hotels were ensured by asking the participants not to write their names on the questionnaires and codes were used to conceal the identity of the hotels.

were knowledgeable about the different sources of food contamination although 11.3% of the

Results

Socio-demographic Information

Table 1 shows the socio-demographic profile of the respondents which show that most (59.1%) of the respondents were within the age group of 21 to 30 years with (56.8%) of them being male. In relation to position in the hotel or job title, waiters/waitresses and cooks were the majority accounting for 33.7% and 27.9% respectively. Most (67.8%) of the respondents had attained college education and a high percentage (87.6%) of the respondents had received some training on FSM majorly from college (57.6%).

Knowledge on FSM

The study sought to investigate the respondents' knowledge in relation to circumstances for double hand washing technique, sources of food contamination, possible vehicles for food contamination, likelihood for the stages in the food flow to cause food contamination, causes of foodborne illnesses, duration for routine medical examination, and danger zone.

Table 2 describes the respondents' knowledge on circumstances for double hand washing technique, sources of food contamination, and possible vehicles for food contamination. The findings reveal that majority (90%) of the respondents had adequate knowledge on the various circumstances for double hand washing technique and over 95% of the respondents

Table 1

Socio-demographic Characteristics

Characteristics	Proportion	Percent (%)
Age		
Below 20	1	1.1
21 to 30	52	59.1
31 to 40	23	26.1
41 to 50	9	10.2
Over 50	3	3.4
Gender		
Male	50	56.8
Female	38	43.2
Highest level of education		
Primary	3	3.4
Secondary	6	6.8
College	61	69.3
University	18	20.5
Job title/position in the hotel		
Waiter/waitress	29	33.7
Cook/chef	23	27.9
Storekeeper	7	8.1
Purchasing officer	3	3.5
Food and beverage manager	8	8.1
Others	20	18.6
Received training on FSM		
Yes	78	87.6
No	11	12.4
Where FSM training was received		
College	49	57.6
In-service training	19	22.4
On the job training	8	9.4
Not applicable	9	10.6

Others include bar tenders, cleaners, housekeeping staff and supervisors who also handle food respondents did not know that improper cooking temperatures can cause food contamination. The findings also show that 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.



Table 2

Knowledge on Circumstances for Double Hand Washing Technique, Sources of Food Contamination, and Possible Vehicles for Food Contamination

Variables	Yes f (%)	No f (%)
Circumstances for double hand washing technique		
Before handling food	89 (98.8)	1 (1.1)
After visiting 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)
Sources of food contamination		
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)
Possible vehicles for food contamination		
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)

Table 3 depicts the respondents' knowledge on the likelihood of stages in the food flow to cause food contamination. The findings indicate that the largest percentage of the respondents reported that use of leftovers (65.1%) and storage (64.4%) were very likely stages to

Table 3

Likelihood of Stages in the Food Flow to Cause Food Contamination

Variables	Don't know f (%)	Less likely f (%)	Likely f (%)	Very likely f (%)
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)

Table 4 shows the degree to which the respondents agree that the various causes of foodborne illnesses can cause foodborne illnesses. 84% of the respondents agreed that bacteria, parasites and viruses can cause food contamination leading to food-borne

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

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 4

Causes of Food-borne Illnesses

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

Figure 1 describes the respondents' knowledge on the duration with which food handlers should go for routine medical check-up. The largest percentage of the respondents reported that routine medical check-up should be done after three months (72.7%), 20.5% of

the respondents reported that it should be done after six months while 5.7% of the respondents reported that this should be done after one year and 1.1% did not know that routine medical examination should be done.

