THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

Food Hygiene and Safety Practices (FHSP) among Street Food Vendors in a Low-Income Urban Community of a Metropolis in Ghana

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Abstract:
Street foods remain important source of meals to individuals and homes especially in developing countries. However, street foods have public health concerns due to lapses in food hygiene and safety practices (FHSP) from vendors especially in low-income communities. The aim of this paper is to assess food hygiene and safety practices among street food vendors in a low-income community of a metropolis in Ghana. Also a rapid assessment framework for food vendors is proposed and tested. The study involved interviewing and observing 50 street food vendors. Almost all vendors are females (96%) with a significant number (52%) without formal education. Few respondents (28%) claim they have permits. The rapid assessment framework appears promising showing that food hygiene and safety practices (FHSP) are low with only 28% of vendors achieving a basic practice level. Statistically FHSP have no association ($p>0.05$) with vendors' characteristics like age group, years of experience and education. However, stalls vendors use and nature of food sold have significant association ($p<0.05$) with FHSP. While 38% of vendors repackage leftover food, almost all vendors practice poor garbage containment. Monitoring activities by authorities are centered on advising food vendors.

Key words: *low-income urban community; street food vendors; food hygiene; food safety; practices; rapid assessment framework; Ghana*

1. Introduction

The informal sector is dominated by economic activities like street vending which has become distinctive in urban areas of developing countries due to limited job opportunities and high unemployment rates [1]. Street food vending like other vending is an important entrepreneurial activity that serves as income source for people particularly women [2, & 3] and also contributes to economic development [4 & 5]. Street foods are foods prepared on the streets and ready-to-eat, or prepared at home, patronized and consumed on the streets without further preparation [6]. It is known that millions of people feed on street foods daily because they provide variety, they are relatively cheap, easily accessible etc [5 & 7]. Chukuezi [8] asserts that street food patronage has become part of the culture and survival strategy by many regardless of age, ethnic or socio-economic status. This phenomenon has good reasons and can easily be linked to justifiable causes. For instance, Ackah *et al* [9] claim that street food boom in Ghana started after the post-independence era following promotion of industrial development where new working environments increasingly pushed people away from their homes. Interestingly, some people view the shift towards eating food outside the home as a mark of affluence [5].

Although street food vending is source of livelihoods and meets food demand of many, it also has public health concerns mainly with outbreak of diarrheal diseases and deaths especially in low-income countries [7, 10-15]. For instance, Ghana recently reported street food related deaths, about 14 deaths recorded in at least 3 regions nationwide [16]. Moreover, a study in one of the larger cities in Ghana by Feglo and Sakyi [15] shows that most street foods are contaminated with microbes potentially linked to any or all these conditions: wearing of dirty clothing, improper cleaning of dishes, unhygienic handling and serving practices. Elsewhere, Ahmed *et al* [6] cite a report where there is widespread of low health and hygiene standards among street food vendors. The chief reasons for low hygiene and safety practices among a large section of street food vendors include their poor knowledge on personal hygiene, insufficient training, illiteracy or uneducated background and perhaps lack of knowledge and/ or appreciation of hygienic and safe food handling, low skills levels, and poverty [3, 17-20]. These definitely, directly or indirectly compromise the potential barriers to food contamination.

Clearly street food vending must be regulated with provisions like licensing, initial and periodic trainings, enforcement and prosecutions [5 & 7]. This process exists in Ghana under the jurisdiction of local authorities (City, Metropolitan, Municipal and District Assemblies/Authorities) [5 & 16], where enforcement campaigns are usually mounted in the early part of every year. However, it is common to find vendors ignoring the processes altogether especially those in the low-income urban communities.

Also important is that the magnitude of lapses in hygiene and safety practices among such vendors are limited apart from the lack of existing framework for field officers to rapidly assess vendors. This paper therefore assesses the practices of food vendors using a proposed adaptable framework that has the potential to be integrated into local authorities' monitoring tools.

2. Methodology: Study Area, Data Collection and Analysis

The area under study is Aboabo, a suburb of the regional and metropolitan capital Tamale in the Northern region of Ghana. Aboabo is a low-income community in the Metropolis characterised by several street food vendors trading in various local dishes. Most of these street food vendors refuse or ignore registration, licensing and training which exist as routine processes for all food vendors organised by authorities (Metropolitan Assembly – MA /Environmental Health & Sanitation Unit – EHSU).

