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RESEARCH ARTICLE

**EFFECT OF EDUCATIONAL INTERVENTION ON KNOWLEDGE ATTITUDE AND  
PRACTICE OF FOOD HANDLERS ON FOOD HANDLING IN SELECTED LOCAL  
GOVERNMENT AREAS IN ABIA STATE NIGERIA**

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## Abstract

Educational intervention on food industry personnel in hygiene matters has been recommended as a means of improving food handling practices and food safety. This is because human handling errors continue to be responsible for the major outbreaks of food poisoning and food-borne illnesses in developing and developed countries.

**Aim:** This study aimed to Assess the Effect of Educational Intervention on knowledge, attitude and practice of food handlers on food handling in Selected Local Government Areas in Abia State Nigeria.

**Methodology:** This study adopted Quasi Experimental design, questionnaires and observational checklist was used to assess and compare the knowledge, attitude and practice of the food handlers trained in Areas selected in Abia State, comprising of one experimental group and one control group, with 52 food handlers in each of the groups. The face and construct validities were determined, and a pilot study carried out and the questionnaire were self-administered to selected participants. Descriptive and inferential statistics were used to analyse the result using simple percentages, frequencies, and independent samples t-test. P value was set at 0.05 level of significance.

**Result:** The result indicated that Females who participated in this study were 33 (63.5%) in the experimental group and females were 28 (58.3%) in the control group. The result also indicated that majority of the food handlers had formal education, in the experimental group 22 (42.3%) were educated and in control group 24 (50.0%) were educated respectively. Before the intervention, mean knowledge score of the control group was  $4.02 \pm 1.55$  while the mean knowledge score of the experimental group post intervention was  $7.92 \pm 2.50$ . The difference between the means of the two groups showed there was significant association ( $p=9.28$ ;  $t=0.0001$ ). Also, the mean attitude score was  $37.58 \pm 3.31$  in the control while mean attitude score was  $37.79 \pm 5.10$  in the experimental. The difference between the groups was not statistically significant ( $p=0.24$ ;  $t=0.813$ ). The mean practice score was  $8.21 \pm 2.69$  in the control group while the mean practice score was  $8.73 \pm 4.76$  in the experimental group. The difference between the groups showed there was no significant association ( $p=0.67$ ;  $t=0.506$ ). After the intervention, the mean knowledge score for the experimental group was  $9.02 \pm 1.58$  while that of the control group was  $5.55 \pm 1.54$ . The difference between the group was statistically significant ( $p= 11.03$ ;  $t=0.000$ ). The mean attitude score for the experimental group was  $40.33 \pm 4.10$  while that of the control group was  $41.81 \pm 1.963$ . The difference between the groups was statistically significant ( $p=2.26$ ;  $t=0.026$ ). The mean practice score for the experimental group was  $5.10 \pm 3.527$  while that of the control group was  $5.26 \pm 2.231$ . The difference in mean between the groups was not statistically significant ( $p=0.27$ ;  $t=0.792$ ).

**Conclusion:** Educational and training programme influenced the food handler's knowledge, attitude, and practice positively. Therefore, It is recommended that more training be provided for these food handlers and government providing the Essential facilities needed to enhance the practice of these food handlers in the study Areas.

**Keywords:** Food safety, food handlers, foodborne illness, hygiene, food.

## Introduction

Educational intervention on food industry personnel in hygiene matters has been recommended as a means of improving food handling practices and food safety, World Health Organization and Food and Agricultural Organization (WHO, 1996; FAO, 1997). This is because human handling errors continue to be responsible for the major outbreaks of food poisoning in developing and developed countries (Clayton, Griffith, Peters & Prince, 2002; Ehiri & Morris 1996; Greig, Bartleson, & Michaels, 2007; Howes, McEwen, Griffith, & Harris, 1996).

According to U.S National Library of Medicine, food handling is defined as, “any aspect of the operations in the preparation, transport, storage, packaging, rapping, exposure for sale, service, or delivery of food, while a food handler is anyone who, through their work activity, has direct contact with food during any of its phases until it reaches the final consumer. This includes preparation, manufacture, processing, packaging, storage, transport, distribution, sale, supply and services” (Coformacion, 2020). The educational intervention on food handling is an approach that enhances the increase in the level of behavioral component such as attitude, subjective norms perceived behavior control, and self- efficacy for instance, knowledge, attitude, and practice. Educational intervention also increases the knowledge of food handlers on hazards associated with the products used in food preparation and its safe handling.

