Knowledge, Attitude And Practice Of Street Food Vendors In Selected Schools Within Bo City Southern Sierra Leone

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Abstract: This paper attempts to investigate the lack of knowledge, attitude and practices of street food vendors in Bo the Southern Province of Sierra Leone. A cross – sectional study conducted among eighty-seven respondents vendors in forty-four in Bo City. Data was collected using a structured and semi – structured questionnaire. The collected data is analysed using a simple descriptive statistics with the help Excel Microsoft ware. A statistical significance was found in relation to knowledge. Attitude towards food safety was negative, self-reported practices by Street Food Vendor's were statistically significant with low hygiene standards, while predisposing factors showed relatively low personal hygiene, poor environmental sanitation and low food safety practice. The realize consequences are utmost health risks of consuming street foods as food contamination has caused food borne diseases and outbreaks. It is recommended that standard training be provided for these vendors by the Bo City Council in collaboration with Njala University. It is essential that poor people in a developing country such as Sierra Leone be allowed to earn their livelihood by means of an 'easy-to-enter' business such as street food vending when hygiene standards are sustained.

Index Terms: Five (5) Keys to Safer Foods: Essential food safety messages or principles linked to behaviours that, if adopted and practiced, will reduce the probability of food borne illness. Food Safety: The assurance that food will not cause harm to the consumer when it is eaten. Food Hygiene: All conditions and measures necessary to ensure that safety and suitability of food at all stages of the food chain. Street Foods: Ready-to-eat foods prepared and/or sold by vendors and hawkers in streets and other similar public places. Street Food Vendors: Entrepreneurs selling ready-to-eat foods and beverages.

1.1 BACKGROUND OF THE STUDY

Food is a silent vehicle for microbial, chemical and physical hazards. There is concern about transmission of multiple antimicrobial resistant bacteria via the food chain. Several devastating outbreaks of food borne diseases have been reported in the African Regions. In 1998, the Regional Office, in collaboration with partners, established the Integrated Disease Surveillance and Response (IDSR) in the African Region. Food poisoning, food borne diseases and food safety have been declared a major public health concern by international health agencies and street foods have in many studies been associated with microbiological contamination and low hygiene standards (WHO 2006).Street food vendors are of massive importance for public health since they alone have influence on the health of thousands of people every day. The International Health Regulations (IHR 2005) cover events of international importance involving contaminated food and outbreaks of food borne diseases. According to the Food and Agricultural Organization (FAO), street foods are "ready-to-eat foods and beverages prepared and or sold by vendors and hawkers especially in the street and other public places. However, Sharit K. Bhowmik (2005) defines a street vendor as a person who offers goods for sale to the public without having any permanent built-up structure from which to sell. These represent a significant part of urban food consumption for millions of low-and-middle-income consumers, in urban areas on a daily basis. Street foods may be the least expensive and most accessible means of obtaining a nutritionally balanced meal outside the home for many low income people, provided that the consumer is informed and able to choose the proper combination of foods. In developing countries, street food preparation and selling provides a regular source of income for millions of men and women with limited education or skills, especially because the activity requires low initial investment. The problems of food safety in the industrialized world differ considerably from those faced by developing countries. Whereas traditional methods are used for marketing fresh produce in the latter countries, food processing and packaging are the norms in industrialized countries. In developing countries, a large proportion of ready-to-eat food is sold on the streets. A study conducted by SHarit K. Browmik (2005) reported that most of the street foods vending activities are sparked by reasons such as unemployment and poverty in rural areas. Mostly, these street vendors move from rural to the urban areas in search for greater opportunities. Street food vending is a rapidly growing sector and a source of employment in most developing countries like Sierra Leone. Tinker I. (2003) attests to this statement by stating that the number of street food vendors and their customers has increased as economic crises have become more frequent in developing countries. Street food may be consumed where it is purchased or can be taken away and eaten elsewhere. The consumption of street food is common in many countries where unemployment is high, salaries are low, work opportunities and social programs are limited, and where urbanization is taking place. Street food vendors are often unlicensed, untrained in food hygiene and sanitation, and work under crude unsanitary conditions. They benefit from a positive cash flow, often evade taxation, and can determine their own working hours. In selling snacks, complete meals, and refreshments at relatively low prices, they provide an essential service to workers, shoppers, travelers, and people on low incomes. People who depend on such food are often more interested in its convenience than in questions of its safety, quality and hygiene. The hygiene aspects of vending operations are a major source of concern for food control officers. According to WHO (1989), food handling personnel play an important role in ensuring food safety throughout the chain of food production and storage. For example, Kiosks are often crude structures, and running water may not be readily available. Also, toilets and adequate washing facilities are rarely available. The washing of hands, utensils, and dishes is often done in buckets or bowls. Disinfection is not usually carried out, and insects and rodents may be attracted to sites where there is no organized sewage disposal. Finally, food is not adequately protected from flies and refrigeration is usually

unavailable. This study will concentrate on how safe are street foods in selected schools within Bo City, the second city in Sierra Leone, West Africa. Several studies from the Ghanaian capital Accra have already confirmed that the street food sector is facing serious challenges in maintaining hygiene and safety of foods (Mensah 1999). The Department of Health published statistics relating to food poisoning in 2006. The report looked at a number of reported food borne illnesses and fatalities between 2001 and 2005. The main aim of this research is to provide answers and possible solutions for safety food name are area. The choice of area was influenced by the fact that these areas have relatively lower income earners with street food vending being one major source of employment and are highly patronized sectors. This study therefore sought to evaluate the current food safety practices of the food vendors in selected name. Findings from this study will provide useful information for policy formulation and strategic interventions.

1.2 Geography and Administrative System of Bo

Bo where this research is conducted is the second largest city in Sierra Leone after the capital Freetown and the largest city in the Southern Province. The city serves as the capital and administrative centre of Bo District. It is a major urban centre, and lies approximately 155 miles south-east of Freetown. After Freetown, it is the leading financial, educational, transportation, commercial and urban centre of Sierra Leone. The city of Bo is one of Sierra Leone's six municipalities and is locally governed by a directly elected Bo City Council, headed by a mayor. The municipality of Bo had a population of 149,957 in the 2004 census and a current estimate of 250-266. Bo is one of the most ethnically diverse cities in Sierra Leone. The city is home to a large population of many Sierra Leone's ethnic groups, with no single ethnic group forming a majority of the city's population. The Krio language is by far the most widely spoken language in Bo and is used as the primary language of communication in the city. The city's population is religiously diverse among Muslims and Christians. Centrally located, Bo lies on the main rail line east and south of Freetown which was closed in 1974. From 1930 until independence 1961, it was the capital of the Protectorate of Sierra Leone. After Freetown, Bo began its modern development with the coming of the rail road in 1889 and became an educational center in 1906, when the Bo Government Secondary School was established. The inhabitants of Bo are known for their resolve, resistance and hospitality. The town was named after its generosity. An elephant was killed close to what is now known as Bo Parking Ground. People from the surrounding villages came to receive their share. Because the meat was so large, the hunter spent days distributing it and the words **"Bo-lor" (**which in Mende language means "this is yours," with reference to the meat) was said so much that the elders and visitors decided to name the place. **"Bo-lor"** in Mende also translates to "this is Bo." Like the rest of Sierra Leone, Bo has a tropical climate with a rainy season from May to October and a dry season from November to April. Average annual precipitation varies with up to 5,080 mm (20 inches) in the wettest parts. The prevailing winds are the SW Monsoon during the wet season and the north-eastern harmattan winds is a dust laden wind from the Sahara Desert during the dry season. Average temperature ranges in Bo are from 23 degrees Celsius (73 degrees Fahrenheit) to 31 degrees Celsius (88 degrees Fahrenheit) all year.

1.3 Statement of the Problem

The emergence of street food vendors has become very rampant, therefore there is an assumption that by their nature, street food contamination is inevitable, yet, millions of people depend on this source of nutrition. Education of food industry personnel in hygiene matters has been recommended as a means of improving food handling practices and thus the safety of food. There is, however, a lack of documentary evidence of improvements in food hygiene standards which can be directly related to education or training. It is thus imperative than an assessment be conducted to assess what information street food vendors have, in relation to food safety. Such an assessment has potential to identify areas that require strengthening or attention in the training programme with regard to ensuring the safety of street foods, especially for vulnerable groups like schools. Additionally, legislative changes that may be necessary in the light of such an assessment could be suggested. This study is therefore aimed at assessing the knowledge, attitudes and practices of street food vendors regarding food hygiene and safety and factors predisposing food contamination. As in many developing countries, a policy decision has to be taken by local authorities to allow people to earn their living from street food vending in areas under their jurisdiction. Street food vendors are ubiquitous and conspicuous presence in most cities and they sell a variety of wares ranging from snacks and drinks to full meals. Despite this, the attitude of many governments towards the street food trade has been indifference with little or no interest in the role that it may play in either the economy or the food supply of the city. The rise in consumption of street foods has been identified by some as deleterious trend (Gorpalan 1992), but this bias against street foods and also the street food trade is largely unfounded.

1.4 Significance of the Study

This study assesses the knowledge, attitudes and practices of street food vendors regarding food hygiene and safety and to investigate the microbial quality of foods sold in schools in Bo and factors predisposing to their contamination. Aside, the support that these interest parties can render to the vendors, policy makers and investors can identify this sector as a growing sector which will perform extremely well when given the necessary attention and tools. As previously stated that this sector employs majority number of people, it will be prudent that the study is conducted. Through this study, gaps in food safety and hygiene knowledge amongst street food vendors can be identified in order to underpin the development of more specifically targeted and effective training program for such groups. Consumer confidence and regulatory control in street food vending can thus be achieved and the detrimental effects of food poisoning incidents on the consumers as well as the city would be minimized. Furthermore, the study findings is also aimed at providing information for future investigations into this sector as well as proposing recommendations that will help reduce the challenges that the sector is faced.

