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Factors associated with poor food safety compliance among street food vendors in the Techiman Municipality of Ghana

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This study assessed various factors associated with poor compliance of street food vendors to safety measures in the Techiman Municipality with emphasis on the World Health Organization's five keys to safer food policy. Two sets of questionnaires were designed to collect data from 150 respondents (140 food vendors and 10 officials of the Environmental Health and Sanitation Agency) in the Techiman Municipality. Data was collected based on the level of awareness, food hygiene/handling practices and effectiveness of regulatory bodies in the Techiman municipality. Overall, awareness of food hygiene was high (91.4%) and depended on vendor's educational level (Chi-square = 7.810, P<0.05). The ability to maintain a clean food preparation area was generally poor. Most food vending sites (68%) were dirty and most respondents disposed of their waste in polythene bags (56.4%). Only a few food vendors washed their hands after scratching themselves (32%) or handling money (22%). Separation between raw materials from cooked food was also poor. Overall, 25% of the vendors always stored raw and cooked food separately, 29% stored them separately sometimes, while 47% did not. Food was however kept at safe at temperature 82%. The hygiene and safety of raw materials used in cooking was in doubt. Most food vendors (69%) considered price important and purchased cheap raw materials. Finally, the effectiveness of regulatory bodies was generally fair (50%). This might be a result of some challenges faced by regulatory bodies in terms of logistics and resources (90%) and also lack of cooperation from food vendors (10%). The study concluded that there is high awareness of food safety among food vendors in the Techiman municipality. Yet food hygiene and handling practices are poor. This might be due to challenges faced by food vendors in terms of finances (65.7%) and pressure from consumers (34.3%). There is also poor regulation by regulatory bodies which might also be due to a lack of logistics and resources (90%). Current regulations in the municipality regarding general food hygiene practices should be reviewed and strengthened to focus on a risk based approach.

Key words: Compliance, food safety, food vendors, food hygiene.

INTRODUCTION

The street food industry plays an important role in cities and towns of many developing countries. It also contributes substantially to meeting food demands of city dwellers and provides an income to many female-headed

households (Tracy, 2011). It is estimated that street foods contribute up to 40% of the daily diet of urban consumers in developing countries (Afoi et al., 2015). The term street food as quoted by Tracy (2011) refers to a "wide variety of ready-to eat foods and beverages sold and sometimes prepared, in public places". Street food may be consumed where it was purchased or can be taken away and eaten elsewhere (Tracy, 2011). The people who sell these foods are referred to as street food vendors (WHO, 2008). Food passes through a lot of steps in the food supply chain before it gets to the consumer. Food should be handled, prepared and stored in ways that prevent the occurrence of foodborne illnesses like cholera and gastroenteritis (WHO, 2008).

Millions of people fall ill and many suffer from serious disorders, long-term complications or die as a result of eating unsafe food (FAO, 2007). Foodborne and waterborne diarrheal diseases kill an estimated 2.1 million people annually, most of whom are children in developing countries (Fleury et al., 2008). The high prevalence of diarrheal diseases in these countries suggests major underlying food and water safety problems. One out of every three Africans suffers foodborne illness every year (WHO, 2011). In Ghana, it is estimated that the total number of out-patients that report with a foodborne disease is about 420,000 per year, with 65,000 dying annually. Twenty-five percent are children under five years (Mensah et al., 2009).

Street food safety is influenced by many environmental factors. These include knowledge and awareness of food safety measures, poor food hygiene and low socio-economic status of food vendors, poor attitude of food vendors towards food safety, socio-cultural beliefs and trust (Thilde, 2008), and limited effectiveness of food safety regulatory bodies. All these play a role in determining the safety and quality of street food consumed by people.

In 2009 The World Health Organization adopted *Five Keys to Safer Food* for the street food sector to be used as the basis for global training of street food vendors. The policy requires that street food is prepared and served under good environmental conditions. In so doing, food vendors must maintain good personal hygiene, Separate raw and cooked foods, cook foods thoroughly, keep foods at safe temperatures and use both safe water and safe raw materials. This policy has achieved results in many WHO nations (WHO, 2010). However, Ghana and for that matter Techiman Municipality is retrogressing in its practice of food hygiene and safety (Thilde, 2008). A survey carried out by the Techiman Municipal assembly in 2010 revealed that about 70% of street food vendors in the Municipality did not comply with the WHO safer food policy (Techiman Municipal Assembly, 2010). This led to the establishment of food bye-laws in 2012 by the Environmental Health and Sanitation Agency (EHSA) for food vendors which were poorly implemented (EHSA, 2012).