Food handlers serves to provide prepared food for public consumption on or off its premises, and includes, but is not limited to, a store, shop, sales outlet, restaurant, grocery store, supermarket, delicatessen, catering truck or vehicle, any other person who prepared food, and any organization, group, or individual that provides food as part of its services (Law Insider Inc., 2020). It was further stated that food handling in Nigeria is confronted with challenges (Okuenye, 2007). Food handlers has formed an integral part of food supply in African countries like Nigeria, Morocco, Kenya, and studies have shown that major street food handlers usually earn above countries minimum wage (Okojie & Isa, 2014). Muzaffar, (2009), affirmed that street food vending was a prevailing and distinctive part of a large informal sector, and is commonly seen in public places, especially in the cities and is distinctive in the sense that it provides a basic need to the urban dwellers. This sector is flourishing rapidly due to growing and changing food demands by the urban dwellers that need cheaper food in the face of poverty and economic meltdown. Many people prefer eating foods from food handlers to preparing or cooking the food at home (Muzaffar, 2009).

The problem is that there is inadequate supervision and proper monitoring of food safety by the safety officials and the enforcement of food hygiene regulation, lack of training in food safety and good hygiene practices is also a serious menace among food handlers, (Lihua, 2013). Hence vended foods are at risk of contamination, almost at all stages of handling. Vended foods are sometimes stored at improper and inadequate temperatures and sold from vending sites which include kiosks, make-shift accommodation, and push carts as well as other temporary structures, (Mercier, 2017). Food is prepared under very poor sanitary conditions with wastewater and garbage disposed nearby, providing nutrient and breeding ground for rodents and vermin. Most of the time, running water is not available at vending sites, washing of hands are done in bowls or buckets and sometimes without soap. The conditions under which street food is prepared and vended are worsened by weak implementation of relevant environmental and public health regulations, (Okojie, 2014).

The World Health Organization (WHO, 2015) earlier reported that cases of Food Borne Diseases (FBD) are not reported or documented, however, the FBD Burden Epidemiology Reference Group (FEG) of WHO reported an estimated 582 million cases of 22 different enteric FBDs and 351,000 associated deaths at global level (WHO, 2015). African countries recorded highest FBD burden followed by South East Asian Region. This translates to the need for a focus on food handling in parts of Africa.

According to Chapman, Eversley, Fillionk, & Madaurin (2010), about 70% of disease outbreaks have been connected to vended foods while evidence provided by Mensah, Yeboah-Manu, Owusu-Darko, and Ablordey (2002) referred to the fact that, vended foods are potential sources of enteropathogenesis. A major challenge related to the presence of food vending sites is that despite the problems associated with these eating places, their establishments have been on the increase. An appreciable number of high-ranking Nigerians patronize the food which the open kitchens display under conditions exposing the items to germs, flies, dust, and automobile fumes. Such foods are hawked in unclean environments such as on the streets, under bridges, near dump depots, and on other available spaces (WHO, 2008)

These foods provide a source of inexpensive, convenient, and often nutritious food for both the urban and rural poor people as well as attractive and varied food for tourists. Other report (FAO, 2002) found that 2.5 billion people eat vended food from the food handlers every day. More often

than not, street food handlers are always at the end of accusing fingers for the spread of food-borne diseases, particularly cholera outbreaks, across the country and are sometimes banned momentarily as a desperate measure to control the outbreak. Therefore, the need for food handlers to be engaged in health promotive activities is essential to maintain the high standards of food hygiene. Hence, this study seeks to improve the cognitive aspects related to food handling amongst food vendors in selected LGAs in Abia state using a focused educational programme.

