

## Food Safety Knowledge, Attitude and Practice of Food Vendors in Abia State, Nigeria

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### Abstract

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Vended foods and their nutritional value and safety characteristics has contributed immensely to the proportion of food intake in many populations worldwide. In Nigeria, urban city dwellers spend as much as half of their food expenditure on vended foods, when compared with other developing countries. 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. Assessment of food safety knowledge, attitude and practice of food vendors in Abia State Nigeria. Material and methods: Before and after interventional comparative study were carried out in five local Government Areas of Abia state. The study design used for this study include descriptive, before-after, comparative, and randomized controlled experiment. Results: The pre-intervention and post-intervention levels of knowledge score were  $8.33 \pm 2.59$ ,  $9.12 \pm 1.51$  respectively and that of control group were  $4.71 \pm 1.81$  and  $6.15 \pm 1.85$  respectively, the pre-intervention and post-intervention levels of attitude score were  $18.44 \pm 4.49$ ,  $17.73 \pm 4.81$  respectively and that of control group were  $18.65 \pm 2.55$  and  $14.87 \pm 1.51$  respectively, the pre-intervention and post-intervention levels of practice score were  $13.37 \pm 3.28$ ,  $16.37 \pm 2.30$  respectively and that of control group were  $15.06 \pm 1.96$  and  $18.38 \pm 1.01$  respectively. The study recorded low knowledge, low attitude, low practice levels. However, there was statistically significant difference in knowledge but there was none in attitude and practice. Conclusion: The educational programme affected positively on food vendor's knowledge and practice of food hygiene but did not affect food vendor's attitude. Recommendation: Periodical training and retraining of food vendors should be encouraged and enforced among food vendors in Abia State.

**Keywords:** *Food Safety, Knowledge, Attitude, Practice, Food vendors, Abia State, Nigeria*

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### **Background to the Study**

Vended foods and their nutritional value and safety characteristics has contributed immensely to the proportion of food intake in many populations worldwide (Okojie 2014). In Nigeria, urban city dwellers spend as much as half of their food expenditure on vended foods, when compared with other developing countries. The vended food sector in Nigeria is confronted with challenges (Okuenye, 2007). Food vending has formed the integral part of food supply in African countries like Nigeria, Morocco, Kenya, and studies have shown that major street food vendors usually earn above countries minimum wage (Okoji and 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 who need cheaper food in the face of poverty and economic meltdown. Many people value eating foods from vendors to preparing or cooking the food at home. This work focused on health education, among food vendor's knowledge, attitude and practice of the food vendors on vended foods.

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 at very poor sanitary condition with waste water 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 food is prepared and vended are worsened by weak implementation of relevant environmental and public health regulations, (okojie,2014)

The rate at which street vending is increasing, constituting social and environmental problems in Nigeria, and particularly in Aba has become very worrisome (Nduka and Duru, 2014; Ugochukwu et al., 2012; Amoo et al., 2012). These scholars identified problems associated with street vending to include congestion resulting from the ever-increasing number of street vendors operating on sidewalks and on the streets; struggle for space between the vendors and the pedestrians on the pavements resulting in conflict of vehicular and pedestrian traffic. The social aspect of the problems include street begging, child labour, drug abuse, pick- pocketing and high rate of school dropout. previous studies revealed that street vending poses numerous health and social risks and hinders the educational development of children, while they identified unemployment and poverty as factors contributing to street vending. Amoo.(2012) observed that street vending is a risky type of business that makes women to be more vulnerable to workplace hazards, by which maternal health could be negatively affected as a result of perennial physical exhaustion, physical abuse and inherent stress associated with the enterprise.

Satan, (2007) reported that Food vendors are often poor initially, uneducated and Untrained people make up the greater percentage of the population. They are often ignorant about food hygiene, which are the conditions and measures necessary to ensure the safety and protection of food from production to consumption. Lack of adequate food hygiene and poor knowledge of nutrition can lead to food-borne illnesses due to improper food handling practices, food poisoning as a result of poor food combining and in extreme events, even death of customer, (Satin, 2007).

