
Assessment of Food Hygiene Practices in Abia State, South East Nigeria

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Abstract: This study was to determine the food hygiene practices among food handlers in Abia State, South East Nigeria. The study employed a cross sectional research design. A walk-through inspection and food hygiene checklist were used and vetted by Federal Ministry of Environment for its relevance to the studied objective. Analysis of data used was Statistical Package for Social Science (SPSS) version 20.0. The results showed that 150(21.3%) of the respondents undergone training on how to prepare food for human consumption and 179(32.5%) were aware of the 5 keys principles to safeguard food such as keeping clean, separate raw and cooked, cook thoroughly, keep food at safe temperatures. Majority 298(54.2%) of the food handlers had 6-10 years experience of food hygiene practices and it proved a statistical insignificant ($p > 0.05$) between food preparation and years of experience. The highest percentage (94.9%) do wear clean apron and 171(31.1%) cut their fingernails and keep clean. Twenty percent (20%) agreed it is necessary to go for food medical examination. In conclusion, food handlers had a moderate knowledge of food hygiene practices because of educational influence in relation to the 5 keys principles. Therefore, food handlers must be inspected by environmental health officers to ensure human body or food premises do not contaminate food for human consumption.

Keywords: Food, Hygiene, Pathogen, Food-Borne Infections and Abia State

1. Introduction

Food is very important for living organism and it can be describe as any substance in form of solid or liquid that is taken into the body, which nourishes the body, providing energy, builds the body, replenishing worn-out tissues and regulate body processes [1]. Food hygiene can simply mean the preservation and preparation of food in a hygienic manner to ensure that food is safe for human consumption [2, 3]. Food hygiene in every home includes proper storage of food before use, washing one's hands before handling food, maintaining a clean environment when preparing food and making sure all serving dishes are clean and free of

contaminants [4]. According to Isaac et al., [5] and Amadi, [6], the principles of food hygiene include pre-employment and periodic medical examination of all food handlers, daily inspection of service staff to ascertain their health status, sick staff or vendors should be excluded from duty, all suspected cases of infection should be reported to the medical officer and management, there should be pre-deployment training, there should be clean apron to be worn by the staff while on duty, food should not be touched by a staff after he/she has touched animals without washing his/her hand, staff should be neat in appearance, hairs and nail should cut short while on duty, all cuts and sores must be properly covered and all food must be covered and protected. Poor handling of food can

lead to food borne illnesses which are a growing public health concern worldwide and results from food contaminated by pathogenic microorganism, mycotoxins or chemical hazards [6-8].

For the fact that food is contaminated by pathogenic microorganism, the incidence of food borne illness is still on its increase in which the Center for Disease Control and Preservation (CDC) estimates shows an annual occurrence of 47.8 million, 2 million and 750,000 food borne illnesses in the United State, United Kingdom and France respectively [9]. It is still yet to proved scientifically, if some African foods are free from contamination during food processing [10]. Epidemiologically, Nigeria's food have had fared better records on food problems considering the fact that a large quantity of food produced and distributed in Nigeria today get to the consumers in an unwholesome condition [11].

The determinant factors that enhance the occurrence of food borne illnesses are poor handling methods, inefficient processing, equipment and storage practices, high ambient tropical temperature and humidity conditions. These factors promote rapid bacterial decomposition, fungus contamination, and insect infestation, resulting in dietary inadequacies, excesses and in balances use of cooking substances [6]. Again, inadequacy of Environmental Health Officers in the country for the inspection of food processing and the premises has also contributed to increase in the food crisis.

Grace [12] opined that in an establishment, there is Hierarchy of hazard control employee needs to adhere which includes engineering controls (machine guards and other safety devices); administrative controls (policies that limits employee exposure to hazards); and personal protective equipment (including puncture resistance gloves, respirators, foot wear, aprons and other devices). Considering the economic situation of the country today, many people cannot afford to prepare food in their respective homes rather eating outside their homes more frequently, and microbes spread via poor hygiene practices. Therefore, this study was aimed to determine the food hygiene practices among food handlers in Abia State, South East Nigeria.