The study collected data from 50 randomly street food vendors (who willingly volunteered participation) in their stalls and/ or iterant rounds using semi-structured interviews and extensive observations. There was no constituted institutional review board or ethics committee that approved this study except the Environmental Health and Sanitation Unit (EHSU) who because of its oversight responsibility of regulating food vending was consulted for permission to be granted for the study. Also verbal consent instead of written consent was obtained from participants because most vendors could not read and/ or write, and more so for convenience since participants usually feel intimidated and reluctant to participate in a survey like this especially when participation requires writing and/ or signing their names on paper. The verbal consent was asked from vendors after surveyor or enumerator finished a well-rehearsed introduction, which was mainly surveyor's self-introduction, purpose of survey, assurance of respondent's anonymity and request for consent. The EHSU approves of participants' verbal consent once participants agreed to participate willingly. Vendors who consented are those interviewed and recognised in the study as respondents but those who decline consent were automatically ignored.

The focus of the data collection included profile of vendors, personal hygiene, food hygiene and safety practices, environmental hygiene, water sources, monitoring and supervision activities of EHSU/MA, and others. Moreover, this study proposed and tested a rapid assessment framework for food hygiene and safety practice (FHSP) levels. The framework has four (4) practice levels, thus starting from improved (the highest) to poor (the lowest) level (see Table 1). The levels depend on the combined score of 12 FHSP indicators (see Table 2) and the FHSP indicators (12 in number) are all considered equally important without any differential ratings/weights. The framework is primarily developed from the concepts and key parameters in the Application for Street Food Vendor Permit Form (FDB/FSMD/FM/SFV-02), the EHSU's routine inspection checklists and commonly compromised food hygiene and safety practices found in literature including: improper storage of food; washing utensils with dirty water; selling within unhygienic surrounding; houseflies invasions; washing of hands and utensils without soap; contaminated hands used for serving food; and disregard for the need to wear aprons, cover hair, avoid blowing air into packaging bags (polythene bags) before use etc [6-8, 12, 19, 21-23]. The permit application form referred here is the national mandatory form required by MMDAs/EHSUs to be used for food vendors' registration nationwide before permits are issued.

The data collected was entered into Microsoft Excel to create a database for analysis with IBM SPSS Statistics Software Version 21, 2012. The analyses were in frequency distribution tables and cross tabulations. Pearson Chi square analysis was also used to establish any significant association (significant level set at $p \leq 0.05$) between FHSP (food hygiene and safety practices) levels and parameters like age groups, educational level, work experience, type of food vended and the stall type used. This study is limited to the 50 street food vendors in one of the low-income urban areas in Ghana and it will be overambitious to make generalization from the findings. However, the findings could be indicative of the prevailing situation in similar context.

Levels of hygiene practice	Combined indicators score
Improved	High in all 12 observed hygiene practices indicators
Basic	High in at least 8-11 of the observed hygiene practices indicators
Limited	High in at least 5-7 of the observed hygiene practices indicators
Poor	High in only 4 or less of the observed hygiene practices indicators

Table 1: Framework for rapid food hygiene & safety practices levels assessment

No.	Observed hygiene practices indicators	Occurrence/score	
		Yes	No
1	Vendor has long finger nails	low	high
2	Vendor has covered the hair	high	low
3	Vendor is wearing apron and it is clean	high	low
4	Vendor is wearing ring(s)	low	high
5	Cleanliness of vendor's environment is satisfactory	high	low
6	Vendor handles money & serves food concurrently with bare hands	low	high
7	Vendor serves food with bare hands	low	high
8	Vendor blows air from mouth into polybags before using to serve food	low	high
9	Vendor has soap available for customers' handwashing	high	low
10	Vendor keeps the food warm while on sale (selling)	high	low

11	Bowls/utensils/cutlery rinsing water is clean (appears not overused)	high	low
12	Vendor uses improved water sources	high	low

Table 2: Food hygiene and safety practices indicators

3. Results and Discussion

3.1. Profile of Street food Vendors Involved in the Study

Table 3 presents the profile of the street food vendors involved in the study. Majority of the food vendors interviewed are females with a good number of these women (52%) without any formal education. The educational background of the other women is 30% (primary school) and 14% (secondary school). Meanwhile, the 4% male are all with secondary school education, and that is highest educational level among all respondents. It is observed that the dominant age group is 31 – 40 years and most respondents are stationary vendors selling at stalls that are mostly "wooden structure". Also most of the vendors learned the trade especially food preparation themselves without any organised training or apprenticeship (see Table 3).

