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Knowledge of Food Safety and Practices among Cooked Food Vendors in the East Mamprusi District of the Northern Region of Ghana

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Abstract Food safety has become a major public health concern globally as street food vending is a rapidly growing industry in both developed and the developing world. An increasing incidence of diarrhoea cases in Ghana is attributable to unhygienic street food vending. This study was carried out to assess knowledge and practices regarding food safety among cooked food vendors. The research design was a cross-sectional study. A sample size of 81 food vendors was selected. Data was collected using questionnaire. Results showed that 98.9% of the respondents were females. Majority of the food vendors had some knowledge on food safety and hygiene and knew that diarrheal diseases could result from food contamination and/or poisoning. 98% of the respondents said hand washing was necessary at all times but, only 13.6% washed their hands all the time and out of this only 45.5% washed their hands always with soap and running water. Only 21% store leftover foods in the refrigerator whilst 41% store food at room temperature. 35% of the respondents had undergone medical screening for food vendors and out of this percentage, 60% were screened more than six months ago. It was concluded that food vendors in East Mamprusi generally had a fair knowledge of food safety and hygiene but the practice of food hygiene was inadequate. Thus there is the need for health officials and the local government to periodically inspect and encourage food vendors to practice food hygiene and to always to be available for medical screening periodically.

Keywords Food Safety, Hygiene Practices, Food Vendors, Mamprusi, Northern Ghana

1. Background

Food is any material consisting essentially of protein, carbohydrate, and fat used in the body of an organism to sustain growth, repair, and vital processes and to furnish energy [1]. The increasing number of fast food joints and local eateries in nooks and crannies of major cities and towns in Ghana has been recognized as one of the forces that serve to boost the economy. Street foods generally refer to ready-to-eat foods and beverages prepared either at home or on the streets and sold by vendors, especially on streets and other public places [2]. Statistics by the FAO [3] point out that, 2.5 billion people eat food prepared on the street every day. It is particularly so for women in the developing world, where food prepared on the street serve as a major source of livelihood providing a means of self-employment and the opportunity to develop business skills with low capital investment [4]. There are instances where these foods are not handled well, leading to foodborne diseases, a phenomenon that remains a major public health problem globally [5].

The safety of food prepared and sold on the street is a constant public health concern, and is supported by the fact that in both industrialized and developing countries; the rates of foodborne diseases are increasing and encompass a wide spectrum of illnesses. Estimates by the World Health Organisation [6] suggest that food-borne illnesses account for about 2.2 million deaths annually, out of which about 86% are children. In developing countries, up to an estimated 70% of cases of diarrheal disease are associated with consumption of unwholesome food [7]. Improper and disregard for hygiene measures on the part of food handlers may result in food contamination and its attendant consequences as [8] have alluded to, including food poisoning and spread of diseases with resultant morbidity and occasional mortality.

In Africa where sanitation is still a major public health challenge, street foods are easily contaminated almost throughout the supply chain from production through preparation and processing to the final consumer. Street foods, particularly in developing countries have been reported to get contaminated by pathogenic bacteria that could lead to foodborne illnesses [9, 10]. In Africa, the

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incidence of both food and water-borne diseases is estimated at 3.3 to 4.1 episodes per child per year accounting for between 450,000 to 700,000 deaths in children annually, with many more sporadic cases not recorded [11]. An estimated hospitalization in Ghana due to food-related diseases stands at 420,000 per year, with an annual death rate of 65,000 people [12]. Interestingly, research has it that even vendors who exhibit knowledge about food hygiene still find it difficult associating dirty hands with the transmission of diarrheal pathogens in Ghana [13]. This leads to the argument that about 65,000 people die annually in Ghana from food-borne diseases resulting in the loss of some US$69 million to the economy [14]. The consumption of unwholesome foods creates a vicious cycle of disease, diarrhea, and malnutrition which may significantly impede public health and socioeconomic development. The number of people buying and consuming food prepared in public places has increased as a result of migration, changes in consumer demand and behaviour with urban dwellers needing cheaper foods in the face of harsh economic realities and as a consequence, the risk of foodborne illnesses are more prevalent due to challenges in food safety especially in regions where adequate resources have not been allocated for food safety control and intervention efforts [15]. The role of the food handlers especially the food vendors in effectively reducing the risk of foodborne diseases is critically important as they are in direct contact with the consumers and also, they are the least challenging in terms of implementing food safety control measures.

