

Environment and Awareness Influencing Food Safety in the Western Area, Sierra Leone

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How to cite this paper: Kanu, P.J., Turay, H., Kandeh, A. and Hodges, M. (2023) Environment and Awareness Influencing Food Safety in the Western Area, Sierra Leone. *Food and Nutrition Sciences*, 14, 1013-1030. <https://doi.org/10.4236/fns.2023.1411064>

Received: September 27, 2023

Accepted: November 6, 2023

Published: November 9, 2023

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Abstract

Food safety, nutrition, health and wellbeing are inextricably linked. This study investigated the environmental, awareness and practices amongst both food vendors and consumers in and around Freetown the capital of Sierra Leone. The population of the area has vastly out-grown the infrastructure laid down before and since independence. De-centralization of authority to local councils as recommended post-war has only been partial. The role of local versus central government in the planning and maintenance of water, sanitation and market-infrastructure and related policies was explored. This is a qualitative study that used semi-structured interviews with vendors, consumers and 29 key informants. Amongst an estimated population of 5386 actors in food services a sample size of 309 vendors, consumers in and around the 12 busiest market hubs in Western Area Urban and Rural Districts were sampled. Most of the respondents described “food safety” as “*good-to-eat, well taken care-off, and free from germs*”. The respondents cited that main causes to unsafe food are poor hygienic practices: 38%, contamination by flies: 28%, uncovered food/improper handling/poor personal hygiene: 21%, and environmental factors, such as improper refuse disposal: 11%. Respondents expressed that consuming unsafe foods can lead to diarrhoea: 34%, food poisoning: 24%, vomiting: 17%, stomach ache/pain: 16%, or typhoid: 9%. Various measures to improve food safety were cited as hand washing: 60%, cleaning surroundings: 57%, covering food: 56%, washing utensils: 52%, covering hair: 42% and using a face mask: 32%. However almost 76% of food vendors interviewed were trading near gutters, where muddy/dirty water settled, with slippery floors, discarded plastic waste, flies and inadequate water, sanitation, and/or storage facilities. None of the food vendors had had any formal training on food safety. Despite progress recently made in solid and liquid waste management during the

“Transform Freetown” agenda much more improvement in infrastructure and behaviour change is required. Similarly, despite improvements in formal market facilities the pattern of informal street trading remains the most prevalent especially for the poor. The link between “safe food” and good health was only partially understood, whilst the widespread application of recommended practices to reduce risks was lacking due in part to inadequate infrastructure. As the importance of food safety becomes better understood by administrators and the public the investments required in infrastructure and social and behavioural change will contribute towards a healthier environment and outcomes.

Keywords

Food Safety, Freetown, Sierra Leone, Water and Sanitation, Hygiene

1. Introduction

Food safety, nutrition, health and wellbeing are inextricably linked [1]. Unsafe food leads to diseases and contributes to malnutrition, particularly affecting infants, young children, pregnant/lactating women, and the elderly/frail [2]. Foods or fluids can be contaminated by harmful bacteria, parasites, viruses or polluted by chemical substances such as heavy metals leaking from dump sites.

Food-borne diseases (FBD) are associated with 75% of disease outbreaks [3] [4] and are responsible for significant morbidity and mortality rates with 2.1 million deaths globally every year [5]. According to the World Health Organisation FBDs are of serious public health issues in sub-Sahara Africa due to unhygienic food handling practices, poor understanding on food safety measures, inadequate food safety laws and regulatory systems, inadequate infrastructure and investment, weak surveillance of food establishments and financial misappropriation [6].

Children are especially at risk of frequent episodes of diarrhoea, when living in environments of poor hygiene and sanitation that leads to environmental enteropathy [7]. This increases intestinal permeability and impairs the gut immune function resulting in nutrient malabsorption and potentially oral vaccine failure [8].

Freetown is the capital of Sierra Leone situated on the west coast of Africa. The population has expanded rapidly over the last 30 years and spread to along the estuary around the mountains known as the Western Area. Currently it is administered as two districts: Western Area Urban (WAU) and Western Area Rural (WAR). The food environment is characterized by the co-existence of formal and informal outlets, formal covered marketplaces (with many traders), street vendors (fanna/table tops), small “Fullah” shops, kiosks, house shops, self-production/sale of fruit and vegetables, sharing, borrowing, community food kitchens (during a crisis) and food aid.