### **Theoretical Framework**

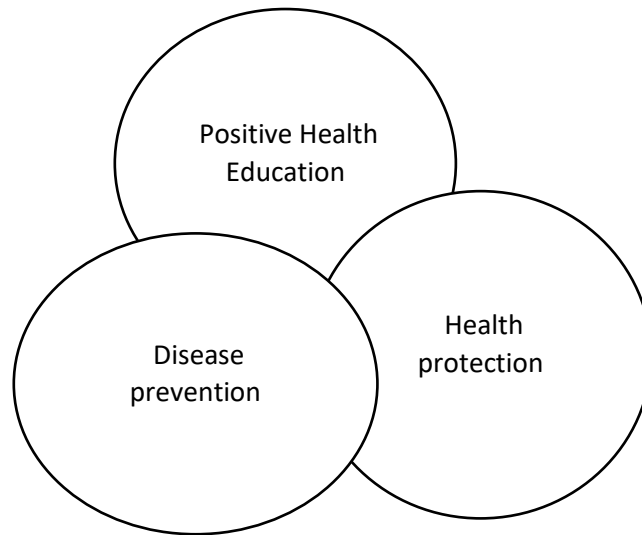
The aim of any food handlers training program is to influence safe handling, and the effect of educational intervention on cognitive factors and sanitation among food handlers. However, a study conducted Clayton and Griffith (2008) have shown that knowledge-based training program do not automatically translate to safe food vending or handling of the food amongst food vendors. Therefore, this calls for the use of behavioral science theories to help food vendors understand sanitation and hygiene behavior (Rennie, 1995). The theoretical framework that was used for this study were An Intervention-based Model: The Tannahill Model (1980). As Kaplan (1990, 1994) asserted, behavior is the central outcome of concern for health care. Change in lifestyle could save thousands of lives per year. To “control” behavior, we must focus on manipulable influences of behavior. Manipulable influences are found only in an individual’s environment. Based on Bandura findings (Cited by Cherry, 2011). Part of human attitude are learned through and modeling,” and the attitude and practice will be displayed based on the state of the mind of that individual, along with the environment both physically and socially. Most attitudinal disposition of human behavior is learned through observation or modeling, the people and is through observation that more knowledge is acquired, change in attitude and practice now takes place. People also learn through coded information, observation, imitation and reading. The mental stability of an individual is of great importance in learning process, and when people are informed it brings about attitudinal change. Attitudinal change is dependent on the knowledge gained, environment factors, interaction with people and the society.

When a new knowledge is gained, there needs to be a conducive environment to practice and for the individual to translate learning into a behavior change.

In 1980s, Andrew Tannahill created a health promotion model consisting of three overlapping sphere of activity: health education, prevention, and health protection. This was done in response

to a shift in focus within the literature from health education and prevention to health protection and health promotion. Health education is designed to change the knowledge, belief, attitude and practice in a way that facilitates health.

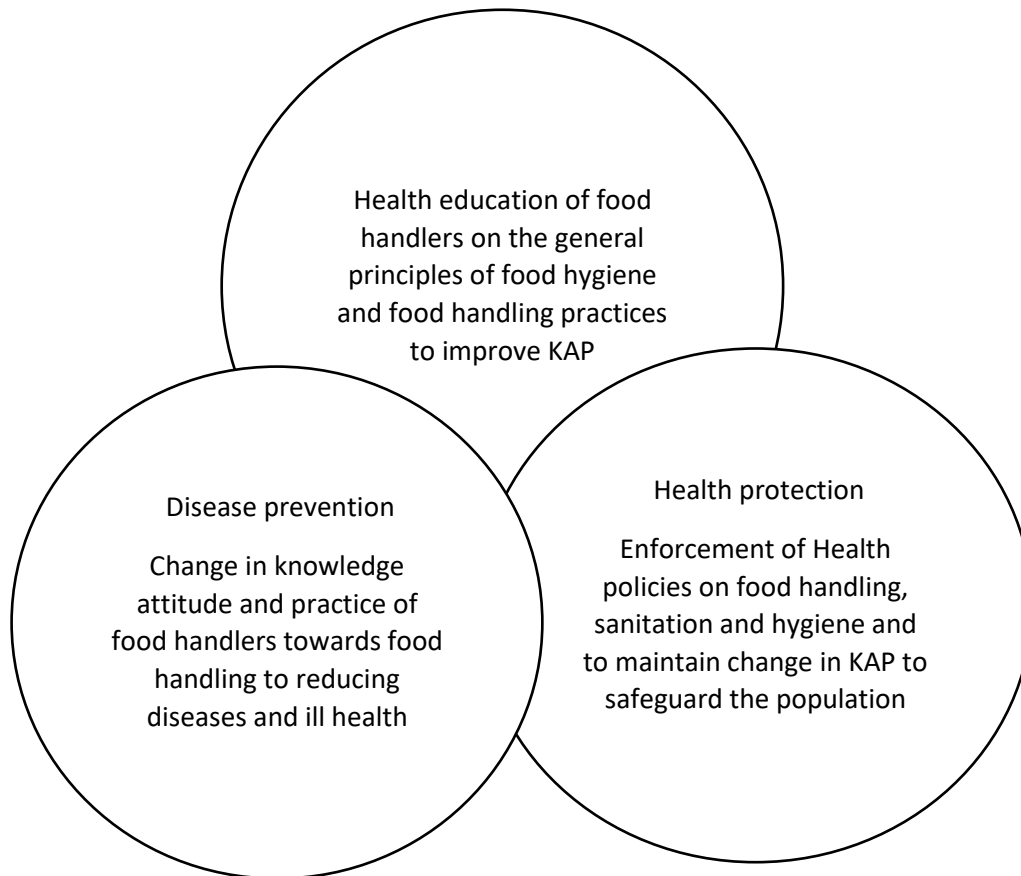
AN INTERVENTION –BASED MODEL: THE TANNAHILL MODEL (1980).