The above situation has led to contamination of street food with microorganisms and toxic substances like pesticide residues, heavy metals, myotoxins, dust and smoke (WHO, 2007) and proliferation of foodborne illness in the Techiman Municipality. In 2012, 12,072 cases of diarrheal disease were recorded with 1.2% mortality. In 2013, 15,228 diarrheal cases were recorded with 1.9% mortality (Holy Family Hospital, 2013). Cases of food-borne illness are on the increase with a corresponding increase in mortality. Foodborne illness can cause social and economic burdens beside death (Agyen, 2012). Children suffer most in such situations since they comprise 75% of street food consumers in Ghana (Micah et al., 2012). This research therefore seeks to identify the most important factors leading to the poor compliance by street food vendors with the WHO safer food policy guidelines in the Techiman Municipality.

MATERIALS AND METHODS

Informed consent

Ethical clearance was first obtained from the Faculty of Public Health and Allied Sciences of the Catholic University College of Ghana, Fiapre and the Environmental Health Unit of Techiman Municipal Assembly before the study. The nature, purpose and procedure of the study were explained to each respondent and they were given the option to either accept or decline to respond to the questionnaires. Respondents were assured of confidentiality and anonymity.

Study area

The study was carried out in the Techiman Municipality. The Municipality lies between longitudes 10 49'East and 20 30'West and latitudes 80 00' North and 70 35' South. Techiman Municipal Assembly is one of the 27 Municipal/District Assemblies in the Brong Ahafo Region of Ghana and Techiman is its capital. The total land size of the Municipal Assembly is 669.7 km^2. This area forms about 1.69% of the regional land area of 39,557 km^2. The population of Techiman is 206,856 with females forming 51%. Techiman Municipal Assembly is situated in the central part of the Brong Ahafo Region and shares common boundaries with four other districts; three in Brong Ahafo Region and one in Ashanti Region. The Wenchi Municipal, Kintampo South is to the Northeast. Nkoranza South District is to the South-East and Offinso North District (in the Ashanti Region) is to the south.

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Table 1. Socio-demographic characteristics of respondents.

Variable	Category	Frequency	%
Gender	Male	42	30.0
	Female	98	70.0
	Total	140	100.0
Age	15-25	36	25.7
	26-35	67	47.9
	36-45	21	15.0
	Above 45	16	11.4
	Total	140	100.0
Marital status	Married	76	54.3
	Single	46	32.9
	Divorced	15	10.7
	Widowed	3	2.1
	Total	140	100.0
Educational level	Senior High School levers (SHS)	22	15.7
	Junior High School levers(JHS)	64	45.7
	None	54	38.6
	Total	140	100.0

Study population

Inclusion criteria

The study population was stationary registered street food vendors above the age of fourteen in the Techiman Township. 10% of hot and cooked registered food vendors above 14 years in Techiman Municipality were chosen due to their maturity and level of knowledge. Stationary street food vendors were used because they were easy to locate during the sample process using the register of food vendors in the Municipality.

Exclusion criteria

Mobile street food vendors were excluded due to difficulties in locating and sampling.

Data collection tools

Two sets of questionnaires were designed for the study, one for street food vendors and the other for environmental health officials. While the views of street food vendors were assessed based on knowledge and food hygiene practices, regulatory protocols used by environmental health officials were also examined. As the questionnaires were administered to the food vendors, an observation on their surrounding was made to find out the hygienic nature of the vending site.

Data analysis

Analysis was done using Statistical Package for Social Science (SPSS) version 20 and Microsoft Excel. In this study, the statistical significance, dependence and association levels were set at 5% ($P \leq 0.05$).

RESULTS

Demographic/background information

The socio-demographic characteristics of the 140 food vendors included in the study are shown in Table 1. Overall, 30% of the food vendors were male and 70% were female with 25.7% between the ages of 15-25 years, 47.9% between 26-35 years, 15% between 36-45 years and remaining 11.4% 45 years or older. With respect to marital status, 54.3% were married, 32.9% were single, 10.7% were divorced and 2.1% were widowed. In terms of educational level, 15.7% were Senior High School leavers, 45.7% were Junior High School leavers and 38.6% had no formal education.

Knowledge of food hygiene and safety by street food vendors

Awareness of food safety and contamination

The results indicated high awareness of food safety and contamination concerns by street food vendors. Overall, 128 (91.4%) of vendors were aware of food safety concerns and 12 (8.6%) were not. There was strong evidence of relationship between awareness and

Table 2. Chi-square computation between awareness of food safety and contamination.