Ready-made foods accessed by the poor and middle classes are accessed at “cookri” baffle¹, restaurants, table-tops (selling beans salad² or “fry-fry”³), Ataya base⁴ (meeting places of males selling tea and eggs, roast meat/pepper soup)⁵, and street vendors of acheke, “ebeh⁶/fofoo⁷, hot-pap⁸ or lafidi⁹”. People find it cheaper and more convenient to buy food from “cookri” than to make food at home as they have limited time or storage facilities [9].

In the Western Area, poor sanitation affects all these markets. Most of the formal markets and “cookri-baffle” do not have access to safe drinking water or adequate waste management. Market vendors pay a small daily market fee (tax) to the local council towards water, sanitation and/or storage facilities. However, there are persistent waste management problems including long duration before overfull pit latrines are emptied, nearby dump sites and open sewers. These conditions attract rodents and insects. Progress are being made by Freetown City Council to improve solid and liquid waste management by the establishment of commercially viable bio-digesters piloted in Aberdeen [10] that would be able to process 600 kg waste per day and provide energy and compost to nearby customers. Another bio-digester in the Mabella community near Douff Cut market is being planned in collaboration with UNOPS and Save the Children.

Street trading of any kind of commodity especially local foods found in nearly every street in the WAU that has repeatedly evoked political tension. Traders prefer selling on the road side and main junctions and move out of the formal markets, causing traffic congestion, making it difficult for pedestrians, motor-bikes and vehicles to move. Formal markets are insufficient to accommodate all traders and some have transformed into dwellings where youths smoke “kush¹⁰” and marijuana.

Poor and very poor households are heavily dependent on street trading for their livelihood. During the school holidays, parents may send their children to trade to raise money for school fees and uniforms for the next academic year. These children are vulnerable to exploitation. They can be robbed while selling and are afraid to return home for fear of being beaten by their “aunty”. Some

¹A structure of low cost/used material often temporary in nature and lacking in planning permission where cooked meals are sold.

²Based on cowpeas, macaroni, lettuce, fried plantains/chicken/fish cost NL10-15 per plate depending on the size of the chicken/fish.

³Various items such as plantains, fish, chicken, akara, pan cake, fish ball, potatoes, and fried herring served with bread NSL 1.5-3.

⁴Ataya bases (tea houses) are places where young men socialize and discuss the topics of the day. They sell coffee, and snacks like a fried egg, bean salad, and other fries like plantain, and cakes.

⁵Pepper soup can have slice of goat meat, sheep or cow meat. It is commonly sold in bars.

⁶Ebeh is a soup cooked with cassava, potato, coco yam, mango, plantain/banana and other ingredients mixed with/without palm oil.

⁷Cassava soaked, ground, strained, fermented for a few days, cooked into a bulky wet paste, rolled into balls, eaten with stews.

⁸Rice porridge.

⁹Plain rice with roast-pounded sesame in an okra sauce.

¹⁰The drug is an amalgamation of the various chemicals and plants that mimic the natural (cannabinoid) found in cannabis.

prefer staying on the street asking for help, and a “good Samaritan/stranger” may take him/her to his own dwelling with a promise to send him/her back to school. Girls are especially at risk of sexual exploitation and abuse in this situation [11].

Street food vendors play an important role in providing affordable cooked food to low-income people, based upon popular traditional recipes [12]. However, they generally do not have clean spaces to store, prepare and sell [13]. Washing their hands, utensils, and dishes is often done in buckets or bowls using the same water [14]. Some of these vendors sell their food just beside a rubbish dump or gutters where broken pipes lead to open sewers running side-by-side with leaky water pipes.

2. Research Questions

What role does government play in food safety? What are the hygienic practices by food handlers to protect food? How can food safety be improved?

3. Methods

This study used a qualitative approach to allow respondents to explain what they know about food safety and their coping practices. The interview guidelines with open-ended questions were developed in English, pre-tested using the local dialect “Krio” and revised as shown in **Figure 1**. Each interview started with consent procedures.

There is an estimated 5386 “food service providers” in the WAU and WAR [15]. There are 50 formal markets in the WAU (40) and WAR (10). In both districts, there are major “hubs”. In the WAU the largest are at Douff Cut (including Bombay and Mallama Thomas Street), Lumley, Portee, Low-cost-Kissy, Peace (including Public Works Department (PWD), Old Road), Calaba and Congo Town. In the WAR the largest are at Waterloo, Jui, Grafton Market, Funkia and Tombo.

Convenience sampling of vendors were interviewed including street traders, “cookri”, Ataya Base, Bean-salad, Fry-fry, restaurants, roast meat/pepper-soup/cakes vendors, and door-to-door vendors that were within or around these hubs. Convenience sampling of consumers near these vendors participated based on their willingness to participate.

