

Position of street food vendors and food handling practices in Mbeya city Tanzania.

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Abstract

When it comes to positioned food vendors and vending sites, experiences showed that cities in many other settings around the world have similar situations and health risk consequences. This study aimed to investigate the current non-compliance features in food handling practices amongst the street food vendors in their natural setting and the environment they work in Tanzania. A cross-sectional study conducted in urban and peri-urban two wards each, of which 96 food vendors were studied from June to December 2014 in Mbeya City Tanzania. The questionnaires include direct and in-direct observation checklist used to identify the position of food vendors and multivariable logistic regression analysis with the support of 95% confidence interval interpreted the association features in practices. The vast majority of 72% of the food vendors in the study area only attended elementary, primary education. Most of the vendors, 94% observed sold vended food at temperatures of below 63°C (145°F); the prevailing condition may pose a risk pathogenic growth of foodborne diseases that is statistically significant at OR=14.4 (5.57-37.22) $p < 0.0001$.

Furthermore, only 3% of food vendors seen did wash hands between food handling and money handling after visiting the toilet. The existence of casual (53%) and non-casual labourers (27%) and others (20%) as un-intruders makes the situation adversely worse in the food industry. The non-compliance observed in food handling may lead to foodborne, preferably communicable and non-communicable diseases. The given situation at the ground triggered the need for prompt action focused on, and multiple interventions include training, regular and random food inspections, medical check-up, resources support from the local public authority, and international partners to raise the food handling compliance level.

Keywords: Foodborne illnesses, Food contamination, Food handling practices, Food safety, Food vendors, Food equipment, Ready-to-eat food, Food stall, Food tableware and five keys to safe food.

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Introduction

The context of street food vendors and ready-to-eat food is bringing mystification to many people and consumers. The food vendors exist in many backgrounds, and they make substantial supplements in food and requirements of city consumers at affordable prices across income groups [1]. They are valued for their incomparable food services of different flavoured taste and convenience as they usually packed in plastic materials; also vendors can stand to sell anywhere close to where people are [1,2]. In contrast to these, ready-to-eat food has poor nutritional quality [2]. The desire for quick incomes and preference for low-quality materials mean that often sold by vendors is absolute with a high content of trans-fatty-acids of sugar and sodium.

The consumption of unsafe ready-to-eat food that having harmful bacteria, viruses, parasites or chemical substances, may pose risk factors for food-related diseases spreading from diarrhoeal, cancers, cardiovascular diseases [3]. At the same time, high intake of sodium may lead to hypertension, so the street vended food may be considered as a risk factor for non-communicable diseases. The review of [2] found that eating of unhealthy food that have potentially holding a higher risk of

contamination by physical, chemical and biological contaminants have become a severe concern in positions of food safety [2]. Furthermore, routine data collection on street food consumption is essential to food-interrelated risk factors for non-communicable diseases, exclusively in backgrounds where street food is extensively operating.

In one extreme, the studies found that foodborne diseases are commonly affecting around one in 3 to one in 6 people every year; this resulted in a high burden of disease [1-3]. Moreover, the well-known gastrointestinal symptoms of foodborne illnesses vomiting and diarrhoeal were responsible for only about half the total health burden. Similarly but the less visible burden may come from severe but rare causes septicemia, paralysis, stillbirth, and meningitis. Street food convinces food security for low-income populations and livelihoods for a large segment of the people in many settings. Street food is usually prepared at home and consumed on the streets anytime without further preparation [4].

Vendors and hawkers sell these food items on the roads or other similar public places. While street-vended food valued for their unique flavours taste and their convenience, they are also important in contributing to the nutritional status of the

population. Even though the potential benefits have, some literature has sited that education, unemployment, and pre-cooking were among the key factors. The listed key factors reflected the status of street food vending business while the costumers based on their knowledge of food safety and other demographics characteristics [5]. Poor diet is one such risk factor to non-communicable diseases the consumption of high in saturated and trans-fatty-acids salt, and sugar [6].