World Health Organization, (2015), reported that cases of Food Borne Diseases (FBD) are not reported or documented, however, FBD Burden Epidemiology Reference Group (FERG) of World Health Organization (WHO) reported an estimated 582 million cases of 22 different enteric FBDs and 351,000 associated deaths at global level. African countries recorded highest FBD burden followed by South East Asian Region. It was indicated in India, National Centre for Disease Control under Integrated Disease Surveillance Programme (IDSP) reported over 200 food poisoning outbreaks in 2015, which lead the world health organization to focus on the challenges of food safety at all levels.

Alfred, (2019) Reported that more than 200,000 persons die of food poison in Nigeria annually, that the deaths were caused by contaminated foods through improper processing, preservation and service. He also affirmed that there were many avenues through which foods could be contaminated. He also stated that when people eat the foods, they would have problems which may result in deaths. He therefore suggested in that in order to reduce the burden to the barest minimum, the food vendors were called for continuous sensitization and training on food handlers and how to operate in hygienic environment and sanitary conditions required for processing of food. Abuja Municipal Area Council (AMAC).

Uchegbuo (2000), observed that most eating places such as hotels, local eatery (bukas), restaurants and mobile food sellers are sources of food borne diseases. Most of the cooking's, especially the open-air cooking (bukas), were done in filthy environments. He noted that places are sources of generation and transmission of diseases such as faecal oral infections, typhoid, hepatitis A and diarrhea, the sources of the raw foods cooked and the quality of water served, broken pipes, streams, constitute serious health hazards. WHO, (2008), Stated that poor environment, sanitation, poverty and malnutrition are contributory factors to ill health. Part of the issue is that despite the problems associated with these eating places, their establishment 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.

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. Estimations by the World Health

Organisation (2008), suggested that, food-borne illnesses account for about 2.2 million deaths annually, out of which about 86% are children. In Ghana, about 65,000 people die annually from food-borne diseases resulting in the loss of some US\$69million to the economy. More often than not, street food vendors 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 vendors to adhere to high standards of hygiene and maintain clean vending environments are essential. This has prompted considerable research to assess hygiene and food handling practices among food vendors across the globe in order to contribute to efforts aimed at improving food handling practices.

The aim of this study is to determine the Food Safety Knowledge, Attitude and Practice of Food Vendors in Abia State, Nigeria.

### **Literature Review**

Training of food handlers in safe food handling was identified as the most critical intervention in prevention of foodborne disease outbreaks. It has been noted by the previous researchers that the outbreak of food borne diseases are as a result of improper handling of food and poor personal hygiene by the food vendors (WHO2007).

The literature is inconclusive as to the effectiveness of food vendors' training programs. In most cases, food vendor's knowledge remained low even after training, and knowledge was not always translated into practice. Researchers used the survey method to determine knowledge and practice. Researchers have tried to improve knowledge transfer by developing training programs based on social cognitive theories. Such programs have shown greater improvement in hygienic practices. The objective of this research was to determine the role of food vendors in disease outbreaks, based on knowledge, attitude and practices of food vendors, and the effectiveness of training programs for food vendors.

Effectiveness of Food Handlers' Training is One of the strategy to reduce the growing increase in food-borne illnesses. According to Rennie (1994), voluntary training programs may reach only those who are interested in food safety and want to behave appropriately. Training programs ensure a wider coverage of food handling personnel. Effectiveness of food hygiene training programs is generally measured by change in food safety knowledge, food hygiene practice, or food safety regulation violations identified through observation/inspection of the food premises. Several studies have been conducted to test the effectiveness of these training programs. These studies have yielded results as to the effectiveness of training. Egan et al. (2007) conducted a review of studies done to determine the effectiveness of food hygiene training in the commercial sector of the food industry. Specifically, Egan et al. focused on outcome measures used by the scholars to ascertain training effectiveness. Forty-six studies met the inclusion criteria. These studies spanned the period 1969-2003 and were conducted in 10 countries, with the majority being done in the United States and the United Kingdom. Sixty-five percent

involved food handlers, and 24% focused on managers. Most of the researchers measured knowledge, attitude, behavior, and practices concerning food safety or food hygiene.