Source: Tannahill,A, (2009) Health Promotion.The Tannahill Model Revisited. *Public Health* 123(5), 397.

Figure 25

## CONCEPTUAL FRAMEWORK



## Methodology

**Study Overview and study design:** Quasi Experimental design was used to determine the Effect of Educational Intervention on Knowledge, Attitude and Practice of Food Handlers on Food Handling in Selected Local Government areas in Abia State Nigeria using structured instrument and observational check list shared randomly. The respondents of the study were 52 Food Handler in the five selected Local Government Areas in Abia State namely Aba South, Aba North, Osioma, Obingwa and umuahia South. This study was conducted using on experimental and one control group. Selected vending units surveyed food handlers interviewed on the food handling practice.



The Study utilized three types of descriptive statistics. Cumulative frequency of individual food handler and categorical data of pre- and post-training were divided by the total frequency of the food handlers. Total frequency were the data from both pre- and post-intervention training were used to determine if there was difference in the level of knowledge ,attitude and practice of food handlers based on training session attended.

## **Study Area**

This study was conducted in Abia State in Nigeria using the food vendor selected in five (5) local Government areas extracted from the seventeen (17) local Governments in Abia state. The five selected Local Government Areas are Aba South, Aba North, Obi-Ngwa, Osisioma Ngwa, Umuahia South

Abia state is one of the States in the South Eastern part of Nigeria with its Capital in Umuahia and the major commercial city Aba, which was formerly a British Colonial Government outpost in the region. Abia State was created in August 27, 1991 out of Imo State. It is one of the constituent States of Niger Delta Regions.

It is made up of 17 Local Government Areas with a population of 193,392,500 according to 2016-03-21 projection and a total population of 140,431,790 according to population census 2006.with the area of 6,320 kmsq- Densities: 589.8/kmsq. Gender TOTAL NO of Males 1,430,298 and Females 1,415,082.

Abia State is bounded in the East by Enugu and Ebonyi. In the South by Akwa Ibom and Cross River State. In the West by Rivers State and in the North by Imo State. Its major occupation is Agriculture and Merchandises.

## **Sample Size Determination**

The formula for comparing two proportions was used to determine the minimum sample size required:

$$n = \frac{[z\alpha + z\beta]^2 \times [p_1(1-p_1) + p_2(1-p_2)]^2}{[P_1 - p_2]^2}$$

Where

n= minimum sample size in each group

Z $\alpha$ = 1.96, the standard normal deviation at 5% level of significance

Z $\beta$ = 0.84, the standard normal deviation at desired power of 80%

p1 = anticipated change in study group, that is the proportion of respondents with good knowledge of food sanitation and hygiene related practices among food vendors after intervention; taken at 50.5%

p2 = control group response, that is proportion of respondents with good knowledge on sanitation and hygiene related practices among food vendors before intervention; taken as 30.5%.

Inserting the required information in the formula:

$$n = \frac{[1.96 + 0.84]^2 \times 0.305 (1 - 0.305)}{[0.50 - 0.305]^2}$$
$$= \frac{(7.84 + 1.96)^2 \times 0.212}{0.195^2}$$
$$= 43.71 \text{ minimum } 44$$

Adjustment for drop-out (loss to follow-up): To compensate for loss to follow -up an adjustment was made to the calculated sample size leading having 52 in experimental group and 47 in control group. Considering the attrition rate of 20 % that is the response rate 80%, the sample size that was calculated by dividing the original calculated sample size by anticipated response rate are  $n/0.8 = 50/0.8$  gave approximately 52 in each group, a sample 104 food vendors, a total 52 of food vendors for each group.

