



## **EFFECTIVENESS OF A NURSE-LED TRAINING ON FOOD SAFETY PRACTICES AMONG PUBLIC PRIMARY SCHOOLS FOOD VENDORS IN ABEOKUTA SOUTH LOCAL GOVERNMENT, OGUN STATE**

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**ABSTRACT:** *Food-borne illnesses are responsible for disease globally. Using theory of planned behaviour as a framework, the objectives of this study was to assess the effectiveness of a nurse-led training on food safety practices among public primary school food vendors in Abeokuta South Local Government Ogun State, to determine the pre intervention and compare the post intervention knowledge, attitude and self-reported practices, mean scores on food safety and hygiene of intervention and control groups and to administer and evaluate food safety and hygiene training programme. This study adopted quasi-experimental design with two treatment groups forming the control and intervention groups using 120 food vendors who registered with Government in Abeokuta South Local Government. Self-administered questionnaires were used to assess food safety knowledge, attitude and self-reported practices of registered food handlers trained in the programme; a draft of the instrument along with the objectives of the study, research questions were submitted for face and content validation. Cronbach's Alpha Coefficient was used to test for reliability, values of 0.70 and above was accepted and items that scored less were reframed. Descriptive and inferential statistics such as t test were used to explore relationships between the nurse-led training and knowledge, attitude and self-reported practice. The study results revealed a statistically significant difference ( $p>000$ ) between knowledge, attitude and practice of food handlers after the intervention. Results of this study may assist policy makers in planning future training programs for food handlers, which will eventually lead to a safer food supply for the school children and a reduction in food-borne disease outbreaks in Ogun State.*

**KEYWORDS:** Effectiveness, Nurse-led Training, Food safety Practices, Food vendors, Public Primary Schools.

### **INTRODUCTION**

School is a place for learning new things and should include eating food that is free from contaminants and necessary for growth and development but in recent years, varying lifestyle, collapse of joint family structure and rise in number of employed women has steered to ingestion of ready to eat foods or street foods (Santosh, 2008). This has ensued in more school children reliant on school food handlers for mid-day food. The inference is that the children are unprotected to hazards of buying food from sellers who may harbour dangerous pathogen or have the potentials of disseminating infection to a vast number of students.



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 (Fleury, Stratton, Tinga, Charron & Aramini (2008); Nyenje & Ndip (2013). 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, Ennaji & Cohen, 2013).

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 in sufficient 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 indiscriminately and devoid of adequate monitoring and supervision of what and how they prepare the foods they serve (Adewunmi et al., 2014; Green, Selman, Radke, et al., 2006). In developing countries, foodborne diseases can cause or exacerbate malnutrition. Together foodborne diseases and malnutrition cause an estimated 12 to 13 million child deaths annually; survivors are often left with impaired physical and/or mental development.

Ogun State Government in July 2016 accredited large numbers of food vendors to cater for primary school children towards ensuring effective implementation of the school meal programme launched by the Federal Government in June, 2016. Although it is expected to be of benefit to millions of primary school pupils but the engagement of the food vendors were not carefully selected which does not ensure hygienic food for the school children and may be prone to food-borne diseases.

Despite the role of the school meal programme to form the cornerstone of the nationwide home-grown school feeding programme, limited attention has been given to the training of the food vendors in ensuring proper food safety and hygiene. The food vendors were not trained adequately by the state government as their training is scheduled every two years which sometimes are not regular. The incidence of food borne illness is known to be on increase in health centres in Abeokuta South Local Government recently as stated by environmental health officers in Ogun Newspaper Update in July 2016, effective and coordinated actions should be taken.

It is in the light of the above gaps that the researchers became interested in planning a training programme to determine the effectiveness of a nurse-led training on food safety practices among public primary schools food vendors in Abeokuta South Local Government Area of Ogun State through assessing and enhancing their knowledge and reported practices and to survey the impacts of training organised by Ogun State government every two years to educate the food vendors on food safety and hygiene within the Local Government.

