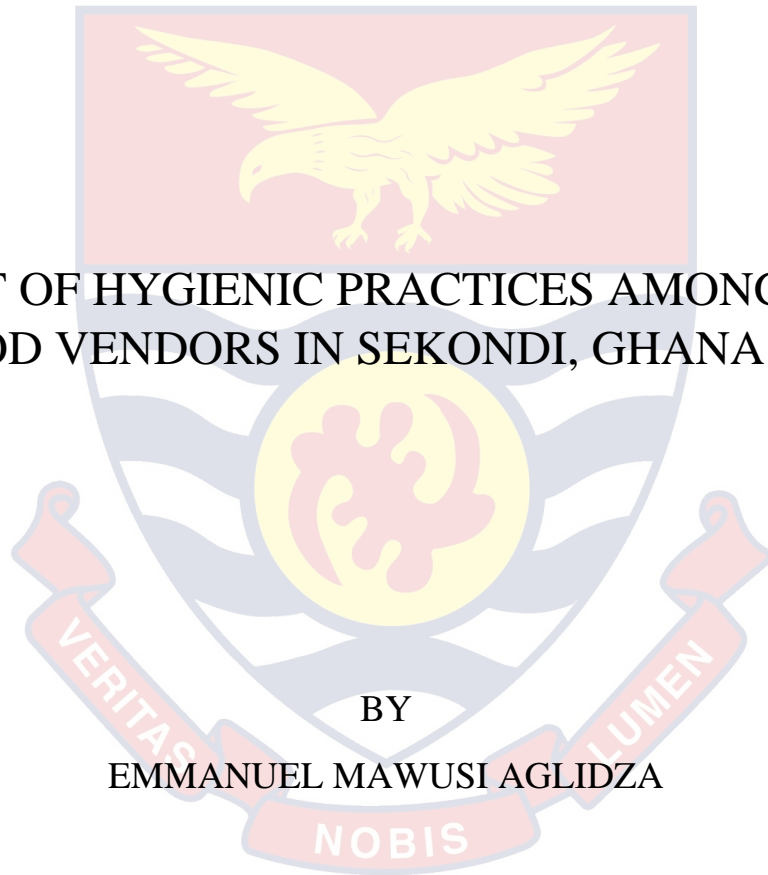


PRESBYTERIAN UNIVERSITY COLLEGE, GHANA  
FACULTY OF DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES  
MANAGEMENT

ASSESSMENT OF HYGIENIC PRACTICES AMONG STREET  
FOOD VENDORS IN SEKONDI, GHANA



BY  
EMMANUEL MAWUSI AGLIDZA

SEPTEMBER, 2019

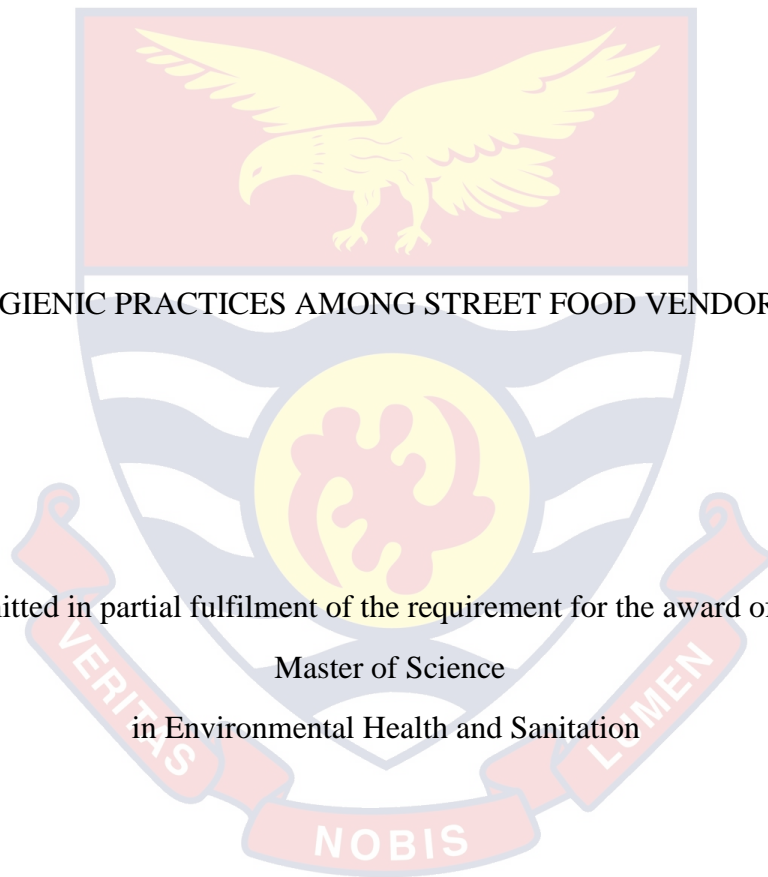
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ASSESSMENT OF HYGIENIC PRACTICES AMONG STREET FOOD VENDORS IN SEKONDI

A thesis submitted in partial fulfilment of the requirement for the award of the degree of  
Master of Science  
in Environmental Health and Sanitation



BY

EMMANUEL MAWUSI AGLIDZA

SEPTEMBER, 2019

## DECLARATION

### Candidate's Declaration

I hereby declare that this project work is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature: ..... Date: .....

Name: Emmanuel Mawusi Aglidza

### Supervisor's Declaration

I hereby declare that the preparation and presentation of the project work were supervised in accordance with the guidelines on supervision of project work laid down by the Presbyterian university college, Ghana.

Supervisor's Signature: ..... Date: .....

Name: Mr. Samuel Akpah Yeboah

## ABSTRACT

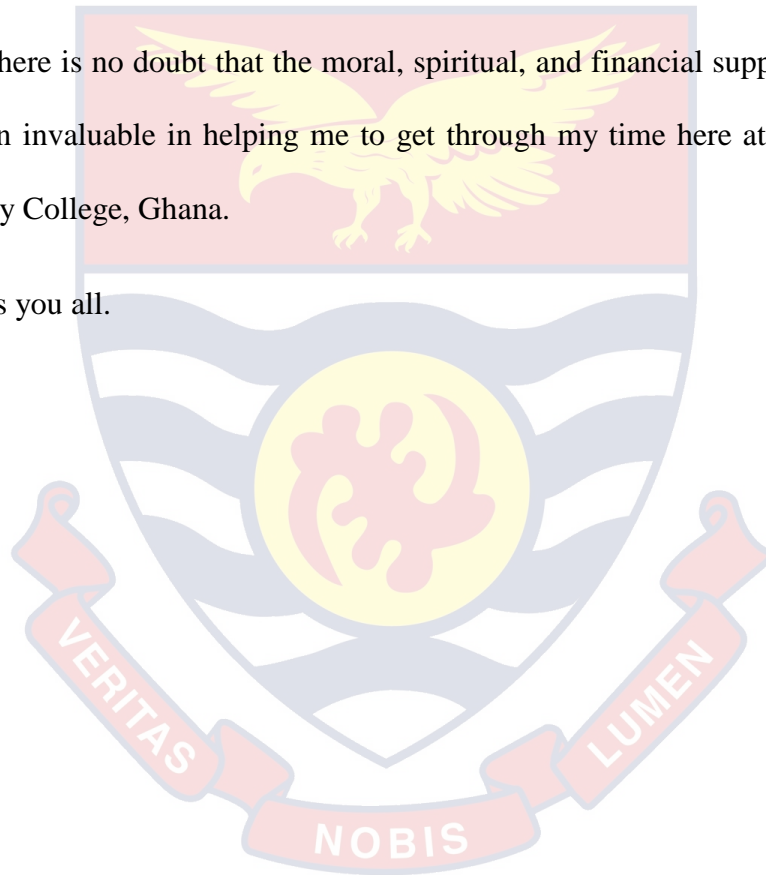
Food poisoning, food borne diseases and food safety have been declared a major public health concern and street foods have been associated with microbiological contamination and low hygienic standards (WHO, 2006). The objective of the study was to examine the factors that influence the choice of location for street food vending, to assess the safety practices of handling and serving of food by street food vendors and to examine sanitary conditions under which street food vendors operate. Descriptive design was used for the study and simple random sample was used in selecting 85 informal street food vendors to respond to researcher assisted questionnaire. A self- designed structured questionnaire as well as an observational checklist was used to collect data from the street food vendors. The major findings of the study were that the most significant factor influencing the choice of location of food vendors is closeness to customers; it was also noted that in most cases the food vendors did not choose a location due to the cleanliness of the surrounding environment. Forty per cent of the respondents made contact with food with their bare hands; there were no open sewages near all the vending sites; most (65%) of the food vendors operate near open drains, 20% of the food vending outlets were located near waste dump sites and 60% of the food vending outlets did not have dustbins available for waste storage. The study concluded that the most significant factor influencing the choice of location of food vendors is closeness to customers, and therefore vendors did not consider sanitary conditions around their vending points. Thus, the safety of food vendors' food handling practices was compromised. It was recommended that the environmental health officials should embark on frequent media and personal education of the food vendors on safe food handling practices.

## ACKNOWLEDGEMENT

I wish to express my deepest gratitude, appreciation, and indebtedness to my supervisor, Mr Samuel Akpah Yeboah (Department of Environmental and Natural Resources Management) of the Presbyterian University College, Ghana, Akuapem campus. I would also like to thank the staff of the Environmental Health Department of the Sekondi-Takoradi Metropolitan Assembly for the support given throughout the conduct of this research.

Finally, there is no doubt that the moral, spiritual, and financial support of my family have been invaluable in helping me to get through my time here at the Presbyterian University College, Ghana.

God bless you all.



## DEDICATION

To my family



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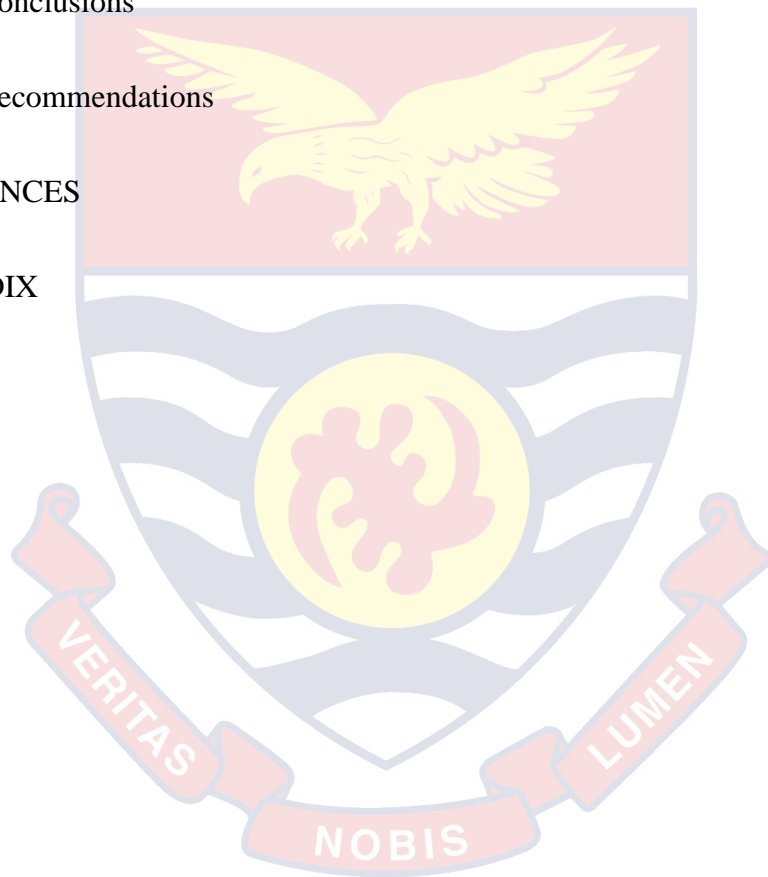
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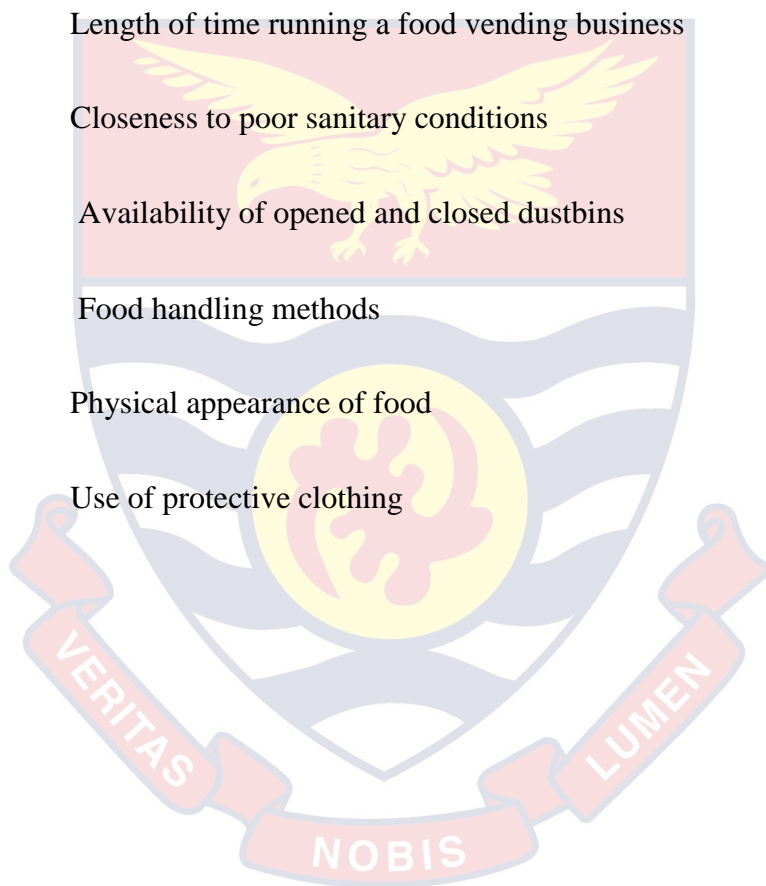
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## LIST OF ACRONYMS

