

Full Length Research Paper

Knowledge of food borne infection and food safety practices among local food handlers in Ijebu-Ode Local Government Area of Ogun State

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Received 5 July, 2015; Accepted 5 August, 2015

Increase in food borne infection has been linked with the lack of knowledge of food borne infection (FBI) and poor food safety practice (FSP) of food handlers. This is a major determinant of the kind of patronage received by local restaurants and fast food restaurants. This study was carried out to assess the knowledge of FBI and FSP of local food handlers in Ijebu-Ode Local Government Area of Ogun State. Four hundred and seventy three local food handlers (snacks and cooked food handlers) were recruited for the study. Interviewer's administered questionnaire was used to gather information on knowledge and practice and a score index was then created. Data was analyzed using SPSS version 15. Frequencies, percentages, Chi square and correlations were done. The results revealed that majority (66.4%) of the respondents were female and 17.0% food handlers had no formal education. Majority (84.5%) of the respondents earned below ₦30,000. About 41.6% food handlers had poor knowledge FBI. Only 7.6% respondents had adequate knowledge. Also, 31.5% respondents had poor FSP. Educational qualification of respondents had a significant relationship with their knowledge of FBI ($P=0.001$) and it also significantly affected their FSP ($P=0.0011$). Furthermore, monthly income of respondents did not affect the practice of FSP ($P=0.216$) and the type of outlet of respondents had no significant effect on FSP ($P=0.654$). Knowledge of FBI and FSP of food handlers have a poor correlation coefficient ($r<0.24$). The knowledge of FBI among food handlers is adequate, but this does not translate into practice.

Key words: Food vendors, food borne infection, food safety practices, knowledge score, disease outbreak, hygiene, micro-organism.

INTRODUCTION

Food borne infections (FBI) are infections caused by the ingestion of food containing pathogenic microorganisms

which multiplies within the gastrointestinal tract, producing widespread inflammation and is a significant

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public health problem with major economic and social effects (Altekruse and Swerdlow, 1996). Microorganisms commonly implicated are species of *Salmonella*, *Shigella*, *Escherichia coli* (pathogenic strains), *Bacillus* species, *Clostridium botulinum*, and *Listeria monocytogens*, viruses such as hepatitis A and E; Norovirus, molds, fungi and yeasts (Oranusi et al., 2011). FBI have incubation periods usually from 6 to 24 h or longer after ingestion and the causative organism may be identified by laboratory examination of the vomits, feaces, or blood of the infected individual and the suspected food (Sudershan et al., 2014). FBI includes salmonellosis, shigellosis typhoid fever, amoebic dysentery, gastroenteritis among many others.

FBI is usually characterized by diarrhea (which may be sometimes bloody) and vomiting. Symptoms may include fever and cold, headache, nausea, abdominal pain and cramps, distress, and weakness which in some instances may lead to respiratory arrest; other symptoms include signs of shock which include weak or rapid pulse or shallow breathing, confusion or difficulty reasoning (Mead et al., 1999).

Foodborne illness is a growing public health problem in developing as well as developed countries, causing morbidity and mortality in the general population, especially in vulnerable groups, such as infants, young children, elderly and the immunocompromised (Nyenje and Ndip, 2013; Fleury et al., 2008). Despite the efforts made on food safety and environment, 2.1 million adults and three million children, including two million in developing countries, die each year from water consumption or contaminated food (Sabir et al., 2013). Also, the World Health Organization (2007) estimated up to 1.5 billion episodes of diarrhoea and more than three million deaths occur in children every year as a result of food and water contamination.

It has been reported that an estimated 47.8 million, 2 million and 750,000 people become ill as a result of consumption of food containing pathogens or disease causing substances in the United States, United Kingdom and France, respectively while 5.4 million cases of food-borne illness was estimated to occur yearly in Australia, causing 18,000 hospitalizations, 120 deaths, keeping 21 million people away from work, 1.2 million people receiving medical consultations and 300,000 people receiving antibiotics prescriptions (Ifenkwe, 2012; Akintaro, 2012).

