Original Research Article

Assessment of Food Hygiene among Food Handlers in Ebonyi State, Nigeria.

Abstract

Background: Food handlers have an important role to play in food businesses and that is to guarantee that meals served are hygienic for consumption. Conscious or inadvertent contamination of such food places consumers at risk of suffering food-borne illnesses. The aim of this study was to determine the attitude and practice of food hygiene among food handlers in Ebonyi State Nigeria.

Methodology: This was a cross-sectional study in design. A multi-stage sampling technique was used to select 170 respondents. Data were collected using pre-tested interviewer-administered questionnaire and observational checklist. Statistical analyses (proportions, chi-square tests) were carried out using IBM-SPSS version 20.

Results: Majority (75.9%) of the study participants were females, 84.1% were in the age range of 20-49 years. Most of the respondents (98.2%) had one form of education or the other. Only 4 (2.4%) of the restaurants had adequate physical infrastructure, availability of water supply, toilet facility, refuse and dish/hand washing facilities. Slightly above half (52.9%) of the study subjects had positive attitude toward food hygiene while only 27.6% had good practice. Only 33.5% of them wore apron, 27.1% covered their head, 18.2% did not handle money while serving food to consumers. There were however significant associations between level of education and infrastructure/environment of food premises with attitude and practice of food hygiene.

Conclusion: Though there was some level of positive attitude toward food hygiene, their practice was poor. Only few restaurants had adequate infrastructure for operation. Thus, there is high risk of food contamination in the food businesses. Health education intervention programs for food handlers will help to prevent food-borne diseases/illnesses. Also regulatory agencies and government should ensure that all food premises used for preparation and sale of food to the public meet the minimum standard for operation.

Key words: Food handlers, hygiene, attitude, practice.

1.INTRODUCTION

Food hygiene deals with practices in food handling that helps to keep food clean and safe to bacterial, fungal or viral contamination of food [1, 2].The primary aim of food hygiene is to prevent food poisoning and other food-borne illnesses. Food borne disease is a problem in both developing and developed countries. It is a strain on health care system and severely affects people's health and well-being. The economic consequences for individuals, families, communities, the food industry and the national economy are enormous [3].

Symptoms of food poisoning such as diarrhea, abdominal cramps and pain mirror those of other common gastro-intestinal illnesses. It has been estimated that each year about two million people die of diarrheal diseases worldwide and most of these cases can be attributed to contaminated food and water [4, 5].This figure calls for concern since food- borne illnesses are grossly under-reported. Reported outbreaks of food poisoning affect large segments of the population and often result in hospitalizations and illnesses [6-8]. Practices identified as contributing to some of these outbreaks include prolonged handling, inadequate re-heating of cooked food and contamination by food handlers who worked while ill or had poor personal hygiene [8-11].

Food handlers play an important role in the spread of food borne pathogens and constitute a significant risk to the spread of food-borne diseases [3-4].They carry pathogens on their skin, nose and throat without experiencing any serious ill-effect themselves. These pathogens can be transferred to food if they fail to observe proper food and personal hygiene. Food handlers have a prime role to play in ensuring that meals served through their business are hygienic for consumption. Conscious or inadvertent contamination of such food places consumers at risk of suffering food-borne illnesses [1, 2].

The aim of the study was to determine the attitude and practice of food hygiene among food handlers in restaurants in Ebonyi State, Nigeria. The study was aimed at generating useful result for policy makers. The findings will contribute to formulating new food safety policies as well strengthening existing strategies for safeguarding of consumers from food- borne diseases associated with poor sanitation in food management. Additionally, since there is a limited research in the study area, this study can be used as a benchmark for further studies.

2. METHODOLOGY

2.1 Study Area

The study was carried out in Ebonyi State, Nigeria. Ebonyi State was created from old Enugu and Abia State in the South-East zone of the Federal Republic of Nigeria. The State lies between $7^{0}3^{|}$N longitude,$5^{0}4^{|}$E with a land mass approximated at 5,932 square kilometers [13]. Ebonyi people are mainly agrarian. The State has a rich reservoir of cultural heritage which provides the basis for the peaceful and harmonious co-existence of its various communities, thereby promoting socio-cultural and ancestral commonality. The main towns in Ebonyi State are Abakaliki, Afikpo, Onueke, Uburu, Nkalagu, Ezillo, Ishieke, Ezzamgbo, Nwezenyi, Nwofe, Ekoli, Owutu, Iboko, Amasiri, Onicha, Ebunwana, Agubia, Onuebonyi, Echara and Isu.