In the instances of non-compliance, street food vendors have linked to foodborne illnesses that cause communicable and non-communicable diseases. Currently, there is a tremendous increase in non-communicable diseases such as cancers, including breast, prostate, diabetes type II, heart diseases that are significant health problems associated with street food. In this scenario, the most affected groups with non-communicable diseases are children, pregnant women, and the elderly. Also, people with compromised immunes of cancer, diabetes, and Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) are among the prone group. Furthermore, children of under-five years of age carry two-fifth of the foodborne diseases burden around the world [3].

The foodborne disease has health risks equal to malaria, HIV/AIDS, or tuberculosis, with the most of 98% of the burden falling on Low and Middle-Income Countries and children [7]. Within these backgrounds, the foodborne disease also impaired by the weight enforced on the understaffed and over-utilised healthcare system, which linked to reduced productivity. These are further compounded by emerging of new diseases such as aflatoxins control and antimicrobial resistance, which are ultimately introducing exclusive and complex human health into the food chain [6].

Also, the resistance of foodborne microorganisms in multi-drug made the food safety situation to be more prone in public health [3]. Foodborne preferably diarrhoeal diseases outbreaks are the farthest typical food in many parts of the world and some cases; they can cause deaths. The foodborne illnesses are either generated by the microbial or toxin from the microbes. The traditional processing methods used in the preparation, inappropriate holding temperature, and poor personal hygiene of food handlers are some of the leading causes of contamination of street foods [2]. These studies found that foodborne diseases were commonly affecting around one in three to one in six people a year) and resulted in a high burden of disease [1-3].

Additionally, gastrointestinal symptoms of foodborne diseases vomiting and diarrhoeal are responsible for half of the total health burden. Similarly, but less visible burden came from severe but rare effects such as septicemia, paralysis, stillbirth, and meningitis. A study conducted in Dhaka City Corporation on socioeconomic factors, including hygiene and sanitary practices of food vendors (14) the result revealed that 25% of food vendors were illiterate and cannot read or writes their names and has no formal education. As the food business requires low investment, most of the vendors (88%) found to own the business. Most of them are working for long hours (13-18) around-the-clock without lavatory facilities.

Micros study of different foods items, such as drinking water and hand swab samples showed that the prevalence of coliform bacteria, and pathogens [5]. Some studies indicate that food vendors may jeopardise with diseases than the services they proffer. In African regions, foodborne disease outbreaks that often attributed to poor personal hygiene of food vendors and food handling practices [1]. Demonstration on food hygiene practices and food safety measures among them required for proper planning and operation of targeted interventions [1]. Furthermore, some of the studies developed the checklist, which used to evaluate street vendor outlets and to pre-assess the hygiene conditions by those responsible for food handling. Furthermore, this can serve for self-assessment as an internal audit by the vendors themselves and be adopted as a consumer education tool, to promote self-awareness of among food vendors [4].

Studies from other settings come out with a checklist for the quick assessment of the compliance of a street food vendor, with European Union standards of hygiene. That can be used not only to pre-assess hygiene conditions by health inspectors but also to educate street food customers. The checklist extended to self-assessment by the owners of street food outlets and their workers as an internal audit tool [5]. In moreover, food safety and improvement of handling practices need to weigh out the issue of life earnings and safeguard of people's health. Thus, the sector requires effective integration at the national level in food safety, nutrition, fitness, economic development, agriculture, and diminishing of poverty [6].

The purpose of this study is to determine the extent of street food vendors performing food handling practices in regards to their position and associated risk factors in the environment they work. Also, the study aims to determine the level of food hygiene and safety measures among street food vendors in the food establishments of Mbeya City in the Mbeya region, Tanzania. In many readings, the argument on food vending and management of food vendors in settings engaging more on other competitive of financial and social service priorities those are recurrently taking much precedence and forgot about the frightening of public health risks [7].

Materials and Methods

It was a cross-sectional study conducted amongst the street food vendors of Mbeya City in Mbeya region, Tanzania. Purposive sampling stratified from the wards as from June to December 2014 collected a sample of 96 food vendors. The information was obtained from the questionnaire while some aspects of vendors required observation. An observational study was involved direct by looking availability of food thermometer for checking cooking food and holding temperature of cooked food.

