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## THE ECONOMY AND SAFETY OF STREET- VENDED FOODS IN UYO AKWA IBOM STATE

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### ABSTRACT

The economy and safety status of street vended foods in Uyo, Akwa Ibom State was investigated using standard procedures. 1215 respondents (735 males and 480 females) were enlisted from streets adjoining two tertiary institutions, two main markets, two major motor parks, the Federal and State secretariats and the University of Uyo Teaching Hospital (UUTH). Structured questionnaire and checklist were used to document vended foods processing and handling safety as well as its economy, while the level of microbial contamination was assayed using standard culture technique. The results have shown that most (86.9-91.3%) respondents agree that street-vended foods is a good source of income, cheap and highly economical, despite its potential as medium for the transmission of different types of food borne illnesses. 99%, 67%, 56.5% and 42.1% respectively are aware of the risks associated with consumption of bad quality water, use of dirty hands/utensils by consumers and the poor personal hygiene of the food vendors respectively. These are attributes of food borne illnesses ascribed to street-vended foods. The results have also revealed that in all cases of food-borne illness, self medication was the preferred (77.4%) method of treatment, while a few respondents retained myths and outdated ideas about food borne diseases. The difference in knowledge between male and female vendors was statistically significant ( $p < 0.05$ ). Treatment is usually done with little or no knowledge of the etiological agents. However analysis of the vended food samples collected in this study has revealed the high risk consumers in Uyo are exposed to as notable food pathogens such as *Staphylococcus aureus*, *Salmonella*, *Shigella* and *Esherichia coli* were readily isolated. Adequate hygiene and enforcement of regulatory policies would address possible outbreak of food-borne illnesses among consumers of vended foods in Uyo.

### INTRODUCTION

Street - vended foods have a nutritional as well as economic importance in many developing countries, such as Nigeria, as they provide easily available, cheap and diverse source of daily meals (Winarno and Allain, 2011; WHO, 2010). Some members of the population such as students in tertiary institutions rely totally on streets foods, while civil servants, artisans, self employed business people, primary and secondary school students and floaters who come in and out of the cities, frequently rely on street meals, snacks and beverages for nutrition (Omemu and Aderoju, 2008; FAO, 2002; FAO, 2006; Winarno and Allain, 2011; Mensah *et al* 2002; Mohammed and Nicolo, 2013).

In rapidly urbanizing cities such as Uyo, a good proportion of the population may not have the opportunity to eat home cooked meals (Ohiokpehai, 2003; Mohammed and Nicolo, 2013), but rely on, street foods for their nutritional needs (Omemu and Aderoju, 2008; Nzeagwu and Uwaegbute, 2007a). Street vended foods are known to provide nutrients from traditional foods and fruits as well as from fresh farm produce. In this regard, they have the potential to reduce over reliance on highly on sugary and fatty foods implicated in the upsurge of diet related

chronic diseases in countries in nutrition transition such as Nigeria (Thiam *et al.*, 2006; Schmidhuber *et al.*, 2005; Kennedy *et al.*, 2004).

Regardless of the benefits of street - vended foods, they can constitute serious public health problem, when vendors operate under unhygienic conditions (Ossai, 2007). Food safety and sanitation is critical to human health. Issues relating to food security in Nigeria are compounded, when the safety of much of the available food cannot be guaranteed (Eneanya and Njom, 2003; Ita *et al.*, 2005; Chukwuezi, 2010). Contaminated foods and water have been implicated in much morbidity and mortality in developing countries (Banda *et al.*, 2007; WHO, 2010; Ezekiel *et al.*, 2013). This study was undertaken to evaluate the economy and safety status street-vended foods in Uyo, Akwa Ibom State.

## **MATERIALS AND METHODS**

### **Study Area**

The study was carried out in Uyo, Capital City of Akwa Ibom State between February and June, 2013. Uyo lies between latitude 5°02' 60" North and longitude 7°55' 60" East of the Greenwich meridian. It is a fast developing urban city located in the coastal south southern part of Nigeria which has witnessed a huge influx of persons from the hinterland and neighbouring states, in search of a means of livelihood. The area had a population of 309,573 persons (Nigerian Population Commission, 2006) occupying 95 square kilometers, with a population density of 1,400 per square kilometer (Facts about Uyo, 2013).