AIDS	-	Acquired Immunodeficiency Syndrome
FAO	-	The Food and Agriculture Organisation
HIV	-	Human Immunodeficiency Virus
LMICs	-	Low and Middle-Income Countries
SAEMA	-	Shama Ahanta East Metropolitan Assembly
SDGs	-	Sustainable Development Goals
STMA	-	Sekondi-Takoradi Metropolitan Assembly
UN	-	The United Nations
WHO	-	The World Health Organisation



## CHAPTER ONE

### INTRODUCTION

#### 1.1. Background of the study

The growth of urban populations, the consequent outward spreading of cities, and the zoning of cities into distinct residential and economic districts have led to an increased in the time that many people spend moving from their homes to their workplaces and had caused an increased demand for relatively inexpensive, ready to eat food (FAO, 2012). This has stimulated the emergence and spread of street food stalls and carts in developing countries. Street food vending in urban areas is a growing phenomenon in developing countries and now are important sources of daily foods for most urban populations.

Street food vending is the sale of food to the public without a permanent built up structure but with a temporary static structure or mobile stall-head load/wheel-barrow/truck. Street vended foods are a wide range of ready-to-eat foods and beverages sold and sometimes prepared along streets and other public places (Winarno & Allain, 1991).

Street food vending is considered an important informal business activity in most developing countries. Due to its socio-economic contributions, the sector has over the years attracted many researchers from both developed and developing countries. Studies, (Mazhambe, 2017; Mohan, 2018) have looked at the subject from various dimensions such as the economic contributions of street food vendors to development.

Despite the numerous benefits provided to people, street-vended foods can also be a source of food borne illnesses resulting from poor hygiene practices by vendors, insanitary conditions at food vending points, among others. Chapman, Eversley, Fillion, MacLaurin and Powell (2010) revealed that majority (70%) of foodborne disease outbreaks are as a result of the consumption of street-vended foods. Another evidence provided by Mensah *et al.*, (2002) showed that street vended foods are a potential source of organisms capable of producing disease in the intestinal tract.

According to World Health Organisation (WHO) (2006), food poisoning, food borne diseases and food safety have been declared a major public health concern and street foods have in many studies been associated with microbiological contamination and low hygienic standards. Hence, street food vendors are of massive importance for public health since they have influence on the health of thousands of people every day.

In June 1997, the Codex Alimentarius Commission (a collection of internationally recognized standards, codes of practice, guidelines, and other recommendations relating to foods, food production, and food safety) adopted revised basic texts on food hygiene and recommended their wide use and understanding by governments, regulatory authorities, food industries, all food handlers and consumers to ensure that food is safe and suitable for human consumption. The general hygienic requirements and practices to be followed by the vendors was also recommended for translation by the relevant authorities into Codes of practice and this was recognized as cost effective tools for the control of street foods, by fully taking into account local

conditions including specific risk factors that are relevant to each operation (Codex, 1999).

The world is becoming rapidly more urban and the population of the developing countries is projected to double from 1.7 to 3.4 billion by 2020 (United Nations, 2017). Deprivation in urban areas including poverty, food insecurity and malnutrition is increasing faster and urban growth now presents a serious challenge in developing countries (Maxwell, Levin, Armar-Klemesu, Ruel, Morris & Ahiadeke, 2000). The sale and consumption of street foods are on the increase and this will continue to grow (WHO, 2006). In developing countries, there is a noticeable increase in the number of street food vendors as a result of dwindling economy and unemployment (Chukwuezi, 2010).

According to Ashenafi (1995), food exposed for sale on the streets may become contaminated either by spoilage or pathogenic micro-organisms. Furthermore, it is also reported that street-vended foods have epidemiological links with illness (Muinde & Kuria, 2005). FAO (1997), asserts that street foods raise concern with respect to their potential for serious food poisoning outbreaks and associated health problems like cholera, diarrhoea and stomach upset as a result of unhygienic handling of foods and improper sanitary practices. The unlimited and unregulated growth of street vended foods has placed a severe strain on municipal facilities, such as water supply, sewage system and interference with the city plans through congestion and littering which adversely affect daily life (Canet & N'diaye, 1996; Chaulliac & Gerbouin-Renolle, 1996).



## 1.2. Statement of the problem

There is a noticeable increase of street food vendors in Ghana. This is clearly evident in Sekondi, where they sell cooked food items along the streets of Sekondi. This increase might be as a result of the growing population of Sekondi-Takoradi Metropolitan Area possibly due to the presence of increased number of oil drilling companies in the Western Region and changing food demands alongside the need to diversify and/or employ more income sources. Street food vendors may contaminate food by poor personal hygiene, cross-contaminating raw and processed food, as well as inadequate cooking and improper storage of food.

Due to this increased demand for food, there is the need to assess the hygienic practices of street foods vendors in Sekondi. This study therefore sought to assess various aspects of hygienic practices like place of preparation, location of street food vendors, handling, storage, personal hygiene and storage of leftovers.

## 1.3. Objectives of the study

The main objective of the study is to assess the hygienic practices of street food vendors in Sekondi.

Specifically, the study will seek:

1. to examine the factors that influence the choice of location for food vending,
2. to assess the safety practices of handling and serving of food by street food vendors,
3. to examine sanitary conditions under which street food vendors operate

#### **1.4. Research questions**

1. What factors influence the choice of location for street food vending?
2. How safely do street food vendors prepare and serve food?
3. How healthy is the sanitary conditions of the environment within which street food vendors operate?

#### **1.5. Delimitation of the study**

The study was limited to informal street food vendors in Sekondi in the Sekondi-Takoradi Metropolitan Area (STMA). The study focused only on their hygienic practices within their area of operation.

#### **1.6. Significance of the study**

Through this research, gaps in hygienic practices among street food vendors can be identified in order to underpin the development of more specifically targeted and effective training programme for street food vendors. Consumer confidence and regulatory control in street food vending can thus be achieved and the effects of food poisoning incidents on the consumers within the study area would be minimized. The ability of street food vendors to prepare safe foods could still be questionable with the perception sustained that street food vendors pose a health risk for all customers. This research will help streamline food vendors' activities in the Sekondi-Takoradi Metropolitan Area

Data and insights on the current hygienic practices of street food vendors in Sekondi/Takoradi are very scarce and therefore will contribute to existing knowledge and also provide the basis for further academic research especially in the dimension of Environmental Health

In light of the important contribution that street food vendors make to the economy and food security/nutrition of many Ghanaians, information generated from this study might assist regulatory authorities with regard to policy and approaches to street food vendors. This supports the policy of the Government, to ensure that the foods sold on the streets or any other public place is safe, and of good quality.

### **1.7. Organization of the study**

The research work is presented in five (5) chapters. Chapter one provides a general background to the study. It analysed the extent of the problem, states the objectives of the research and addresses the significance of the study in STMA. Chapter two examined existing literature relative to the study. Chapter three described the methodology employed in gathering data from the field. These included questionnaire and observation checklist. It also provided a brief description of the study area. Chapter four analysed the findings gathered from the field and chapter five summarised the key findings of the study, provided recommendations and drew conclusion.

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

#### 2.0 Introduction

This chapter examines existing literature done which are related to the study. It throws more light on concept of hygiene, defining street foods, hygienic practices among food vendors, food handling practices, food quality, hazard analysis of street vended foods, food safety, food hygiene knowledge and practices, economic importance of street vended food, choice of location for food vending and food safety and sustainable development goals-SDGS

#### 2.1 Concept of hygiene

Hygiene is a set of practices performed to preserve health. According to World Health Organisation (WHO) hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases. Personal hygiene would therefore refer to maintaining the body's cleanliness to prevent the spread of diseases. As a consequence of humans also containing microorganisms naturally or from the surrounding environment, it is important to maintain an appropriate personal hygiene. Important hygienic aspects related to personal hygiene for a person handling food may include:

1. Food vendors practicing hand washing before handling food and often during food preparation.
2. Food vendors washing hands after going to the toilet (WHO, 2010).
3. Food vendors drying hands after hand washing procedure.
4. Food vendors wearing clean protective clothing.
5. Food vendors wearing head covering.

6. Food vendors avoiding wearing of personal effects such as jewellery, watches, pins or other items in food handling areas.
7. Food vendors ensuring that cuts and wounds are covered by suitable waterproof dressings.
8. Food vendor's avoiding personal behaviour such as smoking, spitting, chewing or eating, sneezing or coughing over unprotected food.
9. Food vendors not handling food if you know or suspect to be suffering from or to be a carrier of a disease or illness likely to be transmitted through food. (FAO Corporate Document Repository, 1999).

## 2.2 Defining street foods

A street vendor is broadly defined as a person who offers goods for sale to the public without having a permanent built-up structure from which to sell. Street vendors may be stationary in the sense that they occupy space on the pavements or other public/private spaces or, they may be mobile in the sense they move from place to place by carrying their wares on push carts or in baskets on their heads (Bhowmik, 2005) and temporary static structure or mobile stall-head load/wheel-barrow/truck.

Street vended foods are a wide range of ready-to-eat foods and beverages sold and sometimes prepared along streets and other public places (Winarno & Allain, 1991).

Singh, Singh and Chaturvedani (as cited in Food and Agriculture Organisation, 1984) defines street foods as “ready to eat food and beverages prepared and/or sold by vendors and hawkers especially in streets and other similar public place”. The trend of street food vending is spreading globally due to fast urbanization, technological advancement and alarmingly increasing hasty

lifestyle. People are more inclined to buy ready to eat foods instead of cooking at home. They are inclined towards easier ways of spending life without realizing about safety concerns. These foods provide a source of inexpensive, convenient and often nutritious food for both the urban and rural folks.