Sampling

Using the Lemeshow’s sample size formula ($n = (Z^2 * p * q) / E^2$) and the finite population correction:

$$n' = (n * N) / (n + N) \quad [16],$$

where n represents the required sample size,

Z —Z-Score (1.96).

p —Standard deviation = 0.5.

q — $1 - p = 0.5$.

E —the margin of error =0.5.
 and N is the total population size of 5386.
 $n = (Z^2 * p * q) / E^2$.
 $n = (1.96^2 * 0.5 * 0.5) / (0.05^2)$.
 $n = 384.16$ (approximately).

<p>Understanding Food Safety</p> <ol style="list-style-type: none"> 1. What do you understand about the term “food safety”? 2. What do you think are the main causes of unsafe food? <p>Health effects of unsafe food</p> <ol style="list-style-type: none"> 3. What are some of the health effects of unsafe food? 4. Do you know that abortion could be induced in pregnant women by food-borne diseases? 5. Do you know that bloody diarrhea can be caused by unsafe food? <p>Food Quality</p> <ol style="list-style-type: none"> 6. How can you tell that a canned food product is unsafe? 7. How do you determine the quality of the food? <p>Hygienic practices (Knowledge Attitude and Practices)</p> <ol style="list-style-type: none"> 8. Why do you leave your food open/uncovered? 9. What would encourage you to try and sell safe food? 10. What are some of the hygienic practices you do that can lower the risk of unsafe food? 11. Which ways can we get germs and transfer them into food? <p>Food Storage and packaging</p> <ol style="list-style-type: none"> 10. Where do you store the food? 11. Are there storage problems? 12. How long do you/can you store/keep them for? 13. What are the storage facilities in this market? 14. How do you package food? <p>Waste Management</p> <ol style="list-style-type: none"> 15. How do you clean your surroundings? 16. Where do you dispose of your rubbish after cleaning? 17. What are the waste facilities? <p>Water and Sanitation (ALL)</p> <ol style="list-style-type: none"> 18. Do you have access to water supply in this market/restaurant? 19. Do you have access to toilet facilities in this market? 20. Does the market’s toilet have hand washing facilities with soap and water separated? <p>Water and Sanitation (Food vendors)</p> <ol style="list-style-type: none"> 21. Do you have a handwashing facility for consumers? 22. How do consumers wash their hands? 23. Do you have soap and water separately for handwashing? <p>Market Conditions and Improvements</p> <ol style="list-style-type: none"> 24. Have you heard of any plans to improve the facilities in the next 12 months?

Figure 1. Interview guidelines.

The finite population size:

$$n' = (n * N) / (n + N).$$

$$n' = (384 * 5386) / (384 + 5386).$$

$$n' = 2,079,744 / 5770.$$

$$n' = 361.$$

Therefore, the adjusted sample size is 85% (“safest” choice) of the finite population since the sample size required is largest when $p = 0.5$. Therefore, the adjusted sample size of respondents (Consumers and Vendors) recruited was 309.

Key informants were purposively selected. In each of the 12 Markets, one market keeper, one chairman or chairlady or taskforce keeper were selected for interview. We have adopted an interactive semi-structured interview guideline for flexibility of responses and if an unexpected issue is raised then we are free to follow that line of enquiry. The questions were on the conditions in the market (Water supply, Toilet facilities, Storage facilities, Waste facilities, Plans for improvements, food safety surveillance, and daily charges in the markets). We had a free-flow discussion with other key informants working in office setting such as FCC using the same approach and questions on plans to improve the markets places.

4. Results

A total of 29 key informants were interviewed: Freetown City Council (1), Market Women Association (1), Ministry of Trade and Industry (1), Traders Union (1) and Consumer Protection Agency (1), Formal market officials (12), and Chairladies/Chairmen/Market Taskforce (12).

A further 309 interviews were conducted (WAU: 206, WAR: 103) with vendors and consumers as shown in **Table 1**. A total of 55 respondents were from formal markets, 54 cookri/restaurants, 45 street traders and 7 others (vendors of Acheke, Lafidi, Beans-Salad, etc.), and 148 consumers.

Key Themes Identified (amongst vendors and consumers)

4.1. Understanding Food Safety

Most of the respondents described “safe food” as food that is “*good-to-eat*”, *clean*, *well taken care-off and free from germs*. Evidently, respondents associate food safety with health, cleanliness and/or personal hygiene, quality of food and safe environment. Some participants linked food safety as *well-preserved and properly cooked meals*. Some common themes along with quotes, frequency and percentage of each response as shown in **Table 2**.