1.5 Objectives of the Study

1.5.1 Broad Objective of the Study

The aim of this study is to assess the knowledge, attitudes and practices of street food vendors and factors predisposing to food contamination.

1.5.2 Specific Objective of the Study

- To determine the health risks associated with street food vending.
- To identify and illuminate the reasons that predisposes street food contamination.
- Furthermore, the research findings is also aimed at providing information for future investigations into this sector as well as proposing recommendations that will help reduce the challenges.
- To assess the knowledge, attitudes and practices of street food vendors relating to food hygiene and safety.

1.6. Research Questions

It is expected that by the end of this study the following suggested questions would have been answered:

- What are the sources and the predisposing factors to street food contamination?
- What are the microbial properties of street food?
- What type of training session is needed to help improve on the knowledge, attitude and practice of street food vendors regulating to food hygiene and safety?
- What are government involvements in the safety of food? That is, to measure the extent to which government supports the street food vendors?

CHAPTER TWO

1.0 LITERATURE REVIEW

2.1Definition of Concept

A review of the literature explores street food safety and hygiene training. The rationale to undertake a knowledge, attitudes and practices study is also briefly explored. Background literature was searched in relevant online databases, collections, forums and relevant libraries. There has been numerous studies in the street food sector, however, there is little or no research done on why microbial quality of foods sold in schools and factors predisposing to their contamination in Sierra Leone and Bo in particular. Much of the research conducted on street food vending concentrated on the unhygienic repercussions that street foods pose to the populace of a state; nutrition; affordability of food sold; and prevention of the spread of food borne diseases. Even though it was tough getting information that relates to the objective of my study, some articles provide basic concepts needed for the research.

2.2 Street Foods and Vendors

According to Irene Tinker 1987, street food is basically defined as “any minimally processed food sold on the street for immediate consumption”. Another definition proposed by the Food and Agriculture Association (FAO 1997), states that street foods are “ready-to-eat foods and beverages prepared and or sold by vendors and hawkers especially in the street and other public places”. According to the FAO Regional Workshop on Street Foods in Asia, held in Jogjakarta, Indonesia in 1986, street foods are described as “a while range of ready-to-eat foods and beverages sold and sometimes prepared in public places notably streets”. The central characteristic of street foods in this definition is their retinal location, namely, that they are sold on the street and it is this that categorizes them as part of the informal sector. According to the National Policy on Urban Street Vendors (2009), street vendors can be grouped into three main categories. They are stationary, peripatetic and mobile. The stationary vendors are those who carry out their activities on a regular basis at a specific location on the street. The peripatetic vendors on the other hand are those who carry out their vending on foot and sell their goods and services. In the situation of the Mobile vendors, they vend by moving their goods or services from one place to the other whether motorized or not. For the purpose of this study, the stationary category of street vending supports the type of street vendors under study. Therefore, peripatetic and Mobile vendors were excluded. It is also postulated that street-food vendors, owing to their lack of or no education as well as being poor, lack an appreciation for safe food handling. Consequently, this together with the surrounding that they are prepared and sold in, street food is perceived to be a major public health risk. (WHO 1996; Leus, Mpeli, Venter, Theron, 2006) The main health hazard associated with street foods is microbial contamination, although pesticide residues, transmission of parasites, the use of unpermitted chemical additives, environmental contamination and limited access to safe water have also been identified as possible hazards (Abdussalam & Kaferstein, 1993; Arambulo, Almeida, Cuellar & Belotto, 1994). The potential for the contamination of street foods with pathogenic micro-organisms has been well documented and several disease outbreaks have been traced to consumption of contaminated street foods (Abdussalam & Kaferstein, 1993). The risk of microbial contamination is dependent on the type of street food and how the is prepared. Food risk is influenced by food type, pH, and method of preparation, water availability, handling, exposure temperature, and holding time (Mathee et al, 1996). Foods that are cooked immediately prior to consumption are safer than those which have been cooked and stored at ambient temperature (WHO, 1984). Other factors implicated in causing microbial contamination include poor food preparation and handling practices, inadequate storage facilities, the personal hygiene of vendors, and a lack of adequate sanitation and refuse disposal facilities (Abdussalam & Kaferstein, 1993). In Ghana, in a study that investigated the microbial quality of street foods sold in Accra, *Shigella sonnei, enter aggregative Escherichia coli* and Salmonella arizonae were the pathogens isolated from some food samples (Mensah, Yeboah-Manu, Owusu-Darko & Ablordey, 2002). In Ethiopia, a similar study isolated Bacillus spp, staphylococci and mircococci as the dominant groups in some foods (Muleta & Ashenafi, 2001). Additionally, food was not kept overnight (a potential opportunity for contamination) due to the lack of refrigeration facilities (Martins, 2000). As pointed out in a Bulletin of the World Health Organization (2002), the patronage of street food is familiar in many countries where unemployment level is high, salaries are low, work opportunities and social programmes are limited, and where urbanization is taking place. It is further stated that the street food vendors benefit from a positive cash flow, often evade taxation, as well as determine their own working hours. “The Earth Report 2006” states that street food vendors can

be located around markets, schools, construction sites, beaches, lorry stations, commercial centres, offices, factories and basically along almost every major street. Kunateh's article illustrates that there has been numerous increases in the activities of street food vending in the cities of Accra, Kumasi, and Sekondi-Takoradi, Cape coast Tamale and other urban centres over the past decades. Due to the nature of work and student life of people living in the national and regional capitals, they are mostly compelled to patronize street foods which are implied to be more convenient and ready to eat. Also, he observed that 94% of the women vendors have little education and approximately 75% of street food vendors are not members of the Ghana Traditional Caterers Association, hence they hardly pay tax.

2.3 Food safety concerns in the African Region

While a number of related problems keep food borne disease at high levels within the African Region, the root cause is poverty, which disproportionately affects women and children. Poverty exacerbates food safety problems in many ways and contributes to: unsanitary conditions, lack of access to clean water, unhygienic transportation and storage of foods, low education levels among consumers and food-handlers, leading to reduced information on food safety, national governments lacking finance to do surveillance, monitoring and implement food safety regulations among others. Street food is frequently cooked well in advance of consumption and is subject to contamination from exposure to dust and flies. In addition, food preparers may be sick with tuberculosis, typhoid, and other illnesses that can contaminate food. Numerous programs have been developed by FAO and WHO to improve the quality and safety of street foods in African countries. For example, in South Africa, a project provides vendors and handlers with health education and training in acceptable food preparation and handling practices.

2.4 Food-borne Diseases

The burden of food born disease is not well defined globally, regionally or at country level (WHO Food Safety, undated). Estimates of the burden of food borne disease are complicated by the fact that very few illnesses can be definitively linked to food. Often these links are only made during outbreak situations (Flint, Van Duynhoven, Angulo, DeLong, Braun, Kirk, Scallan, Fitzgeral, Adak, Scokett, Ellis, Hall, Gargouri, Walker, Braam, 2005). The extent of the problem is however unknown as food borne diseases often go undetected or underreported. The current estimates of 1,8 million deaths, only represent the tip of the iceberg (WHO Food Safety undated). Although acute gastrointestinal diseases are not all food borne and food borne diseases do not always result in acute gastroenteritis, food does represent an important vehicle for pathogens causing acute gastroenteritis (Flint et al, 2005). The FAO estimates that as much as 70% of diarrhoeal diseases in developing countries are believed to be food borne origin (FAO, 1995). The World Health Organization (WHO) recognizes that food borne diseases include a wide spectrum of illnesses which are a growing public health problem worldwide and are a major contributor to illness, compromised nutritional status, less resistance to disease and loss of productivity (WHO Food Safety, undated). In light of the data gaps relating to the true burden of food borne diseases and its impact on development and trade, the WHO have embarked in 2010 on a Global Initiative to Estimate the Global Burden of Diseases in conjunction with multiple partners (WHO Food Safety, undated). Since most diarrhoeal illness resolve within 24 to 48 hours without any medical attention, many food-related illnesses are not diagnosed and associated food borne disease outbreaks are often not recognized (Department of Health, 2009).

2.5 Challenges faced by street food vendor

Tinker I. (2003) a challenges faced by street food vendors is government policies. Governments require licenses for the occupied space; vendors must also pass food safety inspections. The inconsistent implementation of these laws leads not only to bribery and demands for protection, but also to frequent government campaigns to destroy carts and stalls to "clean" the streets. Government harassment is by far the most serious problem facing street food vendors. According to a report from FAO the following are the categorized obstacles faced by the small scale business:

Internal obstacles: inadequate basic food hygiene, lack of expertise and information, human resources constraints, inadequate infrastructure and facilities; and perceived and real financial constraints. External obstacles: insufficient government infrastructure and commitment absence of legal requirement, lack of business awareness and positive attitude of industry and trade associations, lack of effective education and training program, no expertise, information and technical support made available, and inadequate communications.