### **Study Population and Sampling**

Cluster sampling method was adopted to study areas with bizarre status. The adjoining streets (Ikpa road, Ikot Ekpene and Urua Ekpa Streets) to the two major tertiary institutions, University of Uyo and Uyo City Polytechnic were purposefully selected. The adjoining streets (Udo Umana Street, Oron Road, Itam Junction) to the two main markets in the city, Urua Akpan Andem and Itam Market were also selected. Similarly, the adjoining streets to the two major motor parks Akwa Ibom State Transport Corporation (AKTC) and Itam New Park were also selected in addition to the Abak Road and Edet Akpan Lane on which the Federal and State Secretariats, and University of Uyo Teaching Hospital (UUTH) are located.

### **Data Collection**

A total of 1215 food vendors were enlisted for this study. A pretested questionnaire was administered to each of the food vendors. The illiterate vendors were assisted by interpreters in completing the questionnaires. The data were analyzed using descriptive statistics.

### **Bacteriological Analysis of the Vended Food Samples**

Six types of food ; Fufu, Meat pie, Chicken, Meat (Beef), Roasted plantain and Sugar cane commonly vended in Uyo streets were collected for bacteriological analysis using standard procedures. Food samples were analyzed within 30 minutes of collection. The food samples which were generally taken from the different vendors and contained in sterile glass bottles were subsequently triturated and homogenized. To evaluate the microbial population, the samples were placed in contact with 0.35% NaCl solution (physiological saline) and shaken vigorously for 30 minutes, to release or extract the Protists present in the samples. The samples suspensions were serially diluted before used in the estimation of microbial densities.

The fecal coliform (*Escherichia coli*) and *Salmonella/Shigella* densities in the food samples were analyzed by the pour plate method using Eosine Methylene Blue Agar (EMB) and Salmonella Shigella Agar (SSA) as the analytical media respectively. Also estimated was the density *Staphylococcus aureus* using Mannitol Salt Agar. The bacterial plates were incubated at 37°C in a Gallenkamp incubator for 24 hours (Harrigan and McCance, 1968; Mensah *et al.*, 2002 and Brook *et al.*, 2007). After incubation the organisms were counted with the aid of a Quebec colony counter and the results expressed as cfu/g of food item.

## RESULTS

### Characteristics of Respondents

Out of the 1215 respondents investigated, 735 (60.5%) were males and 480 (39.5%) females. Majority (75%) of respondents were adults (18-59 years), 20% between 12-18 years of age, while 3.9% were elderly (> 60 years of age). More than (68%) had secondary education, 22% primary education, 7%, no formal education, while 3% had tertiary level of education (Table 1). More than 67% of respondents had spent less than 1 year in the business, only 0.2% had a medical examination before starting the business, 0.2% received necessary health education before embarking on the business, while 7% of respondents had formal training as street food vendors. Majority (55.6%) of respondents were stationary without a shade covering, about 24% were mobile, while 19.8% had a stationary shade with temporary cover.

Table 1: Socio-demographic characteristics of respondents by sex, age, level of education, type of street food vendor (sfv) and number of years on the job

Variable	Gender				Total	
	Male n = 735		Female n = 480		N = 1215	%
<b>Age (in years)</b>						
12 – 18	163	13.4	87	18.1	250	20.6
18 – 59	557	45.8	361	75.2	918	75.6
<b>Level of education</b>						
No formal education	30	4.1	57	11.9	87	7.2
Primary	95	12.9	166	34.6	261	21.5
Secondary	594	80.8	236	49.2	830	68.3
Tertiary	16	2.2	21	4.4	37	3.0
<b>Type of sfv</b>						
Mobile	178	24.2	120	25.0	298	24.5
Stationary without shade	499	67.9	177	36.9	676	55.6
Stationary with temporary shade	58	7.9	183	38.1	241	19.8
<b>No. of years on the job</b>						
< 1 years	554	75.4	262	54.6	816	67.2
1 – 5 years	162	22.0	196	40.8	358	29.5
> 5 years	19	2.6	22	4.6	41	3.4
<b>Preparation for the job</b>						
Had pre medical exam	2	0.3	3	0.6	5	0.4
Had health education	-	0	2	0.4	2	0.2
Understand formal training	25	3.4	59	12.3	84	6.9
Registered with government	2	0.3	5	1.0	7	0.6
Registered with association/union	67	9.1	62	12.9	129	10.6

### Respondents' knowledge of types, causes and treatment of food-borne illness

Majority of respondents identified diarrhea/vomiting (91.3%) and typhoid/cholera/ dysentery (86.9%) as types of food-borne illnesses. On the other hand, majority (99%, 67%, 56.5% and 42.1%) correctly identified rotten foods, bad water, dirty hand/utensils and poor personal hygiene as causes (Table 2) The results further revealed that majority (77.5%) of respondents would resort to self medication to treat food borne illness. The differences in knowledge of the correct causes and correct treatment of food borne illnesses between males and female was statistically significant ( $\chi^2 = 16.85$  and  $\chi^2 = 107.91$  respectively  $p < 0.05$  in both cases).