Street food vendors' stalls are usually located outdoors or under a roof which is easily accessible from the street and they have low-cost seating facilities which are sometimes rudimentary (Winarno & Allain, 1991). Their marketing success depends exclusively on location and word-of-mouth promotion. Street food businesses are usually owned and operated by individuals or families but benefits from their trade extend throughout the local economy (Bhowmik, 2005).

Apart from the unique flavours, convenience and the role played in the cultural and social heritage of societies, street vended foods have also become important and essential for maintaining the nutritional status of the populations (FAO, 1997). The sale of street foods can make a sizeable contribution to the economies of developing countries besides offering business opportunities for developing entrepreneurs. In India, the National Policy for Urban Street Vendors/Hawkers stated that street vendors constitute approximately 2% of the population of a city (Bhowmik, 2005).

Further, Bhowmik (2005) stated that street food industry provides employment to women with low educational background. He further noted that the urban poor, day labourers, rickshaw pullers, migrants from rural areas and the homeless depend on street food vendors for their nutrition due to the low prices of street food. However, because of poor hygiene people often fall ill after eating street food and are mainly victims of water borne diseases.

### 2.3 Hygienic practices among food vendors

Food hygiene according to Codex Alimentarius Commission (1999), involves all conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain. Gordon (2011), further explained food hygiene as the preservation of health involving all measures that ensure the safety and quality of food during its handling and identifies these measures as adequate storage of both raw and cooked foods including the right preparation and cooking procedures. Food hygiene can also be said to be a set of basic principles used to check environmental factors during production, preparation, selling and serving food in such a way to ensure that food consumed is of good quality. This therefore means that food hygiene depends largely on the personal hygiene practices of food vendors (Ifeadike, Ironkwe, Adogu & Nnebue 2014).

Food hygiene therefore represents those factors which influence the health and wellbeing of an individual. The factors include observance of simple rules about healthy behaviours including cleanliness among others.

The preparation of food under unhygienic conditions provide opportunity for transfer of bacteria as well as growth or survival of bacteria and other pathogens (Codex, 1999). Hygiene involve the conditions or practices conducive to maintaining health and preventing disease, especially through cleanliness (WHO, 1996). The hygiene therefore is the most important factor that could possibly have a negative impact on food quality (Gordon, 2011).

According to Kok and Balkaran (2014), street food stands are made of simple structures which lacks running water, toilets and washing facilities (de Sousa, 2008). Washing of hands, utensils and dishes are often done in basins.

Disinfection is occasionally carried out and this eventually attracts pests to the vending sites especially when there is inadequate refuse disposal (Kok & Balkaran, 2014). Furthermore, foods prepared at these sites put consumers' health at risk as food is often not preserved at the right temperatures.

A study conducted by Annor and Baiden (2011), revealed that some food vendors including hotels in Accra do not comply to basic sanitary practices despite the efforts of the regulatory bodies to regulate the activities of food vendors and other catering institutions. The study suggests that when food hygiene checks are strictly followed, contamination could be reduced and the efforts of food regulatory bodies in this regard could prove beneficial if adhered to.

Again, Annor and Baiden (2011) stated that most studies conducted in Ghana concerning various aspects of food hygiene over the past decade have revealed poor food hygiene knowledge and attitudes of street food vendors, with personal hygiene least observed by the least educated. Most of the vendors have either no formal education or few years of schooling and therefore are simply ignorant of proper food handling and their tendency to transmit pathogens is higher (Mensah *et al.*, 2002). It is not entirely possible to pinpoint the exact causes of such incidences arising from food contamination.

According to Wilson, Murray, Black and McDowell (as cited in Annor & Baiden, 2011), there is strong statistical evidence that 70% of all bacterial food poisoning is caused by caterers and is much greater than occurrences reported from any other food sector. They further explained that most of the food poison outbreaks are due to the inadequate time and temperature control of food, whereas the remaining thirty per cent is as a result of cross-



contamination. Muinde and Kuria (2005) found that such foods are sometimes held at improper temperatures, or mishandled by food vendors and sold in dirty environs. All these contribute to the infection of seemingly tasty food by different disease-causing parasites.

#### 2.4 Food handling practices

Cross-contamination during food preparation has been identified as an important factor associated with the food-borne illness (Wanyenya, Muyanja, & Nasinyama, 2004). The food handlers play a major role in ensuring the food safety throughout the chain of the producing, processing, storage and preparation. Mishandling and disregard for the hygiene measures on their part may result in food contamination. Food borne illness affect millions of the people each year and an unknown but sizeable proportion of these illnesses could be prevented by the actions taken by the food handlers and consumers. The handling practices in the food preparation areas provide an opportunity for cross-contamination of the bacteria to ready-to-eat foods.

A microbiological analyses of the food vendors' hands were made for some microorganisms, including the aerobic mesophilic plate counts, as well as the some food pathogens by Almeida, Kuaye, Serrano & Almeida (1995), revealed the possibilities of the cross-contamination of the roast beef by the vendors' hands during the slicing operations. The vendors' hands showed aerobic mesophilic plate counts of up to  $10^7$  CFU/hand and the presence of *S. aureus* and *Clostridium perfringens*. It could be concluded that handling of these foods by such food vendors would be a risk in transmitting the pathogenic microorganisms to the foods and it is obvious that would be necessary for these workers to take care of personal hygiene.

Unsanitary handling of food is a major public health hazard. The effect of basic food hygiene knowledge on the hygienic practice identifies the specific areas for emphasis in the development and delivery of effective food safety risk communication messages to the consumers. A study (Almeida et al., 1995) showed that, in most cases, when the safety and hygienic practices were not respected, the food became a true microorganism culture medium under the tropical climatic conditions. In general, some results (Barro, Ouattara, Nikiema, Ouattara & Traore, 2002) showed the failure of the microbial quality of some food which is not preheated (milk product, fruit juice, vegetable, fruit) and in the case of food which is not reheated after a long time of exposure (dry meat and meat on sticks). The presence of *Salmonella* and *Shigella* species in some food represents a serious danger for the consumers. These aspects were observed with most street food vendors (Muleta & Ashenafi, 2001). It probably makes the street food the source of most diseases caused by the bacteria and other microorganisms.

In a survey conducted by Barro et al. (2002), it was found that the major part of the population of Ouagadougou, Burkina Faso, had their breakfast, lunch and dinner in the street food shops. Women play a major part (75%) in street food sale. Vendors have only a slight knowledge of the food processing and of hygienic practices. There is a high proportion (about 50%) of people among them. This dietary habit has some negative aspects on the consumers' health. The hygienic practices during the sales operations were not respected by all the categories of the vendors of the food products. Also, it was observed that the street food vendors sometimes sat close to the waste water drainage system and solid wastes. Sometimes, the food was not appropriately covered and it

was manipulated by the consumers in the areas infested by the flies and others insects. The water used to wash the materials is of poor quality.

A survey of the selling conditions and bacteriological examinations of ice-cream was carried out by Ravaonindrina, Rasolomandimby, Rajaomiarisoa, Rakotoarisoa, Andrianantara, Rasolofonirina & Roux (1996). The results revealed that the sellers had the classic features of a street food vendor: uneducated, having no professional training and mishandling foodstuffs. In the 202 samples of the ice-cream collected, the contamination prevalence rate was of 95% +/-3.7%. *S. typhimurium* was isolated from one sample and recommended that immediate and rigorous measures ought to be put into effect by the authorities to control this alarming situation.

Muleta and Ashenafi (2001) evaluated the bacteriological safety of the food items sold by the street vendors with regard to *Salmonella* and *Shigella* to assess the growth potential of some food borne pathogens in some street foods. The authors found that most of the street food samples had aerobic mesophilic counts  $>10^7$  cfu/g. Nine "kitfo" and one "egg sandwich" samples yielded *Salmonella*. *Shigella* was isolated from three "macaroni" samples. The *Salmonella* isolates were sensitive to all the 10 drugs tested but the *Shigella* isolates had multiple resistances against five drugs. In a challenge study, *Salmonella typhimurium*, *Shigella flexneri* and *Staphylococcus aureus* grew in the street-vended food samples to hazardous levels within eight to twelve hours. They concluded that the street foods were heavily contaminated with microorganisms and were potential sources of the food borne infections and suggested that health hazards from the street foods could be significantly minimized by the consumption within four hours of preparation.

## 2.5 Food quality

It is important to take caution when selecting raw materials for food preparation. These raw materials, including water and ice may be contaminated with dangerous microorganisms and chemicals. Toxic chemicals may be formed in damaged and mouldy foods.

Important hygienic aspects related to Food and Quality includes:

1. Food vendors should select fresh and whole some foods to prepare food for sale.
2. Food vendors must choose food processed to reduce the risk associated with cooking raw foods for food.
3. Food vendors should make ice from safe water (FAO Corporate Document Repository, 1999).
4. Food vendors should use safe water or treat it to make it safe (WHO, 2010).

Microbiological analysis of utensils surface and knives has the presence of salmonella and shigella (Rane, 2011). It is also reported that during the preparation of food, the raw material is cut and chopped using the same knife without in between cleaning and such knives are often invaded by flies (Rane, 2011). A study by Annan-Prah, Amewowor, Osei-Kofi Amoono & Akorli (2011) on street foods: handling, hygiene and client expectations in Cape Coast, confirms the statement made above. Handling, vending and hygienic quality of street foods available to local residents, internal and foreign tourists to Cape Coast, the most important tourism hub in Ghana, were investigated. Questionnaires assessed stakeholder commitment to and expectations of food hygiene. Laboratory analysis evaluated microbial contamination levels of the

street foods. The study showed that both local residents and tourists, foreign tourists put the hygienic safety as the principal criterion over curiosity and price to patronize street foods. It also came out that, although licenses had been given to 54% of the 50 investigated food vendors, only 56% of the licensed vendors had medical examination (Annan-Prah et. al., 2011).

## 2.6 Hazard analysis of street vended foods

Street foods are perceived to be a major public health risk due to lack of basic infrastructure and services, there is difficulty in controlling the large numbers of street food vending operations because of their diversity, mobility and temporary nature (de Sousa, 2008). Street foods are associated with diarrhoeal diseases which occur due to inappropriate use of flavours, the presence of pathogenic bacteria, environmental contaminants and disregard of good manufacturing practices and good hygiene practices (de Sousa, 2008). Inadequate food hygiene can lead to food-borne illnesses due to improper food handling practices and in extreme events, even the death of a customer (Tavonga, 2014). People, who patronize street food, have been reported to suffer from food borne diseases like diarrhoea, cholera, typhoid fever and food poisoning (Ansah, 2014).

There have been several documented cases of foodborne diseases outbreaks due to street foods such as the 691 food poisoning outbreaks and 49 deaths from 1983 to 1992 in Shangdong Province (China) (Lianghui, Xingling, Yuju, Zhang and Haiyan, as cited in Rane, 2011). A report by Debrah (2016) indicates that 98 per cent of salad samples prepared by street food vendors in Accra were contaminated with bacteria known as *Escherichia coli* which cause food poisoning. In India, National Centre for

Disease Control under Integrated Disease Surveillance Programme recounted more than 200 food poisoning cases till the 36th week of 2015 and this is the second highest cause of outbreaks of diseases repeatedly for the past four years (Singh et al, 2018). Avoiding foods that are contaminated with harmful bacteria, viruses, parasites, toxins, and chemical and physical contaminants is vital for healthful eating

Furthermore, there are 582 million estimated cases of 22 different enteric foodborne diseases and 351,000 associated deaths at the global level and African countries recorded highest foodborne diseases (WHO, 2006). Africa alone accounts for 90% of cholera cases worldwide (Osei & Duker, 2008). Foodborne bacterial pathogens commonly detected in street vended foods are *Bacillus cereus*, *Clostridium perfringens*, *Staphylococcus aureus* and *Salmonella* spp. (Rane, 2011). Unsanitary handling of street foods by the some street food vendors has been commonly found to be the source of contamination. The vendors can be carriers of pathogens like *Escherichia coli*, *Salmonella*, *Shigella*, *Campylobacter* and *S. aureus* who eventually transfer these food borne hazards to the consumers (Rane, 2011). The fingers of food handlers are the most important vehicle for the transfer of organisms from faeces, nose, skin to the food (WHO, 1984). Some food handlers may introduce biological hazards by cross contamination after handling raw materials when they suffer from specific diseases and physical hazards by careless food handling practices (WHO, 2008). Most of these vendors pack the food in polythene bags for their customers. When packing these foods, they blow air into the polythene bags to open them, in this process a number of

pathogens can be passed on to the consumer. Table 1 present the sources and type of hazard and the microbial risk involved.

