

PRESBYTERIAN UNIVERSITY COLLEGE, GHANA

FACULTY OF DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES

MANAGEMENT

ASSESSMENT OF FOOD HYGIENE PRACTICES AMONG STREET

FOOD VENDORS IN AYENSUANO DISTRICT GHANA

A Dissertation submitted to the Department of Environmental and Natural
Resources Management of the Faculty of Development Studies,
Presbyterian University College, Ghana in partial fulfillment of the
requirements for the award of Master's degree in Environmental Health and
Sanitation

BY

AMEDEWONU DIAMOND KWAME

2020

DECLARATION

Candidate's Declaration

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

Name: AMEDEWONU DIAMOND KWAME

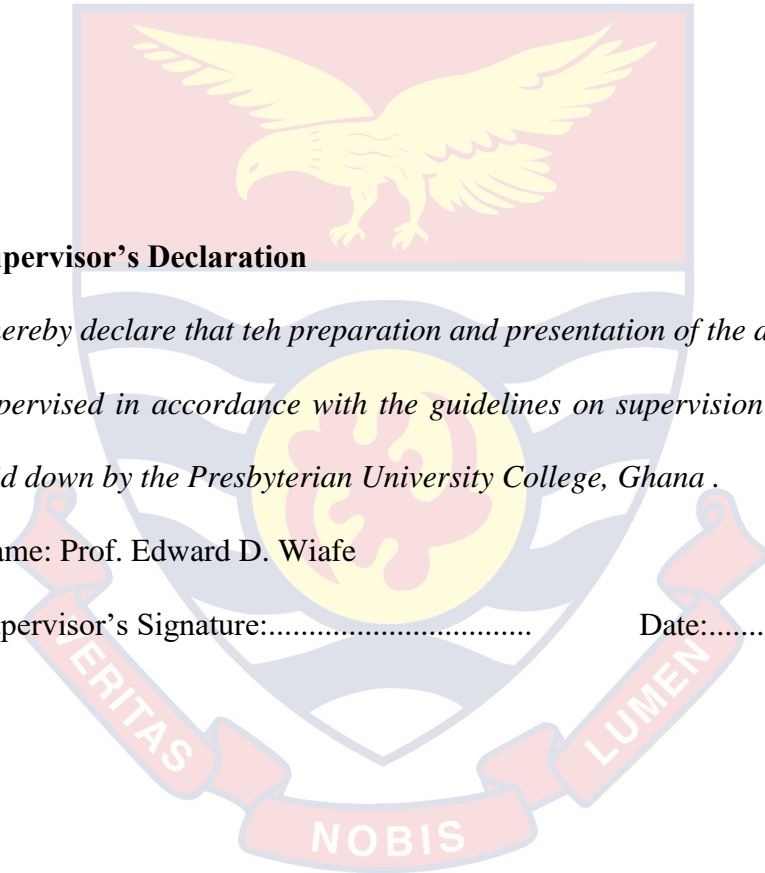
Candidate's Signature:..... Date:.....

Supervisor's Declaration

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the Presbyterian University College, Ghana .

Name: Prof. Edward D. Wiafe

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



ABSTRACT

The study seeks to examine the knowledge level of food vendors on hygiene practices in Ayensuano District. Simple random sampling techniques were used in selecting one hundred and fifteen (115) respondents. Data were collected through interviews, using structured questionnaire. Data collected were analyzed by using SPSS and EXCEL to derive frequency and percentage tables since it involved qualitative data. Majority of the respondents 76.6% have been medically screened and issued with medical certificate of fitness to handle food for public consumption. The results also revealed that, 60% of the street food vendors were not aware of the existence of bye laws governing the sale of cooked foods. Few of the street food vendors 22.6% underwent some kind of training on food hygiene whilst 77.4% neither underwent any form of formal training in food preparation nor did they attempt to seek it. Less than half of the vendors 44% did not wear protective clothing whilst 57.4% did not wear headgears or caps, and 51.3% handled food with bare hands and this could lead to contamination of the foods. Majority of the street food vendors 86.1% used potable water as their source in preparation of food. Without enough water, hygiene and sanitary practices cannot be met. Although, the respondents indicated that the Environmental Health Personnel were doing well in health education, more was expected of them with regards to the enforcement of bye laws on food hygiene, and by prosecuting the recalcitrant. The Ayensuano District Assembly should resource the Environmental Health and Sanitation Unit and other institutions to enhance health and hygiene education for ready food vendors to prevent food contamination.