2.2 Study Population

The study population comprised of all food handlers in food service establishments.

2.3 Sample Size Estimation

A sample of 170 was calculated based on the assumption of 95% confidence interval and 5% expected error margin using the formula for calculating sample size for descriptive studies in population greater than 10,000; $n=z^2pq/d^2$ [14] where n=calculated sample size, z=standard normal deviate at 95% confidence interval=1.96, p=proportion of food handlers with good practice of food hygiene (50%) [14], q=the complement probability of p which is (1-p) that is proportion of food handlers with poor practice of food hygiene (50%), d=precision level, 5%=0.05. Calculated sample size (n) = $(1.96)^2$x(0.5)x(0.5)/$(0.05)^2$ =384. The study population, N =308 food handlers. Correction for finite population less than 10,000 is given by; final sample size (n_f) [14] = n/1+(n)/N=384/1+384/308=170.

2.4 Study Design /Sampling Technique

This was a cross-sectional study designed to determine the attitude and practice of food hygiene among food handlers in Ebonyi State , Nigeria . A multi-stage sampling technique was used to select study subjects. The first stage: of the 3 senatorial zones in Ebonyi State (north, central and south), 2 senatorial zones (north and central) were selected by simple random sampling(balloting) method . Secondly, two major towns each were selected from the 2 chosen senatorial zones (Onueke, Achara, Onuebonyi and Ezzamgbo) by simple random sampling method. Thirdly, a comprehensive list of food handlers in existing catering establishments was prepared in the four towns chosen. It included their names and addresses (location of restaurants).The list of food handlers formed the sampling frame in each town and respondents were selected using of table of random numbers [15, 16].

2.5 Selection Criteria

Food handlers in the four major towns were selected for the study. Street food vendors were excluded.

2.6 Data Collection /Analysis

The study instruments were questionnaire and observational checklist. There were pretested among food handlers /restaurant in south senatorial zone outside those of the study population for validity [14].The questionnaire consisted of characteristics of study subjects/food premises adapted from previous studies [17, 18], questions on attitude adapted from previous studies [18, 19], modified questions from literatures for practice of food hygiene [17,19,20].Observational checklist for appraisal of food premises was adapted from National Environmental Policy [21]. It was used to explore the environmental component of food hygiene. Data collected include - physical infrastructure of restaurants, availability of water supply, toilet facility, refuse management and dish /hand washing facilities.

Comment [WK1]: Long sentence

Fourteen items were used to assess infrastructure /environment of food premises. The scoring was as follows: Item was adequate = 3, item need minor corrective action = 2, item need major corrective action = 1and item not available = 0. The scores were summed and divided by 14 to

get each restaurant's average score. Type of food premises (restaurants) were categorized as follows: adequate (average score of 3) and inadequate (average score of less than 3) [21, 22].

There were 10 questions based on attitude of food handlers toward food hygiene. A 3-point likert scale was used for the analysis of the responses. For positive questions, 3points for agree, 2points for indifferent and 1point for disagree. For negative questions, the scoring was as follows: 3points for disagree, 2points for indifferent and 1point for agree. The mean scores of the weighted responses to the attitudinal questions were calculated. Mean score also known as the cut-off point equaled to the sum of the likert scores divided by 3. For example, 3+2+1 divided by 3 would give a score of 2. The total score of the subjects/ respondents were calculated and divided by 10 (number of attitudinal questions to get the mean respondent's score. A score of less than 2 was graded as negative attitude and ≥ 2 as positive attitude [22].

There were 20 questions based on the practice of food hygiene among food handlers. A three - point score scale was used for the analysis of the responses (3points for always, 2points for sometimes, 1point for never /not done). A total of 60 maximum achievable points were used for practice of food hygiene among study subjects. A score of 0-11 marks out of the maximum marks was graded as poor practice while a score of 12-20 marks (≥60%) was graded as good practice [17,23,24].

