

Food Safety and Hygiene Practices among Food Vendors in Tertiary Hospitals in Plateau State Nigeria

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Abstract—Background: Food safety and hygiene are essential in promoting and preserving the health of the consumers, given that food borne diseases are significant contributors to morbidity and mortality globally. Unhygienic food has been implicated in the outbreak of several food related illnesses with factors such as poor food handling practices of food vendors as the major culprit. Hence, this study was conducted to assess the level of food safety and hygiene practices and its determinants among food vendors in tertiary hospitals in Plateau state, Nigeria. **Methodology:** A cross sectional study carried out among 87 food vendors in food vending premises within the four tertiary health institutions in Plateau state, Nigeria using a multi-stage sampling technique and quantitative method of data collection. Epi info statistical software version 7.0 was used for data analysis. Crude odds ratio and 95% confidence interval were used in this study with a p-value of ≤ 0.05 considered statistically significant. **Result:** The mean age of the food vendors in this study was 30.6 ± 9.0 years with slightly above half of the respondents 54.0% adjudged as engaging in good practice of food safety and hygiene. Attendance of training and availability of running water within the food vending premises showed statistically significant relationship with the practice of food safety. **Conclusion:** The level of practice of food safety and hygiene requires improvement as wholesomeness and utmost safety of food is essential to promoting and preserving health.

Index Terms— Determinants, food safety and hygiene, Practices, food handlers, Tertiary hospitals

I. INTRODUCTION

Food safety and hygiene are essential in promoting and preserving the health of the consumers, given that food borne diseases are significant contributors to morbidity and mortality globally [1]. World Health Organization (WHO) estimated the global burden of food borne diseases to about

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600 million with about 420,000 deaths annually resulting in the loss of about 33 million Healthy Life Years (HLYs) [2]. Thus, leading to significant negative impact on the health status of the population and simultaneously creating an enormous social burden on the communities and their health system [3], [4].

According to Food and Agricultural Organization (FAO), unhygienic food has been implicated in the outbreak of several food related illnesses with factors such as poor food handling practices of food vendors as the major culprit [5],[6]. The simple act of hand washing as well as other safety and hygiene practices have been suggested as measures of halting the transmission of pathogens causing food borne diseases and significantly reducing the contamination of food. Occurrence of food borne diseases has been attributable to the existing gaps between safe food handling measures and its practice [7]-[9]. In view of this void that exists between the prescribed safe food handling measures and its practice, this study was conducted to assess the level of food safety and hygiene practices and its determinants among food vendors in tertiary hospitals in Plateau state, Nigeria as way of identifying evidence based practicable means of closing this gaps.

II. METHODOLOGY

A. Study Area

This study was carried out in food vending facilities within the tertiary health institutions in Jos Plateau State, Nigeria. There are four tertiary Health institutions in the state of which all are located within Jos North Local Government Area (LGA). These health institutions are Jos University Teaching Hospital (JUTH), Plateau State Specialist Hospital, Bingham University Teaching Hospital and Our Lady of Apostles Hospital [10]. Jos North is one of the 17 LGAs in Plateau State having 20 political wards with an area of 291km² and a population of 429,300 [11].

JUTH was established in 1981 and is currently located in Lamingo area of the LGA. JUTH is a tertiary health institution with a 500 bed capacity with several service delivery units which includes: Family health Clinic, Emergency Paediatric Unit, Paediatric Out-Patient Department, Ante-natal Care, Family Planning, Obstetric Care, Gynaecology, Accident and Emergency Unit, Medical Out-Patient Unit, Surgical Out-Patient Department Intensive Care Unit, amongst others [12].

Plateau State Specialist Hospital is the State Governments apex hospital established in 1933 by British expatriates working in tin mines within Jos metropolis. It serves as a

referral centre for other hospitals within the state. The hospital provides specialized medical services, trains health professionals and serves as a research centre. It is presently structured into five major departments and several minor functional units. The major departments are; the administrative department, medical and radiology department, nursing department, pharmacy department and laboratory department. The hospital has a bed capacity of 176 (124 adult and 52 children) [13].

Bingham University Teaching Hospital formerly called Evangel hospital is a missionary hospital owned by ECWA Bingham University. It is a 150 bed hospital founded by Sudan Interior Mission in 1959. Its core medical services include surgery, internal medicine, pediatrics, ophthalmology, dentistry, vesico-vaginal fistula surgery, HIV care including antiretroviral treatment program [14].