In developing countries, an estimated 70% of diarrheal episodes are associated with the ingestion of contaminated foods (WHO, 2008). Approximately 10 to 20% of food-borne disease outbreaks result from contamination of foods by the food handler (Gizaw et al., 2014; Zain and Naing, 2002). In African region, several devastating outbreaks of food borne diseases have been reported, including acute aflatoxicosis in Kenya in 2004 that was attributed to maize (Nyikal et al., 2004) and bromide poisoning in Angola in 2007 associated with the use of sodium bromide as cooking salt (Mensah et al.,

2012).

Inadequate food safety laws, weak regulatory systems, lack of financial resources to invest in safer equipment, inadequate knowledge of food borne diseases and their causes, improper handling of food and unhygienic environments among others have been identified as some of the causes of FBI (Haileselassie et al., 2013).

The changing patterns of food consumption have had a major influence in the increasing incidence of FBI. In the past, foods were produced and consumed locally (Fowora, 2012). A trend towards eating fresh unprocessed foods and processed foods without preservatives permits the growth of food borne pathogens (Altekruse and Swerdlow, 1996). Minimally processed and extended shelf life food also carries inherent risks for increased contamination.

Food handling personnel plays important role in ensuring food safety throughout the chain of food production and storage (Adewunmi et al., 2014; Green et al., 2006). Mishandling and disregard of hygienic measures on the part of the food vendors may enable pathogenic organisms gain entry and in some cases survive and multiply insufficient numbers to cause illness in the consumer (Tivadar, 2003). It has been observed that most of the vendors who sell both raw and cooked food items are not regulated. They operate haphazardly without any monitoring of what they prepare and how they prepare it (Adewunmi et al., 2014; Green et al., 2006).

The knowledge of food handlers about the food borne infections and their safety practices is an important issue in the outbreaks of food borne infection (Fowora, 2012). It has been revealed that in Nigeria, 27.7% of food handlers do not wash their hands before preparing food and 28.1% use only water to wash hands after using the toilet. It was also revealed that 90% of food handlers have heard about typhoid fever out of which only 15.6% of them know how it is contracted (Smith et al., 2010). Furthermore, large quantity of food produced and distributed gets to the consumers in an unwholesome condition due to poor handling methods, inefficient processing equipment and storage practices, high ambient tropical temperature and humidity conditions (Akintaro, 2012). In order to reduce or eliminate these outbreaks of infection through food, proper handling of food and food materials by vendors or food handlers cannot be over emphasized. Therefore, this study aims to assess the knowledge of food handlers on FBI and their safety practices.

MATERIALS AND METHODS

This study is cross sectional and descriptive in design and it was carried out in 8 out of the 11 wards in Ijebu-Ode Local Government Area where 473 food handlers were randomly selected for this study. A validated structured interviewer's administered questionnaire was used to obtain information on the socio-demographic and socio-economic characteristics of the respon-

Table 1. Gender, ethnicity and educational qualification of food handlers.

Variable	N	%
Gender		
Male	159	33.6
Female	314	66.4
Total	473	100
Ethnicity		
Hausa	47	10
Igbo	162	34.4
Yoruba	241	51.2
Others	21	4.5
Total	471	100
Educational qualification		
No formal education	80	17
Primary school education	105	22.3
Secondary school education	145	30.9
Tertiary education	140	29.8
Total	470	100

dents. Knowledge of food borne infection was assessed on a scale of 12 questions. A score of 1 to 4 was categorized as poor knowledge, 5 to 8 as average knowledge and 9 to 12 as adequate knowledge. Food safety practices of the respondents was also assessed on a scale of 10 questions and a score of 1 to 4 was categorized as poor food safety practice, 5 to 6 as average food safety practice and 7 to 10 as adequate food safety practices. Observation was also made on the cooking environment. Data was analyzed using Statistical Package for Social Sciences SPSS 16.