### **The Study Designs**

The study design used for this study include descriptive, before-after, comparative, and randomized controlled experiment. Egan et al. (2007) evaluated the studies based on five measures: knowledge, attitude, behavior and work practice, retraining, and duration of effects. Egan et al. found that most scholars measured effectiveness of training by assessing knowledge using questionnaires or pre/posttests. The knowledge ranged from good to poor on various critical aspects of food safety. With respect to attitude, behavior, and work practice, Egan et al. revealed that, although there was a positive attitude toward food safety, this was not supported by self-reported practice, and there was a discrepancy between self-reported practice and actual behavior. There was also no correlation between knowledge test scores and premises inspection scores. Seven of the studies were rated as moderate, and of these, "four provided good evidence to support the effectiveness of food safety intervention, specifically food handler training or recertification" (Egan et al., 2007, p. 1,187). However, this training program was more effective when conducted in the workplace rather than in a remote training environment. While there is acknowledgment that training of food handlers is critical to effective food hygiene practices, a limited number of studies have addressed the effectiveness of training. Pilling et al. (2008) this training was focused on demographics, knowledge assessment, attitudinal disposition and practice assessment of the food vendors. Participants were food vendors from restaurants in Aba South, Aba North, Osioma and Umuahia South and Obi-Ngwa. The 52 participants were drawn from restaurants who indicated their interest in the study.

The following sanitary facilities were observed in and around the respective food premises of the respondents: waste bin, refuse dump site, wash hand basins, and soap, disposable tissues, presence of flies, presence of rats and cockroaches and sanitary conveniences.

Respondents , sex, age, marital status, level of education, ownership of the business, reasons for vending business, nature of the shop, nature of vending business, years in business, location of the shop, working schedule of the vendor, where food is prepared before vendor, operational license, training on food safety, food serving ,regular inspection from health officers, source of water, storage of water, purification of drinking water and water serving, food display ,customers convenience and method of cleaning toilet facilities, personal hygiene and method of refuse disposal of those who runs the business, or none will be compared among the vendors and their environment to measure if they will be statistically significant association between educational status and hygiene status and food premises? Questionnaire structure and oral interview was done for the respondents. Further qualitative method was used to obtain pertinent information that will be used to contextualize the design and implementation of the intervention in the Five Selected Local Government in Abia State.

## 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, Osioma 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.

Out of the 17 Local Governments in Abia State 5 Local Governments was used for the study. The Local Governments are as follows:

- i. Aba South
- ii. Aba North
- iii. Obi-Ngwa
- iv. Osioma Ngwa
- v. Umuahia South
- vi. Inclusion and Exclusion Criteria
- vii. Food vendors who refused to interact, enroll and participate in the study after full explanation for the intervention were excluded
- viii. All food hawkers that cannot be easily located
- ix. All the cashiers, general cleaners and others who do not handle food. All vendors who frequently change their locations especially those that always sale in the night.
- x. 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%

$p_1$  = 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%

$p_2$  = 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 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.

### **Intervention**

The training was received by the food vendors in various sections. The aim of this study was to improve their knowledge, attitude and practice of food sanitation. The training methods and tools used were: (a) Handouts (b) interactive sections (c) power point projection which was used for its visual advantages.

The training was held at 84 ANgwa Road Aba, Aba town hall and the women center all in Aba. 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 will practice same and to ensure that the program had an in pact especially on the experimental group. Compliance to attending this training was achieved through the mobilization of the research assistants and the researcher during several encounter with the respondent's while organizing the frame work 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.

At the end of the program food vendor's association was formed on the inter local government level for easy access for future researcher and further evaluation when the need arises for future purposes. The sections of the handout were introduction of the training and why the program was conducted, training objectives, duration of the training and evaluation of the participants and the program after which the vendors requested that program of such nature should be conducted for all the food vendor and requested to the training to hold every month for them. The world health organization five keys to safe food were used in the preparation of the manual to fit into the study content.

**WHO Five keys to safe food: Source: WHO 2006a, pp 12.**

**Key Behaviour Rationale**

**1. Keep clean**

While most microorganisms do not cause disease, dangerous microorganism are widely found in soil, water, animals, and people. These microorganisms are carried on hands, wiping cloths, and utensils, especially cutting boards, and the slightest contact can transfer them to food and cause diseases

**2. Separate raw and cooked food**

Raw food especially meat, poultry and sea food and their juices can contain dangerous microorganisms which may be transferred onto other food during preparation and storage

**3. Cook food thoroughly**

Proper cooking kills almost all dangerous microorganisms. Studies have shown that cooking food to a temperature of 700c can help ensure it is safe for consumption. Foods that require special attentions include minced meats, rolled roasts, large joints of meat, and whole poultry

**4. Keep food at safe temperature**

Microorganism can multiply very quickly if food is stored at room temperature. By holding at temperature below 50C or above 60C, the growth of microorganism is slowed down or stopped. Some dangerous microorganisms still grow below 50C

**5. Use safe water and raw materials**

Raw materials, including water and ice, may be contaminated with dangerous microorganism and chemical. Toxic chemicals may be formed in damaged and moldy food. Care in selecting raw material and simple measures, such as washing and peeling may reduce these risks.