2. Materials and Methods

The study was carried out in Abia State which is located in the South-East geopolitical zone of Nigeria between longitudes 7° and 8.5° East and latitudes 4.5° and 6° North. The study employed a cross sectional research design. A walk-through inspection and food hygiene checklist were used and vetted by Federal Ministry of Environment for its relevance to the studied objective. In the study, a total of 550 samples was used and the sampled areas in the state were Aba North (143 samples), Aba South (89 samples), Osisioma (123 samples), Ugwunagbo (113 samples) and Obingwa (82

samples). Analysis of data was done using the Statistical Package for Social Science (SPSS) version 20.0. Influential statistical was used to determine the influence of dependent and independent variables at the significant level of 0.05.

3. Results

Table 1. Demographic Features of Food Handlers in Abia State.

Statement	Frequency	Percentage
Age of the Food Handlers		
Below 20 years	16	2.9
20-29 years	174	31.6
30-39 years	225	40.9
40-49 years	71	12.9
Greater than 50 years	64	11.6
Total	550	100
Sex of the Food Handlers		
Male	263	47.8
Female	287	52.2
Total	550	100
Food Service Organizations of Food Handlers		
Fast food	68	12.4
Food vendor	216	39.3
Abattoir	62	11.3
Dry food	204	37.1
Total	550	100
Experience of Food Handlers in years		
1 – 5yrs	169	30.7
6 – 10 yrs	298	54.2
11 – 15 yrs	77	14
16 – 20 yrs	6	1.1
Total	550	100
Educational Attainment of Food Handlers		
None	14	2.5
Primary school	132	24
Secondary school	347	63.1
Tertiary Institution	56	10.2
Post-graduate	1	0.2
Total	550	100

Table 1 depicts the demographic features of food handlers selected in Abia State. The age of the food handlers; those with less than 20 years recorded 16(2.9%), 174(31.6%) were between 20-29 years, 30-39 years had 225(40.9%), 40-49 years had 71(12.9%) while 50 years above had 64(11.6%). Sex of the food handlers showed that males were 263(47.8%) while females had 287(52.2%). Food service organizations of food handlers recorded as follows; food vendors 216(39.3%), fast food 68(12.4%), abattoir 62(11.3%) and dry food 204(37.1%). Years of experience of food handlers; majority had 298(54.2%) between 6-10 years while the least was 16-20 years with 6(1.1%). From the result, highest percentage (63.1%) of the food handlers attained Secondary education and postgraduate recorded 0.2%.

Table 2. Food Hygiene Practices among Food Handlers in Abia State.

Statement	Frequency	Percentage
Do employee wore clean and proper uniform		
Yes	522	94.9
No	28	5.1

Statement	Frequency	Percentage
Total	550	100
Hair restraint are properly worn		
Yes	550	100
No	0	0
Total	550	100
Fingernails are short, unpolished and clean (no artificial nails)		
Yes	171	31.1
No	379	68.9
Total	550	100
Dowear jewelry other than wedding rings and watch while preparing food		
Yes	59	10.7
No	491	89.3
Total	550	100
Hands are washed properly frequently and at appropriate time		
Yes	519	94.4
No	31	5.6
Total	550	100
Hand sinks are unobstructed and operational clean		
Yes	86	15.6
No	464	84.4
Total	550	100
Hand sinks are stocked with soap disposable towels and warm water		
Yes	524	95.3
No	26	4.7
Total	550	100

Table 2 presented the food hygiene practices among food handlers in Abia State; 522(94.9%) said yes, employees do wear clean and proper uniform while preparing food and 550(100%) properly worn hair restraint. The result also showed that 171(31.8%) had their fingernails short, unpolished and clean (no artificial nails). Out of 550 respondents, only 59(10.7%) worn jewelry other than

wedding rings, band and Watch. Again, 94.4% of the respondents do wash their hands are washed properly, frequently and at appropriate time. The respondents were assessed on hand sinks operational and clean, only 15.6% said yes the hand sinks are unobstructed and 95.3% hand sinks are stocked with soap, disposable towels and warm water.

Table 3. Knowledge of Food Handlers on Methods of Food Preparation.