Parameters	Classifications and Frequencies (N)	Frequency Distribution (%)
Sex	Male, N=2	4%
	Female, N=48	96%
Age groups	21-30, N=13	26%
	31-40, N=18	36%
	41-50, N=12	24%
	51+, N=7	14%
Education level	None, N=26	52%
	Primary/JSS, N=15	30%
	Secondary school, N=9	18%
Kind of vending	Mobile/hawking, N=5	10%
	Stationary/at a stall, N=45	90%
Place of preparing food	At home, N=23	46%
	At the stall (vending site), N=27	54%
Stalls used	Wooden structure, N=26	52%
	Canopy/tent, N=3	6%
	Metal "Container", N=16	32%
	None (Mobile vendor/hawker), N=5	10%
Food preparation knowledge	Observation from other, N=2	4%
	Self taught, N=36	72%
	Taught by parents, N=12	24%
Type of vended food	Sauce/stew-based food, N=38	74%
	Soup-based food, N=12	22%
Years of experience in food vending	1-3 years, N=20	40%
	4-6 years, N=17	34%
	7 & more years, N=13	26%

Table 3: Brief profile of food vendors interviewed in the study

3.2. Food Hygiene and Safety (FHS) Training and Vending Permit Status

The results show that 28% (N=14) of the food vendors claim they have permits. Meanwhile, the permit claims could not be verified since none was able to show any supporting document. These vendors only explained away that the permits are kept at their homes and are not carried along with them since they could easily lose the documents. Contrary to the number of vendors with permits, only one person claims she/he has any training on food hygiene and safety. The surprise here is that permit holding claims contradict responses on training in food hygiene and safety (FHS). In fact, this FHS training is known to be an integral part of the permit acquisition process offered by the Environmental Health and Sanitation Unit (EHSU) of the City/Metropolitan/Municipal/District Assemblies nationwide. So the vendors could not genuinely secure permits without going through any training. Otherwise, possible reasons for the contradiction could include the following: these vendors have forgotten about any training, they might be referring to expired permits which might as well have not been renewed for sometime, or permit claims could be false on the pretext of keeping them safe at home.

Almost all the food vendors (98%) claim they have supporting staff (people working with them). Over half of vendors (59%) have 1 – 3 workers, and the others have 4 – 6 workers (29%), and 7 & more workers (12%). Meanwhile, only 4% of respondents claim they together with all their workers have gone through medical screening/examination and certification with permit; 39% claim

some of their workers have done so, and 57% have their workers without any medical screening/examination. These numbers do not match the 28% permit-holding claims from respondents. Can it be that food vendors prioritize screening processes for supporting staff over themselves who are the registered and responsible proprietress/proprietors? There is enough room to question the credibility of permit claims. Indeed in the long run, the permit-holding claims are more suggestive of falsehood. Meanwhile, it is common that food vendors of this community usually ignore food vending permit processes. This does not mean that food vendors here are unaware of regulations concerning their business since 90% revealed Assembly regulate their business operations by a law.

3.3. Food Hygiene and Safety Practice (FHSP) Levels

The hygiene practice levels are assessed based on the proposed FHSP levels framework (Table 1), which measures some basic and critical food hygiene and safety practices. From the results none of the street food vendors has improved FHSP levels. Only slightly more than a quarter (28%, N=14) of the food vendors were able to achieve the basic level (see Figure 1). Though the number here equals the number of permit claims, this in fact, is coming from both those with and without permits (as claimed). Moreover, over half of the vendors (56%, N=28) achieved the limited level, which means they practice at most seven (7) out of the 12 FHSP indicators. Without details, most of the street food vendors representing 72% (N=36) have low (i.e. both limited and poor) FHSP levels.