This was modified after the baseline survey to address the observed knowledge, attitude and practice gaps from the initial works done. The gaps in knowledge on how to separate raw meat with processed meat, cooling methods, use of jewelries while processing or



serving food, food storage and storage temperature, food contamination and contagious microbes, waste disposal, food poisoning and health condition of the food vendors and their knowledge about vaccination. (b) attitudes like hand washing, personal hygiene, smoking at vending site ,use of chemicals and food additives. Operational license, trainings attended on food vending business. (c) Practice such as use of gloves, apron, head gear, repeated use of water in washing and peeling of vegetables and washing of utensils, rearing of pets around the vending site, provision of sanitary conveniences, handling of money while serving food and other factors.

### **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 was trained for this study.

**Table 1:** Demographic Characteristics

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

## Results and Discussion of Findings

### Demographic characteristics of respondents

Table 1 shows that the experimental and control groups were dominated by females, 33 (63.5) and 28 (59.6) respectively. Vendors between the age 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.

### **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.

### **Results of level of knowledge of food hygiene**

The results suggest that the experimental group demonstrated the highest level of knowledge, although like in other groups, poor knowledge measure. Poor knowledge about food handlers has been reported (Barjatarovic-Labovic et al, 2017). However, unlike in this study, studies have reported marked improvement and good level of knowledge about food hygiene following training (Barjatarovic-Labovic et al, 2017; Ituma, Akpa and Iyare, 2017). Ituma et al, 2017 reported a marked increase in knowledge following a 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 and 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.

### **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.

### **Discussion based on results on attitude towards food hygiene**

The results showed overall poor attitude towards food hygiene. 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, Soe, Lwin, Myint, Oo 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 have also reported less than appropriate attitude of food vendors towards

food hygiene (Aluh and Aluh, 2017). Authors concluded that food safety training in addition to financial assistance to enable good practice be offered to food vendors.

### **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.

### **Discussion of Food Hygiene Practice**

Results show that there was improvement in food hygiene practice amongst food vendors. This result is unlike that reported by Umar et al (2015), where although participants demonstrated good knowledge, but did not translate that knowledge to good practice. Nurudeen, Lawal and 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 and 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, practice of food hygiene was still poor. The challenge of maintaining a formal monitoring culture was noted as a barrier to good practice.

### **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.

### **Discussion of personal hygiene observed after the educational intervention**

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

**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=±1.44; SE=0.20) was obtained for the experimental group, while a mean of 12.53 (SD=±1.32; SE=0.20) was obtained for the control group.

**Level of Environmental Hygiene**

Results above show that the environmental hygiene observed was good in both the experimental and control groups. Other studies are 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.

**Table 2:** Summaries of Descriptive statistics of mean and standard deviation for variables in the study as measured from participants

| VARIABLES                               | Maximum point on Scale of Measure | Respondents in the study<br>N= 99 |      |
|---|-----------------------------------|-----------------------------------|------|
|   |                                   | X (SE)                            | ±SD  |
| <b>Knowledge about food hygiene</b>     | 22                                |                                   |      |
| Experimental(pre-intervention)          |                                   | 8.33(0.36)                        | 2.59 |
| Experimental (Post-intervention)        |                                   | 9.12 (0.21)                       | 1.54 |
| Control (Pre-intervention)              |                                   | 4.71 (0.26)                       | 1.81 |
| Control (Post-intervention)             |                                   | 6.15(0.27)                        | 1.85 |
| <b>Attitude about food hygiene</b>      | 55                                |                                   |      |
| Experimental(pre-intervention)          |                                   | 18.44(0.62)                       | 4.49 |
| Experimental (Post-intervention)        |                                   | 17.73(0.67)                       | 4.81 |
| Control (Pre-intervention)              |                                   | 18.65(0.37)                       | 2.55 |
| Control (Post-intervention)             |                                   | 14.87(0.22)                       | 1.51 |
| <b>Practice (food hygiene practice)</b> | 21                                |                                   |      |
| Experimental(pre-intervention)          |                                   | 13.37(0.45)                       | 3.28 |
| Experimental (Post-intervention)        |                                   | 16.37(0.32)                       | 2.30 |
| Control (Pre-intervention)              |                                   | 15.06(0.28)                       | 1.96 |
| Control (Post-intervention)             |                                   | 18.38(0.15)                       | 1.01 |

### Test of Hypotheses

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

#### **H<sub>01</sub> -There is no significant difference in knowledge about food hygiene between the experimental and control groups following the intervention.**

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.