Statement	Yes	No	Total
Undergo training on how to prepare food for human consumption	150(21.3%)	400(72.7%)	550
Aware of the 5 keys principles to safer foods such as keep clean, separate raw and cooked, cook thoroughly, keep food at safe temperatures etc	179(32.5%)	371(67.4%)	550
Engaged in hand washing can prevent transmission of microorganism on food	280(50.9%)	270(49.1%)	550
Food is prepared in small batches to prevent damage due to temperature influence	493(89.6%)	57(10.4%)	550
Clean reusable towels are used only for sanitizing equipment and surfaces and not for dry hands, utensils or floor	78(14.2%)	472(85.8%)	550
Food is cooked to the required safe internal temperature for the appropriate time	98(17.8%)	452(82.2%)	550
Do temperature of food is being monitored and documented.	50(9.1%)	500(90.9%)	550
Temperature of hot food being held at or above 135F	97(17.6%)	453(82.4%)	550
Food is protected from contamination	116(21.1%)	434(78.9%)	550
Necessary to go for food medical examination	110(20%)	440(80%)	550

Table 3 depicts the knowledge of food handlers on methods of food preparation; 150(21.3%) reported they undergone training on how to prepare food for human consumption while 400(72.7%) did not. From the result, 179(32.5%) reported they were aware of the 5 keys principles to safer foods such as keep clean, separate raw and cooked, cook thoroughly, keep food at safe temperatures etc; while those said no were 371(67.4%). Out of 550 participants; 280(50.9%) agreed on frequent hand washing can prevent transmission of microorganism on food while 270(49.1%) was not in support of the idea. Furthermore, 493(89.6%) reported that food is prepared in small batches to prevent

damage due to temperature influence; only 78(14.2%) out of 550 respondents said that clean reusable towels are used only for sanitizing equipment and surfaces. Also, 98(17.8%) said that food is cooked to the required safe internal temperature and only 50(9.1%) do monitored and documented temperature of food. On the same note, 97(17.6%) reported that temperature of hot food always held at or above 135F and 116(21.1%) said food is protected from contamination. Twenty percent (20%) of the participants said it is necessary to go for food medical examination and 80% said no to food medical examination.

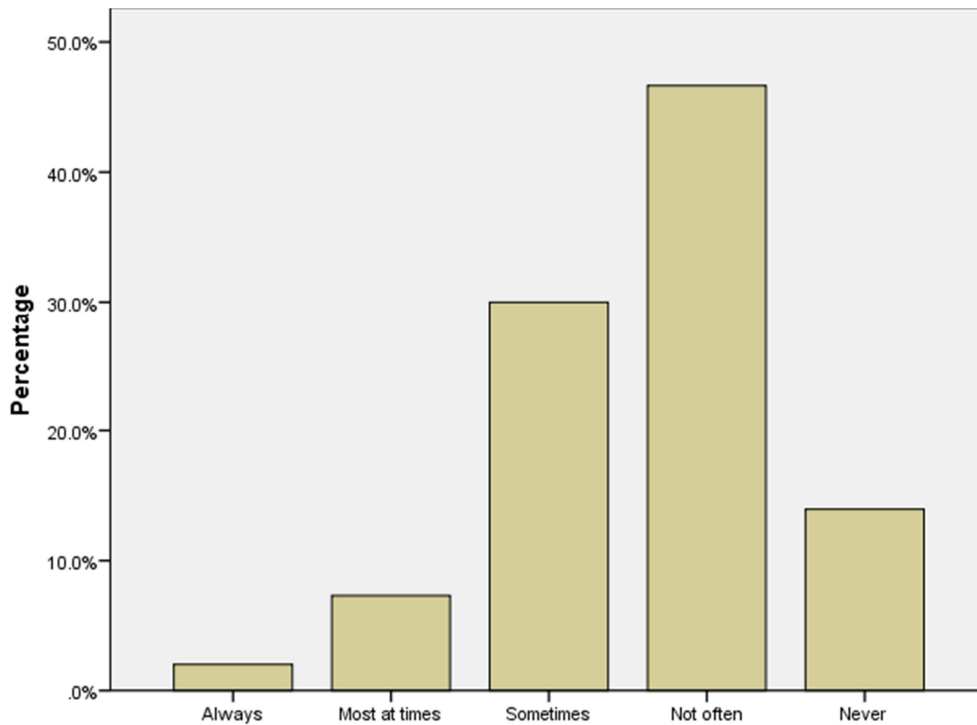


Figure 1. Environmental health officers visit for food inspection to ensure food quality.

Figure 1 Presented the frequency of Environmental health officers visit for food inspection to ensure food quality and the chart showed that not often had the highest percentage (46.7%) followed by sometimes 31% while the least was always (2%).