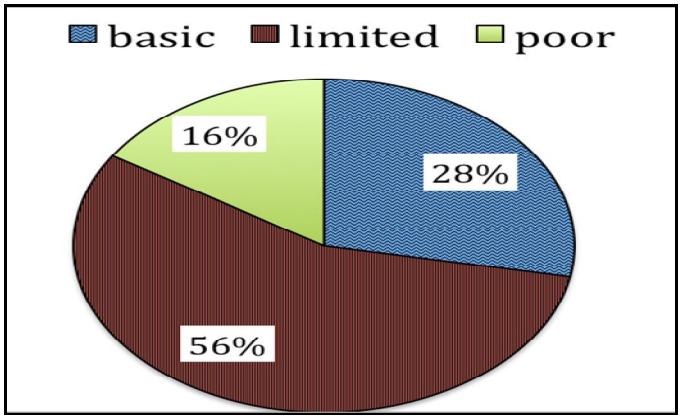

Figure 1: Overall food hygiene and safety practices

More so, most of the indicators (eight out of the twelve) at any point have at least 40% (N=20) of food vendors scoring low (or failing) (see Table 4) and this contributed to the overall low (i.e. both limited and poor) FHSP levels among the vendors. For instance, while almost all vendors (92%) passed (i.e. scored high) in the indicators on covering of the hair, a comparable number (90%) failed (i.e. scored low) in the use of clean rinsing water for bowls/cutleries. The top three indicators with most vendors failing (scoring low) are those bothering on first rinsing water followed by availability of soap for customers' handwashing, and finally keeping of food warm during sales (see Table 4).

No	Observed hygiene practices indicators	Distribution (%)	
		High	Low
1	Vendor has long finger nails	62%	38%
2	Vendor has covered the hair	92%	8%
3	Vendor is wearing apron and it is clean	44%	56%
4	Vendor is wearing ring(s)	60%	40%
5	Cleanliness of vendor's environment is satisfactory	88%	12%
6	Vendor handles money & serves food concurrently with bare hands	52%	48%
7	Vendor serves food with bare hands	54%	46%
8	Vendor blows air from mouth into polybags before using to serve food	66%	34%
9	Vendor has soap available for customers' handwashing	36%	64%
10	Vendor keeps the food warm while on sale (selling)	38%	62%
11	Bowls/utensils/cutlery rinsing water is clean (appears not overused)	10%	90%
12	Vendor uses improved water sources	50%	50%

Table 4: Distribution of scores for food hygiene & safety practices indicators

3.4. FHSP levels against Working Experience, Education, Age and Permit Status

The results shown in Figure 2 describe the FHSP levels among food vendors according to years of experience and educational level. No poor food hygiene and safety practice is found among food vendors with the highest working experience (7 & more

years). Moreover, the highest experience group is observed to have more proportion of basic FHSP levels compared to the lower experience groups (1-3 and 4-6 years) (see Figure 2A). Meanwhile, between the two lower groups, there is a comparable proportion of vendors with basic FHSP levels but high incidence of poor FHSP levels with 4-6 years group. Generally, it is not straightforward (from Figure 2A) whether food vendor's working experience influences the level of food hygiene and safety practices (FHSP) or not. The Pearson Chi-square analysis, however, clarifies that no significant association (p=0.280) exist between vending experience and levels of FHSP among food vendors. Thus in this study, a food vendor's years of working experience do not necessarily influence that person's food hygiene and safety practices.

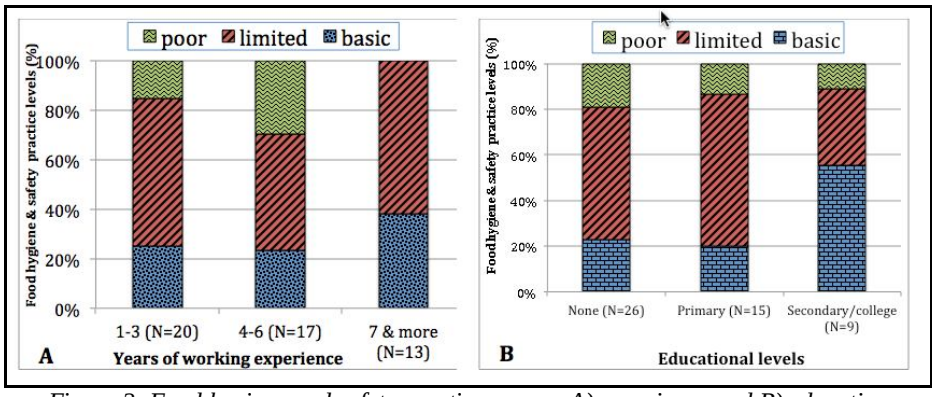

Figure 2: Food hygiene and safety practices versus A) experience and B) education