#### **H<sub>02</sub>: There is no significant difference in attitudinal disposition towards food hygiene between the experimental and control groups following the intervention.**

The results in table 4 show that 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.

#### **H<sub>03</sub>: There is no significant difference in practice of food hygiene between the experimental and control groups following the intervention.**

The results in table 4 show that 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 3:** ANOVA table showing the differences between groups for the knowledge, attitude and practice variables

| ANOVA     |                |                |     |             |        |      |
|-----------|----------------|----------------|-----|-------------|--------|------|
|           |                | 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 |             |        |      |

#### **H<sub>04</sub>: There is no significant difference observed in personal hygiene of the food vendors between the experimental and control groups**

An independent samples t-test was conducted to compare the personal hygiene in the experimental group and control groups. The results showed there was a significant

difference in personal hygiene between the experimental (M=7.46, SD= 1.09) and control (M=8.36, SD= 1.30) groups. The results therefore suggest that the control group had higher mean personal hygiene. The null hypothesis was therefore rejected.

#### **H<sub>0</sub>5: There is no significant difference observed in the environmental hygiene between the experimental and control groups**

An independent samples t-test was conducted to compare the environmental hygiene in the experimental and control groups. The results showed there was a significant difference in environmental hygiene between the experimental (M=11.92, SD= 1.44) and control (M=12.93, SD= 1.32) groups. The results therefore suggest that the control group had higher mean environmental hygiene. The null hypothesis was rejected.

#### **Descriptive statistics of the Key Variables**

This section describes the key variables (Knowledge, attitude, practice, personal hygiene)

##### **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. Thus, personal and environmental hygiene were better in the experimental group as seen in figure 1 and figure 2 below

#### **Summary**

The purpose of this study is to examine the effect of an educational programme on food vendors cognitive and sanitation related practices. Through extensive review of existing literature, it was found that training of food vendors to improve their knowledge, attitude and practice on sanitation, hygiene and food safety and is of great importance in

the prevention and control of food borne and food related diseases. In Nigeria, more than 200,000 persons die of food poison in Nigeria annually. The researcher, haven been a long-term resident of Abia State also observed that food vending faces challenges related to hygiene. Moreover, although trainings had been carried out amongst food vendors in nearby regions, no formal training had occurred in Abia State. In Abia State especially Aba and Umuahia, there has been an increase in the patronage of ready to eat food, vendors in almost all the premises and within an interval of 2 metres, suggesting the need to attend the issue of food hygiene. Thus, the study sought to first, introduce formal training of food vendors and evaluate the programmes effect on the vendor's knowledge, attitude, practice and personal and environmental hygiene. The concept and importance of food vending in an increasing urbanizing area was reviewed. The health believe model were also reviewed in line with the study.

This study adopted a quasi-experimental study research design which involved one experimental group and one control group, an observational checklist and research instrument was shared randomly was carried out amongst food vendors in selected local governments in Abia State. Selected vending units was surveyed, and their operators interviewed on their food handling practice. Structured questionnaire and oral interview were done. Further qualitative method was used to obtain pertinent information that will be used to contextualize the design and implementation of the intervention in the five Selected Local Governments in Abia State.

The subjects of this study were all food vendor's resident in the selected local Governments in Abia State who has been in this business of food vending with a minimum of six months experience and within the last six months of the commencement of this work. The sampling technique was stratified random sampling in each Local Government stratum. The primary data collection was solely primary data which took the form of face to face interview through the use of structured questionnaires. And observational check list platoon 1-3, the first platoon was done by the researcher, platoon 2 was done by one of the research assistants and platoon three was done by the researcher and the research assistant to confirm if the vendors are practicing what they were thought in the training. A total five (5) local Governments out of which ten wards were selected from all the local Government Areas.