ACKNOWLEDGEMENTS

First and foremost, my appreciation goes to the Almighty God for being my sustainer and protector throughout the duration of this research. My special gratitude goes to my supervisor, Professor Edward Wiafe for his time and patience in providing insightful comments to improve the quality of the research.

I also thank Dr. Stephen Omari the head of Environmental and Natural Resources Department of Presbyterian University College, Ghana, and Prof. Clement Essuman, the Dean of School of Physical Science, University of Cape Coast (UCC), for their advice, encouragement, co-operation and assistance that enabled me to complete this research successfully.

I am grateful to Dr. E. K. Obeng, the Head of Water and Sanitation Department, University of Cape Coast, Mr. George Addo, Municipal Community Development Officer, Mr. Prince R. Klu, Municipal Water and Sanitation Team Hygiene Education Officer and Mr. Borlor Stanley Senior Environmental Health Officer, all in Nsawam Adoagyiri Municipal Assembly, for their immense contribution towards the successful completion of this research work and all my staff of Ayensuano Environmental Health Officers, especially Mr. Okyere Isaac.

Finally, my special acknowledgement goes to my dear wife, for her spiritual and material support shown to me throughout my research. To all others, I say a very big thanks, May the good Lord Richly Bless you.

DEDICATION

This project work is dedicated to the almighty God for his protection and guidance throughout the study and through whose grace I am alive to present this dissertation. To my wonderful wife, sons, daughter, siblings and all my loved ones need special mention for their support during my entire Msc. Environmental Health and Sanitation programme.