**Table 1: Source and type of hazard and the microbial risk involved**

S.No.	Source	Hazard	Risk involved
1	Vendor location	Improper food handling	Transfer of pathogens like <i>Salmonella</i> and <i>E. coli</i> , <i>S. aureus</i> from human body and environment into foods
2	Raw materials	Water	Transmission of enteric pathogens like <i>Salmonella</i> , <i>Shigella</i> and <i>E. coli</i> via vectors
		Vegetables and spices	Passage of pathogens like <i>E. coli</i> , fecal streptococci, <i>Salmonella</i> and <i>Vibrio cholerae</i>
3	Utensils and equipment	Chemical contaminants	Introduction sporeformers like Bacilli and Clostridium and pathogens like <i>L. monocytogenes</i> , <i>Shigella</i> , <i>Salmonella</i> , etc.
		Microbial contaminants	Leaching of chemical leading to poisoning
4	Storage and reheating	Improper storage temperature and reheating of food	Cross contamination of food with <i>Staphylococcus aureus</i> , <i>E. coli</i> and <i>Shigella</i> due to contaminated water, dish cloth, handler
5	Personal hygiene of vendors	Biological hazards	Likelihood of heat stable toxins produced by pathogens like <i>C. perfringens</i> and <i>B. cereus</i>
			Introduction of <i>Staphylococcus</i> , <i>Salmonella</i> and <i>Shigella</i> via carriers

Source: Rane, (2011)

## 2.7 Food safety

According to WHO (2006), food handling personnel play an important role in ensuring food safety throughout the chain of food production, processing, storage and preparation. Mishandling and disregard of hygienic measures on the part of the food vendors may enable pathogens to come into contact with food and in some cases to survive and multiply in sufficient numbers to cause illness in the consumer. Some food handlers introduces biological hazards by cross contamination after handling raw materials when they suffer from specific diseases and physical hazards by careless food handling practices (Rane, 2011).

Simple measures such as washing and peeling the food reduces the risk of contamination with microorganisms from raw food. Also, proper cooking kills almost all dangerous microorganism, cooking food to a temperature of 70<sup>0</sup>C can help ensure it is safe for consumption (WHO, 2006). Microorganisms can multiply very quickly if food is stored at room temperature. By holding at temperature below 50<sup>0</sup>C or above 60<sup>0</sup>C, the growth of microorganisms is slowed down or stopped but some dangerous microorganism will still grow below 50<sup>0</sup>C (WHO, 2010). Depending on the nature of the food operations undertaken, adequate facilities should be available for heating, cooling, cooking refrigerating and freezing food, for storing refrigerated or frozen foods, monitoring food temperatures, and when necessary, controlling ambient temperatures to ensure the safety and suitability of food (FAO, 1999). Important hygienic aspects related to Food Safety as stated in WHO, (2010):

1. Separating raw meat, poultry and sea food from other foods.



2. Using separate equipment and utensils such as knives and cutting board for handling raw foods.
3. Storing food in containers to avoid contact between raw and prepared foods.
4. Washing fruits and vegetables, especially if eaten raw.
5. Removing outer leaves of leafy vegetables.
6. Cooking food thoroughly; make sure that the temperature has reached 700.
7. Reheating cooked food thoroughly.
8. Avoid leaving cooked food at room temperatures for more than 2 hours.
9. Refrigerating promptly all cooked and perishable food (preferably below 5°C).

Most of the vendors pack the food in polythene bags for their customers. When packing these foods, they blow air into the polythene bags to open them, in this process a number of pathogens can be passed on to the consumer. According to Buchanan and Whiting (1998), over 30% of a group of food handlers examined Santa Fe de Bogota Colombia were carriers of pathogenic microorganism including *salmonella typhi*, *staphylococcus aureus*, *salmonella enteritidis*, and *shigella spp.*

An important issue influencing food contamination and contributing to further increase in contamination is food storage temperature. The preparation of food long before its consumption, storage at ambient temperature, inadequate cooling and reheating, contaminated processed food, and undercooking are identified as the key factors that contribute to food

poisoning outbreaks. Holding foods at high ambient temperatures for long periods of time have been reported to be a major contributor to the occurrence of food poisoning outbreaks (Rane, 2011). Foods are often held for several hours after cooking and this includes overnight holding at ambient temperatures, until sold, and thus can harbour high microbial populations. Besides, some of the foods are held in the pans in which they are cooked, until sold or reheated, which results in longer holding time, hence creating favourable conditions for the growth of food borne pathogens. In foods which are held under high ambient temperature, the counts of *escherichia coli*, *staphylococcus aureus*, *bacillus cereus* and *clostridium perfringens* are reported to be high (Rane, 2011). *Bacillus cereus* was isolated from samples of fried fish, 'tuwo', soup, boiled rice and 'moin' suggesting that their spores survived the cooking process. The presence of this bacterium coupled with the storage of these foods at ambient temperatures (room temperature) for several hours under high temperature and high relative humidity showed that the product could be hazardous (Rane, 2011). *Bacillus cereus* has been responsible for outbreaks of foodborne illness because it produces heat stable (emetic) and heat sensitive (diarrheal) toxins when foods are held under conducive conditions for several hours (Rane, 2011).

Mensah *et al.*, (2002) conducted a study on the safety of street foods in Accra to purposely investigate the microbial quality of foods sold on streets of Accra and factors predisposing to their contamination. Structured questionnaires were used to collect data from 117 street vendors on their vital statistics, personal hygiene, food hygiene and knowledge of foodborne illness. Findings from the study indicate that most vendors were educated and

exhibited good hygiene behaviour. The cooking of food well in advance of consumption, exposure of food to flies, and working with food at ground level and by hand were likely risk factors for contamination. This study by Mensah *et al.*, (2002) is similar to this study since the same parameters will be assessed to find out the similarities and differences in factors that affect microbial quality of street foods.

In conclusion street foods can be sources of entero-pathogens and vendors should therefore receive education in food hygiene. Special attention should be given to the causes of diarrheal, the transmission of diarrheal pathogens, the handling of equipment and cooked food, hand-washing practices and environmental hygiene. A study conducted by Feglo and Sakyi (2012) in Kumasi, Ghana suggest that street vending foods are readily available sources of meals for many people but the biological safety of such food is always in doubt. Food vendors therefore need education on food hygiene. Street foods are readily available, inexpensive and nutritionally-balanced and also provide a source of income for the vendors (Canet & N'diaye, 1996). Despite these benefits, concerns have been raised about their safety and quality because most of the vendors lack training in basic food hygiene practices (Bryan, Teufel, Riaz, Roohi, Qadar & Malik, 1988).

## **2.8 Food hygiene knowledge and practices**

Knowledge of the consequences of unsafe food hygiene practice can enhance adherence to food safety guidelines. Studies on food hygiene have been done across the globe. In Philippines, a survey on food safety knowledge and practice of street food vendors in a university campus in Quezon City was carried out by Azanza, Gatchalian, and Ortega (2000). Topics such as health

and personal hygiene of vendors, food manufacturing procedures, food contamination and waste management as well as food legislations were assessed. The study found that among the 54 street food vendors surveyed, knowledge on food safety concepts was established particularly on topics that dealt with health and personal hygiene, food contamination and good manufacturing procedures; however, vendors were shown not to be knowledgeable in food legislation and waste management. A significant gap existed between knowledge and practice on these topics and this primarily attributed to the tendencies of street food vendors to compromise food safety for financial issue. The provision of continuous food hygiene education, some financial assistance through social service affiliation and basic water out waste management utilities were recommended to reduce the gap between knowledge and practices of safe vending on school campuses.

Burt, Volel and Finkel (2003), conducted study to assess the food handling practice of 10 processing mobile food vendors operating in Manhattan, New York City and found out that over half of all vendors served food with bare hands. Also some vendors were observed vending with visibly dirty hands or gloves and no vendors once washed his or her hands or changed gloves in the 20 minutes observation period. Muinde and Kuria (2005) had a study on Hygiene and sanitary practices of vendors of street foods and significant associations were found for vending practices and sanitation of vending environment.

According to Muinde and Kuria (2005), the most common food handling mistakes made by consumers as well as food vendors include serving contaminated raw food, cooking or heating food inadequately, obtaining food

from unsafe sources and cooling food inadequately. Consumers need to appreciate the seriousness of food borne-disease. They must learn to recognize unsafe food-handling practices, the latency period for some microbes and the symptoms of food-borne diseases. They also need to understand how to protect themselves through kitchen and personal hygiene, including thoroughness and frequency of hand washing, temperature control and safe food choices. Besides water, other raw materials are also important to the safety of the street vended foods because of the biological, chemical and physical hazards that they might introduce.

In order to keep prices down, some vendors purchase cheap or adulterated ingredients containing unpermitted chemical additives from unauthorized suppliers which may further increase the risks associated with the food so prepared. Raw meat, poultry and vegetables are commonly contaminated with large numbers of bacteria, including potential foodborne pathogens such as *B. cereus*, *C. perfringens*, *C. jejuni*, *E. coli*, *L. monocytogenes*, *Salmonella* and *S. aureus*. Spices are known to harbour a large number of microorganisms which include members of the genus *Bacillus*, anaerobic spore formers, enterococci, members of *Enterobacteriaceae*, a variety of yeast and mould and pathogens like coagulase positive staphylococci (Muinde & Kuria, 2005). Contamination of foods by spices which act as spore carriers has been reported to lead to food spoilage and can even lead to food poisoning. Spore formers in spices may lead to food spoilage, when they survive the cooking process and multiply under favourable conditions.

## 2.9 Economic importance of street vended food

The financial aspect of street food lies in it being a major source of urban food consumption for millions of middle to low income consumers, and is most commonly associated with its accessibility and low prices. Along those lines, street food stands are a source of income for many families (Winarno & Allain, 1991).

According to WHO (1996), street vended food plays an important role in the lives of many people in urban and peri-urban centres in developing countries. Street vended food serves as

A source of inexpensive, convenient and often nutritious food for urban and rural poor; a source of attractive and varied food for tourists and the economically advantaged; a major source of income for a vast number of persons, particularly women and an avenue for self-employment and an opportunity to develop business skills with low capital investment.

Winarno and Allain (1991) found in their study that the benefits of street food vending extend beyond the individuals and their families that own and operate these businesses. It provides an opportunity for low-income groups to access nutritious food at affordable prices. Street food vending, they noted, also provides ready markets for local farmers. This conclusion was confirmed by other studies conducted in the Ashanti region of Ghana which found that majority of the lettuce produced in Kumasi got purchased by street food vendors for their businesses (Maxwell *et al.*, 2000).

In a comparative study of street vending among four West African capitals (Bamako, Abidjan, Freetown and Accra), FAO (2012) reported that in West Africa, women tend to dominate in the sale of street foods. However, it was

also noted that consumers of street food cut across a variety of social backgrounds, income groups, gender, age and education. The report added that street food vending provides a large source of employment and offers abundant opportunities in the informal sector for low skilled people.

While opinions on the nature of consumers of street vended foods appear to vary among researchers (with some positing that street vended food is consumed mostly by low and middle income people, whilst others point out that it is for all manner of persons irrespective of one's income, educational background, gender or age), studies such as Mensah et al., (2002) notes that street vending provides an essential service to people such as workers, travelers and school children by offering them variety of complete meals, snacks and refreshments at relatively low prices. Similar observation was by Annan-Prah et al., (2011) in their study of street food vending in the central region of Ghana. Their study revealed that street vended foods provide the food needs of many local residents as well as tourists visiting the region by offering them various indigenous foods and beverages.