Using the formula for comparing two proportions and adjusting for a loss to follow-up, a sample size of 63 was reached for each group of participants in the experimental and control groups. Respondents were recruited and invited to an education programme. The study took place in 4 phases. Phase one involved approaching, phase two etc. Research assistants who had been trained on the the modalities of the study assisted in collecting data from participants. The questionnaires were administered before the intervention and after at X weeks post intervention by the researcher with the assistance of research assistants. The research instruments used in this study were structured questionnaire and observational check list.



The structured questionnaire consisted of 4 sections. Sections A comprised of demographic characteristics. Section B knowledge about food hygiene on a dichotomous scale of Yes and No. Section C, was used to capture data on the attitude of participants towards food hygiene and questions were constructed on a 5-point likert scale from strongly agree to strongly disagree. Section D was used to capture data on food hygiene practice and consisted of questions constructed on a three-point likert scale (every time, sometimes and not at all). Data were entered into the SPSS 21 version and were analysed after coding and recoding of the variables.

To assess the validity and reliability of the research instrument, a pilot study was carried out involving 10 respondents. Face, content and construct validity were ascertained. The Face validity was carried out by showing the instrument to other faculty and respondents during the pre-test to check for ambiguities. In determining the reliability of the instrument, the Cronbach's alpha was computed using SPSS 25.0 and it ranged from 0.75 to 0.97 for the variables.

The descriptive and inferential statistics using simple percentages and frequencies and then and independent samples t-test were used for analyses. Simple Percentage and frequencies were used to describe basic socio demographic characteristics of respondents, while ANOVA was used to determine differences of significance and independent samples t-test was used to analyse the difference in personal and environmental hygiene between the experimental and control group based on observed characteristics after the programme. Results showed that the food hygiene programme had an effect on knowledge in the experimental group, however the level of knowledge was generally still poor. Food vendor's hygiene practice was also improved. The attitude of food vendors was not changed following the intervention and indicated a decrease in the two groups, experimental and control.

## **Conclusion**

The main objective of this study was to examine the effect of an educational intervention on food vendor's cognitive factors and sanitation related practices. Specifically, the study surveyed food vendor's knowledge, attitude and practice and examined the personal and environmental hygiene of food vendors in selected LGAs in Abia State.

- i. Results from hypothesis one show that there was a significant difference in knowledge about food hygiene between groups at the  $p < 0.05$  level. This shows that a simple educational programme can impact on food vendor's knowledge of food hygiene and further confirms several authors' suggestions on the need to conduct educational programmes.
- ii. Results from hypothesis two show that attitude was not impacted by the programme.
- iii. Results from hypothesis three show that there was a significant difference in practice between the groups. The null hypothesis was rejected. Practice also improved after the programme. This, again, suggests a positive effect of the intervention programme.

- iv. Results from hypothesis four show that there was a significant difference in personal hygiene between the groups, although the control group had higher mean level of personal hygiene. This suggests the need for more interventions in the experimental area of study.
- v. Results from hypothesis five show that there was a significant difference in environmental hygiene. Although the control group had better environmental hygiene. This also suggests the need for further studies in the environmental group.

In general, knowledge and practice were improved, however attitude worsened following the intervention. The reason for this would need to be ascertained in further studies in the area. There could be extraneous factors beyond what was observed that affected the attitude of the food vendors. As earlier mentioned, no focused interventions have been carried out. More needs to be done.

### **Recommendations**

The following recommendations are thus made:

1. There is need to focus more interventions on improving attitude amongst food vendors.
2. There is need to understudy 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.
3. Simple interventions to improve food hygiene knowledge, attitude and practice can be effective as has been found. More interventions need to be carried out based on innate characteristics of the study population.

### **Contributions to Knowledge**

This study provides insight into what obtains in Abia State on food vending. Although not all parameters were improved following the programme. It provides a first step for improving food vending knowledge and practices in the state. Food vendors remain an important link in food vending around the world and in increasingly urbanizing areas. Having the knowledge about what is occurring in different areas can help proffer solutions to the challenge of maintaining adequate food safety.

### **Limitations of the Study**

Although the study provided insights into the state of affairs in Abia State, the study did not understudy administrative factors which are precursors to knowledge, attitude and practice and may have contributed to the results as they have been presented.

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