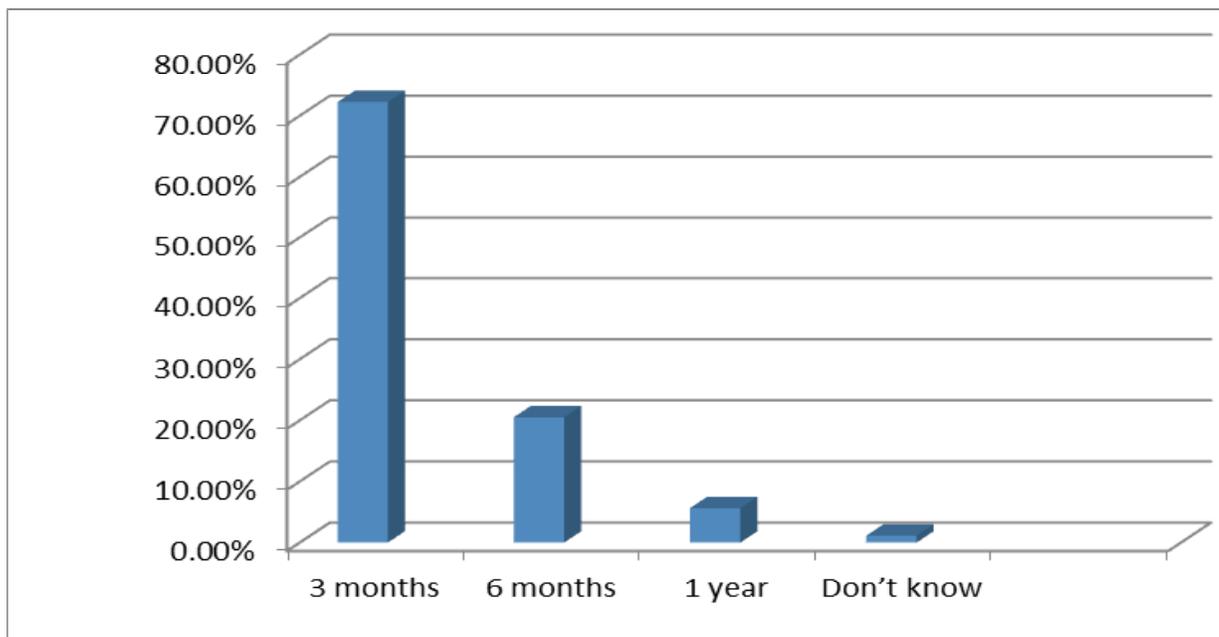


Figure 1. Duration for medical examination.

Figure 2 shows the respondents' knowledge on danger zone. The results indicated that only 13% of the respondents had the correct knowledge, 22.1% of the respondents were not sure of the danger zone and an

alarmingly large percentage (65%) did not know the correct temperature that is referred to as the danger zone.