2. Study Design

This study was a cross-sectional study design and involved a study of the food safety knowledge and practices among cooked food vendors in Nalerigu in the East Mamprusi district of the northern region of Ghana. The choice of the town was based on the fact that the main referral hospital is located there serving many people including Togolese and Burkinabes. Due to the numerous visitors to the township, cooked food vendors cook and serve them.

2.1. Study Population

The study population comprised all cooked food vendors in the East Mamprusi district specifically Nalerigu township.

2.1.1. Sample Size Determination

The sample size was determined using Krejcie & Morgan, (1970) formula for determining sample size for a finite population. Thus;

$$S=\frac{X^2NP(1-P)}{d^2(N-1)+X^2P(1-P)}$$

Where:

S = Required Sample size, X = Z value (e.g. 1.96 for 95% confidence level), N = Population Size, P = Population proportion (expressed as decimal) (assumed to be 0.5 (50%), *d* = Degree of accuracy (5%), expressed as a proportion (.05); the margin of error. Thus a sample size of 81 was determined. However, seven respondents were added to take care of non-respondents, making the entire sample size to be 88.

2.2. Sampling Method

A purposive sampling technique was used. The available food vendors in the community were approached with the help of an interpreter, the purpose of the study was explained to them. All of them granted us permission to go ahead with the data collection.

2.3. Data Collection Technique and Procedure

A survey was done and a questionnaire in a form of structured interview was employed to elicit information from all the respondents. The questionnaire was made up of open and closed-ended questions. The questions were read out to the food vendors with the help of an interpreter in most cases (except those who could speak English language or Twi) and their response was recorded. For those who had difficulty understanding the questions, time was taken to explain in detail before they gave their responses. Data was collected by moving from one food vendor to another in a sequential manner throughout the mornings around 7:30 AM and later in the evening around 4:30 PM daily for five consecutive days.

3. Data Analysis

Statistical Package for Social Science (SPSS 21st edition) was used to analyze the data. SPSS 21st edition was used to analyze the data. The demographic characteristics of the respondents (age, religion, and educational status) were analyzed by the use of frequency distribution table. Raw data collected on knowledge on food safety and hygiene practices were analyzed using frequency distribution tables and bar graphs. Raw data on the various questions dealing with hygiene practices of the respondents were analyzed with the aid of frequency distribution tables and bar graphs. Raw data collected on periodic medical screening and medical screening status of the food vendors were analyzed with frequency distribution tables and bar graph representations respectively.

3.1. Ethical Consideration

Ethical clearance was obtained from the Department of Community Health and Family Medicine, University for Development Studies. Permission was also sought from the DHMT through the DDHS of the East Mamprusi District. Also before the face-to-face interview, the essence of the project was briefly explained to respondents and informed consent obtained.

4. Results and Discussion

4.1. Socio-demographic Characteristics

Table 1. Socio-demograghic Information

VARIABLE	FREQUENCY	PERCENTAGE (%)
Age (years)		
10-19	2	2.3
20-29	22	10
30-39	28	41.3
40-49	23	28.8
50-59	12	12.5
>60	1	6.3
Total	88	100
Gender		
Male	1	1.1
Female	87	98.9
Total	88	100
Educational Status		
No Formal Education	2	2.3
Primary	61	69.3
Middle/JHS	12	13.6
SHS	10	11.4
Post SHS	3	3.4
Total	80	100
Religion		
Christianity	11	12.5
Islam	77	87.5
Total	88	100

Source: Field Survey, 2017

From the data analysis on socio-demographic characteristics of the respondents, 2.3% were among the 10-19 age group, 25% were between 20-29 age group, 31% were between the age group of 30-39, 26.1% were between the 40-49 age group, 13.6% were between the 50-59 year group and 1.1% were 60 years and above (Table 1). Interestingly, 98.9% of the respondents were females whiles 1.1% were males. The skewness of food vending towards women side may be explained by the perceived gender role of women. This tie-in with Tomlins et al. [16] claim which suggest that majority of food vendors in Accra Ghana were female. The results further showed that 87.5% the respondents were Muslims whilst the remaining 12.5% were Christians. Additionally, 2.3% of the respondents had no formal education, 69.3% of them had primary education, 13.6% had Middle/Junior High School education, 11.4% had Senior High School (SHS) level education and 3.4% had a post-SHS formal education. A cumulative percentage of 97.7% of the total respondents had some form of formal education. This finding shows relatively higher percentage coverage for respondents as against 67% of respondents who have had formal education in a similar research by Apanga, et al. [17]. Formal education is important in the food vending industry because the low level of education could be linked to poor food hygiene practices which could lead to food contamination during food handling, storage, and food preparation.