2.6 knowledge, attitude and practices (KAP) on food safety

A study to assess knowledge, attitudes, and behavior concerning food borne diseases and food safety issue amongst formal food handlers conducted in Italy found that the majority of food handlers who had attended a training course had knowledge and a positive attitude toward food diseases control and preventive measures (Angelillo, Viggiani, Rizzo & Bianco, 2000). The positive attitude was not supported when asked about self-reported behaviors and when observed during food preparation for practices of hygienic principles. This was on the basis that only 21% used gloves when touching raw, unwrapped food. Predictors of the use of gloves were educational level and attending training course. The authors suggested that emphasis should continue on improving knowledge and control of food borne diseases amongst food handlers (Angelillo, et al.2000). In Malawi, a study on the KAP on food hygiene of caregivers also showed a poor relation between knowledge, behavioral and sanitary practices, as swabs from caregivers' hands and food tested positive for coliforms and *E Coli,* (Kalua 2002). Based on several literature reviews, many of the studies have been conducted on the formal sector; there is limited information on the effectiveness of training conducted on street food vendors. It is therefore very important to explore the KAP of street food vendor in order to allow for a better understanding of these variables in street food vendors in relation to Food Safety. The relationship between knowledge, attitudes and behavior is often explained through the KAP model (Simelane, 2005). Knowledge accumulates through learning process and these may be formal or informal instruction. Personal experience and experiential sharing, (Glanz & Lewis, 2002) It has been traditionally assumed that knowledge is automatically

translated into behavior (Glanz & Lewis, 2002) Attitude involves evaluative concepts associated with the way people think, feel and behave (Keller, 1998) it comprises a cognitive, emotional and a behavioral component implying what you know, how you feel and what you do (Keller, 1998). It has also been postulated that attitude may influence one's intention to perform a given behavior or practice (Rutter & Quine, 2003). They are thus correlated with behavior, for instance if a person has a positive attitude toward appropriate hand washing, they are more likely to wash their hands (Simelane, 2005). In health related studies, however, it has been found that knowledge is not the only factor that influences treatment seeking practice and in order to change behavior, health programmes need to address a number of issues including socio-cultural, environmental, economic and structural factors (Launiala, 2009). Behaviorists further add that a number of factors can influence one or more of the KAP variables such as self-esteem, self-efficacy and misconception (Ajzen, 2002, Keller, 1998, Glanz & Lewis, 2002). A few studies have looked at this aspect of behaviors change, including behavioral models in food handler training.

2.7 Education and street food safety

Education of food industry personnel in hygiene matters has been recommended as a means of improving food handling practices, and thus, the safety of food (WHO, 1996; FAO 1997). This is attributed to the fact that human handling errors have been responsible for most outbreaks of food poisoning in developing and developed countries (Clayton, Griffith, Peters & Prince, 2002; Ehriri & Morris, 1996; Todd Greig, Bartleson, & Michaels, 2007; Howes, McEwen, Griffith, & Harris, 1996) The Centers for Disease Control (CDC) has indentified five risk factors related to the human factor and preparation methods that contribute to the high prevalence of food borne illness. These are improper handling, temperatures, inadequate cooking, contaminated equipment, food from a unsafe source and poor personal hygiene (Incidence of food borne illness, 2010). This WHO has developed the five keys to safer foods, a tool to enhance food safety behaviors that if followed or adopted can reduce food borne illness occurrence, The five keys are specific behaviors each linked to five risk factors that will likely reduce food borne illness. The 5 keys to Safer Foods are: keep clean, separate raw and cooked, cook thoroughly, and keep food at safe temperature, use safe water and raw materials (WHO, 2007) there is, however, lack of documented evidence of improvements in food hygiene standards which can be directly related to education or training (Rennie, 1994). Furthermore, there is very limited information or studies conducted to assess the impact of education in the informal sector. A systematic review to investigate the effectiveness of food safety training as an intervention was conducted by Campbell and colleagues in Canada (Campbell, Gardener, Dwyer, Isaacs, Kruger & Ying Jy, 1998). Finding from the systematic review suggest that these multiple public health intervention are effective in assuring food safety, since routine inspection of food service premises (at least one inspection per annum) was effective in reducing the risk of food –borne illness as determined through improved inspection scores; food handler training can improve the knowledge and practices of food handlers, particularly if combined with certification; and selected community based education programs can increase public knowledge of food safety (Campbell *et al,* 1998). The Health Action Model (HAM) takes into account the social and environmental factors around the worker that impact on adoption of behaviors (Tones *et al*. 1990; Nieto- Montenegro *et al*, 2006). Seaman and Eves indicate that the Health Action Model gives the most through description of factors that may influence behaviors change following hygiene training (Seaman and Eves, 2006). The study conducted by Nirto – Montenegro *at al* in 2008 using the HAM, found that the educational lessons alone produced a significant increase in knowledge and hand washing after using the restroom. With supervisor re-enforcement after training, hand washing before work and after breaks also increased significantly although there was no effect with the monetary incentive (Nieto - Montenegro *et al,* 2008). Nieto – Montenegro at al show that elements of knowledge and motivational systems are important and that training is enhanced by supervisory reinforcement of the behavioral rules with the personnel. Its premises are similar to the type of study needed to assess the effectiveness of training of street food vendor training.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Description of study area

The research to assess the knowledge, attitudes and practices of street food vendors as well as those factors predisposing street food contamination in selected schools within Bo City was conducted in Bo, solution Sierra Leone. Twenty – Nine Primary and Fifteen Secondary Schools were selected for this study. Bo is the second largest city of Sierra Leone and has a population of 250,266 inhabitants.

3.2 Description of Study Design

This is a descriptive study that involves both quantitative and quantitative research methodologies to collect data from the sampled schools. In the field survey, pre tested semi – structured questionnaires and observational checklist were administered; recruiting inclusion and exclusion criteria to interview food vendors in the sampled food stalls. Vendors selling cooked foods in the targeted schools who were enrolled in the institution within the last six months of commencement of the studies were the target population.

3.3 Description of Target Population

Street food vendors selected for this study sells street food in Primary and Secondary Schools, of the entire enrolled schools – list from the last survey conduct in 2013 by the education office; ministry of Education, science and technology for schools located in Bo City, in the southern provinces of Sierra Leone. This study population consisted of 87 street food vendors selling cooked foods in the selected schools. Inclusion criteria: street food vendors who sell cooked food in the selected schools in the last six months of commencement of the studies. Exclusion criteria: street food vendors not registered to sell in the school and those who sell other foods other than cooked foods. Vendors who sell foods less than six months of commencement of the studies were not interviewed.

3. 4 Sample selected and sampling method

Study subjects for this research were all street food vendors resident in Bo city southern Sierra Leone who has been engaged in the street food trading business within the last six

months of the commencement of the studies comprised the sample frame for this study. The sampling technique used in the research was a purposive sampling method. Stratified random sampling was used in the schools were grouped into stratums of primary and secondary schools. The method used in this particular data collection was solely primary data which took the form of a face to face interview through the use of structured questionnaires. A total of 44 schools were selected for the studies. Out of the 44 schools, 29 schools represent Primary Schools and 15 Schools represented Secondary Schools. A stratified systematic random sampling was done. The schools where stratified into primary and secondary; then they were arranged in an alphabetical order, after which, every forth school was selected from the list in a systematic order. For the vendors, tow vendors were randomly selected from each stratum, i.e. tow vendors from each school. In order to randomly obtain the two vendors from each stratum of the proportion of street food vendors, the names of the vendors were written on individual pieces of paper. The papers were folded and shaken in a container therefore, a paper was withdrawn. The container was re-shaken and a further paper withdraws. Within each of these schools two foods vendors were to be randomly selected to be interviewed.

3.5 Sample size determination

The sample size for this study was determined using the Fisher' statistical formula (Fisher, et al) $\{N_= \{Z^2Pq\} - d^2\}$ for estimating population sizes in surveys.

Where:

N= required minimum sample size
Z= Standard normal deviation (1.96) at 95% CI
P= the proportion of the target population estimated to have a particular characteristics (75/100).
Q= 1.0-p= (1.0-75/100) = 0.25
D= the degree of accuracy desired set at 9% = 0.09.
$N= (1.96)^2 x (0.75) x 0.25 – (0.09)^2$
N= 3.8416 x 0.75 x 0.25 – 0.0081
N= 0.7203 – 0.0081 = 88.925
N= 89

Thus a sample size of 89 respondents was selected for this study

3.6 Description of data collection and presentation

Self-administered questionnaires were used to collect data for this study. Respondents' responses were coded and later presented using tables, figures and percentages. Data collected for this study were also presented diagrammatically. The study also used statistical methods like average mean, median to analyze the collected data. Data were also presented in tabular form to facilitate easy analysis and computation. Prior to data collection a written letter of consent was administered to the potential respondents/study subjects for their approval to be recruited for the study. Three methods of data collection were used:

a) Interviews with street food vendors were conducted in local dialects such as Krio and Mende where appropriate to collect data on knowledge, attitudes and practices on face to face interviews utilizing standardized structured questionnaires. The questionnaire was divided into five sections and comprised 62 questions. Data collected included; general information: such as products sold and demographic information, training and related information: knowledge attitude and practices, to regulatory measures: knowledge, attitude and practice to the tenants of food safety (clean, temperature control, cross contamination, safe ingredients) and factors predisposing to contamination. People, answers were listed, e.g. Yes, No: True, False; Agree, disagree etc. and the correct response were ticked.
b) Observations to collect data on practices related to food hygiene and safety. Data on availability of equipment for hygienic practice was collected from all sampled street vendors using an observation checklist. The equipment was assess if they were available, e.g. a bowl or bucket for washing hands, soap, clean drying cloths etc. if these were available the answer, "Yes" was circled and if not available, "No" was circled.
c) Focus group discussions were conducted in English for pupils and teaching staff (customers) and the local dialects such as Krio and Mende where appropriate for other customers. The focus group discussion was divided into the same five sections as the questionnaires and comprised of probe questions.
d) Ethical consideration: Prior to the commencement of this investigation, a research protocol was designed and presented to the research supervisor who is attached to the Department of Environmental Health Sciences for approval. Questionnaires for this study were pretested before used. Study subjects were requested to fill an informed consent (Annex 2) form before their recruitment into the study. Study subjects were given the options to withdraw from the study at any time if they so desire and that they were not being coerced for taking part in the study.