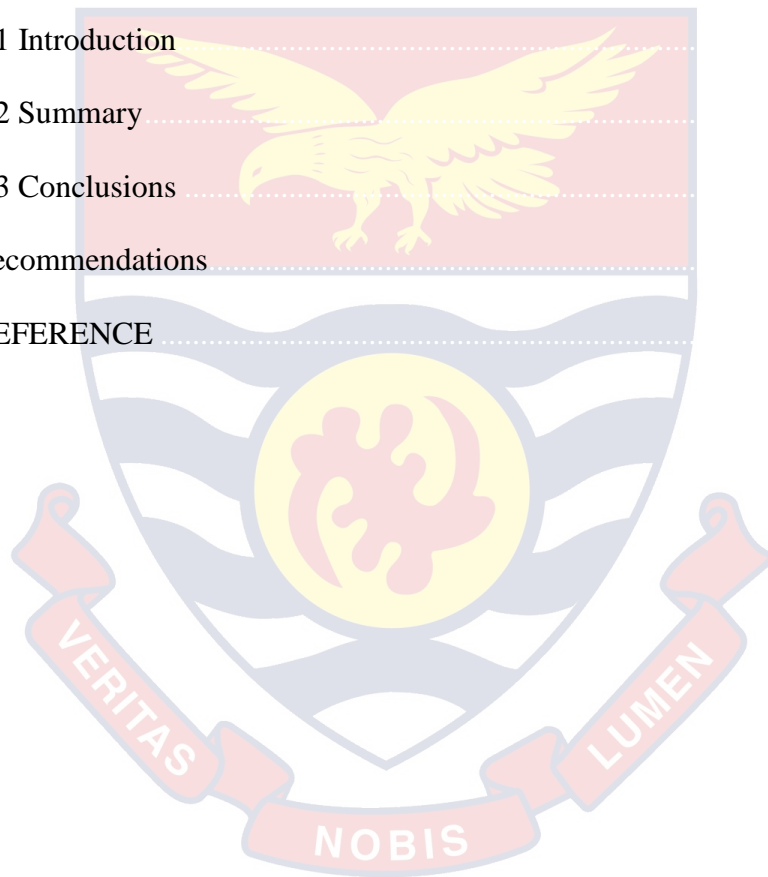
TABLE OF CONTENTS

DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
DEDICATION	v
TABLE OF CONTENTS	vi
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF ABBREVIATIONS	xii
CHAPTER ONE:INTRODUCTION	1
1.1 Background of the Study	1
1.2 Statement of the Problem	3
1.3 Research Objectives	5
1.4 Research Questions	5
1.5 Significance of the Study	6
1.6 Scope of the Study	6
1.7 Organization of the Study	7
Operational Definitions	7
CHAPTER TWO:REVIEW OF RELATED LITERATURE	9
2.1 Street Foods	9
2.2 Food Hygiene Standard	11
2.3 Preventing Food Contamination	12
2.4 Food borne Disease	14
Three Main Types of Food borne Disease	15
2.5.1Food infection	15

2.5.2 Food intoxication	16
2.6 Safe Food Practices	17
2.7 Pest Control and Its Effect on Food Safety	18
2.8 Personal Hygiene of Food Vendors	19
2.9 Equipment Use in Food Preparation	22
2.10 Importance of Storage of Food	23
2.11 Medical Examination for Food Vendors	24
CHAPTER THREE: METHODOLOGY	26
3.1 Introduction	26
3.3 Research Method	29
3.4 Research Design	30
3.5 Target Population	31
3.6 Type and sources of Data	32
3.7 Sample size	32
3.8 Data collection Instrument	32
3.8.2 Questionnaire	33
3.9 Sampling Procedure	35
3.10 Data collection Procedure	35
3.11 Pre-testing Instrument	35
3.13 Ethical Issues and Clearance	36
CHAPTER FOUR: RESULTS AND DISCUSSION	38
4.1 Introduction	38
Demographic of the respondents	38
4.2.1 Sex and Age	38
4.2.2 Educational Background of Food Vendors	40

4.2.3 The Number of Years the Respondents Is in The Business	40
4.3 Acquisition of Education on Food Hygiene by Food Vendors	41
4.4 The Respondents' Awareness of Rules and Regulation on Food Hygiene and Safety	42
4.5 The Acquisition of Training on Food Hygiene by The Respondents	43
4.6 Obtaining of Permit by Food Vendors for The Commencement of Business	44
The Personal Hygiene of Food Vendors on The Street	45
4.7 Wearing of Headgears by The Respondents.	45
4.8 Wearing of Protective Clothing by The Respondents	46
4.9 Dishing Out Food for Customers by The Respondents	46
4.10 The Critical Conditions of Washing Hands During Food Preparation	47
4.11 The Sources of Water Use by The Food Vendors	48
4.12 The Type of Facility Uses by The Respondents in Storing Water	49
4.13 The Type Storage Facility Use by The Respondents Before Disposal of Waste	50
The Compliances of Food Vendors in Acquisition Of medical Examination Certificate	51
4.14 The Reasons for Food Vendors to Undergo Medical Examination	51
4.15 The Recent Dates of Medical Examination Acquire by The Respondents	52
4.16 The Difficulties That the Respondents Encounter in Obtaining Medical Certificate	53
Nature of Difficulties in Acquisition of Medical Certificate	54

4.17 Sanctioning of Respondents by The Various Institutions	54
The Food Vendors Knowledge on Food Borne Diseases	55
4.18 The Respondents' Knowledge of Food Borne Diseases	55
4.19 The Common Illness Experience by The Respondents	55
4.20 What The Food Vendors Do When Experiencing Common Illness	56
CHAPTER FIVE:SUMMARY, CONCLUSION AND	
RECOMMENDATION	58
5.1 Introduction	58
5.2 Summary	58
5.3 Conclusions	58
Recommendations	60
REFERENCE	63



