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Effect of Health Education on Food Hygiene Practices and Personal Hygiene Practices of Food Vendors in Public Secondary Schools at Oshimili South Local Government Area

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ABSTRACT

Background: *Food is a vital substance that helps in the nutritional support and development of the human system and so the issue of food is important for every human being. Food is usually of plant and animal origin and contains nutrients needed by the body and could also be a source of ill health to humans if it is contaminated by microbes through poor hygienic practices.* ***Objectives:*** *The specific objectives are to identify cooked food storage hygiene practices among food vendors in public secondary schools in Oshimili south L.G.A and to determine personal hygiene practices of the food vendors in public secondary schools in Oshimili south L.G.A.* ***Methods:*** *Quasi-experimental design was used for the study. This involves two-phase work using Pre-test and Post-test. The representative sample size of 54 food vendors used for the study was gotten from the school food vending registers of the various schools. Data were entered using Microsoft Excel Windows 7 and exported to IBM SPSS version 15.0 software for analysis.* ***Results:*** *From the finding, more of the vendors (62% and 30%) transport their foods/snacks in closed containers and warmers after the health education intervention. Also, more vendors (Always 46%) started keeping their fingernails clean after the intervention. Similarly, more vendors practiced hand washing after the health education intervention. 41% of the food vendor never practiced hand wash but this was reduced to 26% in the Post-test. Likewise, the number of vendors that never covered food against dust and flies during sales reduced from 10% in Pre-test to 6% in Post-test study. The finding also showed that the vendors clean and sweep their vending environment before and after-sales. From the hypothesis testing, it was established that the health education intervention had a significant influence on the food vendors' hygiene practices ($p<0.05$).* ***Conclusion:*** *The food vendors' hygiene practices were still poor despite some notable improvement after the health education intervention. The school management seems not to be concerned about the hygienic practice of the food vendors and nobody monitors their activities during sales rather they are more concerned about collecting dues from the food vendors monthly. It is therefore recommended that School management should ensure that the food vendors are regularly trained on proper food handling and teachers are also delegated to monitor the food vendors during sales at break time. The government should post health officers to schools in order to monitor food vendors' hygiene practices on a regular basis.*

Keywords: Food hygiene, Health education, Practices, Secondary school

INTRODUCTION

Food is a vital substance that helps in the nutritional value support and development of the human system, and so the issue of food is important for every human being. Food is usually of plant and animal origin and contains nutrients needed by the body such as carbohydrates, fats, protein, vitamins or minerals depending on the type of food [1]. Food

is necessary for human survival however; it could be a source of ill health if it is contaminated by microbes such as *E. coli*, *Salmonella*, *Shigella*, *Campylobacter,* and *S. aureus*.

According to Oggiano, et al. [2], Food hygiene in all conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain [3], interpreted food hygiene as the preservation of health which involves all measures that ensure the safety and quality of food during its handling. These measures include the correct storage of both raw and cooked foods, as well as correct preparation and cooking methods. School meal is a meal provided typically in the middle of the school day, provided to students at school. School meals are a good way to channel vital nourishment to poor children. In 1946, America President Truman officially signed the National school lunch program, although funds had previously been appropriated for it over a decade without specific legislative authority [4]. India also has a long tradition of school feeding programs (some since the 1920s) largely by the state governments with some external assistance [5]. In Nigeria also, the Federal Government launched the Home-Grown School Feeding and Health program under the coordination of the Federal Ministry of Education in September 2005. The school meal program in Nigeria is either non-existent or where available inadequate so that students resort to independent food vendors. Also, with the financial challenges of this modern-day family, most women are now engaged in work that takes more of their time away from home thereby making it difficult for them to prepare food for their children's lunch hence these children resort to buying food from vendors in the schools. Food vending in schools became more common because of the non-availability of school meal facilities/cafeteria systems in most schools and the engagement of today's mother in the labor force.