3.8 Limitations

The study attempts to describe the knowledge, attitudes and practices of street food vendors utilizing a quantitative approach. Such studies have their limitations as discussed in the literature review. A number of issues especially attitudes and practices could perhaps be better described and explored utilizing exploratory qualitative techniques, observation of food preparation as well as microbiological testing of food samples. Certainly the exploratory research regarding key behaviors of temperature control and prevention of cross contamination need to be further explored. A major limitation was the inability to achieve the sample size. Due to operational reasons the sample was reduced from the planned to 89. However, the two vendors were not chosen at random, as it was purposed, because two schools have only one vendor selling cooked food, others have the exactly two or have more than two but with less number of those who sell cooked food as the inclusion criteria stated. Another limitation is self-reported behavior which should be considered in future studies. Additionally, the positive practices could have been substantiated by microbial investigations by microbial sampling and analysis of food samples for pathogenic contamination and preparation surfaces for process hygiene. Findings from this study are restricted to generalization because of the following:

a) Period of the study was too short hence the investigation could not recruit every study subject within the target area or population.

b) Insufficient funds make it very difficult for the researcher to be able to access all the necessary subjects and data necessary for this study.

CHAPTER FOUR

4.0 RESULTS & DATA ANALYSIS

4.1Result

The research findings showed interesting and worrying situations that requires immediate attention by vendors, investors, policy makers and government. Therefore, the findings have been divided into subsections which will be thoroughly discussed. The themes were chosen because it sought to address some of the issues pertaining to the objective of the study.

4.2 Figure 1: *Gender distribution of Respondents*

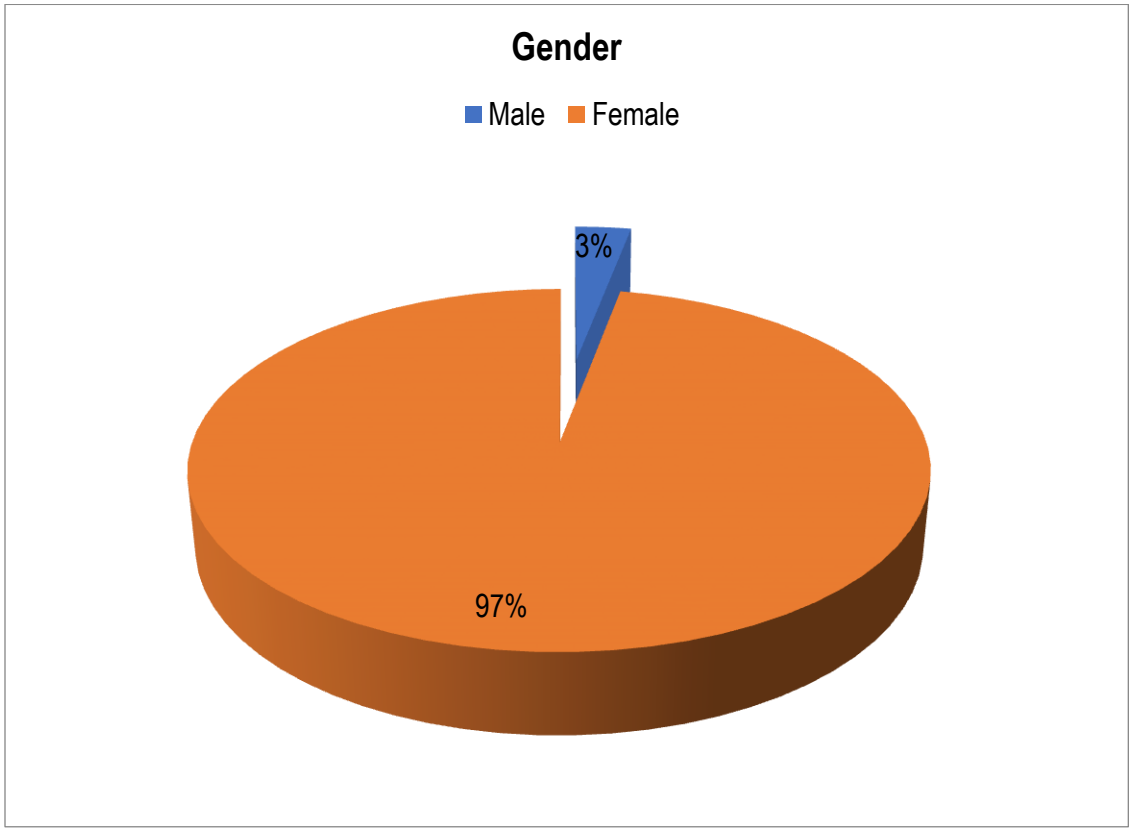

Figure 1 indicates that the majority 84 (96.5%) of the street food vendors were females; male respondents were in minority 3 (3.4%).

4.3 Table 1: *Type of food sold compared with daily income of respondents*

(N=87)

	Food Type							
Daily Income (Le) x1000	Bread	Cake	Cassava	Fofo	Maize	Others	Rice	Grand Total
Above 50	14	1	8	3	2		10	38
Below 10				2				2
Between 10&50	7	2	8	11	6	4	9	47
Grand Total	21	3	16	16	8	4	19	87

The questionnaires helped to bring out the type of food sold by these street food vendors. The types of foods were grouped under the various headings which are indicated below with the aid of a bar chart. Table '1' shows that 3 (3.4%) vendors sold cake. On the contrary, bread based foods showed a high percentage: 21 (24.1%) vendors.

4.3.1 Figure 2: *Type of food sold compared with daily income of vendors*

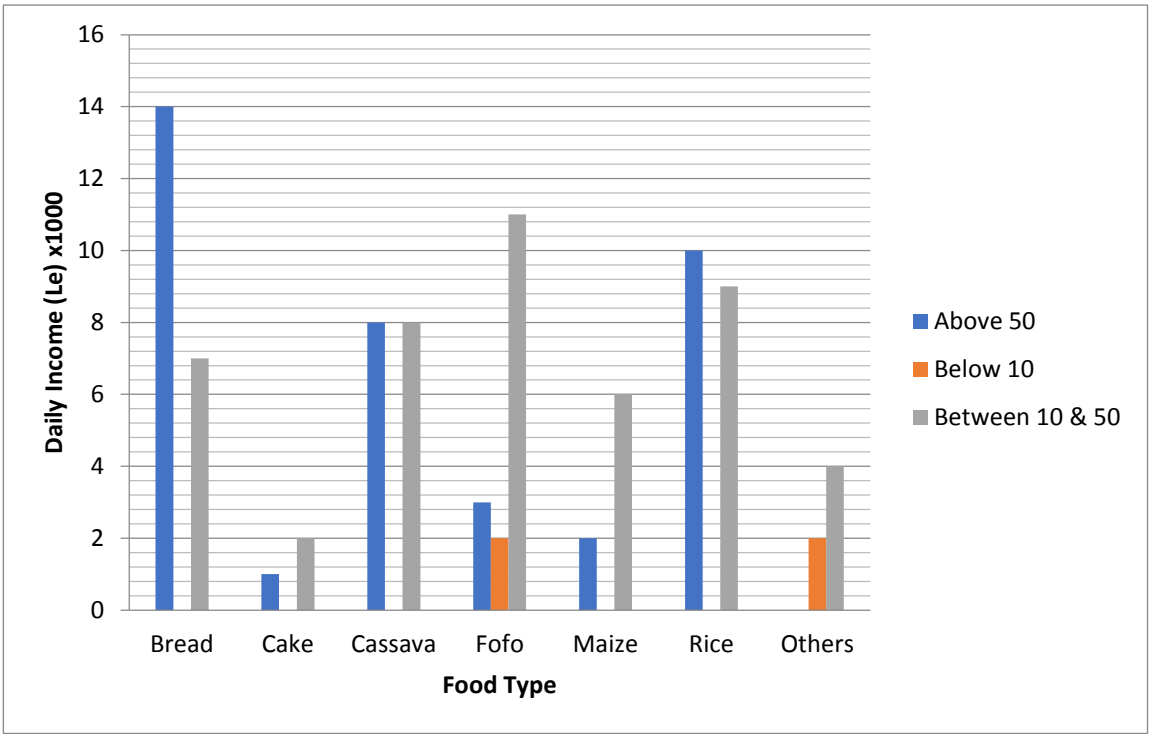

Figure 2 indicates that the majority 47 (54.0%) of the street food vendors earn between Le 10,000 and Le 50,000, trade in all the foods and those who earn below Le 10,000 were the respondents in minority 2 (2.3%) and trade in Fofo, whiles those who earn above Le 50,000 trade in all the listed food except other foods and represent 38 (43.7%).

4.4 Table 2: *Age compared with marital status of respondents*

(N=87)

	Age in years				
Marital status	Below 18	18-25	25-45	Above 45	Grand Total
Divorced		2		1	3
Married	1	8	45	2	56
Single	2	8	6		16
Window		1	5	6	12
Grand Total	3	19	56	9	87

Table 2 above show that the age group 25-45 years has the highest 56 (64.4%) number of SFVs for this study; the range of below 18 years has the lowest 3 (3.4%). This outcome may be; 18 years vendors are mortified to vend in schools since their age mates are in enormous.