In-direct observations of food handling practices during preparation checked thoroughly cooked food and ready-to-eat food serving by vendors while on duty. The street food vendors wearing Personal Protective Equipment, smoking, handling of food and receiving money without washing hands, tableware, spitting, displayed health certificates, presence of pests,

chewing gums, sneezing or coughing onto food in between were observed food storage temperature at serving time.

Data Analyses

The integrated approach of quantitative and qualitative was assumed to collect the records of which the approved questionnaire used to record the replies of participants. The study accompanied by observation checklist which was adopted to assess the food handling practices of participants, the hygienic status of the vending site and the food equipment they used. The data checked for its completeness; correctness, constancy, and they executed in a short period to Statistical Package Social Science (SPSS) version 20. The SPSS version 20 analysed the data through the application of Multivariable logistic regression analysis with the support of 95% confidence interval interpreted the association with food handling practices. The statistically significant differences were determined at $p < 0.05$.

Five keys to safe food, growing safe fruits and vegetables are reduction of foodborne illnesses

World Health Organisation (WHO) has adopted food safety from farm to table; make food safety as the theme for the year 2015. Subsequently, the WHO has developed five keys to safe food, videlicet (viz), keep clean; separate raw and cooked; cook thoroughly; keep food at safe temperatures, and use safe water and raw materials. These applied at home, hotels, markets, and other outlets [4-5]. The WHO's five keys to growing safe fruits and vegetables, viz, practice good personal hygiene, protect fields from animal faecal contamination, use treated faecal waste. It further evaluates and manages risks from irrigation water, keeps harvest and storage equipment for those who usually do not have access to food safety education [4]. These keys are manageable to combine and taught in many countries of the world; including Mbeya City Tanzania in promoting health [3]. As of July 2018, countries reported using five keys to safe food in Africa was 29 (54%) out of 54 states and about 29 (20%) out of 146 countries across the world practice the approaches. Tanzania, as many other countries have not yet started implementation as it needs for immediate action of 67 (70%) of the participants had formal primary education, 26 (27%), secondary education, only one (1%) had a university level of education and 2% hardly any formal school as observed in (Table 1).

Sex	Frequency	%
Female	73	76
Male	23	24
Total	96	100
OR=3.17 (1.85-5.41) $p < 0.0001$		
Education		
No School	2	2
Primary School	67	70

Secondary School	26	27
University	1	1
Total	96	100
P= P-value; $p < 0.0001$		

Table 1. Demographic profile of food handlers by sex, and education.

A vast majority had primary or secondary education. The difference between respondent with formal primary education and secondary and above secondary education were significant huge as data portrayed in Table 1; can be presumed that only 28% of the vendors in the study had a secondary level of education and above. Thus, only 28% might have not able to effect translation of the five keys to safe food into hygiene handling practices.

Personal hygiene cleanliness, including the use of Personal Protective Equipment, was observed in 48 (50%) out of 96 of all the vendors. Thirty-eight (41%) out of 96 of the street food vendors wore jewellery, chains, and watches during food preparation. Twelve (13%) out of 96 dealt with ready food were served and kept in hot pots with either lids or other kinds of cover (Table 2).

Characteristics	Frequency	Percentage
Hand wash	3	9
No hand wash	93	91
Total	96	100
OR=Odd Ratio; P=P-Value: OR=32.33 CI=9.91-105.43 $p < 0.0001$		
Defective, damaged, plastic containers, cracked, rusted, chipped and unsuitable utensils and crockeries and cutleries were discarded		
Yes	3	3
No	93	97
Total	96	100
OR=32.33 (9.91-105.43) $p < 0.0001$		
The presence of insects, pests and pet animals in the food vending areas?		
Yes	8	8
No	88	92
Total	96	100
OR=11.5 (5.30-214.93) $p < 0.0001$		
The temperature of food at service delivery		
<63°C (145 °F)	72	94
63°C-85°C (185°F)	5	6
Total	77	100
OR=14.4 (5.57-37.22) $p < 0.0001$		
smoking, spitting, chewing gums, eating and sneezing or coughing onto food		
Yes	4	13

No	26	87
Total	30	100
OR=6.69 (3.51-12.76) p<0.0001		
Frequency of inspections to street food vendors by Environmental Health Officers		
Once per week	68	71
Once per month	10	10
Not done	18	19
Total	96	100
p<0.0001		
Observed food served/stored frozen at (-18°C) or below		
Yes	1	20
No	5	80
Total	6	100
OR=8.64 CI=0.14-0.44 p<0.0001		

Table 2. Demographic characteristics of street food vendors.