### Respondents Practice of Food Safety and Hygiene

More males (40.5%) than female (17.7%) respondents used potable water in their food vending operations. More females (40.2%) had no covered bin for wastes and the differences in this practice was statistically significant ( $P < 0.00$ ) between sex. Of those who had stationary facilities (n = 241); only 8.7% of males and 17.4% of females had access to water system. The rest had no access to water system and proper human waste disposal.

On personal hygiene (Table 3), the results have shown that only 16.5% of males and 24.8% females would wash their hands with water and soap after defecating, while 4.6% males and 15.5% females would wash their hands with soap and water after urinating.

Table 2: Respondents' knowledge of types, causes and prevention of food-borne illness by gender

Variable	Gender				Total		
	Male		Female		N = 1215	%	
	n = 735	%	n = 480	%			
Types of food-borne illness							
Diarrhea/vomiting	667	21.0	432	13.4	1109	91.3	Pearsons $\chi^2 = 51.859$ P value 0.00
Fever/malaria	181	5.6	211	6.5	392	32.3	
Stroke/paralysis	32	1.0	27	0.8	59	4.9	
Cough/Tb	246	7.6	294	9.1	540	44.4	
Madness	22	0.7	19	0.6	41	3.4	
Causes of food-borne illness							
Typhoid/cholera/dysentery	629	19.5	457	14.2	1056	86.9	Pearsons $\chi^2 = 116.85$ P value 0.00
Rotten/spoilt food	16	2.2	21	4.4	37	3.0	
Bad water	726	20.3	477	13.4	1203	99.0	
Dirty hands/utensils	488	13.7	326	9.1	814	67	
Poor personal hygiene	447	12.5	240	6.7	687	56.5	
Dust	193	5.4	318	8.9	511	42.1	
Enemies	108	3.0	124	3.5	232	19.1	
Witchcraft	35	1.0	28	0.8	63	5.2	
	27	0.8	32	0.9	57	4.7	
Treatment of food-borne illnesses							
Buy medicine and take	544	28.0	397	20.4	941	77.4	Pearsons $\chi^2 = 107.91$ P value 0.00
Go to hospital	49	2.5	186	9.6	235	19.3	
Take enema/herbs	338	17.4	295	15.2	633	52.1	
Prayer & fasting	41	2.1	56	2.9	97	8.0	
Don't treat, wait for the bad blood to be flushed out	18	0.9	22	1.1	40	3.3	

3.2% of male respondent and 8.1% female reported staying away from food vending business if they had diarrhea/dysentery. 41.4% of males and 15.2% females dished cold cooked food from covered bucket. 16.3% males and 10.2% female, sold food with bare hands and 17.7% males and 10.7% females exposed cooked food to flies and dust respectively. The practice of food safety by sex was statistically significant ( $p < 0.00$ ) in most cases.

Table 3: Respondents' practice of food safety and hygiene

Variable	Practice				$\chi^2$	P value
	Yes		No			
	Male n = 735	Female n = 480	N = 1215 Male Female			
1 Use safe water and raw materials	492 (40.5)	215 (17.7)	234 (20)	265 (21.8)	58.54	0.00
2 Vending site hygiene (n=241)						
a) Much litter/stagnant water on ground	29 (12.0)	27 (11.2)			39.3	0.00
b) Some litter	21 (8.7)	59 (24.5)				
c) No litter/bin available	8 (3.3)	97 (40.2)				
3 Water system toilet available	21 (8.7)	42 (17.4)	37 (15.4)	141 (58.5)	4.00	0.059
4 Has running water	17 (7.1)	29 (12.0)	41 (17.0)	154 (63.9)	5.16	0.034
5 Keep raw & cooked food separate	5 (0.4)	12 (1.0)	730 (60.1)	468 (38.5)	6.97	0.011
6 Keep cooked food steaming hot until served	7 (0.6)	189 (15.6)	728 (59.9)	291 (24.0)	316.8	0.00
7 Store salads cold (n=200)	2 (1.0)	4 (4.0)	87 (45.5)	107 (53.5)		
8 Wash hands with soap and water after defecating	200 (16.5)	301 (24.8)	535 (44.0)	179 (14.7)	150.99	0.00
9 Wash hands with soap and water after urinating	56 (4.6)	188 (15.5)	679 (55.9)	292 (74.0)	180.065	0.00
10 Stay away from work when they have cough/catarrh	N (0)	2 (0.2)	735 (60.5)	478 (39.5)		
11 Stay away from when they have diarrhea/dysentery	39 (3.2)	99 (8.1)	698 (57.4)	381 (31.4)		
12 Dish cold cooked food from plastic bucket with cover	502 (41.3)	185 (15.2)	233 (19.2)	295 (24.3)		
13 Food exposed to flies	215 (17.7)	130 (10.7)	520 (42.8)	350 (28.8)		
14 Food sold with bare hands	198 (16.3)	124 (10.2)	537 (44.2)	356 (29.3)		