Our Lady of Apostles Hospital (OLA) is a faith based general hospital owned by the Catholic Archdiocese of Jos. OLA hospital provides quality preventive and rehabilitative health care and optimum diagnostic and curative services [15].

B. Study Population

The study population comprised of food vendors providing food within the premises of Jos University Teaching Hospital (JUTH), Bingham University Teaching Hospital (BUTH), Plateau State Specialist Hospital (PSSH) and Our Lady of Apostles (OLA) Hospital between April and May, 2016.

C. Inclusion and Exclusion Criteria

All permanently engaged food handlers providing food in food vending facilities within the premises of the selected tertiary health institutions either in well-organized restaurants or in make shift structures who gave consent to participate in the study were included in the study. While food vendor below the age of 18 years or those who had not worked as food vendors for up to 6 months were excluded from the study.

D. Study Design

This was a cross sectional study carried out among 87 selected food handlers in food vending facilities in Jos University Teaching Hospital, Bingham University Teaching Hospital, Plateau State Specialist Hospital and Our Lady of Apostles Hospital to assess the food safety and hygiene practices using quantitative method of data collection.

E. Sample Size Determination

A minimum sample size was determined using the sample size determination formula for cross-sectional study [16]. Where n is the minimum sample size, Z is the standard normal deviate at 95% confidence interval (1.96), q is the complementary probability ($1 - p$), d is the precision of the study set at 0.05 and p is the proportion of food handlers with good practice of food safety and hygiene from a previous similar study 96.7 (97%) [17]. This gave a minimum sample size of 50 after 10% addition to cater for non, poor and incomplete responses

F. Sampling Technique

All the food handlers in food vending premises in the four

(4) tertiary hospitals who met the inclusion criteria and had consented to participate in the study were sampled.

G. Data Collection

A semi structured interviewer administered questionnaire with cronbach alpha reliability score of 0.81 comprising of three (3) sections namely; socio-demographic characteristics, practice of food safety and hygiene as well as determinants of practice of food safety and hygiene was used in this study. The data collection instrument was pretested among food vendors in food vending premise in secondary health facility in the state in another LGA among ten percent (10%) of the estimated minimum sample size prior to the commencement of the study. Three research assistants were trained on the content and administration of data collection instrument prior to the commencement of the study by the principal researcher. Ethical clearance was sought and obtained from Jos University Teaching Hospital Ethical Review Committee. Written and verbal informed consent was obtained from all the respondents with confidentiality and anonymity of their responses assured and maintained.

H. Scoring and Grading of Responses

To assess the practice of food safety and hygiene in this study 15 stem questions were used with a maximum possible response of 19. A mark of 2 was assigned to each correct response and a mark of 1 for every incorrect response, however for responses using a 4 point rating scale, 4 marks was allocated for the most favorable response. The percentile graph of the scores was drawn then scores from 50th percentile and above was graded as good practice while those below the 50th percentile cut off was graded as poor practices of food safety and hygiene respectively.

I. Data Analysis

Data collected was processed and analyzed using Epi info statistical software version 7.0. Qualitative data such as sex, age group was presented using frequency table. Quantitative data such as age, practice score and duration of practice as food handlers were presented using mean \pm standard deviation. Chi square test was used to determine the relationship between characteristics of the food handlers and practice of food safety. Crude odds ratio and 95% confidence interval were used in this study with a p-value of ≤ 0.05 considered statistically significant.

III. RESULTS

Majority (71.3%) of the respondents in this study were 25 years and older with the mean age of 30.6 ± 9.0 years. Food vending in the tradition African setting is a vocation that is female dominated as 69 (79.3%) of the respondents studied were females. The marital status of the respondents showed almost similar proportions between the single (51.7%) and married (48.3%) with majority (85.1%) having post primary level of educational attainment. More (64.4%) of the food vendor in this study had been vending food for 5 years and less while 31 (35.6%) had been vending food for more than 5 years. The assessment of attendance of training on food safety within the last 2 years prior to this study revealed that 49 (56.3%) had attended at least one training while 38 (43.7%)

had not attended any training within the specified period. (See table I)