Table 2 in comparisons, the eating and cooking utensils were kept in stored upside down as observed in respect of only 9% of the vending outlets seen adequately handled.

Only nine (3%) of 96 of street food vendors observed did wash hands between food handling and money handling and after toilet. This behaviour if not observed in food vending, is more likely to cause microbial contamination. Besides, the presence of pests and pet animals saw loitering around tables and cupboards by 8% of street food vending points. Tableware observed at 2% of the outlets full of food stacked on top of each other during food displays, storing and serving indicating poor food handling. Besides, including the food handling behaviours, others behaviours observed in Table 2 were smoking, spitting, chewing gums, eating and sneezing or coughing in the proximity of food were found in 13% of the vending sites.

In Table 2, 3% of all cutleries were defective, damaged, cracked, and rusted were only for discarding, while some containers were plastic made. These plastics are polycarbonate with recycle symbol 7, and symbol 3 polyvinyl chloride (PVC) and were not suitable for food vending (Table 3).

Characteristics	Frequency	Percentage
In employment	70	73
No employment	26	27
Total	96	100
OR 4.26 (2.41-7.55) p<0.0001		

Table 3. Street food industry employment contribution in the study area.

Table 3 demonstrated that street food vending business as a key economic resource for street food vendors as it employs people

with low capital investment, education and less professional training. In the study, food vendors business found contributed to a household earning well-being significantly at OR 4.26 (2.41-7.55) p<0.0001.

The scenario of temporary casual and non-casual labourers includes members of the family is unknown group complementing the street food vendors physical work which has a breakdown, as shown in (Figure 1).

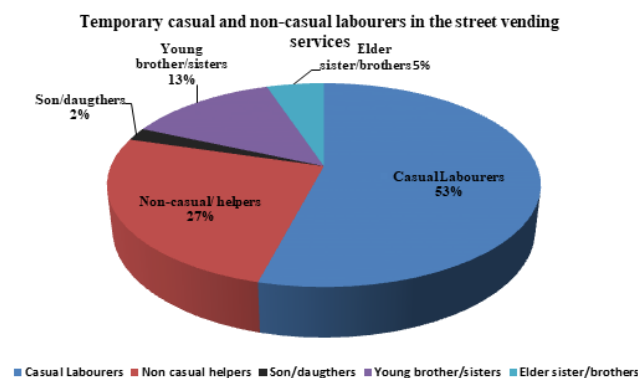


Figure 1. Temporary casual and non-casual/helpers in the street food vending.

Two under-five children observed in the study area while helping their parents. Hence, these, together with the non-casual helpers, represented 47%. Also, the presence of family members to the tune of 20% all added to the burden of health risks in food handling practices. Their existences in the study area were on temporarily base with unknown convention, and their existences were untraced.

The presence of helpers who provide services on an irregular basis in street food vending included members of the family standing at 73% and only two under-five years old children who were helping their parents. In contrast, the non-casual helpers make up 27%. Casual helpers in street food vending were used to purchase food from the market, fetching water, serving food, washing crockeries, cutleries, and all were without any food safety training.

Results and Discussion

Studies conducted in Nigeria and Kenya in 2009 showed that deprived infrastructure, general cleanliness of utensils, and self-esteem were some factors that influenced food-handling practices [4]. From this study, it suggested that street food vending business contributes significantly to family welfare as well as the national economy, including employment creation to the tune of 73% as established in the study area. Street vending provides for economic development as a first job career, which helps to relieve poverty in many settings [6]. The business is the primary source of income for the poor. If this enterprise not handled correctly, it may have awful health consequences. For instance, without proper guidance for food vendors, the business can result in foodborne disease outbreaks for the consumers [7].