4.4.1 Figure 3: *Age compared with marital status of respondents*

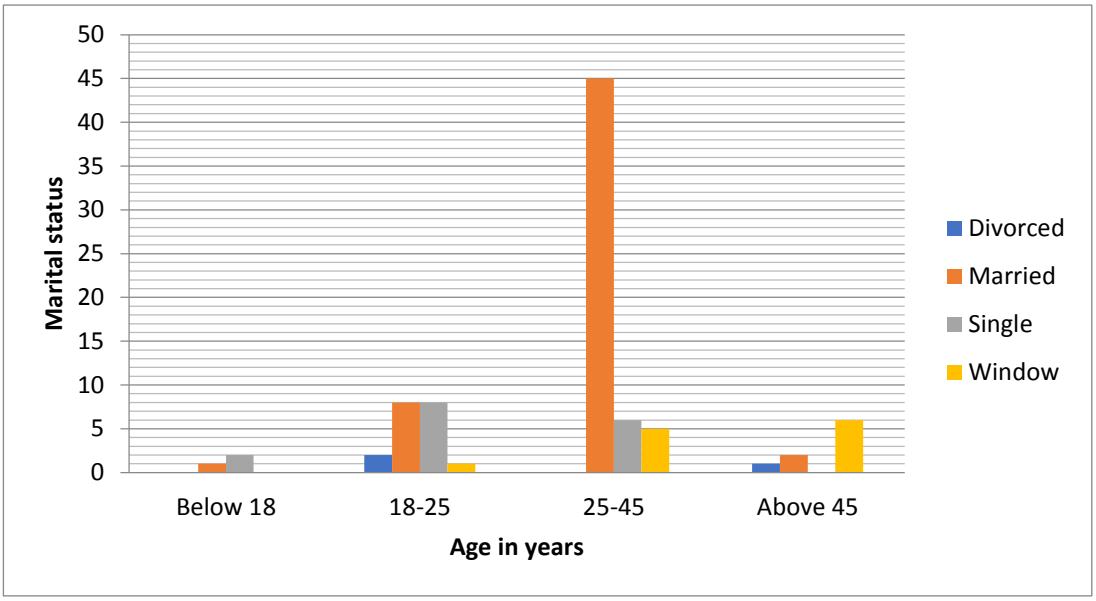

Figure 3 indicates that the majority 56 (64.4%) of the street food vendors are married and minority 3 (3.4%) are divorced. No single was found above 45 years and between 25 and 45 years have more married vendors.

4.5 Table 3: *Educational level compared with income of respondents*

(N=87)

Educational Level						
Daily income	Non Formal	Primary	Secondary	College	Tech Voc	Grand Total
Above 50	14	12	8		4	38
Below 10	2					2
Bet 10&50	23	10	12	1	1	47
Grand Total	32	22	20	1	5	87

Table 3 above show that the non-formal education has the highest 32 (36.8%) number of street food vendor for this study; those who went to college has the lowest 1 (1.2%).

4.5.1 Figure 4: *Educational level compared with income of respondents*

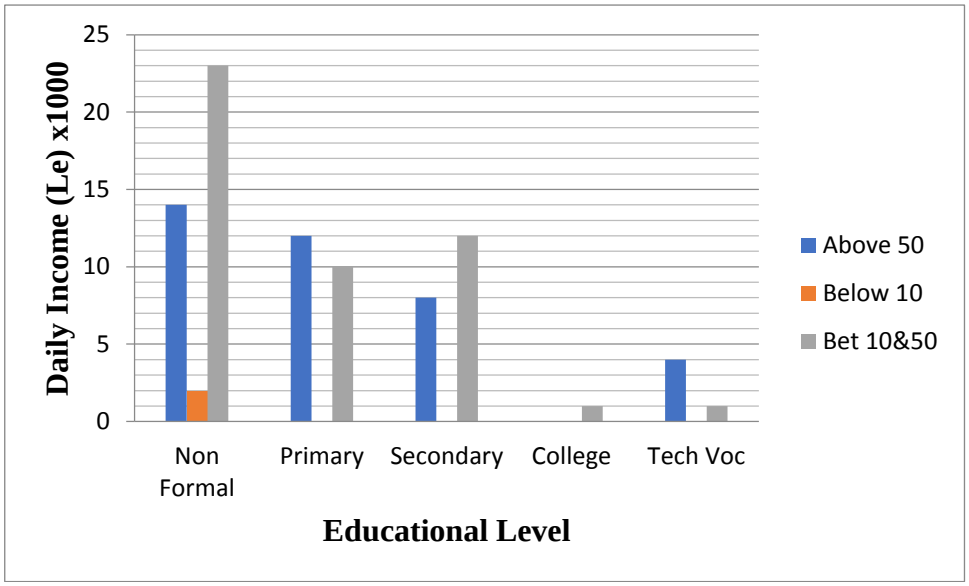

Figure 4 indicates that the bulk 47 (54.0%) of the street food vendors are earned between Le 10,000 and Le 50,000 an alternative to 2 (2.3%) who earn below Le 10,000 and are those who had non-formal education. That stands to reason that, education in food vending is essential.

4.6 Table 4: *Duration of vending likened to help needed by vendors*

(N=87)

Duration of Vending					
Help required	1 to 2 years	2 to 3 years	Above 3	Below 1	Grand Total
Cap. Train	2				2
Capital	13	5	16	9	43
Loan	7	2	12	1	22
Others		1			1
Train. Loan				2	2
Training	2	5	2	8	17
Grand Total	24	13	30	20	87

Table 4 above show that those who have vend above 3 years 30 (34.5%) were the highest and those who have vend for 2 to 3 years had the least 13 (14.9%).

4.6.1 Figure 5: *Duration related with help needed by respondents*

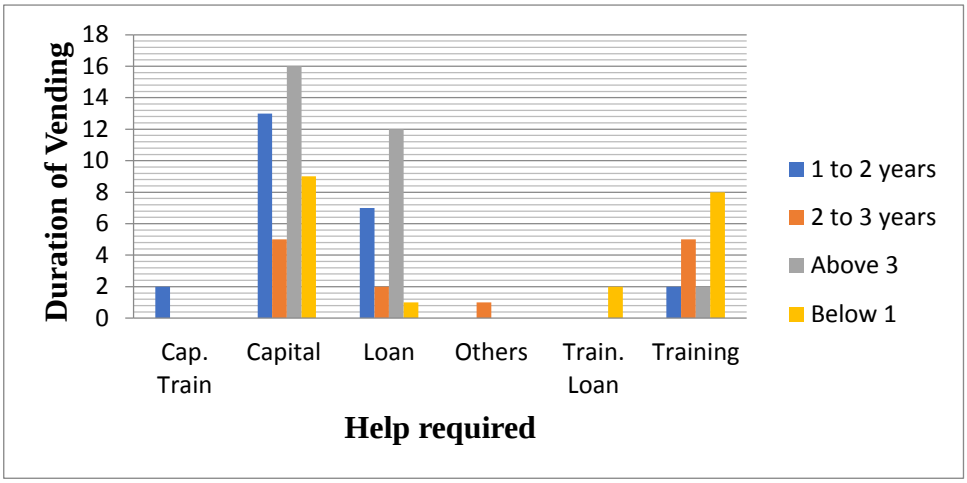

Figure 5 point to capital needs for all the years of vending by 43 (49.4%), whiles below 1 year and 1 to 2 years appeared only once for others 2 (2.3%) and loan with capital 1 (1.1%). It is also observed that every category of years of vending requires training, capital or loan.

4.7 Table 5: *Training received, duration and it importance to respondents*

{N=87}

Importance of Training			
Training Received	**No**	**Yes**	**Grand Total**
No	**78**	**3**	**81**
Yes	**0**	**6**	**6**
Grand Total	**78**	**9**	**87**

Table 6 above show that 81 (93.1%) do not have any knowledge and training, while only 6 (6.9%) do. Those who do not received training and don't know the importance on food safety has the highest 78 (89.7%) number of street food vendor for this study; those who received training and know the importance and food safety has the lowest 6 (6.9%). 3 (3.4%) did not received training but know the importance of training.

4.8 Table 6: *Health problems correlated with hand washing of vendors*

{N=87}

Health Problems			
Hand washing	**No**	**Yes**	**Grand Total**
Always	25	25	50
Once		1	1
Seldom	14	22	36
Grand Total	**39**	**48**	**87**

Table 6 above show the highest number 48 (55.1%) of street food vendors that has health problem for this study; those without health problem has the lowest 39 (44.8%).

4.8 Figure 6: *Health problems correlated with hand washing of vendors*

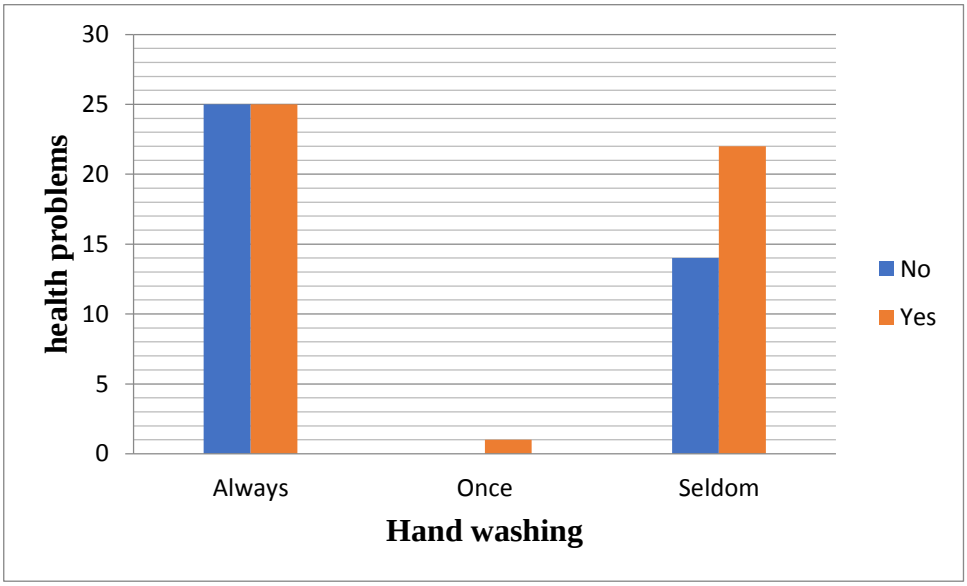

Figure 6 above show the highest number 50 (57.4%) of street food vendors that always wash their hands with equal responses of those with and without health problems in this study; only 1 (1.1%) vendors wash hands once and 36 (41.4%) occasionally wash hands.