Category	Awareness of food safety and contamination			Chi-square	P-value
	Yes	No	Total		
SHS	22	0	22	7.810	0.10
Basic	61	3	64		
None	45	9	54		
Total	128	12	140		

Source: Field survey, 2014

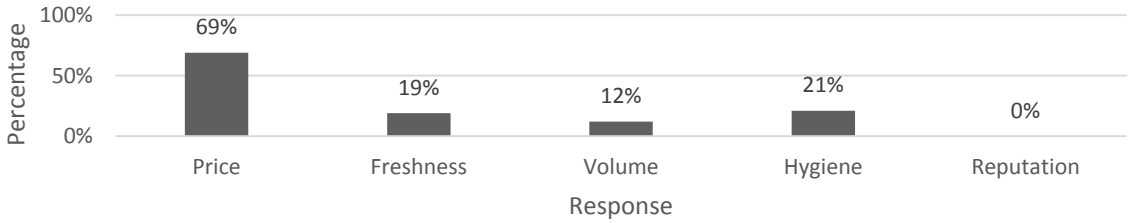

Figure 1. Factors considered by food vendors when buying raw food material.

educational level ($P < 0.05$) (Table 2).

Food hygiene practices

Factors considered when buying raw foodstuffs and storage of cooked and raw foods

Figure 1 shows that 69% of respondents consider only the price before buying raw material for cooking. They target the least expensive products irrespective of quality. Among vendors, 19% considered the freshness of raw materials but 21% of the respondents indicated that, they buy the raw food materials from the source (farms) and considered the hygiene condition of the source before buying. On the practice of storing raw and cooked food separately, 25% of the vendors always stored raw and cooked food separately, 29% sometimes stored them separately, while 47% did not.

Hand washing among street food vendors

Figure 2 indicates that majority of the respondents (90, 94 and 98%) washed their hands adequately after blowing their noses, visiting the toilet and eating, respectively. However, few (22%) food vendors washed their hands after touching money. Overall, 36% of vendors washed after handling raw materials, 34% after handling garbage and 32% after scratching themselves before serving food to consumers. Money is a very good source of microorganisms since it passes through the hands of many people. Hand washing practices among street food vendors in the Techiman Municipality were generally poor, with only 48% practicing continuous hand washing after handling food.

Temperature of food and waste disposal

None of the respondents could tell the actual temperature of the food they sold to customers. However, majority of food vendors (82%) indicated that they served food while it was still hot with the remaining 18% serving cold foods to consumers (Figure 3).

Overall 28.6% of the vendors dispose of their waste in bins, 56.4% in polythene bags, 10.7% in baskets and 4.3% on the ground (Table 3).

Environmental hygiene

Hygiene of vending sites was generally very poor. This conclusion was drawn from the responses of the environmental health officers and personal observations during the administration of questionnaires. According to their responses, 68% indicated the vending sites were dirty, 20% very dirty but only 12% of the environmental health officers indicated that vending sites were clean. During the administration of the questionnaire, the researchers observed that there is a problem with the waste disposal system. After sweeping and collection of