Food hygiene handling practices studied in Johannesburg showed that the vendors were purchased fresh produce from 192 retailers. This fresh produce was daily prepared enough food for the day and gave away or took home the leftovers [2], found that taking leftovers home was prone to spreading microbial content with the possibility of infecting people in the home of food vendors. Various studies showed that low education level and practices health and sanitation have the potential to spread foodborne diseases [2]. The absence of necessary healthy facilities, inadequate structures of food services and the carelessness in safe food handling is the primary cause of foodborne disease outbreaks, especially in many food drinking stalls [4]. The extensive use of plastic materials containers may leak from containers and move and contact the food. [3,4].

Frequent serving hot food in plastic materials food may be unsafe and posture health risks. It would be more risks especially if the foodstuff with near to shelf life compared to those, which are, recently manufactured also temperature and time are equally to influence leaching into food [3,4]. Heating and washing polycarbonate a bottle can increase the amount of bisphenol A (BPA) that leaches out, especially when plastic containers washed for reuse. The adverse effects that may result from leaching include infertility, breast and prostate cancers, heart disease, obesity, early puberty, and other diseases [1].

In comparison with other study data, temperature and time influenced the migration of plasticisers into foodstuff. The plasticisers in plastic materials are among the chemicals known as endocrine disruptors [1-6]. These include diethylstilbestrol (DES), dioxin compounds, polychlorinated biphenyls (PCBs), dichloro-diphenyl-trichloroethane (DDT) and other pesticides. These substances in the environs are air, soil, water supply, food sources, personal care products, and manufactured products that may, in one way interfere with the normal function of your body endocrine system.

The governments have responsibilities to is informed public to avoid using the plastics materials that are without symbols codes or with code numbers 3 and 7 the labels numbers embedded in the triangle symbol at the bottom or other side of the container [6]. These materials that made of phthalate esters are common chemicals in plastic materials used in the package of ready-to-eat food, have been confirmed as endocrine disruptors. Its content near their expiration date is much higher than that of just manufactured packages [3]. There is every reason to avoid using whatever plastic materials despite their specifications while emphasising on more critical that is research.

In the study, only 6% of the food vendors vended food at a between 63°C-85°C (145°F-185°F) required temperature and only one food vendor had a food thermometer for critical testing temperatures of cooked food. The temperature of most food at service delivery outlets showed that 72 (94%) out of 77 of ready to eat food observed sold at temperatures of below 63°C (145°F) this is highly significant below acceptable at OR=14.4 (5.57-37.22) $p < 0.0001$. While the danger zone

temperature is between the 4°C and 60°C the acceptable temperature start from 63°C to 85°C (145°F-185°F) [4].

The food that consumed while cold should be refrigerated immediately after its preparation, while leftovers food should be frozen, preferably kept at -18°C or below [3]. Consuming food that is below the required temperature is very risky, as it can favour the growth of food microbial pathogens. Pre-cooking is one of the main factors causing foodborne diseases ranging from 40–60% of foodborne illnesses, which generated from private households [7]. Foodborne diseases caused by the consumption of undercooked meat as most consumers are lacking cooking equipment such as meat thermometer, which may determine appropriately, cooked chicken. The use of prevailing means of cutting the meat to check changes in colour and texture, or by other subjective techniques of which these may prove a failure in case of chicken breast fillet which frequently results in undercooked meat [2]. This finding was potentially significant to the health risk of microbial contamination.

Conclusion

The study revealed that the features of food vending business, including poor hygiene handling practices, of hand washing, food equipment, food storage knowledge, and environment of vending sites, these may need Local Authority Support. The data analysis proposes the provision of education, on job training, regular and random food inspections, medical check-up, support from local public authority and international partners to enable street food vendors to raise the food handling compliance level. The support includes safe water supply, and sanitation, suitable structures, food utensils, and others that make more readily available in all areas involved food vending.

The study showed that inadequate adhering with WHO five keys safe food might pose a high risk to foodborne, preferably diarrhoeal diseases outbreaks in Tanzania. The insanitary condition that linked to food hygiene handling practices, and observed casual employees and family members are handling food illegally in the study area were new things that substantial need for further studies. Promote the adoption of WHO five keys to safe food and growing safe fruits and vegetables by extending broadening the sphere of its application program to Mbeya City and other settings around the world.

Conflict of Interest

The author declares no potential conflicts of interest.

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