LIST OF TABLES

Table 1 :Sex of Respondents	39
Table 2: Age of Respondents	39
Table 3: Level of Education the Respondents	40
Table 4: Number of Years the Respondents Is in Business	41
Table 5: Kinds of Education on Food Hygiene	42
Table 6: Awareness of Rules and Regulations on Food Hygiene and Safety	43
Table 7: Kinds of Training on Food Hygiene	44
Table 8: Permit to Operate Business	45
Table 9: Importance of Wearing Headgear	45
Table 10: Importance of Wearing Protective Clothing	46
Table 11: Means of Dishing Out Food for Customers	47
Table 12: Most Critical Points of Hand Washing During Food Preparation	48
Table 13:Water Storage Facilities	50
Table 14: Storage of Waste Before Disposal	51
Table 15: Need for Food Vendor to Undergo Medical Examination	52
Table 16:Evidence of Recent Dates of Medical Examination	53
Table 17:Nature of Difficulties in Acquisition of Medical Certificate	53
Table 18: Sanction of Food Vendors by Institutions	54
Table 19: Knowledge of Food-Borne Diseases	55
Table 20: What Food Vendor Does When Experience Common Illness?	57

LIST OF FIGURES

Figure 1: Source of Water Use in Food Preparation	49
Figure 2: Experiencing of Common Illness	56



LIST OF ABBREVIATIONS

EHSD	Environmental Health and Sanitation Department
FAO	Food and Agriculture Organization
GESD	Ghana Education Service Statistical Department
GHS	Ghana Health Service
GNA	Ghana News Agency
HACCP	Hazard Analysis Critical Control Point
GHP's	Good Hygiene Practices
GMP's	Good Manufacturing Practices
MOFA	Ministry of Food and Agriculture
MOH	Ministry of Health
AyDA	Ayensuono District Assembly
NGO	Non-Governmental Organization
NPHC	National Population and Housing Census
PNDC	Provisional National Defense Council
RPC	Reasonably Preventable Condition
SPSS	Statistical Package for the Social Sciences
VIP	Ventilated improve pit
WB	World Bank
WC	Water closet

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Food hygiene is a set of basic principles employed in the systematic control of the environmental conditions during production, storage, processing, and preparation, selling and serving of food in such a manner as to ensure that food is safe to consumer and is of good keeping quality, (WHO, 2008). Food hygiene depends on largely on the personal hygiene practices of food vendors, Ifeadike *et al.* (2014). According to Fosket and Ceserani (2007), hygiene is the science and practice of manufacturing health and preventing diseases in every catering establishment that provides food. Suffice it to mention that conscious effort must always be put in place to protect people as well as the environment from bacteria in order to eliminate combination of the food that people eat, (WHO, 2010).

Street foods generally refer to ready-to-eat foods and beverages prepared either at home or on the streets and sold by vendors, especially on streets and other public places, (FAO/WHO, 2009). These foods provide a source of inexpensive, convenient and often nutritious food for both the urban and rural poor as well as attractive and varied food for tourists. Food and Agriculture Organization, (2008) points out that, 2.5 billion people eat vended food every day. Particularly for women in the developing world, street-vended foods also serve as a major source of livelihood providing a means of self-employment and the opportunity to develop business skills with low capital investment. In Accra, the capital of Ghana, it is estimated that there are about 60,000 vendors of ready-to-eat foods, Odonkor *et al.* (2011) with an estimated

annual revenue of about 100 million dollars and a profit of 24 million dollars (Agyei-Takyi.,2012). World Health Organization (2008) suggests that, food-borne disease account for about 2.2 million deaths annually, out of which about 86% are children. In Ghana, about 65,000 people die annually from food-borne diseases resulting in the loss of US\$69million to the economy, Ministry of Food and Agriculture and World Bank (MOFA/WB, 2006). The operation of fast food joints, restaurants and chop bars has increased in the Ghana community, especially in the urban areas (Ayeh-Kumi *et al.*, 2009).