## **Instrument for Data Collection**

### ***Questionnaire***

Data collection was done using a semi structured questionnaire, key informant interview guide and observational check list. The principal investigator and 5 trained research assistants (environmental health officers) carried out the data collection. The standardization of data was ensured by regular supervision by the research assistants who were always in the field and the researcher within two days intervals. The questionnaire was arranged into four sections and information was collected from respondents covering their socio-demographic particulars, food safety and hygiene knowledge, food safety attitude of the food vendors.

Section I was arranged over the food vendor's socio-demographic characteristics including sex, location, educational level, marital status, employment, vending time and age. Section II on understood on food safety and it included 11 multiple choice questions with Yes and No options. These questions covered general sanitation food safety training of food hygiene, food contamination, food storage, waste disposal, food handling, food poisoning and the general preventive measures on food vendor's health with strongly agree, Agree, Disagree and strongly disagree. Section III of the questionnaire covered 14 questions to assess the food vendor's attitude toward sanitation, hygiene and food safety. Section IV of the questionnaire comprised of four questions to assess the food vendors practice on sanitation, hygiene and food safety all with multiple choice answers like Every time, Sometimes and Not at all.

### ***The observational checklist:***

The Environmental sanitation and infrastructural development were assessed during the visit of the research assistants and the researcher. The following was observed general environmental sanitation of the food premises, personal hygiene of the food vendor and her workers, availability of water supply, toilet facilities, refuse management and water used in washing the dishes and other facilities. The training methods and tools used were: (a) Handouts (b) interactive sections (c) power point projection which was used for its visual advantages.

### **2.4 Intervention**

The last phase of the program was conducted for both the experimental and control group within a period of four contacts to ensure that every food vendor practices same and to ensure that the program had an impact, especially on the experimental group. Compliance to attending this training was achieved through the mobilization of the research assistants and the researcher during several encounters with the respondent's while organizing the framework for this study and the baseline survey, with one-on-one contact as well as mobile phone calls and SMS. No fee was attached to the training. The instrument was prepared in English and Vernacular (Igbo) and lecture was delivered in both languages and other local dialects in Abia State. The training started with registration of the participants followed by a devotion each day the training was conducted. There was a pretest to assess their knowledge on sanitation and food hygiene practices and for comparison with post-test at the conclusion of the training program. The program was organized in different sections with short break for refreshment after which we had questions and interactive sections. After all the training post evaluation test was given to participants.

### **Post Intervention Survey**

Three months after the initial intervention, the same questionnaire used for data collection at base line was administered to the same respondents surveyed at pre- intervention. The aim was to determine and compare knowledge attitude and practice of sanitation related practices among food vendors with the baseline data. The post -intervention survey was carried out in Aba Town Hall where we agreed to be converging in other to maintain social distancing. The same question on knowledge attitude and practice was administered for validity purposes. The respondents in the control group were trained at the end of the study using the same module because they were engaged in a different training on diabetes by two of the research assistants with the manual prepared for that purpose.

### **Data Collection Procedures**

Data collection was carried out using the instrument that was designed for the study; the pre-intervention or base line, immediate post intervention was done after 10 weeks of the study. And a follow up was done by ten research assistants that were trained for this study.

## **Results**

The findings in this study reflected the African culture in which women are regarded as people in charge of preparation and serving of food as the number of females in the food handling industry are greater than the males. Majority of the food handlers had secondary education and only a small number of them have tertiary education. Similarly, majority of them had no formal training on food handling before the intervention. There was a great improvement on the attitude of food handlers on food handling after the intervention. A reasonable number of the food handlers are ignorant of food contamination, there by waiting on the government to provide every facility for them before they can improve. Food handlers practice indicated negative response on protective clothing's like apron and gloves and slippers only too few on the food handlers make use of the protective wears always. These included amongst many others, not covering their hair, undressed skin lesions, exposure of foods to flies and blowing of air into food nylons or bags. The challenge of maintaining a formal monitoring culture was noted as a barrier to good practice.