Both consumers and vendors recognized the importance of proper food handling and preparation in ensuring food safety, 26% and 52% respectively. Both groups reported that safe food should not only be devoid of contaminants but should also possess high quality and sensory appeal, 5% and 39% respectively. Vendors prioritized the cleanliness of their establishments (52%), while consumers voiced apprehension regarding food contamination and the potential presence of germs or bacteria (20%). Consumers (14%) associated food safety

Table 1. Socio-demographic composition of respondents (N = 309).

	Consumers n (%)	Vendors n (%)
	148	161
Males	47 (31.8%)	22 (13.7%)
Females	101 (68.2%)	139 (86.3%)
Age 15 < 25 years	50 (33.8%)	42 (26.1%)
Age 25 < 45 years	89 (60.1%)	108 (67.1%)
Age ≥ 45 years	9 (6.1%)	11 (6.8%)
No formal education	39 (26.4%)	70 (43.5%)
Primary education	8 (5.4%)	15 (9.3%)
Secondary education	78 (52.7%)	72 (44.7%)
Tertiary education	20 (13.5%)	4 (2.5%)
Vocational training	3 (2.0%)	0 (0.0%)
Vendors Experience		
<2 years	NA	46 (28.6%)
2 - 5 years	NA	65 (40.4%)
≥5	NA	50 (31.1%)
Consumers Occupation		
Traders	93 (62.8%)	NA
Public Service	6 (4.1%)	NA
Skilled Trades/Services	15 (10.1%)	NA
Student	21 (14.2%)	NA
Unemployed/other	13 (8.8%)	NA

Table 2. Most common responses on food safety understanding (N = 309).

Common themes	Quotes	Frequency/%
Free from Contaminants	“Food that is free from contamination for human consumption.” “Food that is clean and safe from germs.”	72 (23%)
Proper Preparation and Cooking	“Any food that’s well preserved and cooked under the right temperature.” “Food safety is the way we take care of our food, cooked and the handling to prevent us from sickness.”	46 (15%)
Prevention of Contamination	“Don’t careless food, cover food, protect it from germs.” “Food that is clean and well protected to eat always.” “Food safety is protection, how to prevent food from germs.”	44 (14%)

Continued

Hygiene and Cleanliness	“The handler of the food, the place of preparing the food.”	36 (12%)
	“Clean your body, clean your mouth, clean your place.”	
	“The way we cook, smoke, and steam our food to protect it from dirt.”	
Health and Nutrition	“These are foods that have all the quality to make you strong and healthy.”	30 (10%)
	“Good food you will get protein; bad food is not good for eating; it makes you get sick.”	
	“Food that is good for our health with no contamination for human consumption.”	

with positive health outcomes, whilst vendors prioritized food quality and taste (39%). Both consumers and vendors valued food safety but their perspectives diverged in terms of operational focus versus health-related considerations.

“Fine food looks good, taste good, not sour or spoiled or rotten, always fresh to eat; bad food is not good for the body”

None of the vendors had received any formal training on food hygiene and safety. One market chairlady recalled being trained on “food preservation and hygiene” as confirmed through Market Women Association attesting collaboration and funding from UN women.

4.2. Factors Influencing Unsafe Food

The causes of unsafe food were associated with multiple factors as shown in **Table 3**.

Cross contamination by flies due to inadequate handwashing without soap and running water, unclean utensils, unsanitary selling/cooking environment were emphasized by all respondents as some of the main causes of unsafe food. However, vendors were observed sitting at the door step of a public toilet selling food items such as vegetable oil, palm oil, salt, untied groundnuts paste and other items.

“careless handling, unclean environment and protect food from germs and cross contamination”

Most vendors (88%) mentioned that they left their food uncovered to attract customers, making sure the presentation of food items is appealing, showcasing freshness and quality to facilitate sales. A minority (12%) considered factors such as contamination, cultural practices, hygiene, safety, temperature maintenance and presentation.

4.3. Health Effects of Consuming Unsafe Food

Respondents reported that consuming unsafe foods could lead to a range of health effects, with the most common being diarrhoea/cholera as shown in **Figure 2**.