Table 4. Relationship between food handlers and their food service organizations.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Fast food	68	36.5322	3.76587	.45668	35.6207	37.4438	26.84	38.60
Food vendor	216	37.7179	1.95928	.13331	37.4551	37.9806	26.84	38.60
Abattiors	62	37.6305	2.38365	.30272	37.0251	38.2358	27.21	38.60
Dry food	204	37.4802	2.50368	.17529	37.1345	37.8258	26.84	38.60
Total	550	37.4733	2.51381	.10719	37.2627	37.6838	26.84	38.60

USINGANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)	74.683	3	24.894	4.004	.008
	Un-weighted	38.524	1	38.524	6.196	.013
	Weighted	8.987	1	8.987	1.445	.230
	Linear Term	Deviation	65.696	2	32.848	5.283
Within Groups		3394.593	546	6.217		
Total		3469.276	549			

Table 4 presented the association between food handlers and food service organizations. The food vendors had the highest mean score of 37.72±4.76%, followed by abattoir with 37.63±2.38%, dry food with 37.48±2.50 and fast food with 36.53±3.76%. The differences are statistically significant at F (3, 549) = 5.283, p = 0.005.

Table 5. Multiple Comparisons on percentage score of respondents on food service organizations.

(I) Type of Establishment	(J) Type of Establishment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Fast food	Food vendor	-1.18564*	.34672	.001	-1.8667	-.5046
	Abattiors	-1.09823*	.43784	.012	-1.9583	-.2382
	Dry food	-.94795*	.34915	.007	-1.6338	-.2621
Food vendor	Fast food	1.18564*	.34672	.001	.5046	1.8667
	Abattiors	.08741	.35925	.808	-.6183	.7931
	Dry food	.23769	.24343	.329	-.2405	.7159
Abattiors	Fast food	1.09823*	.43784	.012	.2382	1.9583
	Food vendor	-.08741	.35925	.808	-.7931	.6183

(I) Type of Establishment	(J) Type of Establishment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Dry food	Dry food	.15028	.36160	.678	-.5600	.8606
	Fast food	.94795*	.34915	.007	.2621	1.6338
	Food vendor	-.23769	.24343	.329	-.7159	.2405
	Abattiors	-.15028	.36160	.678	-.8606	.5600

*. The mean difference is significant at the 0.05 level.

Table 6. Relationship between food preparation and their years of experience.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1 – 5	169	37.5979	2.38651	.18358	37.2355	37.9603	26.84	38.60
6 – 10	298	37.8294	2.82614	.16371	36.9829	37.6273	26.84	38.60
11 – 15	77	37.3051	1.25043	.14250	37.5456	38.1133	27.21	38.24
16 – 20	6	37.7451	.18985	.07751	37.5459	37.9443	37.50	37.87
Total	550	37.4733	2.51381	.10719	37.2627	37.6838	26.84	38.60

Using ANOVA

			Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	(Combined)		21.267	3	7.089	.123	.339
	Linear Term	Unweighted	.595	1	.595	.094	.759
		Weighted	.359	1	.359	.057	.812
		Deviation	20.909	2	10.454	1.655	.192
Within Groups			3448.009	546	6.315		
Total			3469.276	549			

Table 6 presented the association between food preparation and years of experience. The analysis shows respondent with years of experience; 6-10 years had highest mean score $37.82 \pm 2.83\%$, 11 -15 had of $37.31 \pm 1.25\%$, 16 -20 years had $37.75 \pm 0.19\%$, 1-5 had $37.59 \pm 2.39\%$. The differences are statistically insignificant, $F(3, 549) = 1.655, p = 0.192$.

4. Discussion

This study focused on the assessment of food hygiene practices in Abia State, South East Nigeria and it provides information on food hygiene practices and method of food preparation among food handlers. From the findings, it was observed that fast food vendors got the highest response on food hygiene and it could be a result much attention given to personal hygiene and equipment sanitation compare to other food service of organizations in order to retain their customers.

Food handlers had greater experience in food hygiene between 6 -10 years and their secondary educational level has helped them to acquired moderate knowledge of food hygiene practice. The findings of this study was supported by Musa and Akande [13] who found highest level of involvement of food vendors in secondary schools in Ilorin, Nigeria. It is important for every food handler to know that food hygiene is necessary to prevent food poisoning. According to Federal Ministry of Environment, [14], food poisoning bacteria are found on human skin, hands, hair, clothes, ears, noses, mouths and between the teeth. Prevention of food hazards starts with good personal hygiene. Personal hygiene and health of food handlers is of the utmost importance when an effort is made to deliver a safe product of high quality to the consumer.