The number of reported outbreaks of food-borne diseases has been high, both in developed as well as developing countries. However, the problem is exacerbated in developing countries due to economic reasons, poverty, the lack of adequate health care facilities, and the dearth of data regarding food-borne diseases, (World Health Organization, 2005). Food contamination in developing countries is caused by many factors including traditional food processing methods, inappropriate holding temperatures, and poor personal hygiene of food, (Jacob, 1998). In Ghana, as well as, in many countries in the African region, there is an abundance of national legislation but limited resources to control street food safety. Institutions such as the Ghana Standards Authority and the Food and Drugs Board are committed to the work of regulating food standards and training the general populace on food safety issues. A number of outbreaks have recently been reported in Ghana. For example, four persons died in Sheho (Upper East Region) after eating contaminated meat reported by (GNA, 2013). Also, a cholera outbreak in Atebubu (Brong Ashafo Region) claimed nine lives reported by (Ghana Web,2013) while another such outbreak resulted in the death of one person in

Obuasi (Ashanti Region) and the hospitalization of over 50 reported by (Joy news, 2013). According to (EHSD/GHS, 2014), Ayensuano District recorded 60 cases of cholera patients with no death.

1.2 Statement of the Problem

Over the years and in recent times the street food sub sector has gained a lot of attention from public health practitioners, local and international organizations as well as social science researchers (Zeru *et al.*, 2007). Even though the food chain industry is considered an important part of the economies of many developing countries by providing employment and readily accessible cooked meal at relatively cheaper prices, there have been major concerns over the quality and safety of street foods (Wuliyeng, 2013). Street food is often regarded unhygienic and of low quality, sometimes due to the poor environmental conditions under which food is prepared or sold, and also due to inadequate knowledge in food safety regarding food preparation and handling by food vendors (Rheinlander, 2006; FAO, 2009; Annan-Prah *et al.*, 2011).

According to Zeru *et al.* (2007) and Mukhopadhyay *et al.* (2012), in low- and middle-income countries, approximately 70% of cases of diarrheal disease are linked to the eating of unwholesome food. This is because most handlers of street foods in Africa and the developing world at large, to a great extent are lacking in knowledge, education or training on basic food safety issues. As a result, street foods are often susceptible to unsafe abuses, in many cases at all stages of handling products (from the raw material to the finished stage) are often laid open to sources of contamination (Annor *et al.*, 2011). Various factors have been said to be associated with unhygienic practice among

street food vendors which include inefficient or lack of effective education, training of food vendors on health and hygiene, non-provision of needed infrastructure as well as non-regulation and enforcement of by-laws governing street food vending by local authorities (ISSER, 2002; Wuliyeng, 2013)).According to FAO (2009), unhygienic street food is linked to an outbreak of serious food poisoning in most parts of the world. In a research conducted on the microbiological quality of street food in Accra, Mensah *et al.* (2002) found that some of the main dishes were contaminated with bacteria of various kinds.

The researchers attributed the contamination to improper handling of cooked food by vendors, poor storage of cooked food, serving of food with bare hands, and inadequate reheating of food cooked in advance of consumption. An investigation was carried out by the Food and Drugs Authority and the Ghana Health Service to trace the source of a cholera outbreak involving 49 cases in the Akwapim South Municipality in 2012. The team revealed that the cholera outbreak was a result of eating a contaminated street food called “waakye” (rice and beans) from Nsawam (Ministry of Health/Ghana Health Service Report, 2012) as cited in Wuliyeng (2013, p3).