Statistical package for social sciences (IBM-SPSS) version 20 was used for the analysis of the data. Descriptive statistics of the variables were presented in frequency table and proportions were calculated. The chi-square tests were carried out to test for the associations between the variables and the level of significance set at $p<0.05$ and confidence interval at 95%.

2.7 Ethical Considerations

Approval for this study was obtained from Research and Ethics Committee of the Federal Teaching Hospital Abakaliki, Ebonyi tate, Nigeria. Informed consent was obtained from food handlers after full explanation of the study purpose to them and their rights as participants were provided by the interviewer.

3.RESULTS

The characteristics of respondents /food premises are shown in Table 1. Responses from one hundred and seventy food handlers were analyzed. One hundred and twenty nine (75.9%) of the respondents were females while 41(24.1%) were males. Most of the study participants 143(84.1%) were in the age range of 20-49 years while 15(8.8%) were teenagers (age less than 20). A majority 167(98.2%) of the respondents had completed one form of formal education or the other with the highest proportion (52.9%) in the secondary cadre. However, only 48(28.2%) had undergone /attended food hygiene training workshop organized by the State or Local Government authorities in the past. Sixty-five (38.2%) had worked in the restaurant for 1-3years.This was followed by those who had spent less than a year (23.5%). Only 4(2.4%) of the respondents had adequate physical infrastructure, availability of water supply, toilet facility, refuse management and dish /hand washing facilities.

Table 2 shows that 52.9% of the respondents had positive attitude toward food hygiene while only 27.6% had good practice of food hygiene.

Table 3 shows the relationship between food handlers' attitude toward food hygiene and their work profile. Analysis of the factors showed that level of education ($p=0.0017$) and infrastructure/environment of food premises ($p=0.001$) influenced the attitude of food handlers toward food hygiene.

Table 4 shows that there were statistically significant associations between practice of food hygiene and level of education ($p=0.016$) and infrastructure/environment of food premises ($p=0.001$).

Table 5 shows that only 33.5% of the respondents wore apron on top of their clothes while at work, only 27.1% covered their head and only18.2% of the study participants did not handle money while serving food to consumers.

174 Table 1: Characteristics of study subjects/food premises

Characteristics	Variables	Frequency n = 170	Percentage (%)
Gender	Male	41	24.1
	Female	129	75.9
Age group(in years)			
	<20	15	8.8
	20 – 29	69	40.6
	30 – 39	44	25.9
	40 – 49	30	17.6
	>49	12	7.1
Marital Status			
	Single	74	43.5
	Married	96	56.5
Level of education			
	None	3	1.8
	Primary	47	27.7
	Secondary	90	52.9
	Tertiary	30	17.6
Duration of service (in years)			
	<1	40	23.5
	1 – 3	65	38.2
	4 – 6	28	16.5
	>6	37	21.8
Previous training			
	Yes	48	28.2
	No	122	71.8
Infrastructure/			

environment of food premises			
	Inadequate	166	97.6
	Adequate	4	2.4

Table 2: Overall attitude and practice of food hygiene

Characteristics	Variables	Frequency n = 170	Percentage (%)
Attitude categories			
	Negative	80	47.1
	Positive	90	52.9
Practice categories			
	Poor	123	72.4
	Good	47	27.6

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187 Table 3:Respondents'/restaurants' attributes and attitude toward food hygiene.

Characteristics	Variables	Negative	Positive	X^2 (p-value)
Level of education				
	None	2(66.7)	1(33.3)	
	Primary	33(70.3)	14(29.8)	15.073
	Secondary	60(66.7)	30(33.3)	(0.0017)
	Tertiary	9(30.0)	21(70.0)	
Duration of service (in years)				
	<1	28(70.0)	12(30.0)	
	1 – 3	44(67.7)	21(32.3)	4.613
	4 – 6	15(53.6)	13(46.4)	(0.202)
	>6	19(51.4)	18(48.6)	
Previous training				
	Yes	27(56.2)	21(43.8)	0.277
	No	74(60.7)	48(39.3)	(0.598)
Infrastructure/ environment of food premises				
	Inadequate	105(63.3)	61(36.7)	6.617
		0(0.0)	4(100.0)	(0.01)

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193 Table 4: Respondents'/restaurants' attributes and practice of food hygiene