Street food is defined as a wide range of ready-to-eat food sold and sometimes prepared in public places, notably streets [6]. According to Janie and Marie [7], a street food vendor is broadly defined as a person who offers goods for sale to the public without having a permanent built-up structure but with a temporary static structure or mobile stall/ headload/wheel-barrow/truck. Street vendors may be stationary by occupying space on the pavements or other public/ private areas or maybe mobile in the sense that they move from place to place carrying their wares on pushcarts, wheelbarrow or in cycle or baskets on their heads, or may sell their wares in moving trains, etc. in the environment. According to Simon [8], a good location and organization of the workplace are essential to ensure hygienic street food preparation and vending premises.

According to the World Health Organization [9], food handling personnel play an important role in ensuring food safety throughout the chain of food production, storage, and consumption. Also, the World Health Organization [10] outlined the golden rules to ensure the safety of food when being processed. Despite these set standards, food vendors most times neglect these rules thereby increasing the risk for the sale of pathogens infested food to school children which can lead to food poisoning. Food poisoning and other foodborne diseases occur in schools. The number of reported outbreaks of food-borne illnesses has been high, both in developed as well as developing countries. However, the problem is exacerbated in developing countries due to economic reasons, poverty, the lack of adequate health care facilities, and the dearth of data regarding foodborne diseases [8]. The safety of street or vended foods is, therefore, one of the most pressing health and safety issues facing most developing countries since it leads to both public health and social consequences, hence appropriate health education intervention directed to food vendors will assist them to appreciate the hazards associated with poor food handling and how to avoid them. However, Nutbeam [11], defined health education as any planned combination of learning experience designed to predispose, enable and reinforce voluntary behavior conducive to health in individuals, groups or communities. However, promoting the health of children is a lot of work that involves all stakeholders working together at all levels [12]. Consequently, inculcating healthy food hygiene habits to school children should be both in theory and practice. An aspect of the practice includes ensuring that food vended in the schools is wholesome for human consumption.

General observations show that most children of secondary school age are prone to cases of food poisoning due to exposure to food intake from food vendors because of the collapsing cafeteria system in a secondary school in Nigeria including Delta state. Consequently, the incidences of food poisoning seem to be on the increase and this may be attributed to the knowledge deficient and poor food hygiene practices of food vendors. According to Lyonga [13], poor food hygiene practices lead to a whole lot of foodborne illnesses e.g. typhoid, cholera, diarrhea, food poisoning and food hazards which pose not only health threats to everyone but also contribute to economic and social burden. In consideration of the noted issues and lack of cafeteria system in public secondary school, the researchers studied the effect of health education on food hygiene and personal hygiene practices of food vendors in public secondary schools in Oshimili South Local government Area, Delta State.

MATERIALS AND METHODS

The study was conducted in Oshimili South Local Government Area, Delta State. There are both private and public secondary schools in the local government, and they both comprise classes one to six. Students between the ages of 9 to 19 years made up of both boys and girls are found in the secondary schools. Each school is headed by either a male or a female principal. Each of the secondary schools has provisions for food vendors and they are being supervised by a teacher in each of the schools. The target population consists of food vendors in the public secondary schools in Oshimili South Local Government. The total number of public secondary schools in Oshimili South is ten. Five out of these ten schools were used for the study. The population of the study was 54 food vendors comprising of 13 persons at Asagba mixed secondary school Asaba, 11 persons at Niger mixed secondary school Asaba, 8 persons at Okwe secondary school Okwe, 10 persons at Westend mixed secondary school Asaba, and 12 persons at Zappa Basic secondary school Asaba. The population size was gotten from the school food vending registers. All the food vendors were used for the study and no sampling was done. Data were collected using a researcher-developed questionnaire and observation checklist for Pre-test and Post-test.