TABLE I: Socio-demographic characteristics of the respondents

CHARACTERISTICS	FREQUENCY	PERCENTAGE
Age group (years)		
≤ 25	25	28.7
> 25	62	71.3
Total	87	100.0
Mean age(years)	Mean ± SD 30.6 ± 9.0	
Sex		
Female	69	79.3
Male	18	20.7
Total	87	100.0
Marital status		
Single	45	51.7
Married	42	48.3
Total	87	100.0
Level of education		
Primary	13	14.9
Post primary	74	85.1
Total	87	100.0
Duration of food vending(years)		
≤ 5	56	64.4
> 5	31	35.6
Total	87	100.0
Prior training in food safety		
Attended	49	56.3
Not attended	38	43.7
Total	87	100.0
Availability of running water		
Available	70	80.5
Not available	17	19.5
Total	87	100.0

SD = Standard deviation

Food safety and hygiene practices revolves around a constellation of activities in the chain of food production. In this, the practice of hand washing at times necessary before and after handling food was found among 59 (67.8%) of the respondents while 11 (12.6%) and 1 (1.1%) sometimes and never practice the act of hand washing as required before and after food handling respectively. Majority (94.3%) of the respondents affirmed that they stay off work when sick in order to minimize the possibility of compromising the safety of the food. The use of appropriate cooking aprons always while in the act of food preparation was found among 49 (46.3%) of the studied food handlers while proper covering of wounds and cuts all the time in the course of food handling was found among 59 (67.8%) and never among 6 (6.9%) respectively. Slightly above half of the respondents 54.0% were adjudged to engage in good practice of food safety and hygiene with mean practice score of 35.6 ± 5.8 out of a total score of 50.(See Table II)

TABLE II: Practice of Food Safety and Hygiene

PRACTICE	FREQUENCY	PERCENTAGE
Hand washing before and after handling food		
Always	59	67.8
Most of the time	11	12.6
Sometimes	16	18.4
Never	1	1.1
Total	87	100.0
Staying off work when sick		
Yes	82	94.3
No	5	5.7
Total	87	100.0
Sanitizing utensils before and after use		
Always	66	75.9
Most of the time	15	17.2
Sometimes	5	5.8
Never	1	1.1
Total	87	100.0
Use of cooking apron		
Always	49	56.3
Most of the time	26	29.9
Sometimes	11	12.6
Never	1	1.2
Total	87	100.0
Covering of wound and cuts when handling food		
Always	59	67.8
Most of the time	14	16.1
Sometimes	8	9.2
Never	6	6.9
Total	87	100.0
Level of practice		
Good	47	54.0
Poor	40	46.0
Total	87	100.0
Mean ± SD	35.6 ± 5.8	
Practice Score	35.6 ± 5.8 out of 50.	

SD = Standard Deviation

The relationship between the practice of food safety and the characteristics of the respondents such as age, sex, duration of food vending, attendance of training on food safety, level of education, availability of running water within food vending premises and marital status revealed that only attendance of training within the last 2 years prior to this study as well as availability of running water within the food vending premises had statistically significant influence on the practice of food safety. The odds of good practice of food safety and hygiene among those who had previously attended at least a training prior to this study was found to be 3.5 times the odds of those who had not attended any training with the last 2 years prior to the study ($\chi^2 = 8.018$; $p = 0.005$; $COR =$

3.5, 95% CI = 0.1162 – 0.6883). Similarly, the odds of good practice of food safety and hygiene among food handlers in food vending facilities with running water was 3.6 times the

odds of those in facility without running water ($\chi^2 = 5.152$; $p = 0.023$; $COR = 3.6$; 95% CI = 0.090 – 0.850). (See Table III)

TABLE III: Relationship between characteristics of the respondents and the practice of food Safety

Characteristics	Food Safety Practice		Total	χ^2	P- value	OR* (95Conf.Interval)
	Good Freq (%)	Poor Freq (%)				
Age (year)						
≤ 25	12 (48.0)	13 (52.0)	25	0.512	0.474	0.7 (0.2805 – 1.8075)
> 25	35(56.5)	27 (43.5)	62			
Total	47	40	87			
Sex						
Female	37 (53.6)	32 (46.3)	69	0.022	0.884	0.9 (0.3259 – 2.6254)
Male	10 (55.6)	8 (44.4)	18			
Total	47	40	87			
Duration of working (years)						
≤ 5	31 (55.4)	25 (44.6)	56	0.113	0.737	1.2 (0.4824 – 2.8017)
> 5	16 (51.6)	15 (48.4)	31			
Total	47	40	87			
Attendance of training on food safety within the last 2 years						
Attended	33 (67.3)	16 (32.7)	49	8.018	0.001	3.5 (0.1162 – 0.6883)
Not attended	14(36.8)	24 (63.0)	38			
Total	47	40	87			
Level of Education						
Primary	5 (38.5)	8 (61.5)	13	1.490	0.222	0.5 (0.6273 – 7.0305)
Post primary	42 (56.8)	32 (43.2)	74			
Total	47	40	87			
Marital Status						
Single	24 (53.3)	21 (46.7)	45	0.002	0.893	0.9 (0.4555 – 2.4632)
Married	23 (54.8)	19 (45.2)	42			
Total	47	40	87			
Availability of running water within the vending premise						
Available	42 (60.0)	28 (40.0)	70	5.152	0.023	3.6 (0.0900 – 0.8500)
Not available	5 (29.4)	12 (70.6)	17			
Total	47	40	87			