RESULTS AND DISCUSSION

The results of this study (Table 1) show that more females are involved in the food business. Adewunmi et al. (2014) reported that 100% of food handlers were females in a study among food vendors in selected secondary schools in Ogun State, Nigeria. Other studies in Nigeria also reported the same (Afolaranmi et al., 2015; Isara and Isah, 2009; Chukuezi, 2010; Musa and Akande, 2003). However, Kasturwar and Shafee (2011) reported that 62.7% of food handlers assessed in a Rural Private Medical College in India were males. About 31% of the food handlers in this study had only secondary school education. Some other studies reported similar findings (Thidarat et al., 2011; Oridota et al., 2014). Just about a quarter of the respondents in this study had tertiary education. As a result, they may have little or no knowledge on proper handling and hygienic practices of food and food materials, hence, contributing immensely to food contamination by pathogenic microorganisms.

About 40% of the food handlers had a monthly income below ₦15,000 (75 US dollar) and more than 50% of them are involved with snacks production (Table 2).

Since snacks production does not require huge amount of money, the monthly income of respondents may be a major determinant of the type of food sold by the food handlers.

Knowledge of FBI

Figure 1 shows that about half of the respondents (50.7%) had average knowledge of food borne infection; 41.6% had poor knowledge and only 7.6% had adequate knowledge. This result disagree with the report of Labib et al. (2013) where majority of food handlers had excellent knowledge of FBI. More than one-third (41.6%) of the food handlers in this study had poor knowledge of FBI and this implies respondents are not likely to put in place the food safety measures required to prevent food borne infection and ensure food safety. This result is similar to some reports which show that a large number of food handlers had poor knowledge of FBI (Zain and Naing, 2002) and food safety (Gizaw et al., 2014).

Factors affecting the knowledge of FBI

Though research has shown that female food handlers maintain better personal and food hygiene than male food handlers (Kasturwar and Shafee, 2011), gender, the type of food sold and ethnicity did not have a significant relationship with the knowledge of FBI among the food handlers ($P = 0.858, 0.654, \text{ and } 0.417$, respectively). Factors identified to contribute to the knowledge of FBI

Table 2. Type of food sold and monthly income of respondents.

Variable	N	%
Types of food sold		
Snacks	263	55.7
Cooked food	209	44.3
Total	472	100
Monthly income (₦)		
Below 5000	106	22.5
5000 – 14,999	186	39.5
15,000 – 29,999	106	22.5
30,000 and above	73	15.5
Total	471	100