### **Demographic characteristics of respondents**

The result of the study showed that the experimental and control groups were dominated by females, 33 (63.5) and 28 (59.6) respectively. Vendors between the ages of 30-39 were majority (40.4%) in the experimental group, while those within 40-49 (44.7%) were the majority in the control. Those in the control group had a larger number who had attained tertiary level education (14, 29.8%). In both groups, majority owned the food vending shops, 42 (80.8%) and 44 (93.6%) respectively.

Table 1

Demographic Characteristics of the participants in the study for each variable

<b>Respondents in the study N-99</b>						
Variables		N (%)		N (%)		
		Experimental		Control		
Sex	• Male	19	36.5	19	40.4	
	• Female	33	63.5	28	59.6	
Location	• Aba South	33	63.5	0	0	
	• Aba North	11	21.2	0	0	
	• Obingwa	5	9.6	20	42.6	
	• Osioma	0	0	24	51.1	
	• Umuahia North	3	5.8	3	6.4	
	• No formal Ed	7	13.5	4	8.5	
Educational Level	• Primary	11	21.2	6	12.8	
	• Secondary	22	42.3	23	48.9	
	• Tertiary	12	23.1	14	29.8	
	• Single	17	32.7	11	23.4	
Marital Status	• Married	32	61.5	32	68.1	
	• Divorced	1	1.9	3	6.4	
	• Separated	1	3.8	2	2.1	
Employment	• Shop owner	42	80.8	44	93.6	
	• Spouse of shop owner	7	13.5	3	6.4	
Time of Vending	• Laborer	3	5.8	--	--	
	• Less than 12 months	15	28.8	15	31.9	
	• 1-3 yrs	23	44.2	10	21.3	
Age	• Above 5 yrs	14	26.9	22	46.8	
	• 20-29	7	13.5	9	19.1	
	• 30-39	21	40.4	14	29.8	
	• 40-49	15	28.8	21	44.7	
	• Above 50 yrs	9	17.3	3	6.4	

### **Level of knowledge of food hygiene practices among the food vendors before and after the educational intervention in Abia state**

The level of knowledge was computed based on a 22-point rating scale at two levels. A mean score of 0-11 points was considered as low level of knowledge, while a mean score of 12-22 points was considered as high level of knowledge. The computed mean level of knowledge in the experimental group before the intervention was 8.33 ( $\pm 2.59$ ; SE=0.36) and after the intervention the mean level of knowledge in the experimental was 9.12 ( $\pm 1.54$ ; SE=0.21). In the pre-intervention phase of the control, the mean level of knowledge was 4.71 ( $\pm 1.81$ ; SE=0.26), and post intervention the mean was 6.15 ( $\pm 1.85$ ; SE=0.27). Therefore, the level of knowledge of vendors about food hygiene practices in the groups was poor overall; however, the mean level of knowledge in the post experimental group was highest as shown in table 4.2.

### **Level of attitude of food vendors towards food hygiene practices before and after the educational intervention in Abia State**

The level of attitude was computed on a 55-point rating scale at 5 levels and can be considered as follows: Very poor= 1-12; Poor= 12.5-23.5; Fair= 24-35; Very good= 36-47; Excellent (48-59). Hence, given a mean score of 18.44 (SD= $\pm 4.49$ ; SE=0.62), the level of attitude in the pre-experimental group was Poor. A mean score of 14.87 (SD=  $\pm 1.51$ ; SE= 0.22) in post control group also showed poor level of attitude. The mean scores in the post experimental group and pre-control were 17.73 (SD=  $\pm 4.81$ ; SE=0.67) and 18.65 (SD=  $\pm 2.55$ ; SD=0.37). Overall, the attitude in all groups was poor as shown in table 2.

### **Level of food hygiene practice amongst the food vendors before and after the educational intervention**

The level of food hygiene practice was computed based on a 21-point rating scale at three levels. A mean score of 0-7 points was considered as poor practice, a score of between 7.5 -13.5 was considered fair practice and a score of 14-21 was considered good practice. The computed mean level of practice in the experimental group before the intervention was 13.37 (SD= $\pm 3.28$ ; SE=0.45) and after the intervention the mean level of practice in the experimental was 16.37 (SD= $\pm 1.54$ ; SE= 0.32). In the pre-intervention phase of the control, the mean level of practice was 15.06 (SD=

$\pm 1.96$ ;  $SE=0.28$ ), and post intervention the mean was 18.38 ( $SD=\pm 1.01$ ;  $SE= 0.15$ ). Therefore, the level of practice of food hygiene good in the post experimental group, pre-control and post control groups and fair in the experimental group before the intervention as seen in table 2.