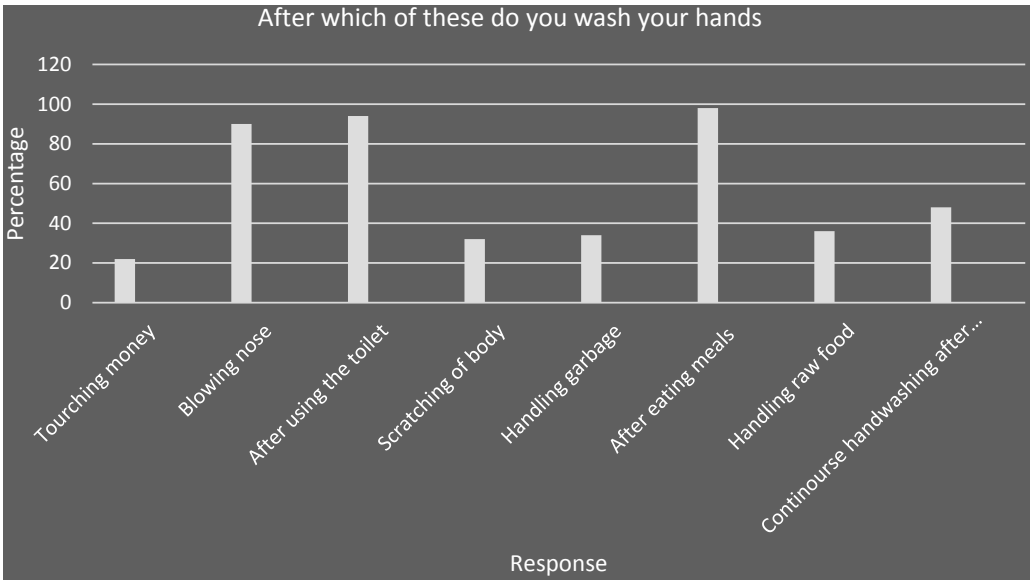

Figure 2. Percentage distribution showing Hand washing practices among street food vendors in the Techiman municipality

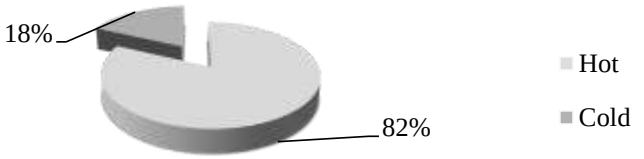

Figure 3. Temperature of food served.

garbage, it is still left there for some time which generate flies and are sometimes been blown away by wind which could further affect the safety of the food they prepared and sold. This observation was in line with the responses of the environmental health officers.

Challenges faced by food vendors in practice good food hygiene

From Table 4, most of the food vendors (65.7%) identified financial constraints as an obstacle in adhering to good food hygiene practices. Pressure from consumers to purchase the food whilst it is not yet ready for consumption was also stated by 34.3% of food vendors as a hindrance to food safety.

Effectiveness of regulatory bodies in ensuring hygienic food practices

This section queried 10 Environmental Health Officers in the Techiman Municipality on the effectiveness of their regulatory agencies in enforcing the regulations. The Environmental health offices were established in every District and Municipal Assembles in Ghana to enforce by-laws to promote the health and safety of the people. The Techiman Municipal Assembly office was represented by 10 officials (Table 5). The work of the regulatory bodies is described as good if they are able to enforce the by-laws effectively. Fair if they are able to perform half of their duties and poor if they are not able to perform their

Table 3. Disposal of waste by vendors.

Waste disposal	Frequency	%
In bin	40	28.6
Polythene	79	56.4
Basket	15	10.7
On the ground	6	4.3
Total	140	100.0

Table 4. Challenges faced by food vendors as they practice food safety.

Challenge	Frequency	%
Financial constraints	92	65.7
Pressure from consumers	48	34.3
Total	140	100

Table 5. Effectiveness of regulatory bodies.

Variable	Category	Frequency	%
Rating of effectiveness in ensuring enforcement	Good	3	30.0
	Fair	5	50.0
	Poor	2	20.0
	Total	10	100.0
Challenges associated with regulating activities of street food vendors	Lack of logistics and resources	9	90.0
	Lack of cooperation from vendors	1	10.0
	Total	10	100.0

duties.

Thirty percent (30%) rated the effectiveness of ensuring bye-laws as good, 50% as fair and 20% as poor. With regards to the challenges associated with regulating the activities of street food vendors, 90% stated lack of logistics and resources as a challenge and 10% stated lack of cooperation from vendors as a challenge.

DISCUSSION

Knowledge on food hygiene or safety

Increasing the education and knowledge of food vendors and consumers in hygiene matters has been recommended as a means of improving food handling practices, and thus, the safety of food (WHO/FAO, 2009). In this study, awareness of food safety and contamination was high; 128 (91.4%) among respondents. Only 12 (8.6%) were not aware. This is in contrast with the analysis by Tambekar et al. (2009) who showed that street food vendors are mostly uninformed about good hygiene practices and causes of diarrheal diseases. There was however a strong relationship between awareness and educational level ($P < 0.05$). The likelihood of being knowledgeable on food hygiene and safety increases with the educational level attained by food vendors. This raises many questions and concerns since 45.7% of the respondents were junior high school leavers and if education increases awareness of food hygiene, then many consumers are at risk of foodborne illness.

Food contaminants can enter the food supply chain at any point from the farm to the table. Farm animals and their manure can carry human pathogens without any clinical manifestations. Likewise fresh vegetables and grains can harbor pathogens or mycotoxins without any discernible loss of quality (FAO, 2007). Therefore, any raw food could potentially be contaminated before reaching the caterer. However, most food vendors (67%) did not consider this scenario because price was indicated as the most important determinant when purchasing raw food materials. This means that they are more likely to purchase less expensive products for cooking which may affect the quality of food. Overall, 19% of vendors considered the freshness of raw materials, 21% of caterers who indicated that they buy the raw food materials from the farms use the hygiene practices and conditions at the source to determine the kind of raw materials to buy. However, no one took into consideration the reputation of the manufacturer when purchasing the raw materials, especially ingredients and other food items that have been packaged. This might be due to lack of experience and awareness, bad behavior of vendors and financial constraints.