The questionnaire was made up of 3 sections. Section A addressed the respondents' demographic variables, section B was used to elicit information on the food storage method, section C elicited information on personal hygiene practices. The instrument was validated by 2 experts from the Department of Nursing Sciences and 1 from Measurement and Evaluation, University of Nigeria, Nsukka. The instrument was pilot tested using 5 food vendors in two private secondary schools in Oshimili South LGA which were not among the schools used for the study. Data obtained were analyzed using Cronbach's alpha test which yielded a reliability coefficient of 0.752. Ethical clearance was obtained from the Health Research Ethics committee of the Ministry of Health Asaba, Delta State. Delta State Ministry of Education gave permission for the study to be done in the public secondary schools in Oshimili South local area. Informed consent of the respondent was obtained verbally and their willingness to participate was ascertained. The collected data were coded, categorized and entered into Microsoft Excel Windows 7 and exported to IBM SPSS (Statistical package for social sciences) version 15.0 software for analysis. Using descriptive statistics which includes frequency, percentages, means and standard deviations, results were presented in tables. This was done in two phases, the first phase covered the Pre-test data while the second phase covered the Post-test data. The Pre-test data was analysed based on the 94% (51) return rate, while the Post-test was analysed using 93% return rate. The hypothesis was tested with inferential statistics (Chi-Square) at 0.05 level of significance.

RESULTS

Socio-Demographic Characteristics of the Participants

Table 1 shows the demographic profile of the respondents (food vendors). 6 (12%) of the food vendors were males while 45 (88%) of them were females. About half of the food vendors 27 (53%) were between 31 and 40 years of age, 15 (29%) of them were between 41 and 50 years, 8 (16%) of them were between 21 and 30 years, 1 (2%) of them were between 11 and 20 years.

The table also shows that 18 (35%) of the food vendors have primary education, 28 (55%) of them have secondary education whereas 5 (10%) of them have diploma education.

Table 1 Demographic profile of the respondents, n=51

Variables	Frequency	Percentage (%)
Sex		
Male	6	12%
Female	45	88%
Age Range		
11 yrs-20 yrs	1	2%
21 yrs-30 yrs	8	16%
31 yrs-40 yrs	27	53%
41 yrs-50 yrs	15	29%
Educational Qualification		
Primary sch cert.	18	35%
WAEC/SSCE	28	55%
OND/NCE	5	10%

Cooked Food Storage Hygiene Practices among Food Vendors

Table 2 showed in the Pre-test study that while transporting foods/snacks to the schools, 28 (54%) of the food vendors store their food in closed containers, 12 (24%) of them store their foods in a warmer while 11 (22%) store their foods in a sack. In the Post-test, 31 (62%) of the food vendors store their food in the closed containers, 15 (30%) of the food vendors store their foods in the warmer while 4 (8%) store their foods in a sack when transporting foods/snacks to the school.

Also in the pre-test, the table showed that 20 (39%) of the food vendors store their foods/snacks in a basin/bowl while attending to customers. It also shows that 24 (47%) store their foods in open coolers for easy access while attending to customers. 4 (8%) store in closed cooler and 3 (6%) in glass containers while attending to customers. In the Post-test while attending to customers, 16 (32%) of the food vendors store their foods in a basin, 22 (44%) of the food vendors store their foods in open warmer/cooler for easy access, 9 (18%) of the food vendors store their food in covered warmer/cooler and 3 (6%) of the food vendors store in glass containers. On what to do to the leftover food, 23 (57%) of the food vendor eat their leftover foods/snacks after-sales, 16 (31%) of the store in refrigerator, 3 (6%) of them throw their leftover away and 1 (2%) of them re-warm leftovers for next day sale. The remaining 8% (4 persons) return their snacks to the producers after the day's sale during the Pre-test study. In the Post-test study, 36 (72%) of the food vendors eat their leftover foods with their family, 3 (6%) of the food vendors throw away their leftover foods, 7 (14%) of the food vendors store their foods in the refrigerators and 4 (8%) of the food vendors return their frozen foods to the producers after the day's sales.