However, socioeconomic benefits breed risks, such risks include sanitation problems, traffic congestion in streets, social problems (child labour, unfair competition to formal trade), lack of knowledge of street vendors on food poisoning and diseases associated with preparation methods, and health hazards (Winarno & Allain 1991).

### **2.10 Choice of location for food vending**

The location of any business is important for its survival, growth, and success. The choice of business location is established in location theory which is concerned with the geographic location of economic activity, and

why businesses choose to locate where they are (Weber, 1999). It is based on the assumption that agents, including business owners, suppliers, governments, and customers, act in their own self-interest. Thus, the theory proposes that firms choose locations that maximize their profits and individuals choose locations that maximise their utility (Glatte, 2005). Location is particularly important to food vendors, because marketing success of the street food vendors depends exclusively on location and word-of-mouth promotion (Winarno & Allain, 1991).

Generally, certain factors may push a business away from a location, whereas other factors may draw the business to a certain location. To a great extent, the probable influence of any of the factors would depend on the type of business and the business objectives. According to Winarno and Allain (1991), factors that draw a business away from a certain location are “push” factors. These include increasing costs, more competition, reduction in demand, as well as poor communication and transportation systems. Conversely, those that “pull” a business toward a location are lower labour costs, a growing consumer base, government incentives, and improved transportation and communication systems.

### **2.11 Food safety and Sustainable Development Goals-SDGs**

The SDGs incorporate food safety into the targets of Agenda 2030 alongside food security, nutrition and health outcomes. As the World Health Organisation says, Food safety, nutrition and food security are inextricably linked. Unsafe food creates a vicious cycle of disease and malnutrition, particularly affecting infants, young children, elderly and the sick. Foodborne



diseases impede socioeconomic development by straining health care systems, and harming national economies, tourism and trade.

Improving food safety and hygiene is integral to the successful attainment of the Sustainable Development Goals (SDGs). Foodborne diseases continue to impose a high burden on low and middle-income countries (LMICs), particularly children under five years, and meeting stipulated conditions for both domestic and export markets can be challenging.

The SDG 2 target 1 states that by 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations including infants, to safe, nutritious and sufficient food all year round.

An estimated 600 million – almost 1 in 10 people in the world – fall ill after eating contaminated food and 420 000 die every year, resulting in the loss of 33 million healthy life years. Children under 5 years of age carry 40% of the food borne disease burden, with 125 000 deaths every year (WHO, 2019).

The Sustainable Development Goals (SDG) envisage “a world where we reaffirm our commitments regarding the human right to safe drinking water and sanitation and where there is improved hygiene; and where food is sufficient, safe, affordable and nutritious” (UN SDGs). However, specific focus in the SDGs has been placed on issues of nutrition, food security and sustainable agriculture, water, sanitation and hygiene, economic development, and poverty reduction, with little to no mention of specific food safety practices.

The control and reduction of foodborne disease has not been a development priority, despite its integral role in the health and well-being of the world’s population. According to Havelaar (as cited in Morse, Masuku, Rippon &

Kubwalo, 2018) foodborne disease has a health burden equal to, or in excess of, malaria, HIV/AIDS, or tuberculosis, with 98% of the burden falling on Low and Middle Income Countries (LMICs) and children. Improving food safety and hygiene at a national level can have widespread impact on a population, from reducing diarrhoeal disease.



## CHAPTER THREE

### METHODOLOGY

#### 3.0 Introduction

This chapter describes the methods and procedures of the study for the collection of relevant data for the purpose of addressing the research questions. Areas covered include the study area, research design, sources of data, data collection instrument, data collection procedure, study population, sample size, sampling procedure/selection of respondents and statistical data analysis.

#### 3.1. Study area

Sekondi is the administrative capital of the Sekondi-Takoradi Metropolitan Area and the Regional Administration. In 1930, the Sekondi Town Council was created to administer the development of the area under the Town Council Ordinance No. 26. In 1946 the Takoradi area was joined to the Sekondi Town Council as one administrative council. By June 1962, the Sekondi-Takoradi Town Council was elevated to a metropolitan assembly. The name was changed to Shama Ahanta East Metropolitan Assembly (SAEMA) through a Legislative Instrument (LI) 1316 in 1994. However, in 2008 the name was changed to Sekondi-Takoradi Metropolitan Assembly (STMA) through an LI 1928 after Shama was elevated as a District. The total land area of STMA is 219 kilometers square; it is bordered to the North by Mpohor district, Shama district to the east, Ahanta West district to the west and south by the Gulf of Guinea. STMA is located on coordinates 04° 55' 00" N and 01°46'00" W. It is also located on the west coast of Accra about 280 Km and 130km east from La Cote D'Ivoire.

Accessibility is the key to development in any country and with its physical environment such as the closeness to the sea, air strip and railways, STMA is strategically located and as a city there is the need to take advantage to enhance development through local economic development as it serves as a big market for informal activities such as trade and commerce.



Source: Ghana statistical service, 2010

**Figure 1: Map of Sekondi-Takoradi Metropolitan Assembly**

The average annual temperature of the Metropolis is 22°C. The mean annual rainfall is about 1,380mm and covers an average of 122 rainy days. There are two rainy seasons, namely the major and the minor. 70% of the rainfall occurs in the major rainy season which is the month of March to July. These rains are sometimes accompanied by storms and slight thunderous activities. The minor rainy season in the metropolis is from September to November. It is short and severe and this leads to flooding in most of the communities in the metropolis. The dry seasons are short and pronounced which occur from August to September and a more extended one from December to February which ends as the Harmattan. The weather condition provides a propitious environment for aquaculture and crop production in the metropolis.

### **3.2. Research design**

The research design of the study is a descriptive one. Descriptive research is used to obtain information concerning the current status of the phenomena to describe "what exists" with respect to variables or conditions in a situation.

The selection of a research design is based on how the problem is shaped, by the end result that is desired and by the questions that are being raised. Babbie and Mouton (2001) defined research design as a set of guidelines and instructions to be followed in addressing the research problem. This design relies on observation of street food vendors as a means of collecting data on the sanitary conditions persisting within their operational areas. It attempts to examine sanitary situations existing in order to establish what the norm is.

Descriptive studies are procedures for organizing and summarizing sample data so that one can communicate and describe their important characteristics.

The nature of the research being undertaken requires a descriptive study to help us better demonstrate the relationship between street food vending and hygienic practices. The study involves finding out food hygiene practices of the food vending industry as a social unit.

### **3.3. Sources of data**

Primary and secondary data were used for the study. The primary data was sourced through field investigation using researcher assisted questionnaires and field observations of street food vendors and their area of operation in Sekondi. Secondary data was sourced from the Environmental Health department of the Sekondi-Takoradi Metropolitan Assembly. Secondary information sources also included research publications on this subject and articles published on the internet.

### **3.4. Data collection instrument**

A self- designed structured questionnaire was used to collect information from street food vendors. The questionnaire comprised of both close-ended and open-ended questions. The open-ended questions were included to solicit additional information and detail responses from the respondents. The study also made use of an observational checklist to observe the environment within which the street food vendors operate.

### **3.5. Data collection procedure**

Data collectors were given guidance on the purpose of the study and how the questionnaires were to be administered and the components of the questionnaire. Data collected from respondents was based on their knowledge and practice of appropriate hygiene during handling of food. The questionnaires were delivered to the respondents at their selling places, and

interpreted to them in the local language where necessary for clear understanding before responding to each of the questions. A total of 85 respondents were sampled for the study.

### **3.6. Study population**

The targeted population for the study comprised of 215 registered street food vendors who operated their business on the streets of Sekondi.

### **3.7. Sample size**

The sample size for the study was 85 street food vendors.

### **3.8. Sampling procedure/Selection of respondents**

A simple random sampling was used in selecting the food vendors to respond to researcher assisted questionnaire. This was done by writing numbers on pieces of papers from 1 to 85. They were folded and then a piece of paper with a number was selected at a time. This method made it easier for any food vendor to be selected at random since the list of registered street food vendors was readily available at the Environmental health department of the Sekondi-Takoradi Metropolitan Assembly.

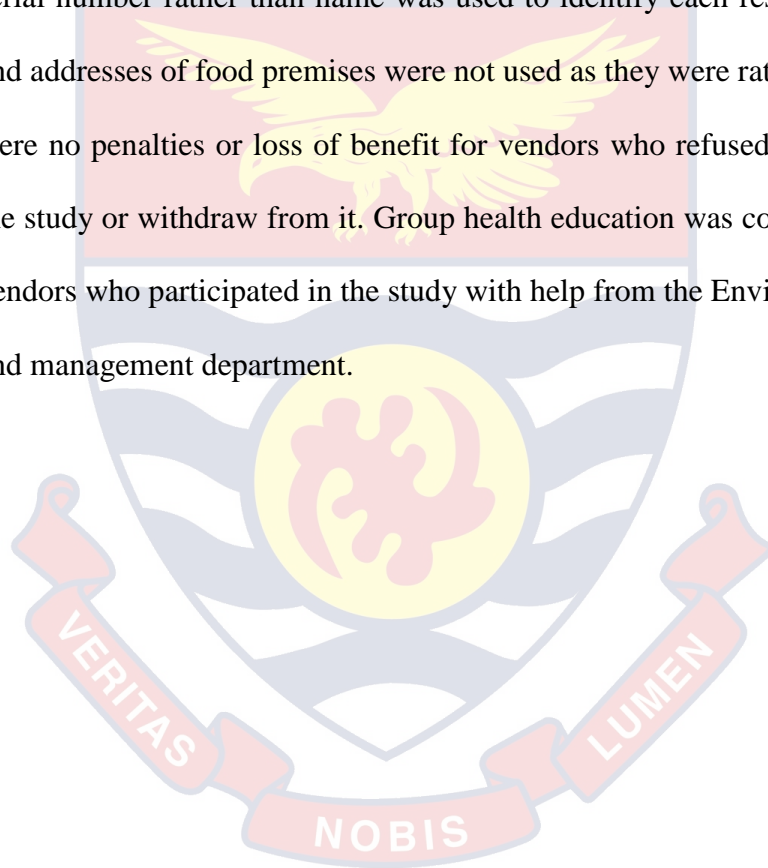
### **3.9. Data analysis**

The collected data were separated into components and reduce to more manageable pieces to allow for accurate interpretation and extraction of conclusions. For this study, data was analysed across the specified sample groups in order to identify common themes.

The analysis of quantitative data was done with the statistical analysis tool SPSS and Microsoft Excel. Most of the demographic characteristics about food vendors was analysed with this tool.

### 3.10. Ethical Considerations

Permission was obtained from the Environmental Health and management department of the city area council authority (Sekondi-Takoradi Metropolitan Assembly). Consent was obtained from each respondent before the conduct of interviews after adequate information was provided by the interviewer. Confidentiality and privacy were respected during the course of the study: serial number rather than name was used to identify each respondent. Names and addresses of food premises were not used as they were rather coded. There were no penalties or loss of benefit for vendors who refused to participate in the study or withdraw from it. Group health education was conducted for food vendors who participated in the study with help from the Environmental health and management department.





## CHAPTER FOUR

### RESULTS AND DISCUSSION

#### 4.0 Introduction

This chapter presents the results and discussion of the study in relation to the sanitary conditions of informal street food vending sites in Sekondi. Results were explained as pertained to the specific objectives. The first section of the chapter examined the demographic characteristics of respondents while the subsequent sections addressed the specific objectives of the study.

#### 4.1 Demographic characteristics of vendors

##### 4.1.1 Sex of respondents

The sex of the respondents was analysed and presented as shown in Table 2. Out of a total of 85 respondents, 80% were females, whereas 20% were males. The sex distribution of the street food vendors indicated that there were more females than males.