On the practice of storing raw and cooked foods separately, 25% of the vendors always stored raw and cooked food separately, 29% sometimes stored them separately, while 47% did not. This agrees with the findings of Donkor et al. (2009) who reported that 27% of vendors always stored raw and cooked food separately, 23% stored them separately most times, while 49% did not do this often. Proper cooking will eliminate most microbial hazards. Studies have shown that cooking or serving foods at a temperature of 60 to 70°C or above can help ensure that it is safe for consumption. Microorganisms can multiply very quickly if food is stored at room temperature. By holding at temperatures below 5°C or above 60°C, the growth of microorganisms is greatly slowed or stopped (WHO, 2010). Most food vendors (82%) served food while it was still hot while 18% served cold foods to consumers. This may be as a result of increased awareness and the culture of the people.

Hands should be washed before handling food and often during food preparation. Hands must be always washed after visiting the toilet in order to minimize the chance for transmitting disease (Addo et al., 2014). The World Health Organisation (2010) also indicated that most the number of food-related illnesses and deaths could be substantially reduced by using proper food handling techniques and hand washing practices. These assertions were shared in the study as the majority of the respondents (90, 94 and 98%) washed their hands

adequately after blowing their nose, visiting the toilet and after eating, respectively. However, the response to the following activities with respect to hand washing contrasted the assertion of Addo et al. (2014). Few vendors (22%) washed their hands after touching money, 36% after handling raw materials, 34% after handling garbage, 32% or after scratching themselves, however 48% practiced continuous hand washing with regard to serving food. This might be as a result of pressure from consumers or lack of knowledge.

According to Donkor et al. (2009), waste bins with lids should be used and emptied on a regular basis. As stated by Addo et al. (2014), fomites in poor environmental hygiene can help transmit diarrheal diseases. In this study, waste disposal was poor with 28.6% of vendors disposing their waste in a bin, 56.4% in polythene bags, 10.7% in a basket and 4.3% on the ground which might be due to financial constraints to buy bins and poor education as stated by WHO/INFOSAN (2010).

Food vendors in the Techiman Municipality followed poor environmental hygiene practices. The study found that 68% of the vendor sites dirty and 20% were very dirty and with only 12% characterized as clean. These results were slightly different from that of Donkor et al. (2009) who scored 60% of the food vendor sites as hygienically. This calls for increased attention since most food contamination could be prevented by keeping the vending units and locations clean (WHO, 2012). Financial constrains (65.7%) and pressures from consumers (34.3%) were the main factors affecting personal and environmental hygiene with respect to food safety. Factors like a low level of education and lack of discipline or poor \are also likely influencing these findings.

Food laws and regulations attempt to protect the health of consumers. These laws have been kept in place to guide food providers to ensure proper food handling and to ensure the serving of wholesome food to the general public (Rosaline, 2008). In Ghana, the Food and Drug Board is charged with educating and training food manufacturers and handlers on safe food handling procedures. They are supported by environmental health officers, the Environmental Protection Agency, and the district assemblies. They also help in inspecting facilities where food is being cooked for compliance with current safety standards (Rosaline, 2008).

In this study, 50% of environmental health officers rated the effectiveness of the food safety bye-laws as good and 20% as very good. The regulatory authorities failed to carry out their roles effectively mainly because of poor institutional capacity, lack of coordination, shortage of personnel and funds (FAO, 2007). This observation was also evident in the current study with 90% of regulatory officials stating a lack of logistics and resources as a challenge associated with regulating the activities of street food vendors and the remaining 10% lamenting a lack of cooperation from vendors as a challenge inhibiting them from performing effectively.

Conclusions

The study concludes that there is high awareness of food safety and contamination (91.4%) among food vendors. Food hygiene practices are poor in the Techiman Municipality, likely due to financial constrains (65.7%) and consumers pressure (34.3%). Ineffective enforcement of the food safety bye-laws by regulatory authorities was likely due to challenges in logistics and resources (90%) and a lack of cooperation among food vendors (10%). We therefore recommend that current regulations be reviewed and strengthened to focus on a risk-based approach.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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