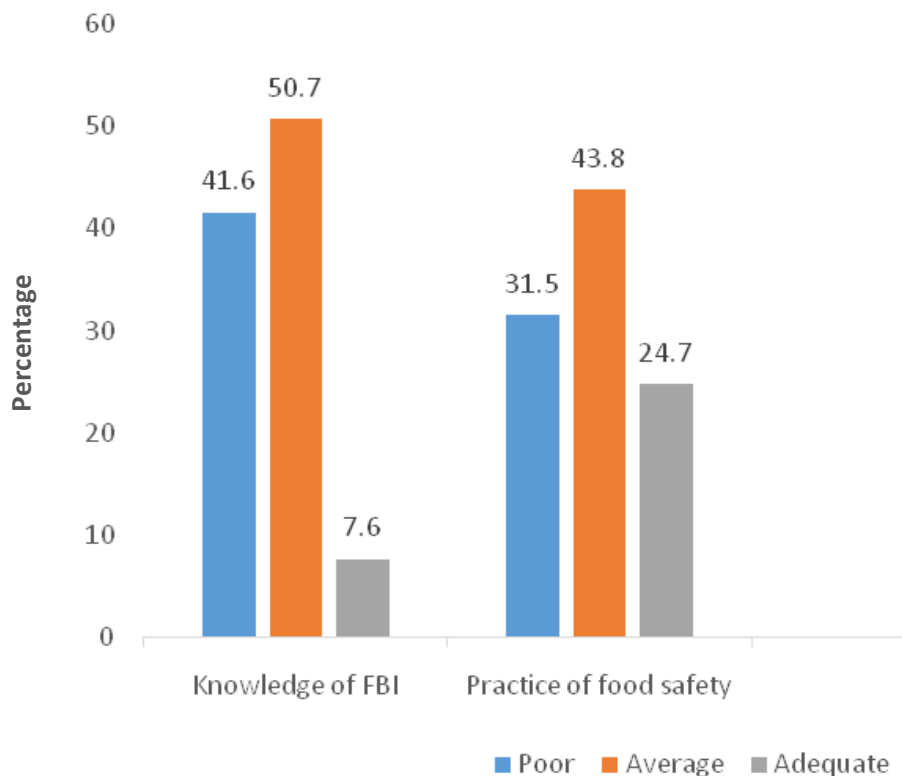


Figure 1. Knowledge of FBI and food safety practices.

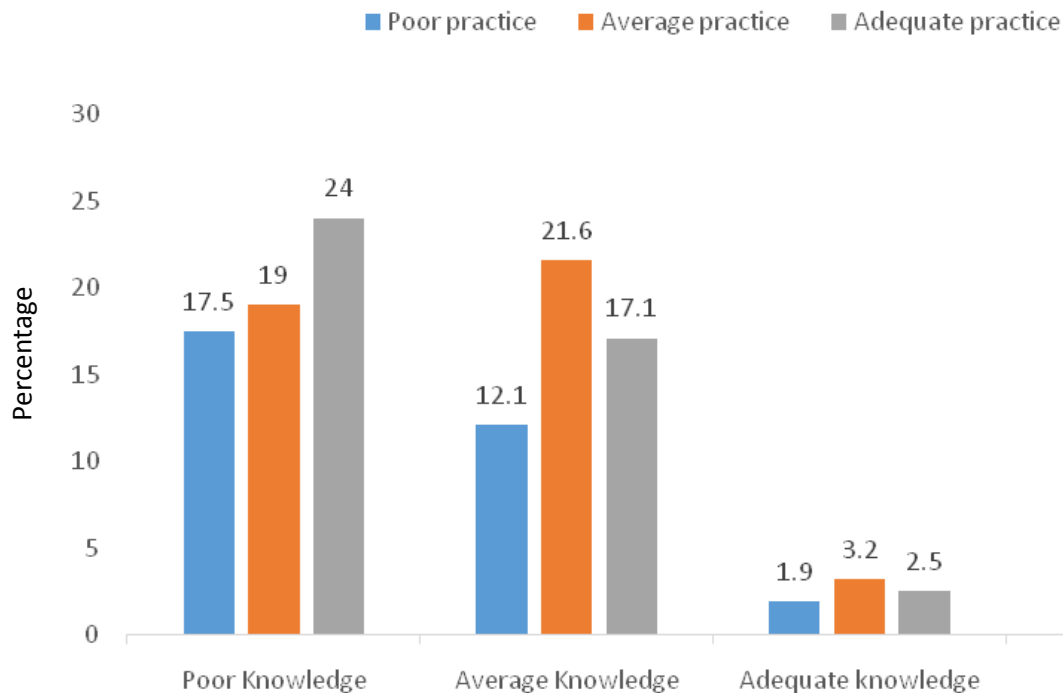
include income and educational level of the food handlers. It was observed from this study that the higher the educational level of the respondents the higher their knowledge of food borne infection ($P = 0.001$). A study in India (Kasturwar and Shafee, 2011), Jordan (Labib et al., 2013) as well as a study in Northwest Ethiopia (Labib et al., 2013) established that poor knowledge of food borne infections was due to low educational level. Another study in Malaysia (Mizanur et al., 2012), however identified ethnicity and age as important factors for good knowledge of food safety (Table 3).

Food safety practices

About one-third (31.5%) of the respondents had poor food safety practices as observed in Figure 1. This study is similar to the report of Gizaw (2014) where 22.10% food handlers had poor food safety practices. It has been reported that food handlers do observe food safety practice like personal hygiene and hand washing, food separation, sickness leave from work, vaccination or deworming, use of gloves, mask and cap (Anuradha and Dandekar, 2014). It was also observed in this study also

Table 3. Knowledge of FBI by educational qualification and monthly income.