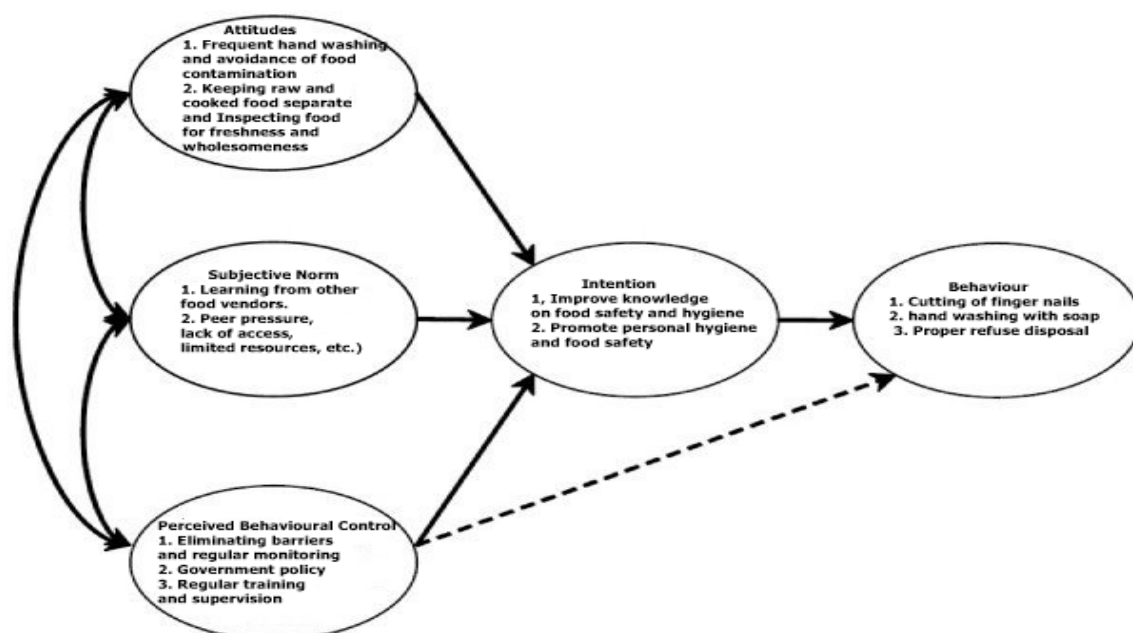
### **Research Hypothesis**

- H<sub>01</sub>. There is a significant difference between the pre and post intervention mean knowledge score of the food vendors on food safety and hygiene.
- H<sub>02</sub>. There is a significant difference between the pre and post intervention mean attitude score of the food vendors on food safety and hygiene.
- H<sub>03</sub>. There is a significant difference between the pre- and post-intervention mean self-reported practices score of the food vendors on food safety and hygiene.

## Application Theory of Planned Behavior to the Study

Ajzen (1988) developed the Theory of Planned Behavior as an off-shoot of the Theory of Reasoned Action. Ajzen's (1991) Theory of Planned Behavior uses attitudes, subjective norms and perceived behavioural control to predict "intention" with relatively high accuracy. The theory assumes that a person's intention, when combined with perceived behavioural control, will help predict behavior with greater accuracy than previous models (Ajzen, 1991).

According to the TPB, an individual's behavior is determined by behavioural intentions, and these intentions are a function of attitudes, subjective norms, and perceived behavioural control. The TPB can be used to describes major sections that act together to influence food safety and hygiene choices and actions. The first section comprises of an interacting system of attitudes, subjective norms, intention, behaviour and perceived behavioural control. The attitude and behaviour implies what the participants will be taught and exposed to during the training, the subjective norm will improve on the gaps identified by the researchers from the food vendors in their food vending practices. The intention is to provide adequate information on the components of food safety and hygiene practices during the training programme. The perceived behavioural control will provide knowledge on how to eliminate barriers and allow the participants to see the reinforcement programme available in ensuring food safety and hygiene. The model will promote the attitudes and behaviours of the food vendors on prevention of food borne diseases.



**Figure 2: Application of Theory Of Planned Behaviour**

*Source: Adapted from Theory of Planned Behaviour (Ajzen, 1991).*



## METHODOLOGY

**Research Design:** This study adopted a pre-test, post-test quasi-experimental design with experimental and control groups covering the food vendors in public primary schools in Abeokuta South Local Government, Ogun State. This involves comparing the participants pre and post implementation of the intervention. The food vendors were divided into two groups (experimental and control). The experimental group consists of food vendors that sell food in public primary schools in two Zonal educational areas and the control groups were food vendors that sell food in one other Zonal educational area of Abeokuta South Local Government.

**Population:** the population comprises of 120 public primary school food vendors who registered with Government in Abeokuta South Local Government. There are 55 food vendors within the schools in the Zone A of the local government; 35 within the Zone B area and 30 within the Zone C area of the local government.