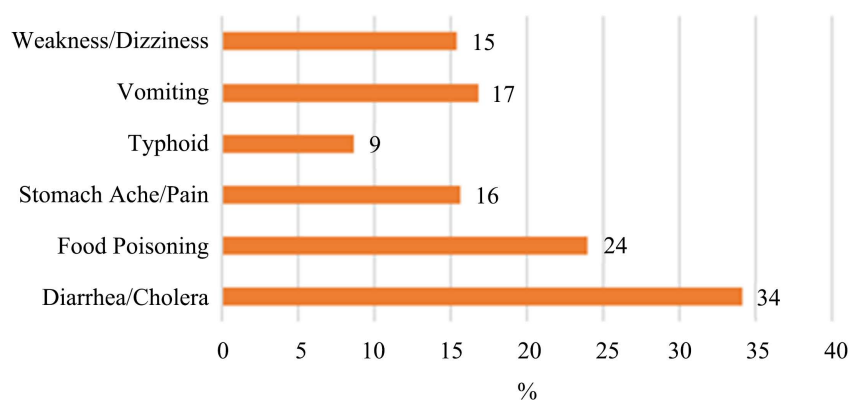


Figure 2. Common health effects of consuming unsafe foods.

Table 3. Factors influencing unsafe food (N = 309).

Common Themes	Examples	Frequency (Percentage)
Unhygienic Practices	that included not properly washing hands before cooking or eating, not cleaning utensils and cooking surfaces, and failing to maintain a clean cooking environment	116 (38%)
Contamination	believed this could occur from various sources such as dirty water, uncovered food, contact with rodents and insects, and improper handling of food	87 (28%)
Food poisoning	eating food picked from the ground can lead to complications like food poisoning that can cause death, when you eat improper food you will have a runny stool, diarrhoea, cholera, unwashed hands after using the toilet, uncovered food, eating expired food makes us sick	74 (24%)
Personal Hygiene	failing to wash hands, touching food with unclean hands, and poor personal hygiene practices	66 (21%)
Improper Preparation & Storage	when the food is not cooked well, it will cause sickness to our body, leaving your food uncovered, food that has pathogens, no proper hygiene, no proper taking care of	53 (17%)
Germs	Bacteria are the main causes of unsafe food, germs can spoil your food, food that has germs can cause different sickness	45 (15%)
Environmental Factors	dirty cooking areas, unclean surroundings, and exposure to pollution were mentioned as potential contributors to unsafe food	34 (11%)
Flies & Insects	Flies can transfer germs to uncovered food... a toilet near food, leaving your food open, allowing flies, dirty environment, cockroaches	24 (8%)

“Bad food is not good, if you eat bad food, you will get sick and it affects the body.”

“Vomiting resulting from unsafe food consumption, can lead to dehydration and weakness.”

4.4. Determining Food Quality

The responses provided by the participants were diverse. Sensory attributes (smell and taste/appearance) 38% were the most frequent means of determining the food quality, followed by “cleanliness and environment” (28%), price: 8%, then personal experience/trust/familiarity: 7%. Respondents also mentioned signs of unsafe canned food as expiry date: 84%, odour: 33%, swelling: 35%, rust: 22%, taste: 11%, leakages: 8% and appearance: 6%.

4.5. Preserving Food and Storage

4.5.1. Food Safety Practices

Both consumers and vendors in restaurants and in fish markets (73%) mentioned using refrigeration and cold storage to preserve freshness and prevent spoilage. However, they expressed vexation on poor and irregular supplies of power to enable this process.

Overall, 42% of both vendors and consumers utilize varied storage facilities like cupboards and shelves to safeguard food from pests and contaminants, while 25% emphasize using containers and bags to shield against pests, showcasing their awareness of food safety risks. Vendors expressed strong dissatisfaction of not having adequate storage facility in the formal markets, mentioning that in the evening they have to pack up and carry all their items home for safe keeping. Some mentioned the high incidence of theft and daily expenses to pay for unreliable space in a shop with high risk of losing their properties.

“Not having conducive storage facility is a security threat and has a negative affect the food safety”.

Many respondents mentioned cooking techniques like reheating, boiling, steaming, and frying to ensure food safety (34.7%). Some consumers (25%) expressed that sometime the fish/meat they eat from cookri are almost rotten, yet vendors still sell it expensive.

Respondents reported storage challenges linked to pests, dampness, coursing spoilage. A small majority (57%) preferred one-day storage for optimal freshness. Around 19% extended this to two days, while 12% stored food for three days, 4% for a week and 5% did not store food at all due to limited storage access.