Table 2 Storage hygiene practice of food vendors

Items	Pre-test, n=51		Post-test, n=50	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Where do you store your food while transporting it to the vending site?				
In the Warmer	12	24%	15	30%
In a sack	11	22%	4	8%
In a closed container	28	54%	31	62%
How do you store your food/snacks while attending to customers?				
In covered cooler/warmer	4	8%	8	16%
In an open cooler/warmer for easy access	24	47%	20	40%
In a glass container	3	6%	7	14%
In a basin/bowl	20	39%	15	30%
How do you preserve leftover food after each day vending?				
Re-warm for next day selling	1	2%	0	0%
Eat leftover food	27	53%	36	72%
Store in refrigerator	16	31%	7	14%
Throw it away	3	6%	3	6%
sales elsewhere and return to the producer	4	8%	4	8%

Personal Hygiene Practices of Food Vendors

From the Table 3; in the Pre-test study, 10 (19%) of the food vendors wear clean and proper clothes to vending places sometimes, 33 (65%) of them wear clean and proper clothes most times while 8 (16%) always wear clean and proper clothes to vending place. In the Post-test study, 1 (2%) of the food vendors wear clean and proper clothes to vending places sometimes, 22 (44%) of them wear clean and proper clothes most times while 27 (54%) always wear clean and proper clothes to vending place.

In the Pre-test study, 27 (53%) Food vendors keep their nails and clean fingernails sometimes whereas, 24 (47%) of them keep their fingernail short and clean most times while in Post-test study, 1 (2%) of the food vendors keep short and clean fingernails sometimes whereas 26 (52%) of them keep their fingernail short and clean most times while 23 (46%) maintained their fingernails short and clean always.

In the Pre-test study, 19 (37%) of the food vendors have never covered their hair while selling their foods, 27 (53%) of them cover their hair sometimes, 4 (8%) of them cover their hair most times while 1 (2%) of them do cover their

hair always when selling their foods. In the Post-test study, 5 (10%) of the food vendors have never covered their hair while selling their foods, 16 (32%) of them cover their hair sometimes, 25 (50%) of them cover their hair most times while 4 (8%) of them do cover their hair always when selling their foods.

In the Pre-test study, 14 (27%) of the food vendors have never chewed gum while attending to their customer and 37 (73%) of them do chew gum sometimes while attending to their customer while in the Post-test study, the number of food vendors that stopped chewing gum while attending to their customers increased to 30 (60%) while the number of the food vendors that chew gum sometimes reduced to 20 (40%).

In the Pre-test study, 11 (22%) of the food vendors have never sneezed/coughed over food while 40 (78%) of them sneeze/cough over food when cooking or selling while in the Post-test study, the number of food vendors that stopped sneezing/coughing while attending to their customers increased to 32 (64%) and the number of the food vendors that sneeze/cough over their food sometimes reduced to 18 (36%).

In the Pre-test study, 2% (1) of the food vendors have never stayed away from selling when having diarrhea or cough, 48 (94%) of them stay away sometimes and 2 (4%) of them stay away most times when having diarrhea or cough while in the Post-test study, 1 (2%) of the food vendors have never stayed away from selling when having diarrhea or cough, 28 (56%) of them stay away sometimes and 20 (40%) of them stay away most times and 1 (2%) stay away always when having diarrhea or cough.

Table 3 Personal hygiene practices of food vendors

Items	Pre-test										Post-test									
	Never		Some times		Most times		Always		Mean	SD	Never		Some times		Most times		Always		Mean	SD
	F	%	F	%	F	%	F	%			F	%	F	%	F	%	F	%		
Do you wear clean and proper clothes to your vending place?	0	0%	10	19%	33	65%	8	16%	2.96	0.6	0	0%	1	2%	22	44%	27	54%	3.52	0.54
Do you keep your finger nails short and clean?	0	0v	25	49%	24	47%	2	4%	2.47	0.5	0	0%	1	2%	26	52%	23	46%	3.44	0.54
Do you cover your hair while selling cooked food?	19	37%	27	53%	4	8%	1	2%	1.75	0.69	5	10%	16	32%	25	50%	4	8%	2.56	0.79
Do you chew gum while serving food?	14	27%	37	73%	0	0%	0	0%	1.73	0.45	30	60%	20	40%	0	0%	0	0%	1.4	0.49
Do you sneeze or cough over while cooking or selling food?	11	22%	40	78%	0	0%	0	0%	1.78	0.42	32	64%	18	36%	0	0%	0	0%	1.36	0.48
Do you stay away from serving food when you have illness like diarrhea or cough?	1	2%	48	94%	2	4%	0	0%	2.02	0.24	1	2%	28	56%	20	40%	1	2%	2.42	0.57

Hypothesis Testing

Ho: Health education does not significantly influence food vendors' hygiene practices.