**Table 1: Numbers of Public Primary Schools with the number of Food Vendors**

Local Government Education Authority District	No of Schools	No of Food Vendors
Zonal Education Area A	25	55
Zonal Education Area B	15	35
Zonal Education Area C	14	30

**Sample Size and Sampling Techniques:** All the food vendors in Zonal Education Area A and Zonal Education Area B which are 90 in numbers were used as the experimental group while the food vendors in Zonal Education Area C which are 30 in numbers were used as control group. A purposive sampling technique was used to select Abeokuta-South local government area in Abeokuta, Ogun State. The local government is divided into three educational districts. From the three educational districts in the Local Government, one district was randomly selected. Three zones are present in the selected district, two zones were purposively selected out of the three zones for the experimental group while the food vendors in the third zone category were used as control group.

**Design of Intervention:** Information was sought from Abeokuta South Local Government was visited to see the officer in charge of school health programme and also the State Ministry of Health, public health department unit about the state school health programme on food vendors and school meal. Permission was requested to use the food vendors trained and certified by the State and Local government as participants in the research. The Nursing officer in Charge of School Health Programme granted the permission to conduct the training at the Primary Health Centre, Oke-Ilewo, Abeokuta where the Local Government and Ministry of Health officials who are in charge of school health usually trained them. Timetable for the activities was drawn. The training was held for four weeks. The administration of pre-test questionnaire was done on the first week to both experimental and control group, followed by training session of experimental group on the second and third week and administration of post-test questionnaire on the fourth week to both groups at the same venue.

**Table 2: Time Line Activities**

<b>Week 1</b> <b>Date: 7/11/2017</b>	<b>Week 2</b> <b>Date: 14/11/2017</b>	<b>Week 3</b> <b>Date:21/11/2017</b>	<b>Week 4</b> <b>28/11/2017</b>
Administration of Pre-test questionnaire to experimental and control group	Training Session for experimental group	Administration of Post-test questionnaire to experimental group	Administration of Post-test questionnaire to experimental and control group

**Instrumentation:** The instrument that was used in this study is the questionnaire. The questionnaire was generated with the specific objectives of the study in view. The questionnaire was sectionalised as follows: the first part consists of the Socio Demographic data of the respondents, the second section helped to explore the respondent's knowledge of food hygiene and on personal hygiene. The third section helped to identify measures to improve hygiene practices, attitude and behaviours of Food Handlers. This was followed by the modules for the training programme in accordance with state and local government module for food handlers training.

**Scoring Technique:** The knowledge comprises 14 questions and every correct answers were given 1 mark while wrong answers were scored as 0 then the score was grouped into three phases; poor knowledge = 0 - 4, average knowledge = 5 – 9 and adequate knowledge = 10 – 14.

The attitude comprises 7 questions and every correct answers were given 1 mark while wrong answers were scored as 0 then the score was grouped into three phases; negative attitude = 0 - 2, average = 3 – 5 and positive attitude = > 5

The practice comprises 18 questions where always = 2, sometimes = 1 and never = 0, total score = 36, then the score was grouped into three phases; poor = 1 - 12, average = 13 – 24 and adequate practice = 25 – 36.

**Validity and Reliability of Instruments:** The face and content validity of the instrument was established through the judgment of research supervisors/ methodologist, and modified based on the inputs. The reliability of the instruments was ascertained by administering the questionnaire once to about 10% equivalent of the study participants at the site chosen for the pre-test and Cronbach's Alpha Coefficient was used to establish reliability with a value of 0.5.

### **Method of Data Collection**

**Assessment Phase:** This include a rapid community assessment of the public primary schools in Abeokuta South Local Government, community diagnosis, study design, community work plan and intervention, establishment of rapport with the school authorities, the food vendors, recruitment of trainees and training assessment.

**Planning Phase:** The training materials were constructed in accordance with the existing food handling protocols and modules for the training programme by the State Government



and the Local Government School Health Programme. A group of not more than 30 food handlers were scheduled to be trained at a time for four days. The methods used during the training include lectures, demonstration, group discussions, and practical experiences. This was complemented with the use of flip charts, posters, actual food handling and preparation for educating food handlers as advocated by the WHO (2006). Training was done within a period of two weeks at the Local Government Health Facilities so that actual safe food handling techniques could be demonstrated. The control group was trained after the collection of the post-test questionnaire because of the importance of this study to food vendors in preventing food borne disease among school children.