From Figure 2B, food vendors with secondary or college qualification seem to have comparatively better FHSP levels than both those with primary school qualification and without any formal education. Although vendors with primary and no formal education have comparable FHSP levels, the relatively better FHSP levels from those with higher qualification (secondary/college) could suggest that education may have influence on FHSP practices. However, there is no statistically significant association (p=0.340) between education and hygiene practice levels. This means among the food vendors in this study, educational qualification may not contribute to vendors' food hygiene and safety practices.

In addition, no significant association (p=0.348) is identified between age groups and level of hygiene practice among food vendors. Thus, no significant associations exist between food vendors' FHSP levels and their characteristics like work experience, age, and educational qualification more probably because FHSP is more of a behavioural issue. This then supports the belief that improved or better behavioural practices are not necessarily acquired simply by work experience, formal education or age groups but by conscious effort through appreciating the accompanying incentives or benefits. Thus, emphasizing a key understanding that people will not practice hygiene (and may be safety as well) and unless they want to do so [25].

The Figure 3 describes the FHSP levels among food vendors according to their vending stall and the nature of food sold. Clearly from Figure 3A, both iterant (mobile/hawking) vendors and those using canopy/tent stalls have low (poor and limited) FHSP levels. Though the sample size is limited, not a single respondent was able to pass at least eight of the acceptable hygiene practices to achieve a basic level. Moreover, the findings also show that the low FHSP levels among these groups of vendors came from the high failure rates (mostly 60 – 100%) in connection with unimproved water sources use, non availability of soap for customers' handwashing, poor rinsing water, blowing air from mouth into polybags for serving dishes, bare hands concurrently used for handling money and serving food, etc. Meanwhile, there is improvement in FHSP levels in moving from vendors using wooden structure to metal "container" stalls. It is seen that a significant number of vendors (63%, N≈32) who are using the metal stalls achieved the basic FHSP level compared to 15% (N≈8) from the wooden stalls. It is found that there is a statistically significant association (p=0.020) between the type of vendor's stall and FHSP levels. Also, it is a matter of fact that beyond the limited explanations given already, it is unclear how the type of stalls used by food vendors influences FHSP levels. A detailed and focused study may be required for better understanding in this case.

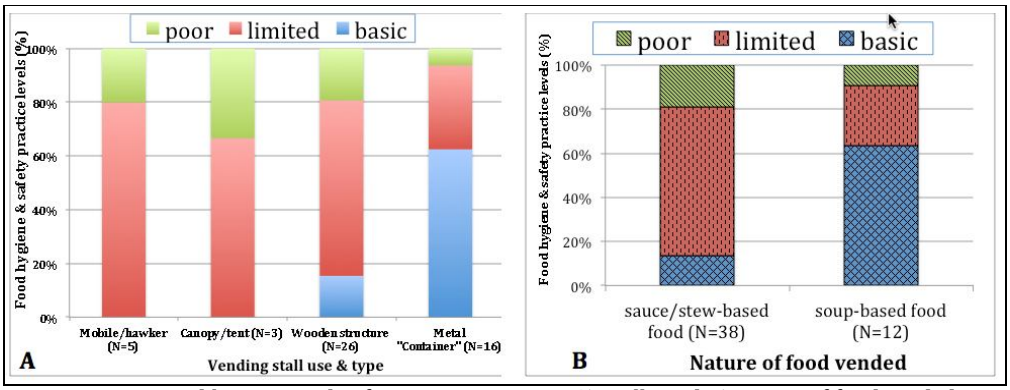

Figure 3: Food hygiene and safety practices versus A) stalls and B) nature of food vended.