### **Level of personal hygiene observed after the educational intervention in the experimental and control groups**

The level of personal hygiene was computed on a 12-point scale at two levels. A score of between 0-6 was considered poor personal hygiene and a score of 6.5-12 was considered high level of personal hygiene. A mean score of 7.46 ( $SD=\pm 1.09$ ;  $SE= 0.15$ ) was obtained for the experimental group, while a mean of 8.36 ( $SD=\pm 1.31$ ;  $SE=0.193$ ) was obtained for the control group.

### **Level of environmental hygiene observed after the educational intervention in the experimental and control groups**

The level of personal hygiene was computed on an 18-point scale at two levels. A score of between 0-9 was considered poor environmental hygiene and a score of 9.5-18 was considered good level of environmental hygiene. A mean score of 11.92 ( $SD=\pm 1.44$ ;  $SE= 0.20$ ) was obtained for the experimental group, while a mean of 12.53 ( $SD=\pm 1.32$ ;  $SE=0.20$ ) was obtained for the control group.

### **Test of Hypotheses**

A one-way ANOVA was used to determine if a difference exists between the variables at a significant level of  $\leq 0.05$ .

The results in table 4 show that there is a significant difference in knowledge about food hygiene between groups at the  $p < 0.05$  level [ $F(3, 195) = 50.86, p = 0.000$ ]. Therefore, the null hypothesis, which states that there is no significant difference in knowledge about food hygiene practices, was rejected. There is a significant difference in attitude towards food hygiene between the groups at  $p < 0.05$  level [ $F(3, 195) = 10.833, p = 0.000$ ]. Therefore, the null hypothesis, which states that there is no significant difference in attitude towards food hygiene practices, was rejected. There is a significant difference in practice between the groups at  $p$  value  $< 0.05$  [ $F(3, 195) = 41.25, p = 0.000$ ]. Therefore, the null hypothesis, which states that there is no significant difference in level of practice of food hygiene, was rejected.

Table 2

ANOVA table showing the differences between groups for the knowledge, attitude and practice variables

<b>ANOVA</b>						
		Sum of Squares	Df	Mean Square	F	Sig.
Knowledge	Between Groups	606.150	3	202.050	50.863	.000
	Within Groups	774.624	195	3.972		
	Total	1380.774	198			
Attitude	Between Groups	436.196	3	145.399	10.833	.000
	Within Groups	2617.271	195	13.422		
	Total	3053.467	198			
Practice	Between Groups	663.895	3	221.298	41.254	.000
	Within Groups	1046.034	195	5.364		
	Total	1709.930	198			

### **Attitude towards food hygiene**

In the experimental group, before the intervention, 44 (84.6%) participants had poor attitudinal disposition, while after the intervention, 38 (73.1%) had poor attitude. Before the intervention 5 (9.6%) had fair attitudinal disposition, while after the intervention, 7(13.5%) participants had fair attitudinal disposition. Before the intervention majority, 46(97.9%) in the control group had poor attitude, while after 46(95.8%) also had poor attitude. Attitude was thus, improved in the experimental group as less people showed poor attitude following the intervention.

### **Practice of food hygiene**

In the experimental group, before the intervention, 27(51.9%) practiced good food hygiene, but after the intervention, 46 (88.5%) practiced good food hygiene at their vending sites. In the control group before the intervention, majority 33(70%) had good practice, while after the intervention all participants (100%) practiced good food hygiene. Practice was improved from 51.9% before the intervention to 88.5% after the intervention.

### **Personal hygiene and environmental hygiene**

Good Personal hygiene was observed in 40(76.9%) of the experimental group, figure while in the control 39 (86.7%) had good personal hygiene. Following the intervention, up to 48 (88.9%) had



good environmental hygiene in the experimental group, while in the control group, 45 (95.7%) had poor environmental hygiene.

### **Discussion**

This study which evaluated the effect of an educational intervention on cognitive factors related to food handling among food handlers in selected LGAs in Abia State Nigeria showed that most of the respondents were female and had secondary level education. Studies (Nurudeen et al., 2014; Adebukola et al., 2015) have traditionally reported these same demographic characteristics of similar groups of respondents. This study therefore shows that respondents in this study align with others.