4.9 Table 7: *Leftover foods, safe and unsafe foods of respondents*

{N=87}

What vendors do with leftover foods										
Eat at Home				Disposed			Reheat			
Food safety knowledge	No	Yes	Total	No	Yes	Total	No	Yes	Total	Grand Total
By looks	6	9	15	-	-	-	-	-		15
Can't tell	2	10	12	-	-	-	-	-		12
Environment	3	9	12	-	-	-	-	-		12
When eat	7	35	42	-	3	3		3	3	48
Grand Total	18	63	81	-	3	3		3	3	87

Table 7 above show that 48 (55.2%) of food vendors can identify if food safe by eating and the lowest occurring for those who can't tell if food is safe and those who know if food safe by the environment are 12 (13.8%) for each sort. Those who tell food safety by the look are 6 (6.8%) and the two later ones don't dispose or reheat leftover foods.

4.9.1 Figure 7: *Leftover food, safe and unsafe foods of respondents*

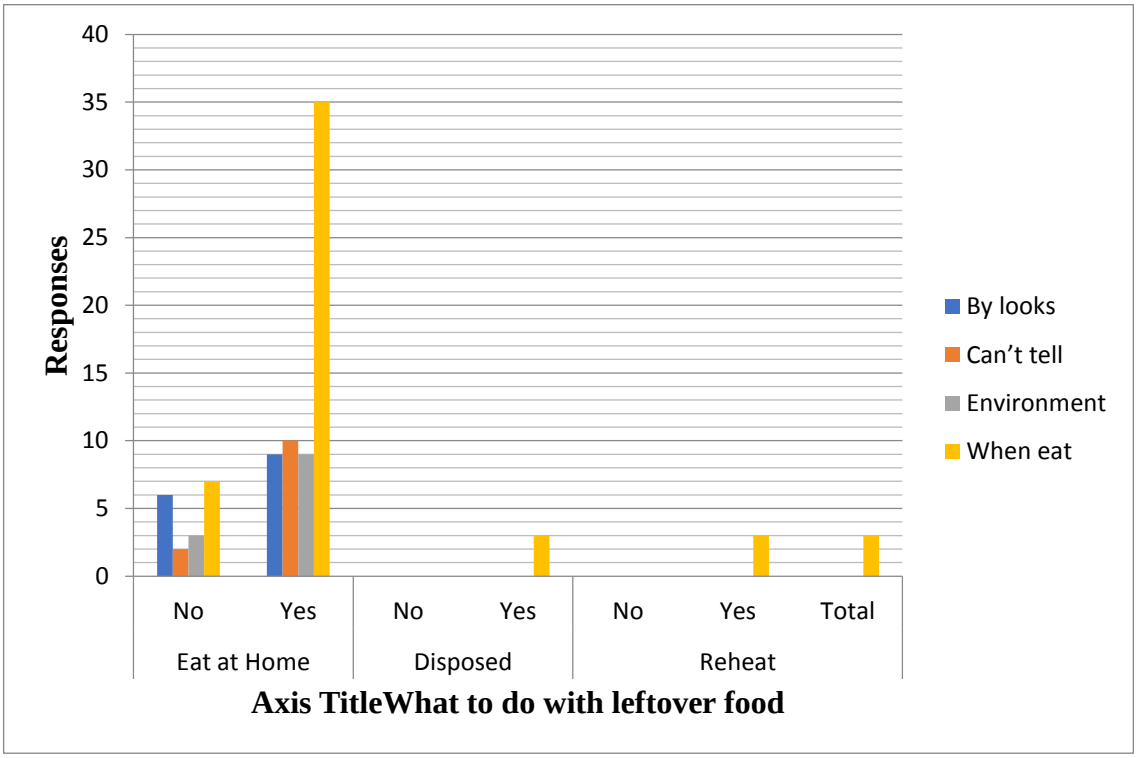

Figure 7 above show the highest number 81 (93.1%) of street food vendors that eat the leftover at home, only 3 (3.4%) vendors reheat and dispose leftover food for each group and represent those who tell how safe a food is by eating.

4.10 table 8: *Certificate of fitness and it importance to vendors*

{N=87}

Importance of Certificate			
Certificate of fitness	No	Yes	Grand Total
No	74	-	74
Yes	12	1	13
Grand Total	86	1	87

Table 8 above shows that those without fitness certificate has the highest 74 (85.1%) number of street food vendor for this study; the ones with fitness certificate have the lowest 12 (13.8%). Shows 1 (1.1%) attach importance to certificate of

fitness while more 86 (98.9%) do not have any value for fitness certificate. These indicate that most vendors do not have any importance for fitness certificate because the legislations are flexible.

4.11 Table 9: *Vendors' knowledge about EHPs, their usefulness and inspections they do* **{N=87}**

	Usefulness of EHPs			Inspection by EHPs			
Knowledge about EHPs	No	Yes	Total	No	Yes	Total	Grand Total
No	57	3	60	1	4	5	65
Yes	15	1	16	6		10	22
Grand Total	72	4	76	7	4	11	87

Table 9 above show that more 65 (74.7%) vendors have no idea about Environmental Health Personnel (EHPs) or health inspectors and less 22 (25.3%) have ideas about them. Because they have limited idea about EHPs; 72 (82.7%) think they are not usefulness and only 4 (4.6%) think EHPs are useful. Also, it is notice from this study that less inspection is done 4 (4.6%) so vendors' knowledge about EHPs and their usefulness is neglected.

4.11.1 Figure 8: *vendors' knowledge about EHPs, their usefulness and inspections they do*

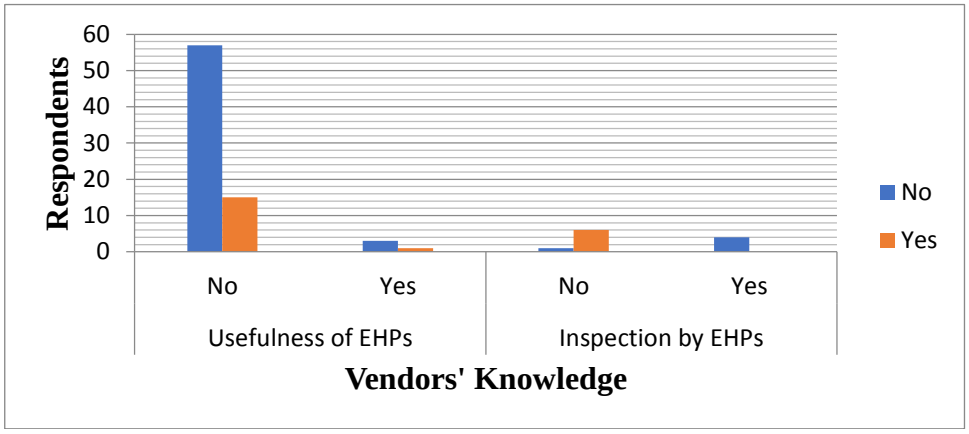

Figure 8 above show high number of vendor' with no-no' response in inspection and low 'no –no' response in their usefulness; all responses where noted for usefulness and 'yes – yes' responses did not show up for inspection.

4.12 Figure 9: *Training received correlated with the 5 keys to food safety*

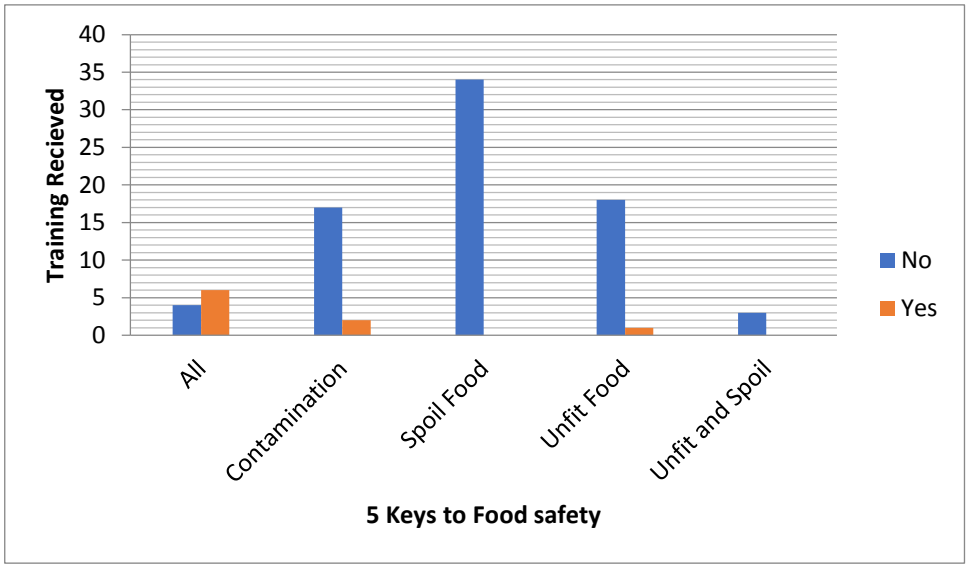

Figure 9 above help to analyses the second objective of this study and show that more 76 (87.4%) of those without training responded that a poisoned food is not spoiled, contaminated or unfit; and 9 (10.3%) said yes to it.