### Nutritional Economic Importance of Street Foods

The average estimated monthly income of street food vendors is shown on Table 4. Mean estimated monthly income of Mobile Food Vendors (MfV) N8900.00 stationary street food vendors was N27900.00 while stationary food vendors with temporary shades (SFVWTC) was N64200.00. However, majority of MFV reported not being satisfied with the business, 20% of SFVWC and 75% of Stationary food vendors with temporary covers (SFVWTC) satisfied.

Table 4: Socio-economic aspects of street foods sold in Uyo

	MFV n=298	SFV WC n = 676	SFV WTS n = 241
Mean monthly income (₦)*	8900.00 (range 5 – ₦15000)	27900.00 (Range 20 – 60000)	642000 (range 20 – 118000)
Number of persons served in a day	35.3 (range 10 – 50)	30.3 (range 20 – 45)	51 (range 20 – 71)
Level of satisfaction with street food vending as a business			
(a) very satisfied	0	135 (20.0)	181 (75.1) 316 (26.0)
(b) Satisfied	0	381 (56.4)	10 (4.1) 391 (32.2)
(c) Not satisfied	298 (100.0)	160 (23.6)	50 (20.7) 508 (41.8)

#### Legend

MFV: Mobile food vendors, SFV WC: Stationary food vendors without cover  
SFVWTS: Stationary food vendors with temporary shade\*1 dollar= N154.74.00)

### Microbiological Properties of Vended Foods

The result of microbiological properties of the food samples analyzed is as shown on Table 5. *Staphylococcus aureus* was recovered from cassava fufu, meat pie, chicken and cow meat *Salmonella and Shigella* were also encountered in the chicken samples while *Escherichia coli* and *Staphylococcus aureus* were detected in all the food items analysed.

Table 5: Method of preparation of food and microbial contamination

Food type	Ingredients	How prepared	Total No of samples	<i>E. coli</i> (cfu/g)	<i>Staph. aureus</i>	<i>Salmonella/Shigella</i> count
Fufu	Cassava	Fermented, boiled and turned with hand, wrapped in nylons and sold in trays	9	$3.0 \times 10^2$	$3.0 \times 10^2$	-
Meat Pie	Flour, Meat, carrot	Baking in hot oven, with hand sold from wooden boxes with a glass side	9	$6.5 \times 10^2$	$6.0 \times 10^2$	$5.0 \times 10^2$
Chicken	Chicken, peppers, salt, Onions	Boiled and roasted sold exposed by the roadside	9	$2.9 \times 10^2$	$2.2 \times 10^2$	-
Cow meat	Cow meat, pepper, Onions, salt	Boiled and fried sold in transparent bucket with cover	9	$7.2 \times 10^2$	$5.2 \times 10^2$	$2.0 \times 10^2$
Roasted plantain	Plantain	Roasted boiled, sold exposed by the roadside	9	$2.3 \times 10^1$	$1.2 \times 10^2$	-
Sugar cane	Sugar cane	Cut in size with the outer covering, sold in open wheel barrows	9	$2.5 \times 10^1$	$2.2 \times 10^2$ -	-



**Note:** The number of cfu/g of *Staphylococcus aureus* of importance is from 10,000 cfu/g and above.

## DISCUSSION

This study has shown that more males are engaged in food vending than females in Uyo. Other studies had reported more females than males (Nzeagwu and Uwaegbute 2007A; Johnson and Yawson, 2000, Mensah *et al*, 2002, Mohammed and Nicolo, 2013). This finding may be a reflection of rising rate of unemployment, which may have forced more males into the business or it might be due to the fact that many (24.5%) respondents in this study were mobile food vendors, which might suggest that more agile males who may have migrated from the hinterland and neighbouring states are now engaged in the trade. The finding in this study that majority of respondents (68.3%) had secondary education while 3% had tertiary education is possibly a reflection of very harsh economic conditions, which Chukwuezi (2010) attributed to as a cause of the increase in street food vending. In Accra Ghana, Mensah *et al* reported that 33.3% of street vendors had no formal education. Uyo being a fast growing capital of the state with one of the highest revenue allocations from the Federal Government has many artisans, civil servants, students and job seekers as a result of the rapid urbanization as observed by other authors (Ohiokpehai, 2003; Winarno and Allain, 2011; Nzeagwu and Uwaegbute 2007B).