Table 4 Personal hygiene responses of the vendors during Pre-test and Post-test studies

Personal Hygiene	Pre-test value	Post-test value
Proper and Clean Clothes		
Never	0	0
Sometimes	10	1
most times	33	22
Always	8	27
Short and Clean Finger Nails		
Never	0	0
Sometimes	27	1
most times	24	26

Always	0	23
Covered Hair		
Never	19	5
Sometimes	27	16
most times	4	25
Always	1	4
Chewing Gum		
Never	14	30
Sometimes	37	20
most times	0	0
Always	0	0
Sneezing/Coughing		
Never	11	32
Sometimes	40	18
most times	0	0
Always	0	0
Staying away when having Diarrhea		
Never	1	1
Sometimes	48	28
most times	2	20
Always	0	1

X^2=84.2, p=0.01

The X^2 (Chi-square) from the SPSS calculation is greater than the X^2 from the statistical table and the $p<0.05$ (level of confidence). These values (X^2=84.2, p=0.01) shows that the null hypothesis (Ho) will be rejected and H1 will be adopted ie health education intervention significantly influence the food vendors' hygiene practices (Table 4)

Presentation of Direct Observation Checklist

From the table below, findings show that 7% of the vendors wear the appropriate dress (cloth, Apron, and cap) for vending during the Pre-test study. This number increased to 12% during the Post-test study. It was also observed that 4% of the vendors who wear trimmed neat nail during the Pre-test increased to 43% during the Post-test study. It was also observed that none of the vendors washes their hands before, during and after-sales in the Pre-test study. However, during the Post-test, 10% of the vendors observed hand wash before, during and after-sales. The environments were observed to be clean before and after-sales in both studies. 22% of the vendor stored their foods in a warmer during the pre-test. This number increased to 28% during the Post-test study. 16% of the food vendors observed proper covering of food against flies and dust during the Pre-test study and the Post-test observation showed an increase to 37% (Table 5).

Table 5 Observation checklist

n=54	Pre-test		Post-test	
	Frequency	%	Frequency	%
Wears when Selling Foods				
Normal clothes	42	78%	30	56%
Cloth with apron	8	15%	14	26%
Apron with caps	4	7%	7	12%
Apron without caps	0	0%	3	6%
Hand Washing while Serving Foods				
Does not wash hand before serving food	48	88%	41	76%
Wash hand before serving of food	3	6%	7	12%
Wash hand before and after serving food	0	0%	5	10%
Wash when they see their hand is dirty	3	6%	1	2%
Finger Nails of the Food Vendors				
Wear trimmed neat nail	2	4%	23	43%

Wear trimmed dirty nail	14	26%	22	40%
Wear long neat nail	29	54%	5	10%
Wear long dirty nail	9	16%	4	7%
Cleaning the Environment where Food is Sold				
Cleaned before sales	0	0%	0	0%
Cleaned after sales	0	0%	0	0%
Cleaned before and after-sales	54	100%	54	100%
Storage of Cooked Food before Sales				
In a warmer	12	22%	15	28%
In a basin covered with waterproof	28	52%	31	57%
In a pot used for cooking	0	0%	0	0%
In a sack	14	26%	8	15%
Storage of Food against Flies and Dust During Sales				
Properly covered	9	16%	20	37%
In an open basin	25	46%	18	33%
In glass case	5	10%	5	10%
In an open sack	15	28%	11	20%