4.5.2. Determining Practices to Lowering the Risk of Unsafe Food

The respondents cited a range of practices to reduce the risk of unsafe food. These included hand washing, environmental cleanliness, food coverage, utensil cleaning, personal hygiene, cooking techniques, avoiding flies and insects, and maintaining toilet hygiene as shown in **Table 4**.

Table 4. Key practices lowering the risk of unsafe food (N = 309 responses).

Common themes	Examples	Percentage %
Hand Washing	Many respondents emphasized the importance of hand washing before handling food	185 (60%)
Cleaning Surroundings	Keeping the cooking area and surroundings clean was a common practice mentioned by respondents.	175 (57%)
Covering Food	Covering food items to prevent flies and contaminants from getting on them.	174 (56%)
Washing Utensils	Washing cooking utensils properly to prevent cross-contamination.	160 (52%)
Covering hair	Many respondents mentioned covering their heads while cooking to maintain hygiene	130 (42%)
Use of Face Mask	Using face masks, especially when handling food, was mentioned for preventing contamination.	98 (32%)
Keeping finger nails short	Keeping nails short and clean to avoid transferring germs.	83 (27%)
Personal hygiene	Overall personal hygiene practices were emphasized by several respondents.	75 (24%)
Using Clean Water	Using clean and safe water for cooking and cleaning.	64 (21%)
Avoiding Dirty Water	Avoiding using unclean or contaminated water for cooking.	48 (16%)
Proper Cooking	Ensuring food is properly cooked to the right temperature.	46 (15%)
Sweeping and Cleaning	Regularly cleaning the environment and sweeping the cooking area.	42 (14%)
Personal Protective Measures	Using gloves, aprons, and other protective gear.	39 (13%)
Avoiding Flies	Taking measures to keep flies away from food.	36 (12%)
Avoiding Contaminants	Not allowing dirt, insects, or rodents to come in contact with food.	32 (10%)
Sneezing/Coughing Etiquette	Covering the mouth while sneezing or coughing.	31 (10%)
Avoiding Open Food	Not leaving food uncovered to prevent contamination.	30 (10%)
Avoiding Contaminated Surfaces	Washing hands after touching contaminated surfaces.	28 (9%)
Washing Food Items	Washing fruits and vegetables before cooking or eating.	26 (8%)
Regular Cleaning	Regularly cleaning the kitchen, dishes, and surroundings.	24 (8%)

4.6. Food Environment

Observation on the market environment was substandard as a place to sell and to eat. All of the market's pathways and surroundings are congested with customers moving in and out in a hurry. The markets are filthy, smelly and stink of stagnant water. At Low-cost market, a neighbouring house has a leaky septic tank that waste through the market paths and in-front of uncovered food item that cannot be washed before preparation such as green leaves ("plasas"). At Douff Cut there is "stream" that runs from start-to-end of the market. All of the markets surveyed were wet and muddy. Only PWD had some paved concreted flooring but without table top to place food items. The gutters in all of the mar-

kets are full with rubbish and some vendors place their tables on top and/or seat besides those gutters to sell food. Almost 76% of the cookri/lafidi places traded besides gutters where frontages are unpaved and where muddy/dirty water settled. Slippery floors with discarded plastics waste abounded. Flies were attracted to the unclean water where plates were washed, or were left on muddy floors near open dustbins.

At Ataya Bases the serving cups and flasks are stained brown by the tea due to inadequate washing. Grinding machines for cassava leaves, groundnuts, pepper, flours (rice, gari¹¹) are rusty stained, unwashed and un-hygienically handled. Women cutting leaves (spinach/krain-krain¹², potato leaves etc) sometimes left the leaves on bare-muddy ground. Youths were found sleeping at the lobby of the toilets at the PWD market. Some of the biggest and popular markets like Douff cut, Bombay, Portee, Calaba Town, Waterloo, Funkia do not have adequate structures to house vendors, resulting in difficulties managing them and encouraging them away from street trading. Douff cut market structure has been transformed to a ghetto known as the “check-point” meaning once a thief ran inside the structure, there is no way the victim would retrieve their stolen property.

4.7. Waste Management

Observation revealed that the varied waste disposal practices in the markets and levels of adherence to proper procedures. Only Lumley market had a refuse container that was emptied and replaced regularly. Ten formal markets emptied their refuse into the nearby river, some bagged it for collection by self-contracted street-boys, while others left it heaped for weeks/months at the corner of the market hoping to be collected by the council. Near Fourah Bay Road bags full of rubbish were piled high obstructing the traffic. It’s important to note that a significant proportion of respondents not specifying a disposal method could indicate improper/unregulated waste disposal methods **Figure 3**.