From Figure 3B, the nature of food vended seems to influence the FHSP levels. Comparatively, soup-based food vendors have more (64%, N=32) acceptable, thus the basic FHSP level than the sauce/stew-based food vendors (14%). The observation is that there are high failures (58 – 92%) from vendors of sauce-based food for these four practices indicators: non availability of soap for customers' handwashing, poor rinsing water for bowls/cutleries, and bare hands concurrently used for handling money and serving food. In addition to the observations, there is a strong statistical association (p=0.003) between the hygiene practice levels and the type of food vended. Thus, the relationships are not by mere chance, instead vendors of certain food type, for instance soup-based food vendors may have comparatively higher food hygiene and safety practices over their stew/sauce-based counterparts. However, it is not clear what is accounting for this and a further study is recommended.

The results on permit status and FHSP levels are observed in Figure 4. Although it is already indicated that permit-holding claims by vendors are doubtful because they could not be verified, the results appear to suggest that among those who claim they have permits, there is better FHSP levels. In fact, at least 43% of respondents with permit claims have the basic FHSP level, which is comparatively better because it is close to twice the proportion of those without permits at a similar level (23%). However, there is statistically no significant association (p=0.190) between permit status and the hygiene practice levels. Thus, implying that securing a food-vending permit does not necessarily influence a vendor to observe at least some basic and acceptable food hygiene and safety practices. This could be true if only the permit claims are true.

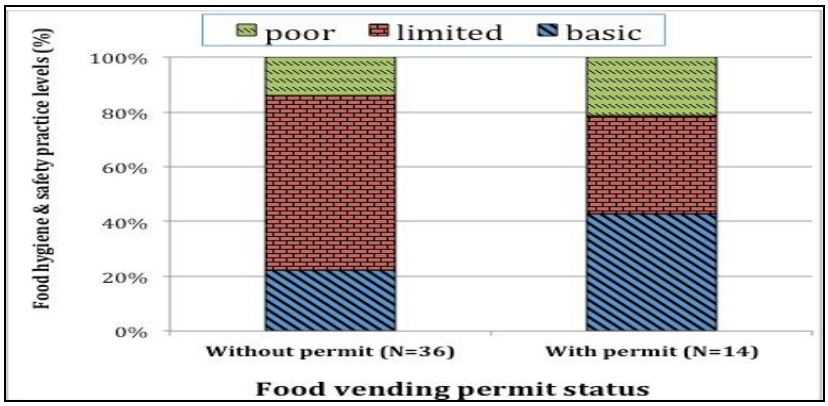

Figure 4: Food hygiene and safety practices against food vending permit status

3.5. Other Issues: Practices and EHSU Monitoring Activities

Apart from the FHSP levels extensively discussed earlier, other pertinent issues deliberated over in this study include handling of leftover food, garbage containment, and monitoring activities of the EHSU/Metropolitan Assembly.

Most food vendors (62%) claim that leftover (unsold) food is used or consumed by their households and never added in part or whole to the next day menu (dishes) irrespective of the quantity. However, the minority, which is also significant in number because they are a little over one-third of the respondents (38%), indicated that leftover (unsold) food is "repackaged" as part or a full meal for the next day. Moreover, all those who practice selling of leftovers indicated that the unsold food (leftovers) is stored under refrigeration and then heated the following day. This practice could be acceptable for reasons like minimizing food wastage and financial losses. However, the concern is that there could be potential consumer health risks from such "repackaged" food. The fact is that most food vendors (62%) in the study do not keep food warm while on sale, and this means food could be going bad by close of the day before refrigeration. On top of that, there is the possibility that poor refrigeration could occur as a result of unreliable electricity (power) supply to homes and this is common nationwide at least in the past 2 years due to power rationing.

On garbage containment, very few (18%, N=9) respondents have receptacles to collect and store the garbage generated from their food vending activities. In fact, only three out of the nine respondents kept their garbage receptacles under sanitary conditions, for instance by not exposing them for houseflies invasions. Also the other six (with unsanitary garbage receptacles) together with those without any receptacles (making the majority, 94% N=47) had unsightly selling environment characterised by scattered garbage and houseflies invasions. Thus, the practices among most vendors are that they keep garbage in the open and only clean them up after close of work.