Characteristics	Variables	Poor	Good	X^2 (p-value)
Level of education				
	None	1(33.3)	2(66.7)	
	Primary	37(78.7)	10(21.3)	10.273
	Secondary	67(74.4)	23(25.6)	(0.016)
	Tertiary	15(50.0)	15(50.0)	
Duration of service (in years)				
	<1	32(80.0)	8(20.0)	
	1 – 3	45(69.2)	20(30.8)	1.776
	4 – 6	19(67.9)	9(32.1)	(0.62)
	>6	27(73.0)	10(27.0)	
Previous training				
	Yes	27(56.3)	21(43.7)	3.537
	No	87(71.3)	35(28.7)	(0.06)
Infrastructure/ environment of food premises				
	Inadequate	123(74.1)	43(25.9)	10.72
	Adequate	0(0.0)	4(100.0)	(0.001)

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Table 5: Food hygiene practices observed on food handlers

Conditions	Frequency (%)	n = 170
	Yes	No
Use of apron	57(33.5)	113(66.5)
Hair covering	46(27.1)	124(72.9)
Well kept fingernails	107(62.9)	63(37.1)
Handling of money while serving food	139(81.8)	31(18.2)
General cleanliness	120(70.6)	50(29.4)

4. DISCUSSION

The female respondents form the predominant part of the workers in this study (75.9%).This is however not surprising since female are naturally endowed with food handling. This finding is also similar to other studies which shows more female involvement in food businesses than males [17, 25,26].The food handlers in this study were predominantly adults with only 8.8% of them as teenagers, a finding higher than that of 6.6% reported in Benin city [17] and of 3.2% reported at Ilorin[26]. The high proportion of respondents who had finished secondary education (52.9%) and working in food service establishment could be those who are waiting to secure admission into institution of higher learning. This finding is consistent with study in Benin City [17]. The proportion of the respondent that have completed their tertiary education was 17.6%.The higher level of literacy among the respondents in this study (70.5%) can be utilized as an opportunity for an effective training program to improve their practice of food hygiene.

In this study, only 28.2% of the respondents had received formal training in food hygiene. Previous studies had also reported few respondents to have undergone food hygiene training / health education prior to the study: 32.1% in FCT Nigeria [25], 47.4% in Benin City [17], 27.8% in Delhi [27], 32.9% in Abakaliki Nigeria [24]. Lack of training /health education program for

food handlers in these studies could be attributed to laxity on the part of the management of food service establishment / government who should ensure training of food handlers. Such lack of training has been reported to increase the likelihood of food contamination [28]. Food handlers therefore need to be educated or trained on basic principles of food safety [19, 20, 22, 24,29].

Infrastructure/environment of food premises was associated with overall attitude of food handlers toward food hygiene (p=0.01) and practice of food hygiene (p=0.001). An evaluation of food hygiene, knowledge, attitude and practices among food handlers in food businesses in Accra Ghana also shown that good practices was influenced by the type of food premises (restaurants) as there was correlation between services offered by different restaurant and the level of contamination [30]. A study of hand washing practice of food handlers in the hospitality establishment of Peshawar city also showed that better practice was associated with type of food premises [31]. Only 4(2.4%) of the restaurants in this study had adequate physical infrastructure, availability of water supply, toilet facility, refuse management and dish/ hand washing facilities. Infrastructure/ environment where food handlers work have been shown in this study to influence attitude and practice of food hygiene. Regulatory agencies and government of Ebonyi state, Nigeria should ensure that all food premises used for the public meet the minimum standard for operation as set by the Federal Ministry of Environment [21].

The food hygiene practices observed on food handlers in this study were poor. Only 33.5% wore apron, 27.1% covered their head, only 18.2% did not handle money while serving food to consumers. The overall good practice of food hygiene among the respondents was very low (27.6%). There was a statistically significant association between education and practice of food hygiene (p=0.016). Since majority of the respondents (98.2%) had completed one form of education and the other, the management of the restaurants should inculcate in-service training/ education to improve their practice of food hygiene

5. CONCULSION

Though there was some level of positive attitude toward food hygiene among the respondents, the overall good practice among them was very low. There were however statistically significant associations between level of education and type of food premises with attitude and practice of food hygiene. It is therefore recommended that massive health education intervention programs

for food handlers be embarked on, to enable them take necessary steps to prevent food borne diseases/illnesses. This will help to reduce morbidity and mortality due to food borne diseases.

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