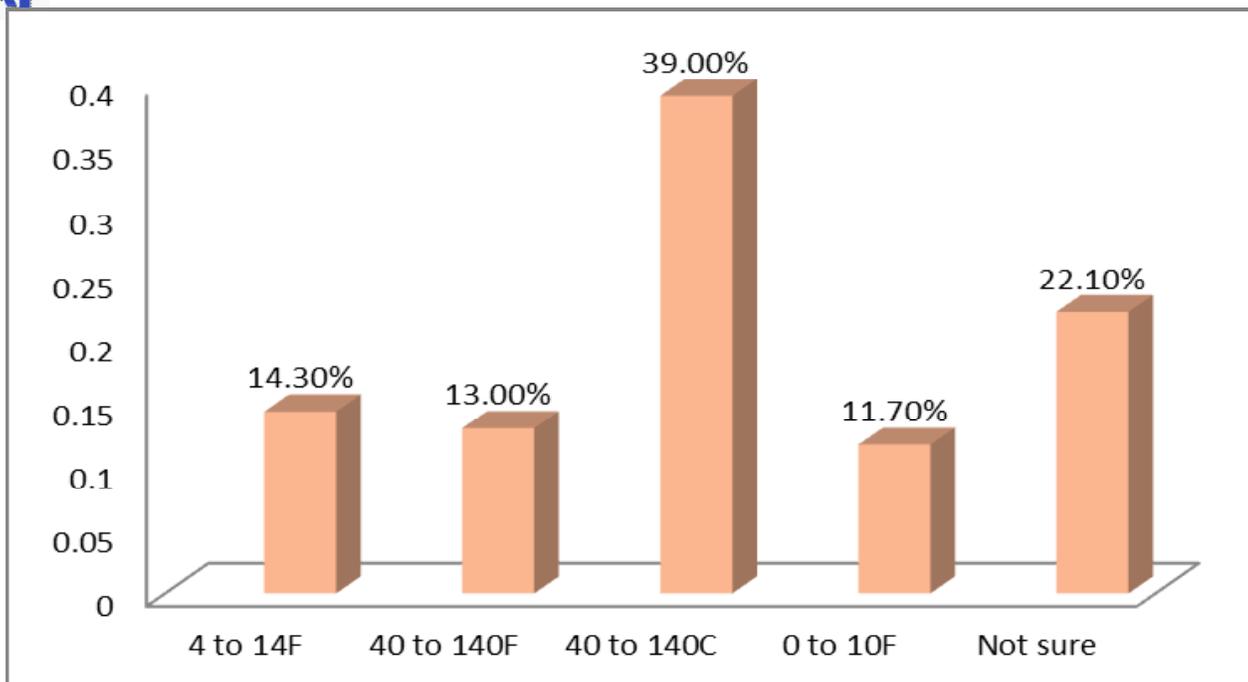


Figure 2. Knowledge on danger zone.

Practice of Food Safety Management

The study sought to find out the respondents' practice of food safety management with respect to personal hygiene, temperature control, cross contamination prevention, and purchasing and storage. Table 5 shows the results which indicate clearly that food safety management practices are not always observed. This finding was confirmed by observation made which revealed that only one hotel (10%) had distinct separate rooms for preparation of the various food items and only two (20%) hotels stored raw and cooked foods separately. Furthermore, most hotels (80%) had everything being prepared in the same room though with designated areas for specific tasks and one hotel (10%) had the same table being used for various tasks with imaginary lines to distinguish which section should be used for various tasks. One hotel (10%) did not even designate any space for different tasks but any food was prepared in any available space on the same table since different food items were prepared at different times as was reported by the chef.

Relationship between Food Safety Knowledge and Practice

Knowledge of circumstances for double hand washing techniques is significantly related to practice of all areas of food safety management. Knowledge of ways that food contamination may occur and knowledge of vehicle for food contamination are significantly

related to practice of temperature control. Knowledge of stages in the food flow that are likely to cause food contamination is significantly related to practice of food safety management in the areas of personal hygiene, cross contamination, and purchasing and storage. Knowledge of causes of food-borne illnesses is significantly related to practice of personal hygiene and temperature control

Although results in table 6 indicate that there is significant relationship between specific food safety knowledge and specific practice of food safety management, in general, there is no significant relationship between food safety knowledge and practice of food safety management ($r = .174, p > .05$).

Table 5

Practice of Food Safety Management

Variables	Never (%)	Sometimes (%)	Always (%)
Personal hygiene			
Food handlers wash their hands before beginning work, sneezing, visiting	3(3.6)	14(16.7)	67(79.8)
Food handlers use the double hand washing technique	5(5.7)	21(24.1)	61(70.1)
Food handlers are examined medically after six months	7(8.1)	9(10.5)	70(81.4)
Food handlers wear appropriate aprons, head gear, and footwear	6(7.0)	7(8.1)	73(84.9)
Food handlers are not permitted to handle food when sick from clinically recognized conditions	11(12.9)	5(5.9)	69(81.7)
Temperature control			
Internal temperature of held foods are checked every two hours	11(13.3)	29(35)	43(51.8)
Leftover foods are promptly cooled using acceptable methods	16(19.3)	9(10.8)	58(69.9)
Highly hazardous foods are cooked to temperatures >70 ⁰ C	6(7.1)	24(28.6)	54(64.3)
Leftover foods are reheated to temperatures >82 ⁰ C	12(14.3)	25(30)	47(56)
Prepared foods are never held at temperatures between 4 ⁰ to 140 ⁰ F	10(12)	24(29)	49(59)
Cross contamination			
Ready to eat foods and raw foods are prepared separately	8(9.6)	5(6.0)	70(84.3)
Work surfaces are sanitized after cutting raw food	6(7.2)	6(7.2)	71(85.5)
Work surfaces are sanitized before Beginning work	7(8.6)	12(14.8)	62(76.5)
Different color coded chopping boards are used for specific jobs	9(11.0)	14(17.0)	59(72)
Ready to eat and raw foods are stored separately	6(7.2)	7(8.4)	70(84.3)
Periodic facility cleaning is done	9(11.0)	10(12.2)	63(76.8)
Purchasing and storage			
Food is purchased from approved suppliers	5(6.0)	14(16.7)	65(77.4)
Receiving of supplies is strictly done against specifications	9(10.7)	10(11.9)	65(77.4)
Supplies that do not meet the standards are rejected	9(10.8)	12(14.5)	62(74.7)
Food is stored using FIFO method	12(14.5)	14(16.9)	57(68.7)
Food safety training and rules			
Foodservice employees are oriented on FSM rules upon employment	8(9.4)	10(11.8)	67(78.8)
Food safety trainings are organized for food handlers	8(9.4)	15(17.6)	62(73)
Food safety rules are displayed on the notice boards for easy access	17(20.7)	13(15.9)	52(63.4)
Physical features			
Food preparation areas are well lit and ventilated	8(9.4)	3(3.5)	74(87.1)
Different storage areas have correct temperature readings	7(8.2)	8(9.4)	70(82.4)