**Implementation Phase:** The food vendors were given pretest questionnaire to fill before the training begins and this was done at different locations for the experimental and control groups. For the experimental group, participants on arrival registered and were given a name tag; and training materials in form of leaflet. The content elements of the training included the following: introduction to food safety and hygiene, training of food hygiene, personal hygiene, and practices of food safety, personal and environmental hygiene. After the teaching, demonstration on hand washing and food demonstration was practiced. Post-test was done a week after the training and return demonstration was carried out by the food vendors to assess the practice of hand washing and food demonstration. All the food vendors were involved in the training and the programme ended by two weeks

**Evaluation Phase:** Outcome evaluation was conducted. The questionnaire used at the pre-intervention phase was used at the end of the training programme. The data generated at the pre and post tests were then subjected to the following analysis using t-test statistics.

- Pretest and Posttest comparison of the experimental and control group's mean knowledge score
- Pretest and Posttest comparison of the experimental and control group's mean attitude score
- Pretest and Posttest comparison of the experimental and control group's mean reported practices score

**Method of Data Analysis:** The collected data was sorted out, coded and entered into the computer using descriptive (frequency, percentage, mean and standard deviation) and T-test. The statistical package for social science (SPSS) version 20 was used as the analytical tool.

**Ethical Approval:** Prior to the commencement of the field work, permission was sought from Babcock University Health Research Ethics Committee (BUHREC), Ogun State Ministry of Education, Science, and Technology; Ogun State Universal Basic Education Board (SUBEB); Abeokuta South Local Government, Coordinator of Food Safety and Hygiene Programme in Abeokuta South Local Government and Head Teacher of each Public Primary School to be used. A detailed explanation as to the purpose of the study was given to all the eligible participants. Verbal informed consent was sought and obtained from each of the participants and they have the right to withdraw from the study at any time without penalty. Confidentiality of the participants as well as the information provided was guaranteed by the researchers.



## RESULTS AND DISCUSSION OF FINDINGS

**Table 3: Demographic Characteristics of the Respondent**

Variables	Frequency (Experimental group)	Percentage (%)	Frequency (Control group)	Percentage (%)
<b>Age</b>				
20 – 30	11	12.2	4	13.3
31 – 40	28	31.1	4	13.3
41 – 50	30	33.3	13	43.3
Above 50	21	23.3	9	30.0
<b>Total</b>	<b>90</b>	<b>100.0</b>	<b>30</b>	<b>100.0</b>
<b>Marital Status</b>				
Married	84	93.3	25	83.3
Divorced	4	4.4	3	10.0
Separated	2	2.2	2	6.7
<b>Total</b>	<b>90</b>	<b>100.0</b>	<b>30</b>	<b>100.0</b>
<b>Level of Education</b>				
Primary	44	48.9	20	66.6
Secondary	34	37.8	5	16.6
Tertiary	2	2.2	1	3.3
No formal	10	11.1	4	13.3
<b>Total</b>	<b>90</b>	<b>100.0</b>	<b>30</b>	<b>100.0</b>
<b>How long you have been working as a food vendor</b>				
1 – 5	46	51.1	18	60.0
6 – 10	23	25.6	7	23.3
11 – 15	11	12.2	3	10.0
16 – 20	10	11.1	2	6.7
<b>Total</b>	<b>90</b>	<b>100.0</b>	<b>30</b>	<b>100.0</b>

*Source: Researcher's Field Report 2020*

The demographic characteristics of the respondents in Table 3 revealed that more than one-third (31.1% and 33.3%) of the experimental group were between the ages of 31 – 40 and 41 – 50 years respectively while majority (93.3%) were married, about half (48.9%) had primary school education with a few (2.2%) who had tertiary education and above average (51.1%) had been working as a food vendor between 1 and 5 years. In the control group, one-third of the respondents (30.0%) were above age 50, majority (83.3%) were married and only one person (3.3%) had tertiary education. More than half of the respondents (60.0%) had been working as a food vendor between 1 and 5 years and only few (6.7%) had been working as a food vendor for 16-20 years.

**Table 4a: Knowledge Distribution of the Respondents on Food Safety and Hygiene**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage(%)</b>
<b>It is important to wash hands before handling food</b>		
Agree*	56	62.2
Neutral	30	33.3
Disagree	4	4.4
<b>Wiping cloths can spread microorganisms</b>		
Agree*	76	84.4
Neutral	2	2.2
Disagree	12	13.3
<b>The same cutting boards can be used for raw and cooked foods</b>		
Agree	74	82.2
Neutral	10	11.1
Disagree*	6	6.7
<b>Raw foods needs to be stored separately from cooked foods</b>		
Agree*	75	83.3
Neutral	10	11.1
Disagree	5	5.6
<b>Cooked foods do not need to be thoroughly reheated</b>		
Agree	69	76.7
Neutral	16	17.8
Disagree*	5	5.6
<b>Proper cooking includes meat cooked to 40<sup>0</sup>C</b>		
Agree*	83	92.2
Neutral	7	7.8
<b>Cooked food should be kept hot before serving</b>		
Agree*	85	94.4
Disagree	5	5.6
<b>Safe water can be identified by the way it looks</b>		
Agree	84	93.3
Disagree*	6	6.7
<b>It is good to wash fruits and vegetables</b>		
Agree*	83	92.2
Neutral	3	3.3
Disagree	4	4.4
<b>Total</b>	<b>90</b>	<b>100.0</b>
<b>Knowledge of personal hygiene</b>		
<b>Good personal hygiene jewellery</b>		
Agree	64	71.1
Neutral	4	4.4
Disagree*	22	24.4