*= Crude Odds Ratio

VI. DISCUSSION

The age of the respondents in this study revealed a relatively young group of food vendors which is in synergy with what was obtained in an Iranian study [18]. Majority of the respondents were females which conforms to the trend of cooking being a feminine business in a contemporary African setting and this corroborates the finding of another Nigerian study [19]. This is not surprising in a contemporary African setting as females are more saddled with the responsibilities of preparing household food and as such food vending could be viewed as largely a female’s vocation but not to say that males are not involved in food vending. Majority of the food handlers in this study had post primary level of education. This level educational attainment shared similarities with what was found in another Nigerian study [20]. Attainment of basic education is important in food handling and vending as this vocation will require basic ability to read and write to ensure conformance to basic food safety and hygiene requirements in some instances. Duration of time spent in food vending business could sometimes but not absolutely influence the practices of food safety and hygiene as it is in most vocations for which there are the tendency to improve in skills and prowess with time. In this study, more of the respondents had spent 5 years of less in food business which is at variance with what was obtained in another study conducted in same state but in a different setting [21]. This

could imply that food vendors in tertiary hospital settings had a relatively young, highly mobile workforce with the

possibility of engaging in this vocation as a temporary one as against in the other setting in which food vending was taken as permanent and stable job. Periodic training on the principles of food safety and hygiene is a key strategy to improving and promoting safe food handling practices. In view of the importance of this training, as much as over a third of these food handlers studied had not attended any of such training within the last 2 years prior to this study. Furthermore, the finding of this study on prior training can be said to be better than findings of other studies conducted in Malaysia, Nigeria and India where as high as 73.2%, 88.5% and 100% of the food handlers respectively had not had recent trainings in food safety and hygiene [21]-[23]. This revelation could be a pointer to the fact that training on food safety and hygiene might not be given the necessary priority by the business owners and probably ill enforced by the relevant agencies.

Good practice of food safety and hygiene is the expected norm among food handlers, however, this expectation quite often is not met thereby increasing the risk of contamination of ready to eat food. Similarity exists in the proportion of the respondents who engaged in good practice of food safety and hygiene in this study and that conducted in Ethiopia but significantly higher than what was obtained in other Nigerian and Indian studies [24] – [27]. However, findings of studies from Malaysia and other part of Nigeria reported better practice of food safety and hygiene [28], [29]. This variation

in findings could be attributable to the difference in the settings where these studies were carried out and more importantly dissimilarities in food handling structures and facilities available in addition to prior attendance of training in this regard.

A significant proportion of the respondents affirmed to always engage in the practice of hand washing before and after preparing meals which is similar to the findings of studies carried out in North west Ethiopia and Nigeria but better than what was obtained elsewhere in Nigeria [30], [31]. Our findings could be due to the fact that accessibility to water and the presence of hand washing facilities were inbuilt structures within most of the vending premises let out to majority of the food vendors by the hospitals.

Prior attendance of training on food safety and hygiene as well as the accessibility of running water within the vending premises were significant determinants of the practice of food safety and hygiene in this study. Determinants such as training as found in this study as well as increasing age of the respondents, level of education, sex, knowledge of food safety, marital status, income, availability of shower and separate dressing facility were found in other similar studies [19], [21], [27] – [29], [32],[33]. The role of training in improvement of the practice safe food handling practices can be overemphasized, however other factors when thoroughly studied and put together appropriately as food safety improvement interventions will further ensure that ready to eat food is wholesome and safe.

V. CONCLUSION

The level of practice of food safety and hygiene requires improvement as wholesomeness and utmost safety of food is essential to promoting and preserving health. Hence, training on food safety and hygiene as well as accessibility to water source within the vending premises are vital to achieving improved food handling practices. It is also opined that further studies be carried out to device means of ensuring continuous quality improvement in safe food handling practices.

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