Majority (78%, N=39) of food vendors acknowledges that the Environmental Health and Sanitation Unit (EHSU) team monitors their activities. Again, more than half of these vendors (56%) claim that the EHSU visits them every month while the rest reported that the EHSU's visits are weekly. Meanwhile, the EHSU itself claims that the outfit's monitoring schedule is at least every week. It is therefore not clear why the vendors gave contradicting reports about the frequency of EHSU's monitoring activities. Either not every vendor is visited every week, which is possible because this community in the metropolis is under the jurisdiction of one EHSU officer, or more so, some vendors intentionally run away from the frequent monitoring exercises. The later is common as reported by Daily Guide [27]. On the exact monitoring activities by the EHSU, Figure 5 presents what authorities do during their monitoring visits as reported by food vendors.

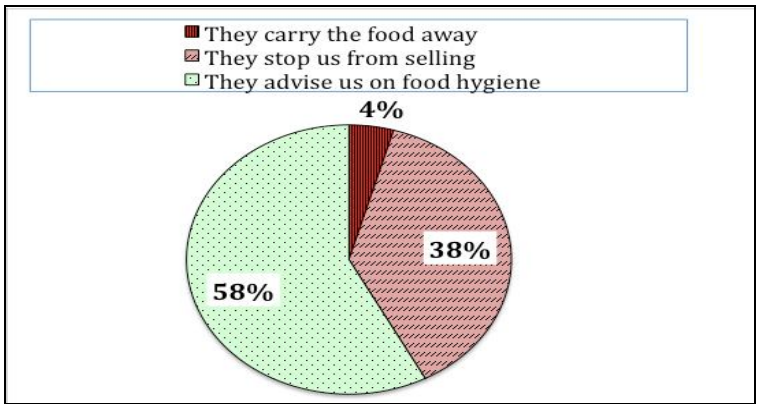

Figure 5: Reported actions undertaken by EHSU officers during monitoring

The predominant action undertaken by officers in the field is advising vendors on food hygiene and safety, followed by stopping vendors from selling and in few instances, carry the food away to the office. These actions show efforts to help educate vendors on good practices and also as enforcement activities to discourage substandard practices [26]. In fact, yet to be recorded among these food vendors in this community is prosecution from authorities especially to offenders. Taking food away and stopping vendors from selling may not be effective deterrent to noncompliance and substandard practices like prosecution. Prosecution is found praiseworthy of the efforts of another local authority – Mankranso District Assembly in Ghana, to regulate activities of food vendors [28-30].

4. Conclusion and Recommendations for Practice

Females dominate the food vendors, an observation that is common in Ghana because the trade is seen as women's business. Also commonly found is illiterate vendors without any formal education but with over half of them having at least four years of working experience. Almost all respondents have employed people as workers to support them. Few respondents claim they have permits but their claim appear more doubtful.

The proposed framework for rapid food hygiene and safety practices assessment is successfully tested and appears promising. The framework's key indicators can be integrated into local authorities monitoring tools for rapid assessment of food vendors on the field. From the framework, food hygiene and safety practice (FHSP) levels among the food vendors are generally low. A little over a quarter of all respondents practices the basic (i.e. also acceptable) FHSP level. Low food hygiene and safety practices are widespread because of the failure in indicators including these top three: use of poor rinsing water, non-availability of soap for handwashing, and lack of keeping food on sale warm. Statistically, FHSPs are not influenced by food vendors' characteristics like age group, years of working experience and education. However, the type of stalls used by vendors and nature of food sold influence their FHSPs. An appreciable number (over one-third) of food vendors "repackage" unsold food for customers the next day. This practice is not encouraged in the current dispensation because the leftover (unsold) food handling conditions appear more doubtful. Almost all respondents practice poor garbage containment that encourages houseflies to invade selling joints. The existing monitoring activities of environmental health and sanitation officers are largely advising vendors and also preventing those with substandard practices from selling, which is positive.

To improve upon permit acquisition monitoring, on-the-spot verification of food vending permit must be made mandatory. The framework proposed and used in this study together with the findings and replications elsewhere (for improvement) need stakeholder discussions for potential integration into local authorities monitoring framework/tools.

5. Acknowledgement

The authors wish to acknowledge Mrs. Nazihatu Inusah an Environmental Health Assistant of Savlugu District (formerly of Tamale Metropolis) for her immense support in the data collection as part of her Diploma project. We also express our appreciation to the Metropolitan EHSU for their support, and not forgetting respondents (the street food vendors) who willingly participated in the study.

6. Conflict of interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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