**Table 2. Sex of respondent**

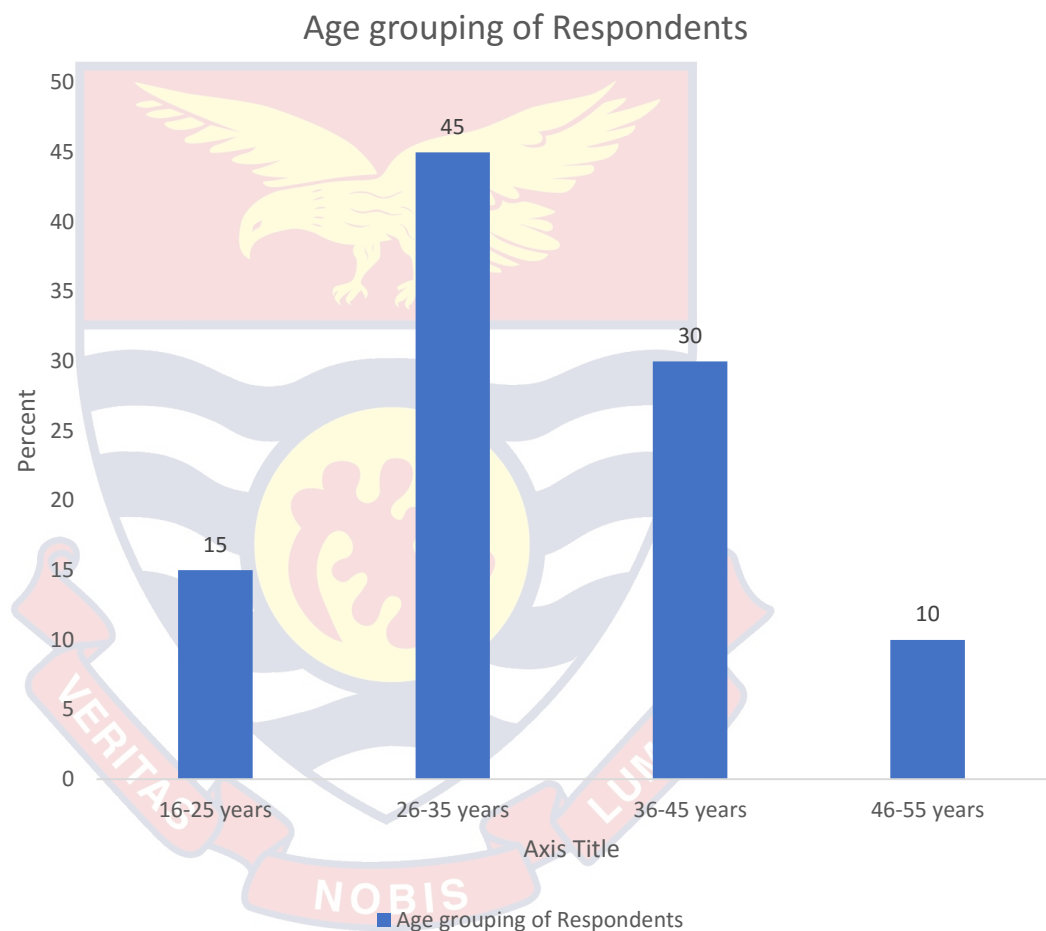
Sex	Frequency(N)	Percent (%)
Male	17	20
Female	68	80
<b>Total</b>	<b>85</b>	<b>100</b>

Source: fieldwork, 2019

In assessing the safety of handling food and serving practices of street food vendors most, 32 (94%), of the vendors who handle food with their bare hands were females, compared to 2 (6%) of their male counterparts.

The study further revealed that the sale of food near waste dump sites was mainly done by the female vendors forming 100% of the total street food vendors who ply their trade near waste dump sites. Handling food with bare hands may result in the transfer of pathogens from the hands to the food.

#### 4.1.2 Age of respondents



Source: field study, 2019

#### Figure 2: Age grouping of food vendors

The study revealed that 15 % of the street food vendors were between ages of 16 and 25 years old. The age group, representing 45 % (26-35 years), formed the highest proportion. This was followed by the age group 36-45 years, who formed 30 % of the total sampled street food vendors. The least were those

above the age of 46 years who formed 10 % of the sampled street food vendors.

#### 4.1.3 Educational level of respondents

The educational level of the respondents was also explored, given that some studies found that educational level of vendors was a significant determinant of the hygienic practices in food vending (Chukuezi, 2010 & Mensah et al. 2002).

**Table 3. Educational level of respondents**

Level	Frequency (N)	Percent (%)
Basic	38	45
Secondary	21	25
Tertiary	9	10
None	17	20
<b>Total</b>	<b>85</b>	<b>100</b>

Source: fieldwork, 2019

The study as shown in Table 3 revealed that, 45 percent of the sampled street food vendors had attained only basic education, they formed the majority of the respondents. The next proportion of the respondents had secondary education (25%), which covered those who had completed and acquired Junior High School and Senior High School certificates. Respondents with tertiary education only formed ten percent (10%) of the total sample, while 20% of the food vendors sampled did not have any formal education at all. Earlier studies that examined the educational attainment of food vendors presented mixed results. The Food and Agriculture Organisation (2007), found that a relevant

number of street food vendors had a secondary level of education (57% in Freetown, 47% in Accra).

#### 4.1.4 Length of Time running a food vending business

**Table 4: Length of time running a food vending business**

Period	Frequency(N)	Percent (%)
Less than one year	13	15
1-5 years	38	45
6-10 years	9	11
Above 11 years	25	29
<b>Total</b>	<b>85</b>	<b>100</b>

Source: fieldwork, 2019

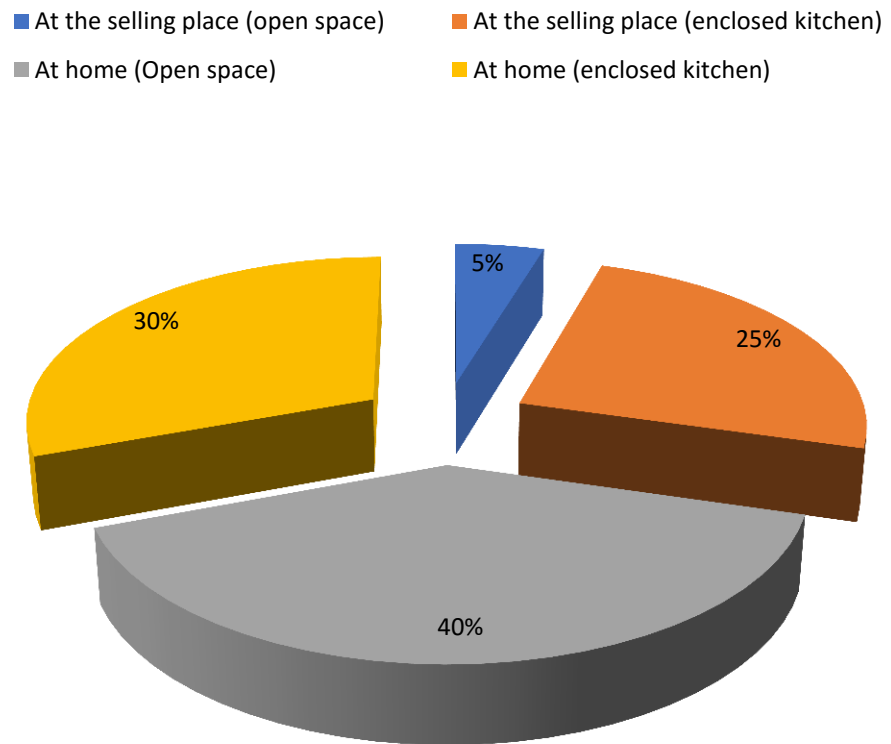
In examining the sanitary conditions under which street food vendors operated, their length of time of operation was taken into consideration. The study indicated that 45% of the operators had been in business between 1 to 5 years (Table 4). In contrast, Food and Agriculture Organisation (2012), on the other hand, found that most street food vendors in Accra had been in operation for more than 10 years. But this is not surprising that 29 percent of the respondents have been in business for over 11 years.

#### 4.2 Factors that influence the choice of location for street food vending

The characteristics of the vending outlets included a description of the site for food preparation. The wholesomeness of food being served partially depends on the environment under which such food is being prepared.

In Figure 3, it was found that 40% of the street food vendors cooked their food in the open spaces of their homes, 5% cooked their food in the open space near

their vending sites. Whilst a total of 55% of the street food vendors prepared their food in an enclosed kitchen both at home (30%) and their selling place (25%).



Source: fieldwork, 2019

**Figure 3: Place of cooking food**

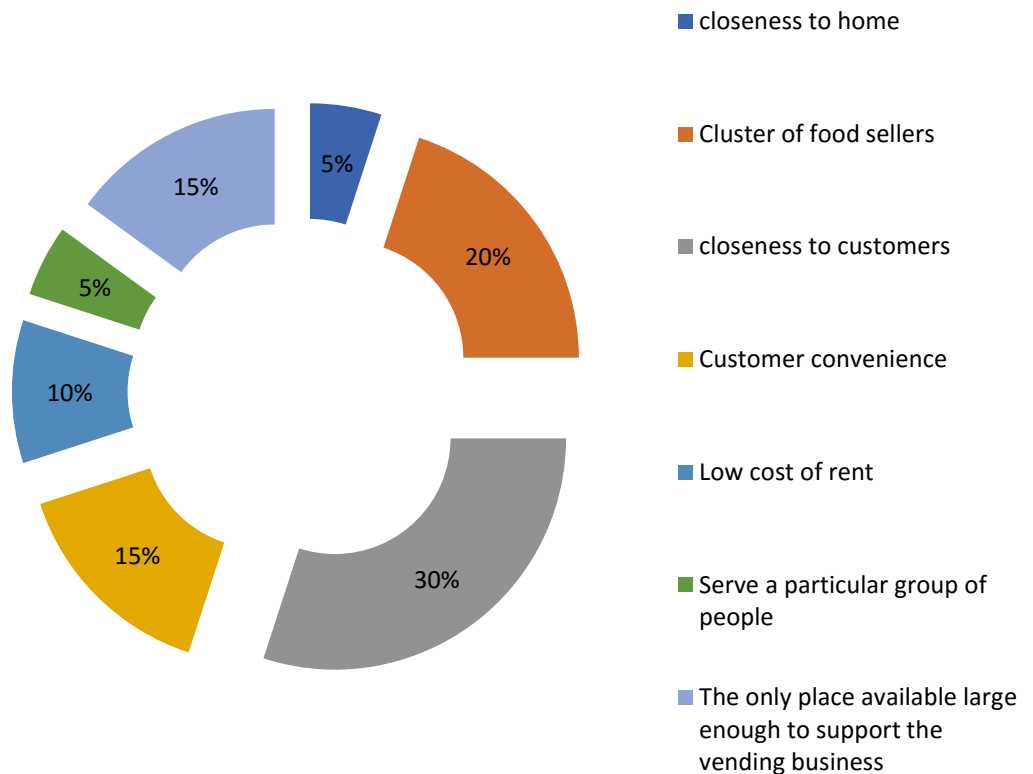
In assessing the safety of handling food and serving practices of street food vendors, 45 % of the respondents prepared their food in the open spaces (Figure 3). This means that there is a possible food contamination by microorganisms in the air and dust making food unsafe for human consumption. Exposed cooking utensils are another sources of food contamination



**Figure 4: Preparation of food in an open place**

Source: fieldwork, 2019

Microorganisms are found everywhere in the environment; many types can be found in air, dust and can contaminate food at any time during food preparation or when food is left uncovered (Figure 4). The primary factors that influenced the respondents' decision to locate their businesses at their current sites were also explored. The study found that 30% of the respondents chose their vending locations to closeness of their customers as shown in Figure 5. Twenty percent (20%) of the street food vendors chose their locations for cluster of food sellers. These responses might also mean that the vendors chose their locations due to closeness to customers since a cluster of food sellers attracts more customers. The study therefore revealed that closeness to customers was the commonest factor to all locational decisions made by the street food vendors.