4.13 Table 10: *Storage and separation of raw materials*

{N=87}

Separation of raw cooked foods					
Storage	Always	Most time	Not often	Sometimes	Grand total
Bowl	1	4	1	-	6
Box	-	-	1	-	1
Cooler	13	5	3	7	28
Cupboard	1	-	-	-	1
Fridge	-	1	-	1	2
Others	3	-	-	--	3
Pan	7	2	2	-	11
Pot	3	1	-	3	7
Rubber	5	8	-	13	26
Table	-	-	2	-	2
Grand Total	28	18	6	22	87

Table 10 above show that more store their foods in cooler 28 (32.2%) And rubbers 26 (29.9%); cupboard and box has the lowest (1.2%).

4.13.1 Figure 10: *Storage and separation raw materials*

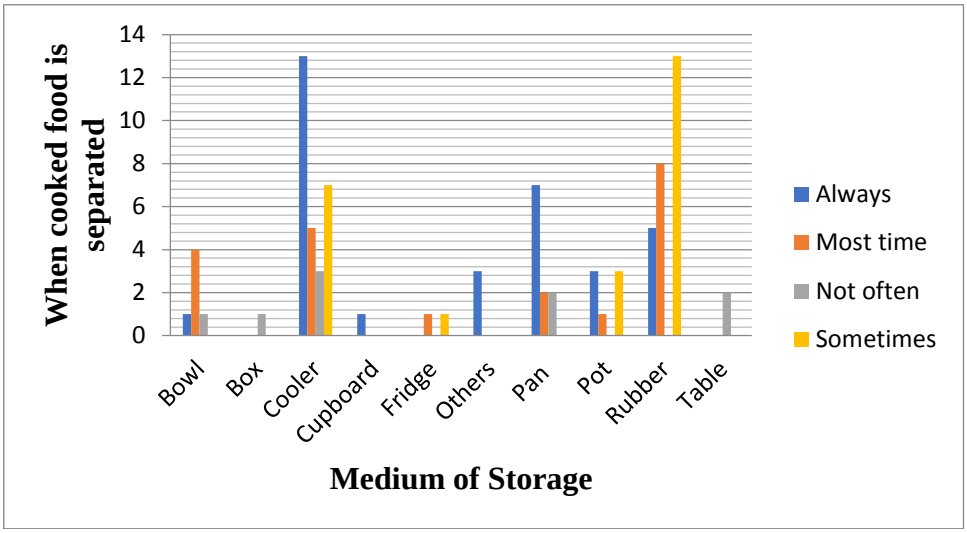

Figure 10 above show that more store their foods in callers 28 (32.2%) and rubber 26 (29.9%); cupboard and box has lowest 1 (1.2%). Many vendors sometime separate their raw material they buy form retailers

4.14 Table 11: *Preparation of foods and the means of transportation*

{N=87}

Prepare food at home			
Means of transportation	No	Yes	Grand Total
No mean	1		1
Children		6	6
Okada.		9	9
Walk		63	63
Walk &Child		7	7
Walk & hire people		1	1
Grand total	1	86	87

Table 11 above show that 86 (98.9%) of vendors in this study prepare their food at home and 1 (1.2%) prepare food at the site of vendors

4.14.1 Figure 11: *Preparation of food and the means of transportation*

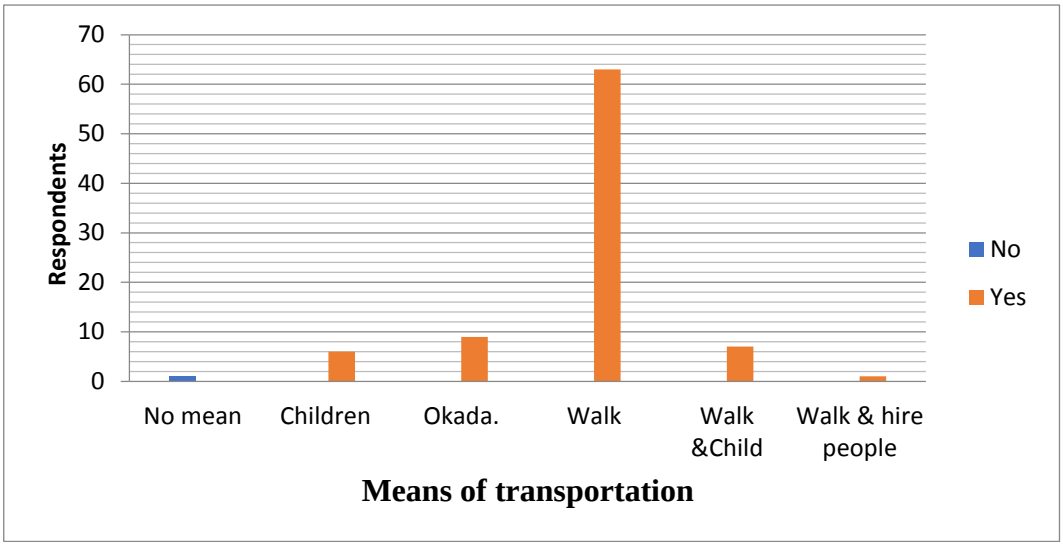

Figure 11 above show high number 63 (72.4%) of vendors' who walk to their vending site and low number 1 (1.2%) who do not use any means of transportation.

Also 41 (47%) agree, 2 (2.3%) disagree and 2 (2.3%) were not sure that they check for freshness and examine for expiry of food.

4.15. Table 12: *Relationship of vendors who examine for freshness and expiry of foods*

{N=87}

Check for freshness	Examine of expiry			
	Agree	Disagree	Not Sure	Grand Total
Agree	41	3	27	71
Disagree	-	2	3	5
Not sure	6	3	2	11
Grand total	47	8	32	87

Table 12 above illustration that 47 (45%) agree to examine for expiry, 8 (92%) disagree and 32 (36.8%) are not sure if they examine for expiry. 71 (81.6%) agree that they check for freshness, 5 (5.7%) disagree and 11 (12.6%) are not sure of it.

4.16 Table 13: *Relationship of Observational Check List*

No	Attitude	Responses	Respondents	Total	Percentage (%)
1.	Location	Permanent Temporary	32 55	87	36.6 62.9
2.	Customer per day	Less 50 Greater 50	6 81	87	7.25 92.7
3.	Water source	Available Not available	61 26		69.8 30.16
4.	Type of water source	Well Tap	40 21	61	65.6 34.4
5.	Toilet	Available Not available	67 20	87	76.7 23.3
6.	Type of toilet sources	Pit VIP Pour flush	34 28 5		50.7 41.8 7.5
	Presence of	Dirt	85		97.3
		Dust	83		95.0
7.		Files Animals Children	78 69 66	87	83.9 79 75.57
8.	Stalls	Good Worn out	73 14	87	83.9 16.4
9.	Materials	On floor Clean Soiled	34 58 29	87	38.9 66.4 33.2

10.	Environment	Drainage Garbage	75 76	87	85.9 87
11.	Covering	Available Not available	75 32		85.9 36.6
12.	Serving	Hand Thongs gloves	86 1 0	87	98.9 1.1 0
13.	Personal hygiene	Cleanliness Fingernails Wounds Apron Head cover	65 58 32 5 29	87	74.4 66.4 36.6 5.7 33.2
14.	Unhygienic behavior	Nose cover Child blowing Coughing	19 68 41	87	21.8 77.9 46.9

Table 13 above illustration that 55 (62.9%) have temporary locations, 86 (98.9%) vendors serve food with hand and handle money with the same, and unhygienic behavior included; nose blowing 19 (12.8%); child care 68 (77.9%) and coughing 41 (41.9%). This table in this study identifies and illuminates the reasons that are predisposing to street food contaminations. It also assessed the attitudes and practices of street food vendors regarding food hygiene and safety. The type of training session required by SFVs and government involvements in the safety of food and support to SFVs was likewise measured.

4.17 Figure 12: *Presence of predisposing factor of food contamination*

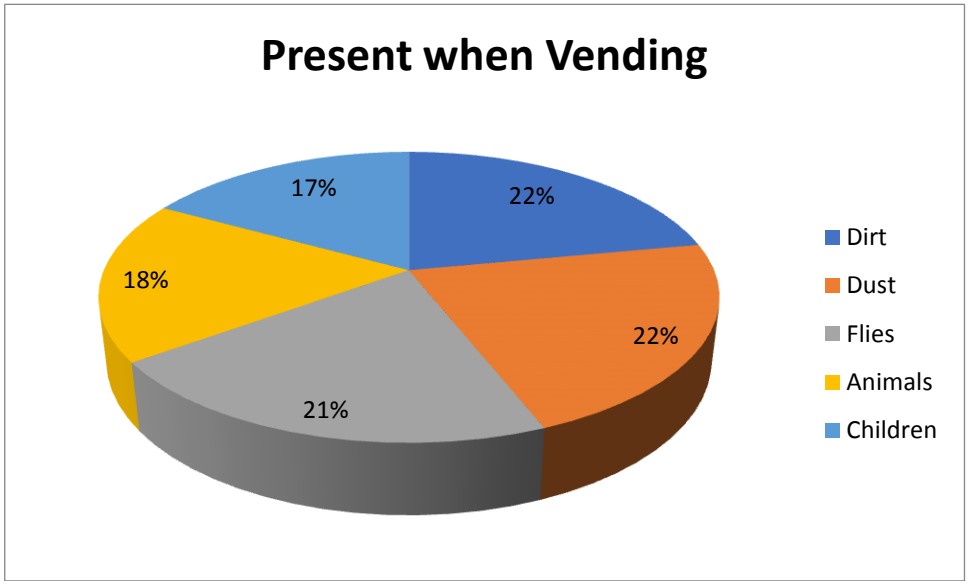

Figure 12 above illustrate that factor predisposing to food contamination may arise from dust 22%, dirt 22%, flies 21% animals 18%, or child care 17%.