4.2. Knowledge of Food Hygiene

Table 2. Knowledge of food hygiene and safety

Heard about food hygiene?	Frequency	Percentage (%)
Yes	84	95.5
No	4	4.5
Total	88	100
Can unclean foods cause diarrhoea?		
Yes	83	94.3
No	2	2.3
Don’t Know	3	3.4
Total	88	100
Do you wash vegetables before cooking		
Yes	88	100
Is hand washing is important?		
Yes	87	98.9
No	1	1.1
Total	88	100
Is hand washing necessary after shaking hands		
Yes	87	98.9
No	1	1.1
Total	88	100

Source: Field Survey, 2017

The study showed that 95.5% of the respondents have heard about food hygiene and could literally expound on the subject of food hygiene. In the same way, 94.3% of the respondents could explain that unclean food could cause diarrheal diseases (Table 2). All the respondents (100%) indicated that they washed vegetables before using them to prepare food. They also indicated that they cover cooked food they sell to the public against flies and other foreign agents. These findings tie in well with Apanga et al. [17] who revealed that knowledge about food safety among street food vendors in rural northern Ghana was 100%. The result is also consistent with Dun-Dery and Addo [18] who claimed that 87% of their respondents were found to be knowledgeable about foodborne diseases and food safety. These two findings contradict what pertains in other countries as Abdalla et al. [19] have indicated that a study in Sudan showed that only 30% of the respondents had knowledge on the foodborne disease and food safety. All the respondents (100%) agreed that hand washing is an integral part of adhering to hygiene practices in the food industry. In the same vein, 98.9% of the respondents demonstrated

knowledge of when it becomes necessary to wash hands (after blowing the nose, after shaking a friend, before serving food, etc). This finding is contrary to Abdalla et al. [19] which showed that 70% of food vendors in their study did not see the need to wash hand after scratching or after continuous handling of food. In the same study by Abdalla et al. [19], the majority, however, agreed that washing of hands after eating and after using the toilets is important.

4.3. Food Safety Practices

With respect to safety practices, the study revealed that 13.6% of the respondents relied on pipe borne water for cooking, 47.7% of them relied on well-water (deep/shallow) and 38.6% of them rely on borehole water for cooking (Fig 1). It also emerged that 14.8% of the respondents relied on standpipe for drinking purposes, 45.5% rely on well-water whilst 39.8% rely on the borehole for drinking. The faeco-oral route of transmission of diarrheal diseases particularly enteric fever (typhoid fever) could be traced to the source of their drinking water. This is contrary to findings of Donkor et al. [20] which found that 99% of the source of water for cooking the by food vendors in Accra was standpipe water. This difference in access to standpipe water, one may speculate is purely a developmental gap as the south is more developed than the northern part of Ghana. But in Sudan, only 60% of food vendors used tap water for cooking and yet a current research even showed a much lower percentage, (39%) having access to pipe borne water [21].

The results further revealed that 76.1% of the respondents used ladles to serve their customers whilst 23.9% used their bare hands to serve food to their customers (Table 3). It is worth noting that those who use their bare hands to serve food to customers could easily infect the food and the resultant effect could be diarrheal diseases and other infectious diseases including hepatitis B and C if the food vendors have already been infected. This is contrary to a study by Mary et al. [22], which put food vendors who still use their bare hands to serve customers at 70%. This study also revealed that 42% washed their hands before serving each meal. Those who washed their hands every 20 to 30 minutes were 43%, the rest practised hand washing only on hourly bases. In a study by [18], close to 90% of respondents washed cooking utensils before preparing food and 92% use soap and water in washing utensils.