Source: fieldwork, 2019

**Figure 5: Reasons for choosing vending sites**

In Table 5, nine per cent (9%) of food vendors were located near dump sites. This confirms that those street food vendors chose their locations because of the closeness to the scavengers working at the dump sites. These dump sites included waste container sites and waste transfer stations. It was found that health-related decisions were not mentioned by any of the respondents as the prime factor influencing their decision to locate their food vending businesses.

### 4.3 Observation of sanitary conditions

The study delved into the sanitary conditions of the food vending sites. This was done through observation. The purpose was to identify the conditions under which street food vendors ply their trade. The first variable that was assessed among the street food vending points was the presence of open sewage near the premises. The study revealed that there were no open sewages near all the vending points.

**Table 5. Closeness To Poor Sanitary Conditions**

Observation	Frequency (N)	Per cent (%)
Drainages	44	52
Dump sites	8	9
Public toilet	4	5
None	29	34
<b>Total</b>	<b>85</b>	<b>100</b>

Source: fieldwork, 2019

The locations of the vendors were also observed for closeness to open gutters and drainages, dump sites and public toilets. The observation revealed that 52% of the vendors were sited near open gutters. Another 9% were sited closer to dump sites and 5 percent operated near public toilets while 34 percent of the street food vendors were located away from either public toilet or waste dumps and open drains (Table 5). The dump sites included refuse container sites and crude dumping sites. Disease organisms would easily be transferred from contaminated sites to food by houseflies.





**Figure 6 :** Sale of food near dump site and open gutters

Source: fieldwork, 2019

#### 4.3.1 Availability of waste bins and litre around selling points

**Table 6.** Availability of opened and closed dustbins

Type of dustbin	Frequency (N)	Percent (%)
Opened	4	5
Closed	30	35
None	51	60
<b>Total</b>	<b>85</b>	<b>100</b>

Source: fieldwork, 2019

The study sought to find out about the availability of dust bins around selling points. It was observed that 35% of street food vendors had closed litre bins around their points of sales; 5 percent had litre bins without covers while 60% did not. It was also observed that these 60% of the street food vendors

had litres around their places of business. This means that unavailability of dustbins at a selling point make people litre around.

#### 4.4 Safety of handling food and serving practices of street food vendors

##### 4.4.1 Food Handling

**Table 7. Food handling methods**

Mode of handling food	Frequency (N)	Percent (%)
Bare hands	34	40
Hand covered with polythene material	30	35
Use of food handling thongs	21	25
<b>Total</b>	<b>85</b>	<b>100</b>

Source: fieldwork, 2019

One of the major issues of concern in food handling is hand-to-food contact in serving food. The study showed (Table 7) that 40 percent of the street food vendors made direct contact with the food with their bare hands (figure 7). It was noted that 35 per cent of the street food vendors covered their hands with polythene material (popularly known as ‘magrine cup rubber’ when picking up food. Others (25 % ) had food handling thongs to pick-up meat and other types of solid food that is picked up by thongs.

A study by Mensah et’al (2002) showed that the use of bare hands to serve food in Accra increased the level of contamination.



**Figure 7: Street food vendor handling food with bare hand**

Source: fieldwork, 2019

In selecting food ingredients for preparation food vendors usually look out for the physical appearance of the ingredient to determine whether it is wholesome for consumption. The respondents were asked to state what they physically look out for on the food stuffs before purchasing them. The results as shown in Table 8 revealed that majority (60%) of street food vendors look out for rotten part of the food item. However, twenty percent of the respondents noted that their primary inspection of food ingredients was the colour of the ingredient.

**Table 8: Physical appearance of food**

Indications	Frequency (N)	Percent (%)
Worms	4	5.0
Rotten parts	51	60.0
Tender parts	13	15.0
Colour	17	20.0
<b>Total</b>	<b>85</b>	<b>100.0</b>

Source: Fieldwork, 2019

Respondents were also questioned on what they would consider when selecting food stuff. The responses indicated that seventy-five percent (75%) preferred quality over cost and quantity. The study also revealed that all street food vendors had access to regular supply of pipe-borne water for cooking. A cumulative percentage of ninety percent of the food vendors used at least one type of food additives during food preparation.

#### 4.4.2 Use of protective clothing

**Table 9. Use of protective clothing**

Type of clothing	Frequency(N=85)	Percent (%)
<b>Use of head cap</b>		
Head cap	64	75
No head cap	21	25
<b>Total</b>	<b>85</b>	<b>100</b>
<b>Use of Apron</b>		
Apron	34	40
No apron	51	60
<b>Total</b>	<b>85</b>	<b>100</b>

Source: fieldwork, 2019

According to the study 75% of the street food vendors covered their hair while serving food (Table 9). The study further revealed that in most cases the sellers wore headgears instead of caps designed for caterers. Therefore, these street food vendors were not able to tuck all their hair under the headgears which still made them susceptible to falling into the food leading to food contamination. Sixty percent (60%) of the food vendors did not use aprons while cooking or serving food.



## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATION

#### 5.1 Summary

The study set out to assess the hygienic practices among street food vendors in Sekondi . The specific objectives were to examine the factors that influence the choice of location for food vending, assess the safety of handling food and serving practices of food vendors and examine sanitary conditions under which food vendors operate.

In examining the demographic characteristics of the street food vendors the study revealed that 80% were females, whereas 20% were males. The majority of the street food vendors were between the ages of 26 and 35 years old, forming 45 per cent and the least were those above the age of 46 years who formed 10 percent of the sampled street food vendors. 45% of the sampled street food vendors had attained only basic education; they formed the majority of the street food vendors. While 20% of the food vendors sampled did not had formal education at all. The majority of the street food vendors (45%) had been in business between 1 to 5 years.

The first objective of this study was to to examine the factors that influence the choice of location for food vending and the results of the study showed that the most significant factor influencing the choice of location of food vendors is closeness to customers, and therefore vendors did not take into consideration sanitary conditions around their vending points.

It was also noted that in most cases the food vendors did not choose a location to due to the cleanliness of the surrounding environment. Other

factors influenced the choice of location of food vendors, and they included easy access, low competition, and convenience.

The second objective was to assess the safety of handling food and serving practices of food vendors. The results of the study showed that most (60%) of the respondents noted that their primary inspection of food ingredients for rotten parts then colour of the ingredient.

All of the respondents had access to regular supply of pipe-borne water for cooking. Majority (75%) of the vendors covered their hair while vending food. Sixty percent (60%) of the food vendors did not use aprons while cooking or serving food. A little less than half (40%) of the respondents also made contact with food with their bare hands, and also food debris could be seen on their bare hands.

The third objective of the study was to examine sanitary conditions under which street food vendors operate. The results of the study revealed that there were no open sewages near all the vending sites, most (65%) of the food vendors operate near open drains. Twenty per cent (20%) of the food-vending outlets were located around dump sites as a result of closeness to customers. While five per cent of the foods were located near public toilet. Sixty per cent (60%) of the food vending outlets do not have dustbins available for the storage of waste.

## 5.2 Conclusions

From the findings of the study the following key conclusions were drawn :

- The majority (45%) of the street food vendors in the study area were between the ages of 26 and 35 years old.

- Most (65%) food vendors operated their trade along open drains, while others operated near dump sites and public toilets.
- Majority (60%) of the street food vendors had no dustbins which might allow for littering of waste at the selling points.
- Most (60%) of the respondents did not wear aprons.
- Forty per cent (40) street food vendors made contact with food with their bare hands as food debris could be seen on their bare hands.
- The most significant factor influencing the choice of location of food vendors was closeness to customers, and therefore vendors did not take into consideration sanitary conditions around their vending points.

### 5.3 Recommendations

Based on the findings and conclusion from the study, the following recommendations were made:

- Health authority should enforce laws on street food vending to ensure that street food vendors located their trade in sanitary environment to prevent possible transfer of infections.
- Food vendors need to be taken through regular and thorough training programmes to be abreast with new developments in food safety practices since they hold the lives of millions of people across the globe and their activities can cause unprecedented death and misery. Once a year training is not enough to help vendors especially vendors who are recruited before the time of training.



- Policy-makers, urban planners, development programme managers involved in the street food sector should implement a plan to achieve a two-fold aim:
  - a) further improve the safety of street food through major structural and infrastructural interventions;
  - b) motivate and facilitate the registration of street food vendors, to enable their monitoring.
- The environmental health officials should be well resourced and should embark on frequent media and personal education of the food vendors on safe food handling practices and also consumers on identifying safe foods to purchase on the streets

#### **Recommendations for further studies**

The study recommends further studies into the practical ways of implanting safety standards for food vendors. Further studies should also be on an analysis of microbial load of street foods samples in relation to location of the food vendors which would be useful in determining the specific environmental conditions that directly affect food contamination.

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APPENDIX  
QUESTIONNAIRE

PRESBYTERIAN UNIVERSITY COLLEGE-GHANA

FACULTY OF DEVELOPMENT STUDIES

ENVIRONMENTAL AND NATURAL RESOURCES MANAGE

DEPARTMENT

INTERVIEW SCHEDULE FOR FOOD VENDORS

This instrument seeks data on the hygienic practices of the food vendors in Sekondi for an academic study. Please answer as candidly as you can.

**SECTION A: DEMOGRAPHICS**

1. Sex a. Male b. Female
2. Age (a) 16-25 years  (b) 26-35 years  (c) 36-45 years   
(d) 46-55 years (e) 56 years and above
3. Level of education a. Basic b. Secondary c. Tertiary
4. Religion a. Christianity b. Islamic c. Traditional  
e. Other, specify.....

**SECTION B: FOOD HYGIENE PRACTICES**

5. Which of the following would you say influenced the choice for locating your food vending services?
- a. Closeness to home b. Only place demarcated by local authorities c. It is a cluster of food sellers  
d. Closeness to customers e.

Customer convenience e.g. Available parking or eating spaces f. The only space available large enough to support the vending

business g. Lower cost of rent h. Lower competition i. To serve a specific group of people (workers, race etc.) j. Others, please specify

6. For how long have you been selling or preparing food for sale?

(a) Less than 1 year  (b) 1 -5 years  (c) 6-10 years  (d) above 11 years

7. How did you acquire your knowledge on food preparation? a. From relatives b. Self-taught c. Catering school d. Others, specify \_\_\_\_\_

8. What do you consider before you select food stuffs?

a. Cost b. Quantity c. Quality d. Cultural background e. None of the above f. Specify if others \_\_\_\_\_

9. What do you physically look out for on the food stuffs before purchasing them?

a. Worms b. Rotten parts c. Tender parts d. Colour of the fruits and vegetables

e. Others, specify

10. Where do you buy your meat and animal foods from?

a. Meat shop b. Abattoir c. Cold store d. From open market

e. Others, specify

11. What do you look out for as indicators of safe meat?

a. Redness or colour of the meat      b. Smell of the meat      c. Darkened and soft spots

d. Texture of the meat      e. Others, specify \_\_\_\_\_

12. Where do you prepare your food before selling?

a. At the selling place (open space)      b. At selling place (enclosed kitchen)  
c. At home (open space)      d. At home (enclosed kitchen)

13. Who prepares the food?      a. Seller      b. Formally trained cooks

c. Home-schooled cooks      d. \_\_\_\_\_ Others, specify \_\_\_\_\_

14. Where is the source of your water supply?

a. GWCL      b. Borehole      c. Hand dug well      d. Other, specify \_\_\_\_\_

15. Which of food additives and condiments do you use during and after food

preparation? a. Preservatives      b. Colour      c. Flavours      d. Flavour enhancers  
e. Emulsifiers

16. How do you transport foodstuff to cooking site?

a. By carrying      b. By car      c. By carriage truck

17. Where do you store cooked foods?

- a. In an open plastic bowl    b. In an ice chest    c. In a saucepan    d. In a plain rubber suck e. Specify if others \_\_\_\_\_