CHAPTER FIVE

5.0 DISCUSSIONS, RECOMMENDATIONS AND CONCLUSION

5.1 Discussions

This chapter compares the current study's finding with published literatures. It also attempts to describe the strengths and the weakness of the data. This study aimed to investigate the knowledge, attitudes and practices of street food vendors regarding food safety in the City of Bo. It was indicated in the literature review that although studies have looked at knowledge, attitude and practices of food handlers regarding food safety, a vast majority have focused on the food handlers in the formal situation, such as established restaurants. The rationale to undertake this study was to assess these factors in the informal sectors as improper street food preparation may pose a significant risk to the consumer by virtue of the conditions in which they are prepared. Studies in developing countries have consistently shown that low educational levels and lack of employment are the most important factor contributing to street vending entrepreneurship. This study has shown the educational profile of street food vendors to be similar to result found in other countries (Chukuezi, 2010; Choudhury, Mahanta, Goswami & Pegoo,2010). In a descriptive study conducted in Nigeria, the profile of the vendors was not very similar to the finding of this study in that 14% of the food vendors did not have any from of education (37% in this study). Other studies in Ghana, Kenya, India and Sudan described similar education profiles. Regulation of street food vendors has been regarded as one of the

interventions together with training that could support the street food sector (WHO, 1996). By regulating street food vendors, they are to be inspected as is the case with formal vendors/restaurants. If conditions are favourable, they are registered with the EHPs and are legally allowed to prepare and sell food in terms of the applicable legislation. They would also then be exposed to raining programmes as they would be known and can be scheduled for training. Although certification and training were not inclusion criterion in this study, this study found that 85.1% were not certified and that 89.7% of SFVs reported not to have received formal training. The main health hazard associated with food borne diseases and street food is microbial contamination. The WHOs Five Keys to Safer Food (WHO, 2007) are recognized as a standard way of producing and maintain safe food. Maximum adoption of these food safeties and their associated behavior ensure consumer protection against food health hazards (WHO, 2007). Although the majority of street food vendors in this study were not able to name the 5 Keys of Safer Foods, the knowledge of these principles was considered acceptable when they were asked on specific behavior relating to the principles. For example, regarding Key 1 (Keep Clean), which relates to general cleanliness and hand washing, 67% knew that hand washing was important and 83% knew the importance of washing raw ingredients. In relation to Key 2 (separate raw and cooked food), 58% knew that raw and cooked food should be stored separately in the refrigerator, and 57% knew that wiping cloths can spread germs. When looking at the critical temperature issues covered by Key 3 (Cook food thoroughly) and Key 4 (Keep food at safe temperatures), 63% knew that cooked meat should not be left out of the fridge overnight and 70.1% knew that hot (cooked) foods should be served piping hot. When data was stratified by training, it was surprising to find no difference in knowledge between trained and untrained vendors although trained vendors provided more correct answers 87.9%. The finding that the food vendors were not able to specifically name the 5 Keys to Safer Food may be attributed to the training. The ability of the vendors to be able to provide correct answers for the actual behaviors was far better than being able to list the 5 keys and the knowledge of the actual behaviors indicates that they are far more likely to be put into practice. In this study the attitude of street vendors to hand washing confirmed the findings of Abdalla et al, in that 83% fully agreed that frequent hand washing was important. It can be said that the food vendors in this study have excellent knowledge and a positive attitude regarding hand washing. However, the perception by 52% of the food handlers that clean water can be easily identified with a naked eye is a concern and may need to be further explored in order to determine whether this id due to the proximity of tapped drinkable (potable) water in this study area or misconception about microbes. The perception that uncontaminated water may be detected with the naked eye is concerning, as with a perception like this, people may drink contaminated water on the basis of sight, whilst exposing themselves to deadly infections such as cholera. From a food safety perspective, this would be concerning when foods that do not have a heat step are washed in water perceived to be clean e.g. salads. Additionally, hand washing, utensil washing and surface cleaning would also be hazardous if water perceived to be clean was used. Time and temperature abuse and cross contamination were well documented in a number of retrospective studies that investigated the cause of food poisoning (Park, Kwak & Chang, 2010; WHO, undated; Bas, Ersun & Kivanc, 2006). The growth potential of microbes is enhanced or increased through time, temperature abuse and cross contamination (WHO, undated). Cross-contamination occurs when harmful micro-organisms are spread between food, surfaces and equipment. Additionally, the prevention of cross contamination through the separation of raw and cooked foods during storage and preparation is an additional important consideration. In the findings from this study the correct knowledge regarding cross contamination during preparation was reported by only 55.2% of the respondents which although satisfactory, is concerning, since major outbreaks are often associated with cross contamination (Park et al, 2010; WHO, undated; Bas et al, 2006). However, from a risk perspective, the risk posed by cross contamination during food preparation in these handlers may not be high since very few prepared salad accompaniments. Knowledge that correct storage of food and clean wiping cloths could prevent cross contamination was very good. When asked about leftover food, many of the vendors indicated that they hardly get leftover food. This study found that many vendors have sufficient knowledge to ensure hygienic handling of food. In addition, 89% of SFVs displayed a positive attitude towards the five principles of food safety. The knowledge was in some instances applied into safe practices. Although samples of food were not collected to verify these safe practices it can be suggested that on the basis of previous studies done on microbial contamination that the low microbial contamination found was due to the high level of knowledge and practices of street food vendors with regard to food safety. lthough only personal hygiene and surrounding were observed in this study, the findings are at an acceptable level, perhaps confirming that hygienic and sanitation conditions have improved and that street food vendors in an urban environment are still capable of producing relatively safe food with low bacterial counts, as per the findings of von Holy and Makhoane (2006) and Leus et al (2006). The observational findings in this study are consistent with the findings of Martins (2006) who reported that street vendors do observe good hygienic practices in preparing, cooking and handling foods (Martins, 2006). The survey conducted in 2014 in Bo City sowed that high hygiene standards were maintained by most vendors during preparation and serving of food. Food safety is also dependent on personal and environmental hygiene. Due to the nature of street foods literally being prepared and served on the street, the physical conditions/preparation area are exposed to the natural elements. Dust has potential to carry many microbes that may be pathogenic if left to settle on prepared foods. Hence it is important that food is covered to protect it from such exposure (Muinde et al, 2005). Based on observations, the current study found that 85.9% of street food vendors had cloths or alternative covering items to cover the food being served. Chukuezi (2010) reported similar findings with 16.1% of the vendors storing food for serving in the open (Chukuezi, 2010). In a study conducted in Bloemfontein in 2006, 71% of street food vendors observed wore head converings during food preparation (Leus et al, 2006). In contrast to the above findings, this study revealed that 5.7% wore aprons and 33.2% wore head coverings. However since the proportion that wore aprons is less than the 14.9% of certified street food vendors; it can be attributed to this. It also can be associated with training as only 10.3% reported receiving training.

5.2 Recommendations

Current regulations regarding the general hygiene of premises and the transportation of foods should be reviewed and strengthened to focus on a risk based approach. Perhaps this should include a clause indicating that certification is dependent not only on the premises but also those food handlers/owners should receive proper training, as part of the certification process. Training conducted should focus an understanding of the rationale for the behaviours as knowledge is not always translated into practices or behaviors. This will require a re-orientation of EHPs on how and what they teach food Practitioners (EHP's) should make use of the Five Keys to Safer Food behavioural methodology as a guide for training purposes, on principles of good hygiene practices. It is also recommended that they City of Bo regularly update the database to ensure that it reflects the current situation and not a cumulative total as is currently the case. Further exploratory studies need to be undertaken to understand the reasons for satisfactory knowledge on cross contamination yet a positive attitude finding towards cross contamination. The FAO/WHO should look at developing a standardized tool that could be used to evaluate the 5 Keys to Safer Foods such that studies such as these can have general basis of comparison as it was difficult to be able to compare the findings of this study with other work done in the street food environment. This study shows that there is a need for additional research in the area of street food vendors and the possible risks they may pose with regard to food safety.

5.3 Conclusion

In conclusion, 87 street food vendors participated in this study. Street food vendors are ubiquitous and a presence in most cities. They are regarded as potential conduits of foot borne disease as a result of the conditions in which food is prepared, yet in many developing countries, the street food trade provides an important source of both food and income. The attitude of street food vendors to food safety can also be regarded as attuned to the need to ensure safe practices in food preparation. Whether this is converted into practice requires further exploration in future studies, with triangulation of methods. The influence of training was evident in some street vendors. Trained vendors had more knowledge in some of the 5 keys principles and had a more positive attitude than the untrained street food vendors. Age, education level and length of time in the business, were not factors determining the knowledge, attitude and practice of SFVs. It can be concluded that these street food vendors practice the 5 key behaviors required to ensure food safety and that possibly the health risk posed by street foods may be no greater than the risk posed by foods from other sources. The study provides the City of Bo with information regarding the knowledge, attitudes and practice of street food vendors as well as information regarding their training and certification. Potential next steps would be to review their database, review the requirements for certification and ensure that all street food vendors are trained and certified. Due to the limitation discussed, these study findings cannot be generalized.

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