**Table 4b: Knowledge Distribution of the Respondents on Food Safety and Hygiene**

<b>Knowledge of personal hygiene cont'd</b>		
<b>Good personal hygiene is wearing protective clothes</b>	<b>Frequency</b>	<b>Percentage(%)</b>
Agree*	55	61.1
Neutral	9	10.0
Disagree	26	28.9
<b>Good personal hygiene is covering cuts on fingers</b>		
Agree*	55	61.1
Neutral	13	14.4
Disagree	22	24.4
<b>Hands should be washed when returning from the toilet</b>		
Agree*	47	52.2
Neutral	27	30.0
Disagree	16	17.8
<b>Hands should be washed after handling raw foods</b>		
Agree*	70	77.8
Neutral	18	20.0
Disagree	2	2.2
<b>Total</b>	<b>90</b>	<b>100.0</b>

\* *correct answers*

Table 4a and 4b presents knowledge distribution of the respondents on food safety and hygiene. Above two-third (62.2%) agreed that it is important to wash hands before handling food while above one – third (33.3%) were indecisive, majority (84.4%) agreed that wiping cloths can spread microorganisms while almost all (92.2%) acknowledged that it is good to wash fruits and vegetables.

Also concerning their knowledge of personal hygiene, one-quarter (24.4%) disagreed that it is a good personal hygiene to put on jewellery during food preparation, above two-third (61.1%) agreed that it is a good personal hygiene to wear protective clothes during food preparation and a little above average (52.2%) agreed that hands should be washed when returning from the toilet.

**Table 5: Attitude Distribution of the Respondents on Food Safety and Hygiene**

<b>Variables</b>	<b>Frequency</b>	<b>Percentage(%)</b>
<b>Frequent hands washing during food preparation</b>		
Always true	52	57.8
Undecided/Neutral	13	14.4
Always not true	25	27.8
<b>Keeping kitchen surfaces clean reduces illness</b>		
Always true	41	45.6
Undecided/Neutral	5	5.6
Always not true	44	48.9



<b>Keeping raw and cooked foods separate prevents illness</b>		
Always true	49	54.4
Undecided/Neutral	8	8.9
Always not true	33	36.7
<b>Using different knives and cutting boards for raw and cooked food prevents illness</b>		
Always true	52	57.8
Undecided/Neutral	4	4.4
Always not true	34	37.8
<b>Soups and stews should always be boiled for safety</b>		
Always true	41	45.6
Undecided/Neutral	12	13.3
Always not true	37	41.1
<b>Inspecting food for freshness is valuable</b>		
Always true	47	52.2
Undecided/Neutral	12	13.3
Always not true	31	34.4
<b>I think it is important to throw away food that have reached their expiry date</b>		
Always true	57	63.3
Undecided/Neutral	5	5.6
Always not true	28	31.1
<b>Total</b>	<b>90</b>	<b>100.0</b>

Table 5 presents the respondents attitude towards food safety and hygiene. About two-third (57.8%) accepts the frequent washing of hands during food preparation to be always true in ensuring food safety and hygiene, and below average (45.6%) accepts as always true that keeping kitchen surfaces clean reduces illness while above average (54.4%) accepts that keeping raw and cooked foods separately prevents illness as always true even, above two-third (63.3%) accepted as always true that it is important to throw away food that have reached their expiry date.