Figure 3. Waste disposal methods by consumers and vendors.

¹¹Made from processed cassava, with a granular texture and versatile culinary uses, of cultural and economic significance common to the West African region.

¹²A traditional leafy green-dish, cooked as a stew and is commonly served with rice or foofoo.

“We sweep and pay some boys to empty the rubbish at the bridge.” Jui Market.

4.7.1. Access to Water and Toilet Facilities and Improvement

Serious constraints were reported and observed regarding access to water in the markets especially during the dry season. Respondents expressed dissatisfaction about market dues being paid to Councils through Market Keepers for providing basic facilities like pipe burn water, proper VIP toilet, store room improved structure or shade, and proper waste disposal. Only one formal market (PWD) still have a functional flush toilet. None of the markets had a reliable water supply provided by either local council. A majority (67%) of respondents indicated that they had access to water from neighborhood sources like tap water, wells/hand pumps, or tanks that had additional payment models either per rubber (5-gallon container). Some received water for free. In Tombo and part of Douff Cut along the wharf, people bath near the water source. In other places, respondent fetch water from pipes inside gutters.

“Most of the houses waste pipes are connected to the gutter passing nearby dwellings with food preparation happening close by”

Around 67% of respondents confirmed access to public toilet facilities. Some respondents mentioned specific conditions, such as payment for use at (2 New Leones for defecation and 1 SLe for urination) with very poor management like not enough water to use and an additional 1 SLe for additional water. There was no soap for handwashing in these facilities and some of the public toilets were closed when the septic tank was full but not emptied. Approximately 32% of respondents expressed concerns about the poor condition or inadequate management of the toilet facilities. Phrases like “poorly managed,” “not decent,” and “dirty” were used to describe their state. Respondents also used toilets in their own homes or nearby locations instead of relying on the market’s toilet facilities (24%).

“we go and defecate into the sea” Some of us are using a small bucket and empty to the sea Tombo Market.

4.7.2. Handwashing Facilities for Consumers in Cookri/Restaurants

Among cookri/restaurants, 48% had handwashing facilities for customers, and 31% offered only water, whilst 7% also provided soap, and 10% reported that customers brought their own handwashing solutions. A significant portion (32%) reported the absence of any facilities, often citing cost constraints or the belief that customers used utensils to eat. Conversely, a significant proportion (20%) indicated that consumers did not frequently wash their hands, attributing it to the absence of handwashing facilities or the belief that utensils sufficed.

4.8. Motivations for Safe Food Handling

Respondents shared a range of motivating factors for providing safe food within the market environment. Customer satisfaction and reputation were frequently

cited emphasizing how feedback and customers contributed to their efforts. Personal health and well-being, financial benefits derived from selling safe food, market demand and competition, hygiene, cleanliness, and adherence to proper food handling practices were cited as important factors. These practices aligned with their commitment to providing a clean and wholesome environment for customers.

4.9. Key Informants' Interviews

Under the transform Freetown agenda self-employed tri-cyclists were trained and deployed to collect solid waste from domestic homes for central processing/recycling. Representative from the council confirmed plans are underway to construct and operate bio-digesters in four formal markets: Aberdeen Road, Peter's Brook, King Jimmy and Allen Town that will generate electric power to nearby communities and organic fertilizer.

Through the Women for Water and Peace Project there are plans to construct 25 water kiosks with solar-powered purification systems in five wards. There are also plans under the Freetown Blue Peace Initiative to construct 60 public toilets and water kiosks in five locations and will purchase vehicles for solid and liquid waste collection, construct markets with water facilities and build storm water drainage. These projects have been launched but yet to commenced.

Participants highlighted a recurring sentiment of unfulfilled promises. They recounted instances where promises were made in the past to enhance the facilities, particularly during election campaigns, but noted the subsequent lack of follow-through. This sentiment of scepticism and frustration was palpable in their responses.

Market Keepers raised concerns of being molested by vendors while collecting daily tax, sometime being fought and kicked out of the market saying that government is not providing any facilities with the money paid.

Some chairmen/chairladies discussed community-driven efforts to uplift the facilities. They mentioned initiatives such as providing water tanks, constructing new market tables, and constructing toilets facilities. These are as a result of personal effort in lobbying to Member of Parliament or private tycoon. This showcased a localized and proactive approach to addressing facility improvements.

Sierra Leone's first ever faecal sludge treatment plant became fully operational in the WAU 2021. Another plant is being considered to serve the WAR.