Table 6a

Pearson Correlation on the Relationship between Food Safety Knowledge and Practice Food Safety

Knowledge	Practice of PH		Practice of TC	
	r-value	p-value	r-value	p-value
Circumstances for double hand washing technique	r = -0.350	p = 0.001*	r = -0.350	p = 0.001*
Ways that food contamination may occur	r = -0.104	p = 0.336	r = -0.354	p = 0.01*
Vehicle for food contamination	r = -0.172	p = 0.113	r = 0.366	p = 0.001*
Stages in the food flow likely to cause food contamination	r = 0.229	p = 0.035*	r = 0.208	p = 0.058
Causes of food-borne illness	r = 0.247	p = 0.023*	r = 0.255	p = 0.019*

*significant at 0.05 level

NB: PH – Personal Hygiene

TC – Temperature Control

Table 6b

Pearson Correlation on the Relationship between Food Safety Knowledge and Practice Food Safety

Knowledge	Practice of CC		Practice of PS	
	r-value	p-value	r-value	p-value
Circumstances for double hand washing technique	r = 0.301	p = 0.005*	r = -0.260	p = 0.017*
Ways that food contamination may occur	r = -0.031	p = 0.781	r = 0.053	p = 0.632
Vehicle for food contamination	r = 0.129	p = 0.242	r = -0.057	p = 0.612
Stages in the food flow likely to cause food contamination	r = 0.287	p = 0.008*	r = 0.297	p = 0.006*
Causes of food-borne illness	r = 0.197	p = 0.072	r = 0.190	p = 0.086

*significant at 0.05 level

NB: CC – Cross Contamination PS – Purchasing and Storage

Discussion

The results from this study reveal that there is no significant relationship between knowledge and practice of food safety management ($r = .174, p > .05$). This finding corroborates previous studies on knowledge and practice of FSM which have shown that knowledge does not necessarily translate into practice (Sneed, Strohbehn, & Gilmore 2004; Seaman & Eves, 2010; Howells et al., 2008; Roberts et al., 2008; Neal, Binkley, & Henroid, 2012). All these studies suggest that there is a problem with the training provided. No wonder MacAuslan (2003) state that training in food safety relies too heavily upon attaining a certificate rather than paying attention to achieving competency in food hygiene practices. Egan et al., (2007) argue that majority of food safety courses rely solely on the dissemination of information with very little emphasis on practice which is ineffective. Moreover, Neal et al., (2012) concur that traditional approaches used to educate and train employees (such as Servsafe) may not be particularly effective and new behavior-based approaches that include food safety education as part of the culture of the organization need to be developed. As a result, Clayton and Griffith (2008) suggest that behavioral changes in food safety will not occur as a result of training alone.

Conclusion

From this study it was concluded that food handlers have adequate knowledge on food safety however, practice of food safety by the food handlers was inadequate and therefore, there is no relationship between knowledge and practice of food safety management among food handlers.

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