DISCUSSION

Cooked Food Storage Hygiene Practices among Food Vendors

Finding from this study showed that cooked food/snacks were majorly stored in a closed container (54%) while being transported to the schools. These practices actually increased to 62% after the education intervention. It also showed that the leftover foods are mainly eaten by the vendors. This increased to 74% in the post-intervention study from 53% in the Pre-test study. During the intervention study, food vendors were encouraged to prepare food for just one day sale. This is in agreement with Sarkodie [14], which recommended that Street food vendors should prepare enough food for the day; so that they can sell all their food since most of them do not have proper storage facilities to store leftover foods which can be contaminated easily. The study also showed that even after the intervention, 40% of the food vendors still stored their food in an open cooler and 30% still stored their food in a basin/bowl. This is in agreement with Mangbo [15], which reported that all the fruit vendors displayed their fruits on open trays in open places and sold. According to World Health Organisation [16], eating fruit that is not properly washed and not kept in refrigerator often results in food poisoning hence it is recommended that food vendors should store their food properly while transporting them to their sales point.

Personal Hygiene Practices of Food Vendors

The study showed that personal hygiene observed by the vendors at the Pre-test study stage was very poor. However, there were some improvements in the Post-test study. In the Pre-test, 4% of the food vendors had maintained neat, trimmed and clean fingernails but after the intervention, 46% of the food vendors maintained neat, trimmed and clean fingernails. Also, vendors that covered their hair always increased from 2% in the Pre-test study to 8% in the Post-test study. Also, the mean score of some of them that observed proper hand wash during the selling of food increased from 1.71 in the Pre-test to 2.12 in the Post-test study. In addition, the mean score of the vendors that cover their food/snacks against dust and flies rose from 2.18 in the Pre-test study to 2.54 in the Post-test study. Also, the direct observation showed that 90% and 78% of the food vendors do not wear hand gloves and apron respectively. Despite some notable improvements in the hygiene practice of the vendors, it is still unsatisfactory. These findings support the findings of Musa, et al. [17], Mudey, et al. [18], Mukhopadhyay, et al. [19], and Mobolaji, et al. [20], which reported that the personal hygiene practices of the food handler were poor. The findings of this study also showed that the Post-test data had better and more positive responses than that of the pre-test. This is an indication that the health education intervention has a desirable and positive effect on the food vendors' hygiene practices. The study showed that the weighted mean of responses in the questionnaire increased during the Post-test study. For instance, the weighted mean of the vendors that wear clean and proper dress increased from 2.96 in Pre-test to 3.52 in the Post-test study; the mean of the vendors that cut and keep their nails clean increased from 2.47 in Pre-test to 3.44 in the Post-test study and the mean of those that cover their hair rose from 1.75 in Pre-test study to 2.56 in the Post-test study. Furthermore, the mean value of the vendors that chew gum reduced from 1.73 in the Pre-test study to 1.4 in the post-study. These parameters

actually showed that the intervention has an effect on the food hygiene practice by the vendor. This finding was in consonance with the findings of Musa, et al. [17], and Ansari [21], which reported that food vendors improve in their food hygiene practices after the intervention. However, this is in contrast with da Cunha, et al. [22], which reported that Food handlers who had undergone training presented higher knowledge scores but did not differ from those who had not regarding attitudes, self-reported practices and observed practices.

Health Education Significantly Influenced Food Vendors' Hygiene Practices

The result of the hypothesis testing revealed that there was a relationship between health education intervention and the food vendors' hygiene practice. In other words, the improvement in the hygiene practice of food vendors in the Post-test study was as a result of the health education intervention. This result is in line with da Cunha, et al. [22], which reported that there was marked improvement among food handler's knowledge, attitude and practice towards personal hygiene after their three years of a health education intervention on food handlers.

CONCLUSION

The food vendors' hygiene practices were still poor despite some notable improvement after the health education intervention. The school management is not concerned about the hygienic practice of the food vendors and nobody monitors their activities during sales rather they are more concerned about collecting dues from the food vendors monthly. Dust was usually stirred up during break time because of rush from students and the untilled state of the floor in the sales area, hence the need to have close supervision of food vendors and the vended food to prevent foodborne diseases among the children.

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Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.e.

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