The results above suggest that the experimental group demonstrated higher mean of knowledge which was significantly different from the control group. Similar to findings in this study, other studies reported marked improvement and good level of knowledge about food hygiene following training (Barjatarovic-Labovic et al., 2017; Ituma, Akpa & Iyare, 2017). Ituma et al. (2017) reported a marked increase in knowledge following training. An increase of up to 46.9% was recorded in the intervention group and only a slight increase in the control group which was not significant. Another study, (Umar, Mande, & Umar, 2018), reported better knowledge in the intervention area than in the control group following the intervention. All authors advocate for routine or periodic training of food vendors to sustain good knowledge of food hygiene as a measure for disease prevention, safety and wellbeing of vendors and consumers.

The results showed general improvement of attitude. Prior to interventions, studies reported poor attitude towards food hygiene. Following the intervention, training sessions improved attitude in intervention sites. In a study by Maung, et al. (2017), post-intervention food safety knowledge, attitude and practice scores were significantly higher than the pre-intervention scores in study group. Other researchers reported less than appropriate attitude of food vendors towards food hygiene (F.O. Aluh & D.O. Aluh, 2017). Authors concluded that food safety training in addition to financial assistance to enable good practice to be offered to food vendors.

Results show that there was no improvement in food hygiene practice amongst food vendors. This result is similar to that reported by Umar et al. (2015), where although participants demonstrated good knowledge, did not translate that knowledge to good practice. Nurudeen, Lawal, & Ajayi (2014) also reported very poor practice amongst participants, which was against the Codex

Alimentarius guideline. These included amongst many others, not covering their hair, undressed skin lesions, exposure of foods to flies and blowing of air into food nylons or bags. A study in Benin (Okojie & Isah, 2014), where food vending site monitoring remains a challenge reported some good and bad practices Monitoring of food vending sites remains a challenge. When trainings are conducted, no monitoring body maintains standard by undertaking routine check to ensure good practice. There have been instances where even after training food hygiene practices remained poor. Evert, Ihudiebube, and Uchechukwu (2019) reported that even after the training that took place, though there was some improvement, although practice of food hygiene was still poor and could not be sustained The challenge of maintaining a formal monitoring culture was noted as a barrier to good practice. Participants in this study had indicated that they lack the basic facilities needed to handle food properly. They are left to utilize the limited resources they can acces. In addition, while revenue is collected for service, no service is offered to aid proper disposal of waste and hence, waste is piled up in unsanitary manner.

Most of the food vendors had good practices of personal hygiene (93.2%) (Lawan et al., 2015). However, Ayuba et al. (2018) also observed that up to half had poor personal hygiene practice and had not received any formal training on personal hygiene. Therefore, they suggested training in this regard. Ma et al.

9(2019) also reported poor personal hygiene which they associated with educational status of participants in the rural-urban border areas.

Results showed that the environmental hygiene observed was good in both the experimental and control groups. Other studies had reported similar observations. In Ayuba et al (2018), 67.0% of the street-food vendors had a fair environmental sanitation status around their vending sites (Ayuba et al., 2018). However, a study by Ma et al. (2019) reported poor environmental hygiene which was associated with the nature of the area being border towns. The LGAs selected in this study were located in the main areas which are the busiest areas competing with other industries. Hence there is always a cluster of activities and increased waste.

Generally, the results show that food handlers have good knowledge of food hygiene and positive attitude but are handicapped to practice appropriate measures due to the presence of disabling factors that have resulted from personal lack of resources and governmental aid.

## **Recommendation**

There is need to focus more interventions on improving practice amongst food handlers. There is need to study for a longer time the food vending operation in the state and look into the current structural and administrative elements to design more focused studies. Simple interventions to improve food hygiene knowledge, attitude and practice should be put in place. More interventions need to be carried out based on innate characteristics of the study population. The environmental health officers should promote standard methods of food preparation and selling food through social media and other media houses in other to get to hard-to-reach areas to improve their knowledge on food handling. The State Environmental Protection Agencies should provide adequate and accessible refuse collection tanks and points to help the food handlers to improve on their environmental sanitation attitude and practice. The Government should enact a law that will ensure that all the landlords make provision for sanitary conveniences in their premises especially where food handler will rent and operate their businesses.

## **Conclusion**

The knowledge and attitude of the participants improved. However, practices were still poor following the intervention. The reason for this was that the Government did not give adequate requirements. There seem to be no previous focused interventions in the study area.

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