**Table 6a: Practices Distribution of the Respondents on Food Safety and Hygiene**

<b>Variables</b>	<b>Frequency</b>	<b>Percentage(%)</b>
<b>I wash hands with soap and water after touching my face</b>		
Frequently/Always	37	41.1
Sometimes	38	42.2
Never	15	16.7
<b>I wash hands when cutting raw meat</b>		
Frequently/Always	45	50.0
Sometimes	38	42.2
Never	7	7.8
<b>I wash hands with soap and water after going to toilet</b>		
Frequently/Always	37	41.1
Sometimes	36	40.0
Never	17	18.9



<b>I cover my hair during food preparation</b>		
Frequently/Always	44	48.9
Sometimes	39	43.3
Never	7	7.8
<b>I clean raw meat first before cooking</b>		
Frequently/Always	45	50.0
Sometimes	32	35.6
Never	13	14.4
<b>I clean kitchen area soon after cleaning meat</b>		
Frequently/Always	40	44.4
Sometimes	42	46.7
Never	8	8.9
<b>I wash hands before handling food</b>		
Frequently/Always	43	47.8
Sometimes	30	33.3
Never	17	18.9
<b>I always cover cooked foods</b>		
Frequently/Always	57	63.3
Sometimes	33	36.7
<b>I wash food utensils using sanitizers</b>		
Frequently/Always	75	83.3
Sometimes	15	16.7
<b>I wash cooking area using sanitizer</b>		
Frequently/Always	58	64.4
Sometimes	19	21.1
Never	13	14.4
<b>In wash my hands before and during food preparation</b>		
Frequently/Always	42	46.7
Sometimes	40	44.4
Never	8	8.9

**Table 6b: Practices Distribution of the Respondents on Food Safety and Hygiene**

<b>Variables</b>	<b>Frequency</b>	<b>Percentage(%)</b>
<b>I clean surfaces and equipment used for food before re-using</b>		
Frequently/Always	54	60.0
Sometimes	27	30.0
Never	9	10.0
<b>I use separate utensils and cutting boards when preparing cooked and raw foods</b>		
Frequently/Always	52	57.8
Sometimes	38	42.2
<b>I separate raw and cooked foods during storage</b>		
Frequently/Always	60	66.7
Sometimes	16	17.8
Never	14	15.6



<b>I check that meals are cooked thoroughly by ensuring juices are clear</b>		
Frequently/Always	57	63.3
Sometimes	26	28.9
Never	7	7.8
<b>I reheat cooked foods until it is piping hot throughout</b>		
Frequently/Always	54	60.0
Sometimes	24	26.7
Never	12	13.3
<b>After I have cooked a food, I store leftovers in a cool place</b>		
Frequently/Always	67	74.4
Sometimes	21	23.3
Never	2	2.2
<b>I wash fruits and vegetables with safe boiling water before eating them</b>		
Frequently/Always	55	61.1
Sometimes	17	18.9
Never	18	20.0
<b>Total</b>	<b>90</b>	<b>100.0</b>

Table 6a and 6b presents the practice distribution of the respondents on food safety and hygiene. Average (50.0%) wash their hands always when cutting raw meat, slightly below average (48.9% and 47.8%) cover their hair during food preparation and wash their hands before handling food respectively. Also, two-third (60.0%) clean surfaces and equipment used for food always before re-using and majority (74.4%) store leftovers of cooked food in a cool place always.

**Table 7: Pre and Post Knowledge, Attitude and Practice Score Distribution of the Respondents**

Variables	Control		Experimental	
	Pre n= 30	Post n= 30	Pre n= 90	Post n= 90
<b>Knowledge</b>				
Poor Knowledge on food & personal hygiene (0 - 4)	1 (3.3)	1 (3.3)	4 (4.4)	3 (3.3)
Average Knowledge on food & personal hygiene (5 - 9)	23 (76.7)	21 (70.0)	59 (65.6)	39 (43.3)
Adequate Knowledge on food & personal hygiene (10 - 14)	6 (20.0)	8 (26.7)	27 (30.0)	48 (53.3)
<b>Attitude</b>				
Negative Attitude to food safety (0 - 2)	5 (16.7)	5 (16.7)	15 (16.7)	-
Average Attitude to food safety (3 – 5)	21 (70.0)	20 (66.6)	66 (73.3)	51 (56.7)
Positive Attitude to food safety (>5)	4 (13.3)	5 (16.7)	9 (10.0)	39 (43.3)



### Practice

Poor food safety practices (1 - 12)	-	-	4 (4.4)	-
Average food safety practices (13 - 24)	10 (33.3)	10 (33.3)	27 (30.0)	9 (10.0)
Adequate food safety practices (25 - 36)	20 (66.7)	20 (66.7)	59 (65.6)	81 (90.0)
<b>Total</b>	<b>30 (100.0)</b>	<b>30 (100.0)</b>	<b>90 (100.0)</b>	<b>90 (100.0)</b>

Table 7 presents the pre and post Knowledge, Attitude and Practices (KAP) distribution of the respondents. One – third (30.0%) initially had adequate knowledge on food and personal hygiene while few (4.4%) had poor knowledge however after the intervention, above average (53.3%) were adequate in the knowledge of food and personal hygiene without none having poor knowledge.