In the storage of leftover food, 20.5% of the respondents stored leftover foods in a refrigerator to be re-heated and sold subsequently. However, a greater proportion of the respondents (48.9%) store leftover food at room temperature in their kitchens and 30.7% eat the leftover food, share among their household and friends in the marketplace whereas others discard the food altogether. This diverges from Odonkor et al. [23] findings on the evaluation of hygiene practices among street food vendors in Accra metropolis which showed 44% of the food vendors storing leftover food in the refrigerator. Similarly, a study carried out by Muinde & Kuria [24] showed that 63% of food vendors stored their leftover food in the refrigerator. By appreciating the preservative atmosphere generated by the refrigeration, one can safely argue that food is less likely to go bad when it is stored in a freezer for just a few hours or days compared to being stored in a kitchen or veranda. On the aspect of hand washing, only 13.6% of the respondents always washed their hands before serving or preparing food; 45.5% said they often washed their hands whilst 40.9% said they don't often wash their hands when they are serving or preparing food. For those who washed their hands, 45.5% said they always washed their hands with soap and water whilst 54.5% admitted that even though they washed their hands they don't use soap during the hand washing exercise.

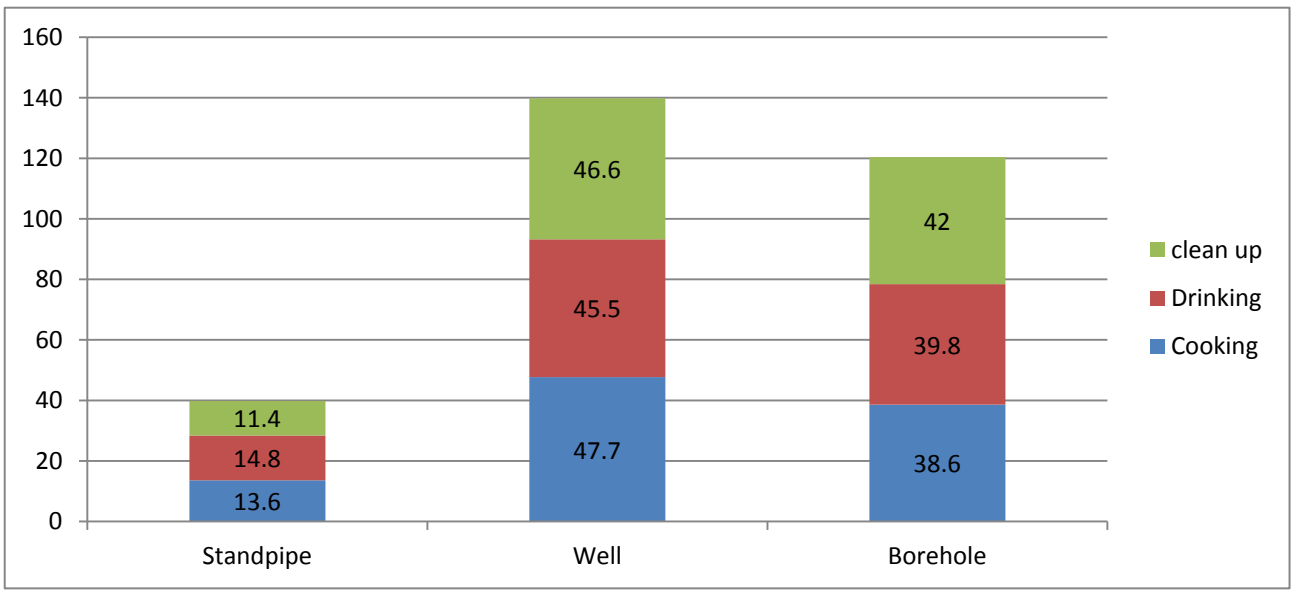

Figure 1. Source of water (Source: Field survey, 2017)

Table 3. Food safety practices among food vendors

What do you use in serving food?	Frequency	Percentage (%)
Ladle	67	76.1
Hands	21	23.9
Total	88	100
How do you store leftover foods?		
Refrigerator	18	20.5
Store at room temperature	43	48.9
Others	27	30.7
Total	88	100
How often do you wash your hands?		
Always	12	13.6
Most of the time	40	45.5
Not often	36	40.9
Total	88	100
Do you wash your hands with soap and running water?		
Yes	40	45.5
No	48	54.5
Total	88	100

Source: Field survey, 2017

4.4. Education on Food Safety and Hygiene

Majority of the respondents (95.5%) indicated that they regularly receive education on food safety and hygiene from different sources. Out of that proportion, 33.3% predominantly received these educational messages from television shows, 35.6% received these educational messages from radio talk shows, 16.1% received education through health officials (sanitary health inspectors and community health nurses), and 15.9% were also educated on food safety through other avenues like community durbars, health talks by the health personnel from health institutions and health talks organised during seasonal meetings of the local Food Vendors Association in Nalerigu. These sources contribute significantly towards helping food vendors in the area to fully appreciate and comply with the food safety principles.