Low rate of respondents who received medical examination or health education (0.2% in each case), portend grave risk. In a study of street food vendors in Abeokuta, Omemu and Aderoju (2008) reported that as high as 12% acquired necessary training with 31% reporting having undergone annual medical checkup. WHO (2010) advocated creating greater awareness among vendors of the basic principles and measures necessary to ensure food safety, and recommended better training as a means of improving the safety of street foods.

The study has also revealed high level of knowledge of the types and causes of food-borne diseases among the respondents. Previous studies conducted in Nigeria reported poor knowledge of etiological agents associated with street foods in Nigeria (Omemu and Aderoju 2008; Chukwuezi, 2010). Similarly Adamu and Abubakar, (2003) had reported that street food vendors in some Nigerian cities still believed that evil spirits malice and curses could cause food poisoning. In a related study in Accra - Ghana, Mensah *et al* (2002) reported that food vendors failed to associate diarrhea with bloody stool with germs in food. However in a study of knowledge of food handlers in Abeokuta, Nigeria, it was reported that majority of respondents had correct knowledge of some food safety aspects, poor knowledge of food borne pathogens but good knowledge of personal hygiene and symptoms of borne illnesses (Omemu and Aderoju, 2008)

On the nutritional and economic aspects of street foods, our results have shown that food vending with stationary facility equipped with temporary cover is a good source of income and vendors utilizing this method are satisfied with the business. This observation is in tandem with previous report by Nzeagwu and Uwaegbute (2007B) who studied the operation of street food vendors in neighbouring Imo and Abia States. In their study, it was revealed that food vendors noted that the business pays and enabled them to feed their families and meet 60-100% of their financial commitment. Allain and winarno, (2011), reported that street food vending was vital for the economic development of many towns in Asia, it accounted for 39% of the active labour force. Urban Street food vending provides employment and income for many people, and can provide economic support for small scale farmers, as an outlet for rural produce (Ohiokpehai, 2003). In this regard, if well regulated and monitored street foods can be a source of a wide array of indigenous and traditional foods, which can increase food availability, expand household food choices, ensure dietary diversity and better nutrition (Ifeyironwa *et al.*, 2006). Gewa *et al.* (2007), reported that out of home foods intake among school children contributed 13 – 19% of their daily energy intake.

The results of the present study revealed that the vendors served between 30 and 51 people daily. In a similar study in two states of Nigeria, Nzeagwu and Uwaegbute, (2007B) reported food vendors as serving between 50 – 100 consumers daily. While 68.3% of those consumers reported that they could meet 41-50% of their daily food intake from street foods. Since street foods provide traditional foods for the local community, there is a great and urgent need to regulate this informal sector (Omotayo and Denloye, 2002), in order to maximize benefits to the populace.

Of the types of ready to eat street foods analyzed, all the foods were contaminated with *E. coli* and *Staphylococcus aureus* indicating the poor personal hygiene of the vendors and the risk consumers are exposed to. These findings are of very serious concern, because of the danger to human health (Mensah *et al*, 2002; Guthrie and Picciano, 1985; Brooks *et al*, 2007).

These findings agree with Chukwuezi (2011), who reported poor environmental conditions of stationary street food vendors, which could lead to epidemics and outbreak of food borne diseases. Similarly Ezeanya and Njom (2003), had reported geohelminth contamination of some common fruits and vegetables sold in Enugu, Ita *et al*. (2005) also reported the prevalence of several enteropathogens in the stools samples of children of street food vendors in Uyo who had diarrhea. The heavy microbial contamination may be expected in the absence of toilet facilities and absence of running water (FAO, 2002). This is in spite of the policies put in place by the government of Nigeria as reported by Omotayo and Denloye (2002).

### CONCLUSION

It can be concluded that street foods have the potential for providing a diverse and healthy diet for the people as well as provide employment opportunities. However analysis of the vended food samples collected in this study has revealed the high risk consumers in Uyo are exposed to as notable food pathogens such as *Staphylococcus aureus*, *Salmonella*, *Shigella* and *Esherichia coli* were readily isolated. Adequate hygiene and enforcement of regulatory policies would address possible outbreak of foodborne illnesses among consumers of vended foods in Uyo

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