Also, before intervention, one – sixth (16.7%) of the respondents had negative attitude and a few (10.0%) had positive attitude towards food safety however after the intervention, none had negative attitude towards food safety.

Finally, before the intervention, above two-third (65.6%) had adequate practices as regards food safety but after the intervention majority (90.0%) practiced adequately food safety.

### Descriptive and Inferential Statistics of Pre-Intervention Control and Pre-Intervention Experimental Group knowledge on Food and Personal Hygiene.

**Table 8: Mean Difference in the Knowledge, Attitude and Practice Score of the Pre-Intervention Control and Experimental Group**

Classification	Max point on scale	Mean±SD	t-value	p-value
<b>Knowledge</b>				
Pre-intervention control group (30)	14	8.20±1.91	.715	.476
Pre-intervention experimental group (90)	14	8.50±2.01		

\*significant at  $P < 0.05$

Classification	Max point on scale	Mean±SD	t-value	p-value
<b>Attitude</b>				
Pre-intervention control group (30)	7	3.63±1.38	.475	.635
Pre-intervention experimental group (90)	7	3.77±1.32		

\*significant at  $P < 0.05$



Classification	Max point on scale	Mean±SD	t-value	p-value
<b>Practice</b>				
Pre-intervention control group (30)	36	26.13±2.65	-1.10	.275
Pre-intervention experimental group (90)	36	25.13±4.74		

\*significant at  $P < 0.05$

Table 8 represents difference between the means in knowledge, attitude and practice of the pre intervention control and experimental group. It is revealed from the table that the significant p-values of 0.476, 0.635 and 0.275 which is greater than the significant threshold of 0.05 respectively. Therefore, we fail to reject the null hypothesis based on this assertion. The study revealed that there is no statistically significant ( $p > 0.05$ ) difference between the means in knowledge, attitude and practice of the pre intervention control and experimental group. The result agrees with Cuprasittrut et al., (2011) who reported that only 13.0% of the respondents had good knowledge of food safety. However, it is not in consonance with Tolulope et al., (2015) who reported that 60.9% of the food vendors have good knowledge of food safety and hygiene while 31.9% had poor knowledge.

**Table 9: Mean Difference in the Knowledge, Attitude and Practice Score of the Post Intervention Control and Experimental Group**

Classification	Max point on scale	Mean±SD	t-value	p-value
<b>Knowledge</b>				
Post-intervention control group (30)	14	8.20±1.91	.206	.001*
Post-intervention experimental group (90)	14	9.77±2.24		

\*significant at  $P < 0.05$

Classification	Max point on scale	Mean±SD	t-value	p-value
<b>Attitude</b>				
Post-intervention control group (30)	7	3.63±1.38	.675	.003*
Post-intervention experimental group (90)	7	5.27±1.13		

\*significant at  $P < 0.05$



Classification	Max point on scale	Mean±SD	t-value	p-value
<b>Practice</b>				
Post-intervention control group (30)	36	26.13±2.65	.187	.000*
Post-intervention experimental group (90)	36	27.83±2.70		

\*significant at  $P < 0.05$

Table 9 represents difference between the means in knowledge, attitude and practice of the post intervention control and experimental group. It is revealed from the table that the significant P-values are 0.001, 0.003, and 0.000 which is less than the significant threshold of 0.05. The null hypothesis cannot be accepted based on this assertion. The study revealed that there is a statistically significant ( $p < 0.05$ ) difference between the means in knowledge, attitude and practice of the post intervention control and experimental group. This result is similar to a study by Mizanur et al., (2012) who reported that training in food safety significantly increased food safety practice among food handlers in Kuching city in Malaysia.