4.5. Periodic Medical Screening of Food Vendors

Results on periodic medical screening for food vendors showed that 73.9% of the respondents had heard about medical screening exercise for food vendors as against 26.1% who have never heard of it before (Fig 2). Approximately 40% of those who have heard about the medical screening have undergone screening for HIV/AIDS, Typhoid fever, Hepatitis B, and Hepatitis C whilst the greater majority (60%) have never undergone medical screening for the above illnesses. Additionally, 39.8% of those who have undergone medical screening did that in the last six months whilst the remaining 60.2% undertook their recent medical screening more than six months ago.

About 8% of the respondents said they were diagnosed with one of the above diseases, 87.5% said they were not diagnosed with any diseases whilst 4.5% said they did not know their disease status. It is generally a fact that evens those who have undergone the periodic medical screening lack periodic renewal. This development fits well with Ababio & Adi, (2012) that indicated equally higher levels of screening but lack of renewal at Kumasi in the Ashanti Region of Ghana. It is also a public health risk for almost 60% of the food vendors in the East Mamprusi district to be selling and serving food to the public without being pre-screened medically. This finding diverges from Apanga et al. [17] who indicated that out of 71% of respondents who underwent medical screening, 64% undertook the screening exercise more than six months ago. The difference in the patronage of medical screening among food vendors could be attributed to the differences in level literacy in the two research populations and probably the awareness and strict enforcement of the practices.

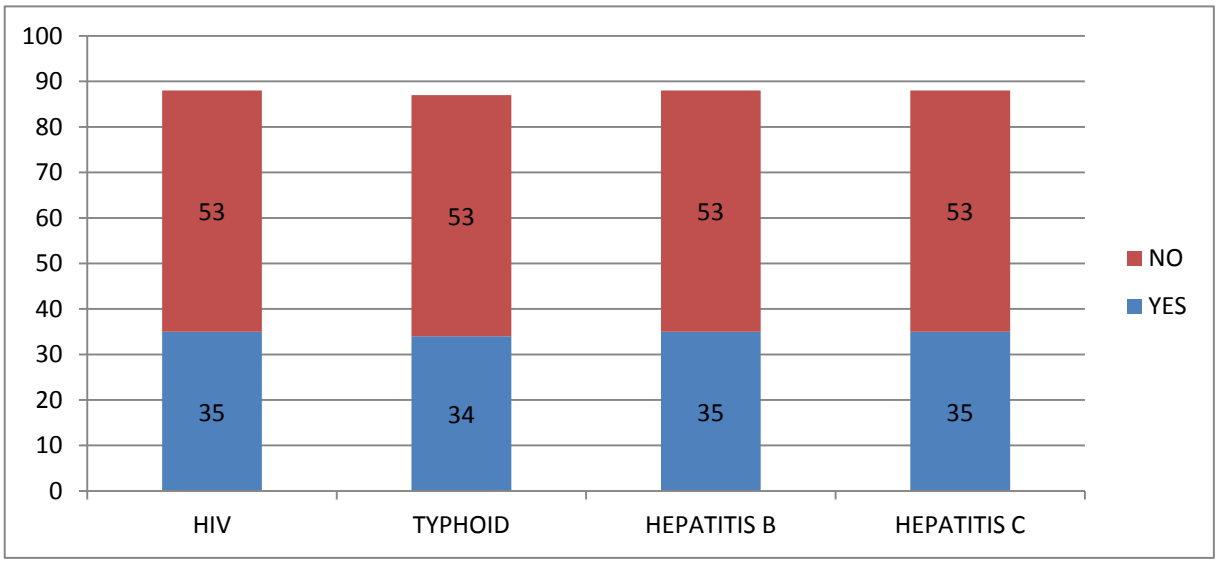

Figure 2. Medical screening of food vendors (Source: Field Survey, 2017)

5. Conclusions

It is referenshing to note that many food vendors have knowledge about food hygiene and food safety practices. Majority of the food vendors washed their hands before serving food, after visiting the toilet. However, quite a number of food vendors still use their bare hands to serve clients. In addition, many of them have not gone through screening for possible diseases. In view of the above, there is the need for public health experts to intensify their campaign on food safety especially the need to screen oneself before joining the food vending business.

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