Variable	Poor knowledge [N (%)]	Average knowledge [N (%)]	Adequate knowledge [N (%)]	Total [N (%)]	P- value
Educational qualifications					
No formal education	55 (11.7)	23 (4.9)	2 (0.4)	80 (17)	0.001
Primary education	54 (11.5)	45 (9.6)	6 (1.3)	105 (22.3)	
Secondary education	54 (11.5)	79 (16.8)	12 (2.6)	145 (30.9)	
Tertiary education	33 (7.0)	91 (19.4)	16 (3.4)	104 (29.8)	
Total	196 (41.7)	238 (50.6)	36 (7.7)	471 (100)	
Monthly income					
Below 5000	52 (11)	42 (8.9)	12 (2.5)	106 (22.5)	0.006
5000 – 14,999	83 (17.6)	97 (20.6)	6 (1.3)	186 (39.5)	
15,000 – 29,999	40 (8.5)	58 (12.3)	8 (1.7)	106 (22.5)	
30,000 and above	21 (4.5)	43 (9.1)	9 (1.9)	73 (15.5)	
Total	196 (41.6)	240 (51)	35 (7.4)	471 (100)	

**Figure 2.** Relationship between knowledge of FBI and food safety practice.

that about half (43.8%) of the food handlers interviewed had moderate food safety practice, although the specific practices observed by these food handlers were not assessed.

From this study, food safety practice score was significantly different among the gender group. Female food handlers had better practice score than the male ($P = 0.011$). A study by Kasturwar and Shafee (2011) reported that female employees maintain proper personal and food hygiene and they are more careful in safe food handling than men. The level of education of the

respondent was another factor that contributed to food safety practice ($P = 0.001$). A study by Mizanur et al. (2012) showed that training in food safety significantly increased food safety practice among food handlers in Kuching city in Malaysia. Although training in food safety was not assessed in this study, it is evident that the level of education of respondent is a major contributing factor to both the knowledge of FBI and food safety practice. Monthly income, type of food sold, and ethnicity did not significantly relate with food safety practice ($P = 0.216$, 0.654 , and 0.777 , respectively) (Figure 2).

Several studies have observed that adequate knowledge of FBI and knowledge of food safety do not necessarily translate into adequate food safety practice (Pragle et al., 2007; Clayton and Griffith, 2004). The findings of this study were not completely different. Knowledge of FBI in this study was poorly correlated to food safety practice ($r = 0.24$). Knowledge of FBI alone cannot be used to predict good safety practice. Other explanatory variables such as training of food handlers, environmental hygiene of food outlets, food control monitoring and food borne disease surveillance not assessed in this study may also contribute to good safety practice.

Observational report

During the data collection and interview of respondents, the following were observed:

- (1) Most of the food handlers prepared cooked food in uncovered space while some prepared cooked food under wooden structures. A study carried out in Ghana showed that there are variations in food hygiene standards among food handlers in different set ups (Tomlins et al., 2002).
- (2) Some of the outlets are either located close to a refuse dump, water way or are on the highway.
- (3) For cooked food handlers, water used in washing and rinsing plates often gets very dirty before they are changed while some do not allow water used in rinsing plates to drain before the plates are used to serve food.

Conclusion

More than 40% of the respondents have poor knowledge of FBI and about one-third indulges in poor food safety practices. The level of education of the respondents was identified as the major contributing factor to good knowledge of FBI and practice of food safety. Knowledge of FBI was poorly correlated to good safety practice. It could only predict about 20% good safety practice.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

- (1) Since education is a major contributing factor to good knowledge of FBI, training of food handlers on prevention of food contamination, personal hygiene and how to ensure food safety should be encouraged.
- (2) A regular food control monitoring and evaluation of food handlers on their food safety practice and hygiene should be encouraged.
- (3) A routine inspection of environmental hygiene of the

food outlets should be carried out.

Conflicts of interest

Authors have none to declare.

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