**Table 10: Mean Difference in the Knowledge, Attitude and Practice Score of the (Control Group) Before and After Intervention**

Classification	Max point on scale	Mean±SD	t-value	p-value
<b>Knowledge</b>				
Pre-intervention control group (30)	14	8.20±1.92	-1.00	.326
Post-intervention control group (30)	14	8.27±1.95		

\*significant at  $P < 0.05$

Classification	Max point on scale	Mean±SD	t-value	p-value
<b>Attitude</b>				
Pre-intervention control group (30)	7	3.63±1.38	-.372	.712
Post-intervention control group (30)	7	3.67±1.35		

\*significant at  $P < 0.05$



Classification	Max point on scale	Mean±SD	t-value	p-value
<b>Practice</b>				
Pre-intervention control group (30)	36	26.13±2.64	1.795	.083
Post-intervention control group (30)	36	26.03±2.63		

\*significant at  $P < 0.05$

Table 10 represents difference between the means in knowledge, attitude and practice of the pre intervention control and post experimental group. It is revealed from the table that the significant values are 0.326, 0.712, and 0.083 which are greater than the significant threshold of 0.05 respectively. Therefore, we fail to reject the null hypothesis based on this assertion. The study revealed that there is no statistically significant ( $p > 0.05$ ) difference between the means in knowledge, attitude and practice of the control group before and after intervention. This result is in line with Ituma, Akpa and Iyare (2017) who stated that food handlers who received training were more knowledgeable about food safety issues and were inclined to be more concerned with food safety than untrained food handlers.

**Table 11: Mean Difference in the Knowledge, Attitude and Practice Score of the (Experimental Group) Before and After Intervention**

Classification	Max point on scale	Mean±SD	t-value	p-value
<b>Knowledge</b>				
Pre-intervention experimental group (90)	14	8.50±2.01	-1.27	.000*
Post-intervention experimental group (90)	14	9.77±2.24		

\*significant at  $P < 0.05$

Classification	Max point on scale	Mean±SD	t-value	p-value
<b>Attitude</b>				
Pre-intervention experimental group (90)	7	3.77±1.32	-1.50	.000*
Post-intervention experimental group (90)	7	5.27±1.13		

\*significant at  $P < 0.05$





Classification	Max point on scale	Mean±SD	t-value	p-value
		<b>Practice</b>		
Pre-intervention experimental group (90)	36	25.13±4.74	-2.70	.000*
Post-intervention experimental group (90)	36	27.83±2.70		

\*significant at  $P < 0.05$

Table 11 represents difference between the means in knowledge, attitude and practice of the pre intervention experimental and post experimental group. It is revealed from the table that the significant value is 0.000 which is less than the significant threshold of 0.05. The null hypothesis cannot be accepted based on this assertion. The study revealed that there is a statistically significant ( $p < 0.05$ ) difference between the means in knowledge, attitude and practice of the pre intervention experimental and post experimental group. This is similar to a study by Mizanur et al., (2012) who reported that training in food safety significantly increased food safety practice among food handlers in Kuching city in Malaysia. A similar study carried out in Accra, Ghana revealed that respondents also acquired some knowledge and were putting it into practice after a training programme (Chukwuocha, Dozie, Amadi, Nwankwo, Ukaga, Aguwa, et al., 2009).

## CONCLUSION

In this study, the evaluation of the training program showed that training was associated with the improved knowledge and practice of trained food handlers. However, almost all the food handlers who were certified and registered by the Ministry of Health in the present study had positive attitude towards food safety but after the intervention provided there was a significant difference in attitude of the respondents towards food safety. This actually describes the intervention to be effective. Training of food vendors on food hygiene and safety has had a significant association with safety of food from foodborne diseases. The importance of training among food vendors is to ensure perpetuation of best practices in the school food vending business thereby protecting public health especially the school children. Significant changes are needed for the food handlers' training program. The changes are needed for both course content and training methodology. These changes must be evidence-based and supported by policy changes and enforcement of regulations.

## RECOMMENDATIONS

Based on findings of the study, the following recommendations are made:

1. More concrete and continuous training programs suitable for the food vendors' educational background should be designed and mandated by the government.



2. Programme should be designed to motivate food vendors to maintain and self-regulate proper practices should be required.
3. Training manuals should be developed for trainers to serve as a guide and ensure uniformity of subject matter. Impact analysis of training programmes in achieving and sustaining behavioural change among food vendors should also be carried out through regular monitoring.
4. Equipping food handlers with the knowledge and skills to safely handle and serve food, and encouraging behavior change with supportive work environments and legislations, this will ultimately lead to a reduction in food-borne disease outbreaks associated with poor food handling practices in Abeokuta South Local Government.
5. Periodic medical examinations and on the job, health education and promotion exercises for food handlers should be carried out by the government.
6. Stakeholders involved in regulating the operations of food vendors should also remove barriers to good food hygiene practices toward ensuring food sanitation and prevention of food borne diseases in schools.
7. Regular training and retraining should be organised and conducted by government through adequate resourcing the Environmental Health and Sanitation Departments country-wide with funds, human resources and logistics to enhance their monitoring and evaluation activities.

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