18. How do you keep food warm before serving?

- a. Reheating by microwave before serving    b. Keeping food in an enclosed ice chest

- c. Keeping food in saucepans with lids    d. Keeping food in plastic cases

- e. Others, please specify

19. How often do you wash your plates?

- a. At the end of the day    b. After each use    c. At the beginning of sales

20. How many hours do you sell in a day?    a. 2    b. 4    c. 6    d. 8    e. 10    f. 12

21. How do you treat leftover foods?

- a. Consume by self and family    b. Discard as waste    c. Reheat for sale the next day

- d. Others, specify \_\_\_\_\_

22. How often do you go through medical examinations?

- a. Every 6 months    b. Yearly    c. Two years    d. None

23. How often do you receive health education on food hygiene?

- a. Monthly    b. Quarterly    c. Annually    d. None

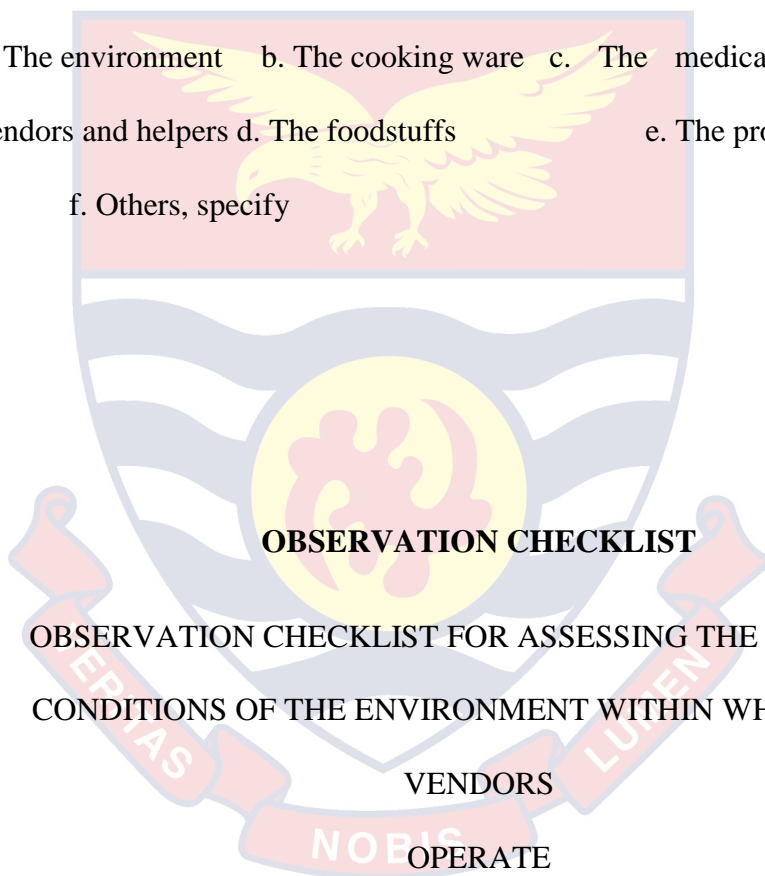
**SECTION C: INSTITUTIONAL SET-UP GOVERNING SAFE PRACTICES OF FOOD VENDORS**

24. How frequent do health officials visit you to inspect your place?

- a. Weekly    b. Monthly    c. Quarterly    d. Annually    f. None

25. What do the authorities inspect before issuing the continuance of your operations?

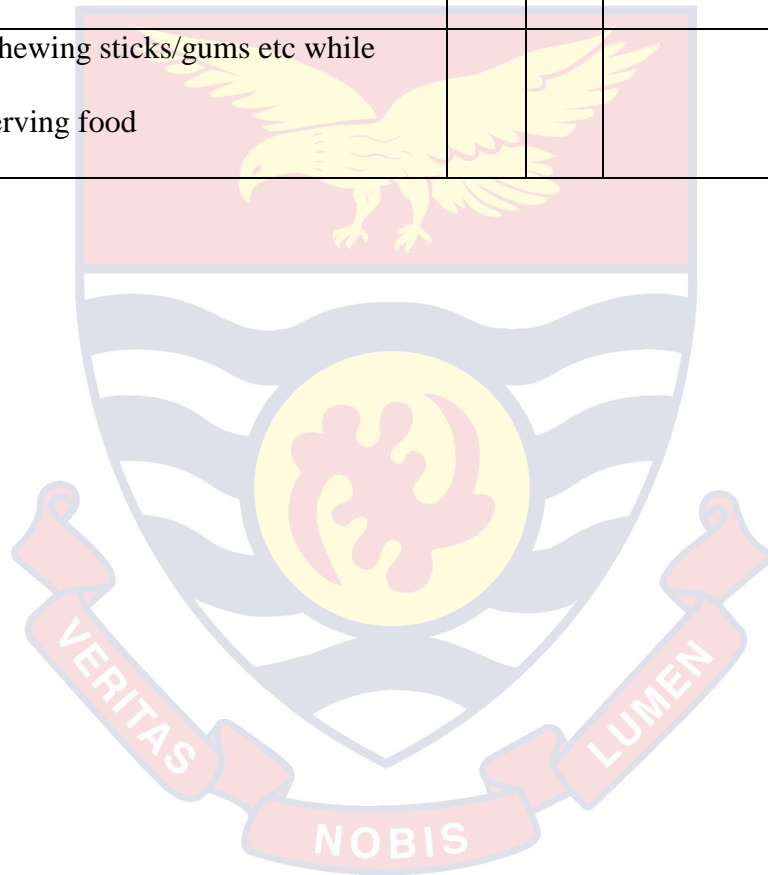
- a. The environment    b. The cooking ware    c. The medical certificate of vendors and helpers    d. The foodstuffs    e. The protective ware  
f. Others, specify



Vendor identification number:			
	Yes	No	Comment
Food sold near open sewage			
Food sold near gutters			
Food sold close to bush			

Food sold close to refuse dump			
Public toilets			
Litter around the selling points?			
Availability of open dustbins			
Availability of covered dustbins			
Flies making direct contact with food served			
Use of clean water for washing plates			
Foods prepared are stored in:			
a. Flytrap sieve case			
b. Glass screen case			
c. Open bowl			
d. Plain rubber suck			
e. Ice chest			
Hair covered			
Street food vendors wear aprons			
Street food vendors touch the food with their bare hands			
Street food vendors use food handling thongs			
Street food vendors touch the food			

and money with same bare hands			
Jewellery on hands make contact with the food			
Particles of food on hands			
Customers allowed to make contact with food			
Talking while serving food			
Chewing sticks/gums etc while serving food			





FACULTY OF DEVELOPMENT STUDIES

Name of Department: Environment and Natural Resources Management

Programme of Study: MSc. Environmental Health and Sanitation

Topic: Assessment of hygienic practices among street food vendors in Sekondi, Ghana

Name of Student: Emmanuel Mawusi Aglidza

Student's ID: 18030001

RESPONSE MEMO

NO	COMMENTS	STUDENT'S RESPONSE TO COMMENTS
<b>EXAMINER</b>		
<b>Suggested corrections in thesis in red pen</b>		
	Front matters	
1.	<ul style="list-style-type: none"> <li>Front page, insert ‘,’ and ‘Ghana’ at the end of the topic.</li> </ul>	<ul style="list-style-type: none"> <li>“,” and ‘Ghana’ inserted at the end of the topic to read as ‘Assessment of hygienic practices among street food vendors in Sekondi, Ghana’.</li> </ul>
2.	<ul style="list-style-type: none"> <li>Abstract should be properly written to cover the essential elements of an abstract- objective, methodology, results, conclusion and recommendation.</li> </ul>	<ul style="list-style-type: none"> <li>The abstract has been re-written to reflect the essential elements- objectives, methodology, results, conclusion and recommendations.</li> </ul>
3.	<ul style="list-style-type: none"> <li>The work should be structured to fit the faculty guidelines for writing dissertation.</li> </ul>	<ul style="list-style-type: none"> <li>The guide for writing and presenting dissertation (2018 edition) has been duly followed.</li> </ul>
4.	<ul style="list-style-type: none"> <li>Create a list of Acronyms</li> </ul>	<ul style="list-style-type: none"> <li>List of acronyms created in page xii and has</li> </ul>

<p>5.</p>	<ul style="list-style-type: none"> <li>The margins should be checked to conform to the standard</li> </ul> <p><b>CHAPTER ONE</b></p> <ul style="list-style-type: none"> <li>The objectives and research questions should be numbered.</li> <li>Significance of the study should include academia and the study area</li> </ul>	<p>also reflected in the Table of contents.</p> <ul style="list-style-type: none"> <li>Margins checked and corrected: front cover: Presbyterian University College, Ghana is 5.08 cm from the top of the page and also the month and year of presentation is 5.08 cm (2 inches) from the bottom of the page.</li> <li>Inside cover or the title page margins corrected: top and bottom of page is 5.08 cm</li> <li>The objectives and research questions corrected from ‘a., b., &amp; c.’ to ‘1., 2. &amp; 3.’</li> <li>Significance of the study on academia and study area has been included in the ‘Significance of the study’ chapter one, page 5.</li> </ul>
<p>1.</p>	<p><b>CHAPTER TWO</b></p> <ul style="list-style-type: none"> <li>The heading should be “ Review of</li> </ul>	<ul style="list-style-type: none"> <li>Chapter two heading changed from</li> </ul>

2.	<p>Related Literature” not “Literature Review”</p> <ul style="list-style-type: none"> <li>• Compare and contrast the issues presented in literature review</li> <li>• Consider current literature</li> </ul>	<p>“Literature Review” to “ Review of Related Literature”</p> <ul style="list-style-type: none"> <li>• Related literature has been compared and contrasted in some areas but not much</li> <li>• Current literature was not readily available due to scarcity of related literature</li> </ul>
1	<p><b>CHAPTER THREE</b></p> <p>1 Include ethical consideration</p>	<ul style="list-style-type: none"> <li>• Ethical consideration has been included in the work. Page 36</li> </ul>
2	<p>2 Relate the research design to your work</p>	<ul style="list-style-type: none"> <li>• Research design has been related to the work and is indicated in page 33.</li> </ul>
3	<p>3 Show the total population of the respondents and the sampled population</p>	<ul style="list-style-type: none"> <li>• The total population has been provided as “215 registered street food vendors in Sekondi” page 35.</li> <li>• The research did not consider specific groups of street food vendors (if any) but rather considered all street food vendors (as target population) who operate their trade in the streets of Sekondi.</li> </ul>

4	Show the sources of the primary data	<ul style="list-style-type: none"> <li>The sample size was stated in the work as 85 street food vendors.</li> <li>The sources of the primary data has been shown in the work as data collected from street food vendors in Sekondi using questionnaires and observation checklist.</li> </ul>
5	The subheading 3.9 in page 35 should be “Data analysis” not “Statistical and data analysis”	<ul style="list-style-type: none"> <li>Subheading 3.9 in page 35 changed from “Statistical and data analysis” to “Data analysis”</li> </ul>
<b>CHAPTER FOUR</b>		
1	Organise the Tables and the Figures properly.	<ul style="list-style-type: none"> <li>Tables and Figures have been properly. Gaps between names of Tables and the tables have been closed and Lines around Figures removed</li> <li>Issues on Table 8 have been resolved</li> </ul>
<b>REFERENCES</b>		
1	Some references do not comply with the APA referencing style	Corrections have been made to references to ensure that they comply with the APA referencing style.
2	There are some in-text references that have not been listed at the references section	The whole work has been checked for

		inconsistences in the in-text references and the missing ones have been corrected.
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**Declaration by Candidate:**

I declare that I have attended to and incorporated the comments made by the examiner in the dissertation.

Name of Student: Emmanuel Mawusi Aglidza

Signature: ..... Date:.....

**Approved by:**

Name of supervisor: Mr Samuel Akpa Yeboah

Signature: ..... Date: .....