5. Conclusion and Recommendations

The study found that food handlers had a moderate knowledge of food hygiene practices because of educational level as it concerned with the use of personal protective equipment (including puncture resistance gloves, respirators, aprons and other devices). The study pointed out that there is significant association ($p < 0.05$) between food handlers and food service organizations and not significant ($p > 0.05$) with food preparation and years of experience. Based on the findings, the following recommendations were made;

Food handlers must when engaging in any food handling operation;

- Take all practicable measures to ensure his or her body does not contaminate food.
- Ensure apron is clean while handling food to prevent contamination of pathogen with sputum, milk, feces, urine etc.
- Ensure all cuts and minor injuries are covered with a durable waterproof dressing.
- Food handlers should have short finger-nails.
- There should be periodic medical examination of food handlers
- Never spit, cough or sneeze near food always use a clean (disposable) handkerchief, which must be deposited in a refuge bin after use. Do not sneeze into your hands.

Conflicts of Interests

There is no conflict of interest in all aspect of this study such as data collection, analyses, or interpretation of data;

writing of the manuscript, and final decision to publish the results.

References

- [1] Omemu A. M, Atanda O. O, Ayinde I. A and Henshaw, F. O. Perceptions of mothers on food safety related and the microbiological contamination of complimentary foods: A case study in 2 rural areas in Southwestern Nigeria. Researcher; Retrieved from: <http://www.sciencepub.net/researcher>. 2011 3 (6).
- [2] Fortune A., Eli H. H and James O. K Food safety knowledge, attitudes and practices of institutional food-handlers in Ghana. *BMC Public Health*; 2017, 17: 40.
- [3] Apanga, S., Addah, J. and Danso R. S., Food Safety Knowledge and Practice of Street Food Vendors in Rural Northern Ghana. *Food and Public Health*, 2014; 4 (3): 99-103.
- [4] Hornby, A. S. Oxford Advanced Learner's Dictionary of current English: [6th Ed] Oxford University Press. 2000.
- [5] Isaac M, Dominic A., and Wellington O. Hygienic Practices among Food Vendors in Educational Institutions in Ghana: The Case of Konongo. *Foods*. Retrieved from: www.mdpi.com/journal/foods. 2013, 2, 282-294.
- [6] Amadi, A. N Modern Environmental Sanitation, Nationwyde printer and publishing Co. Ltd. Owerri, 2009.
- [7] Food and Agricultural Organization/World Health Organization (FAO/WHO). Street food: A summary of FAO studies and other activities relating to street foods. Rome Food and Agricultural organization (FAO). 2001.
- [8] Uwadiogwu, Z. & Nkwa, A. A. Environmental Health and Sanitation Terminologies Eagle Publishers, Aba, Nigeria, 2012. pp. 80.
- [9] Center for Disease Control and Prevention. 2011. Escherichia coli 0157:H7 and other Shigatoxin-producing Escherichia coli (STEC) Available from: <http://www.cdc.gov/ecoli> Accessed on 23/11/2017.
- [10] Omemu, A. M. & Aderoju, S. T. Food Safety Knowledge and Practices of Street Food Vendors in the City of Abeokuta, Nigeria. *Food Control*, 2008, 19 (4): 396-402.
- [11] Rosnani, A. H., Son, R., Mohhidin, O., Toh, P. S. and Chai, L. C. Assessment of Knowledge, Attitude and Practices Concerning Food Safety among Restaurant Workers in Putrajaya, Malaysia. *Food Science and Quality Management*. 2014; 32: 20-27.
- [12] Grace D., Randolph T., Olawoye J., Dipelou M & Kang'ethe E. (Participatory risk assessment: A new approach for safer food in vulnerable African communities. *Development in Practice*, 2008. 18 (4): 611-618.
- [13] Musa, O. I. and Akande, T. M. Food hygiene practices of food vendors in secondary schools in Ilorin. *Niger. Postgrad. Med.* 2003. *J. 10*, 192–196.
- [14] FMENV National Environmental Sanitation Policy and Guideline Challenges and Opportunities. Abuja. 2005, 3 (1); 3.