Key informants confirmed that there was a project funding payment for market sweeping by youths but that's it ended abruptly due the poor management and finances.

5. Discussion

The findings indicated a limited range of understanding and practices regarding food safety in the Western Area. Food vendors especially lacked training on food safety and had inadequate facilities.

Collectively, government should collaborate with local market authorities and stakeholders to intensify food surveillance on proper hygiene practices, proper food handling, storage, and measures to prevent unsafe food.

The current “Food and Feed safety Act of SL 2017” speaks more on imported, exported and formal businesses, with emphasis on certification, licensing, offences and penalties. There is need to incorporate local content food safety Act, with guidance on Food safety management for restaurants, “cookri-baffa”, cafés/Ataya Base, street vendor, and other small businesses. Government should operationalize the Food and Feed safety Act of SL 2017 by establishing a commission/regulatory “Authority” that ensure compliance to food safety laws, develop full food safety guidance (cross-contamination, cooking, cleaning etc.), and provide formal training on food hygiene and safety to all food actor in strengthening the food system.

Key interventions can be implemented by government and partners to improve food safety include: 1) improvement on water, sanitation and hygiene facilities in local markets by installing access to safe drinking water, improve toilet sanitary, proper cleaning of market environment, and effective waste disposal infrastructure to ensure food safety; 2) Develop a basic food safety training manual for formal and informal food vendors, emphasizing proper hygiene practices, food handling, storage, and measures to prevent contamination. The key points should be developed, pre-tested and distributed in an innovative fashion so that the illiterate can comprehend the messages delivered for example as images on their mobile phones. All members of the Market Women’s Association should be linked on a WhatsApp group and regularly be sent these key messages with a feed-back mechanism to ensure the message has been seen and understood/recommendations for modifications; 3) install proper storage facilities and practices to mitigate the risks associated with pests and environmental conditions; and 4) raise awareness (using various channel of communications) about proper food handling, hygiene practices, and the potential health risks of consuming unsafe food.

Whilst these findings are similar to those of many cities that are rapidly expanding in the developing world it is evident that efforts have been and are being made to improve and expand infrastructure.

One area that hasn’t achieved much government or donor attention to date is the formal training of food vendors whether they be in formal markets or operational as “street-traders/cookri”. This was identified as a Priority Complex Problem by the recent Africa Cities Research Consortium report. Providing flexible training using innovative, part-time mobile technologies designed for the semi-literate/illiterate was suggested.

6. Conclusion

This study suggests that the understanding of food safety though weak is greater than the measures put into practice due to insufficient WASH infrastructure and

food storage facilities. Administrations have made and are continuing to making efforts to improve WASH and waste management but the challenges or a rapidly growing and urbanising setting are greater than the effort and funding obtained to date.

Acknowledgements

The authors would like to thank all the Market Chairmen and Chairladies including all the key informants interviewed for their collaboration during the field survey. Our appreciation to the final year students of Milton Margai Technical University who participated as field workers (Kabba Kamara, Mariama Musa, Kadiatu Grace Koroma, Binta Jolloh, Kadiatu Marrah, and Sia Nusu Foday-Ngongou) for their cooperation and patience during the fieldwork.

Availability of Data and Materials

Throughout the research process, stringent data security measures are upheld, including the secure storage of audio recordings and any associated notes. All response and analysis are available: Food Safety Data Consumers and Sellers. The Centre for Development and Food Safety (SL) Limited, archives all responses on site, which will not be shared to maintain confidentiality.

Funding

Funding for this study was made possible by the generous support from the Centre for Development and Food Safety (SL) Limited, Board Council Chairperson. The funder had no role in the design, data collection, and analysis, decision to publish, or preparation of the manuscript.

Ethics Approval and Consent to Participate

Ethical clearance was obtained from the Sierra Leone Ethics and Scientific Review Committee at the Ministry of Health and Sanitation. The optional nature of the study (that participants could refuse to answer questions if they were uncomfortable, that from the study at any time in which case none of their data would be used) was explained verbally. All the respondents granted informed written consent to participate and all data was anonymized. Confidentiality was assured.

Authors' Contributions

HT designed and conducted the study. HT, AKK, KK, MM, KGK, BJ, KM and SNFN participated in the fieldwork and compiled the data. AKK analysed and interpreted the data. HT drafted and PJK, and MH reviewed and revised the manuscript. All authors have read and approved the final manuscript.

Conflicts of Interest

All the authors have confirmed that there is no competing interest.

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