Major risk factors identified by the team of investigators were unhygienic food handling practices and unavailability of adequate toilet facilities around where food was sold (Ministry of Health/Ghana Health Service Report, 2012). In Kumasi, a similar study by Rheinlander (2006) raised concerns about the poor infrastructure with which street food vendors work and how that influenced the quality and safety levels of most street foods in Ghana. Another study conducted in the Niger Delta University in Nigeria showed how traditional methods of processing and

packaging food are evident in improper holding and temperature by food handlers (Oghenekohwo, 2015).

A significant number of studies regarding food hygiene have been done in Ghana. These studies over the years have focused on street food vendors at the large and open markets in the cities, towns and other urban areas. However, an insignificant number has looked at examining food vendors that operate in towns (Rheilander, 2006; Annor and Baiden, 2011; Monney *et al.*, 2013; Addison 2015). Furthermore, a holistic approach or studies that look at the dimension or perspectives of the food vendor, food consumer and regulatory bodies appear to be limited and few have been carried out in the study area. It was based on these research gaps that this study was conducted.

1.3 Research Objectives

The main objective of the study is to examine how food hygiene is being practiced by street food vendors in Ayensuano District, Ghana. The specific objectives of the study are:

1. To examine the knowledge level of food hygiene among food vendors in Ayensuano District.
2. To assess the personal hygiene among food vendors in the Ayensuano District.
3. To assess the level of compliance to acquisition of medical examination certificate by the food vendors in the Ayensuano District.
4. To ascertain the knowledge of food-borne diseases among food vendors in the Ayensuano District.

1.4 Research Questions

The research questions that would guide this study are stated below.

1. Have you any knowledge on food hygiene practices?

2. What are some of the activities that pertain to personal hygiene?
3. Have you any level of compliance to acquire medical examination certificate?
4. Mention any food- borne diseases that you know?

1.5 Significance of the Study

The purpose of the study is to find out the food hygiene practices among food vendors and the level of awareness about food-borne diseases. This will help suggest appropriate methods of intervention in solving the menace. The study will be of importance to the District Assembly and any NGO wishing to assist in solving the aforementioned health problems in the districts. It will serve as a baseline for any future health education programmed in the districts as far as food hygiene is concerned, thus improving health, prolonging life individually in the districts and Ghana as a whole. This research work would also enable future researchers not to waste time and resources to research into the same health problem. It would assist food vendors to know the diseases associated with preparation and serving of food under unhygienic conditions and also sources of contamination.

1.6 Scope of the Study

The topic under study selected (115) food vendors, who were within the confines of the Coaltar Township. The study was limited to only University of Ayensuano District, Coaltar and did not cover any other towns within the District. The study targeted food vendors from the various vending points which are their main food outlets established by themselves Food vendors who did not operate the Coaltar Township were excluded from the study.

1.7 Organization of the Study

This project shall be divided into five chapters. The first chapter provides the introduction, background of the study, statement of the problem, the aim and objectives of the study, the purpose and research questions, and organization of the study. Chapter Two shall present both theoretical and empirical relevant and related literature concerning food hygiene practices among street food vendors. The research methodology comprising the description of the population, sample, sampling techniques, research design, research instrument, validation of instrument, data collection procedure in chapter Three and the analysis of data, shall then be stated in the Chapter Four. Concluding comments in Chapter Five shall reflect on the summary, conclusion, and recommendations based on the findings of the study.

Operational Definitions

1. **Food Vendor:** A food vendor is an individual who sells food. However, a food vendor could also be a food handler or vice-versa.
2. **Food Handler:** A food handler is a person who works with packaged or unpackaged food, food equipment or utensil, or food- contact surfaces for a food service establishment.
3. **Hygienic Practices:** A set of practices performed for the preservation of health.
4. **Street Vended foods:** Foods and beverages prepared and/or sold by vendors on streets and other public places for immediate consumption or consumption at a later time without further processing or preparation.
5. **Food Hygiene:** It is the action taken to ensure that food is handled, stored, prepared and served under hygienic conditions, as to prevent as far as

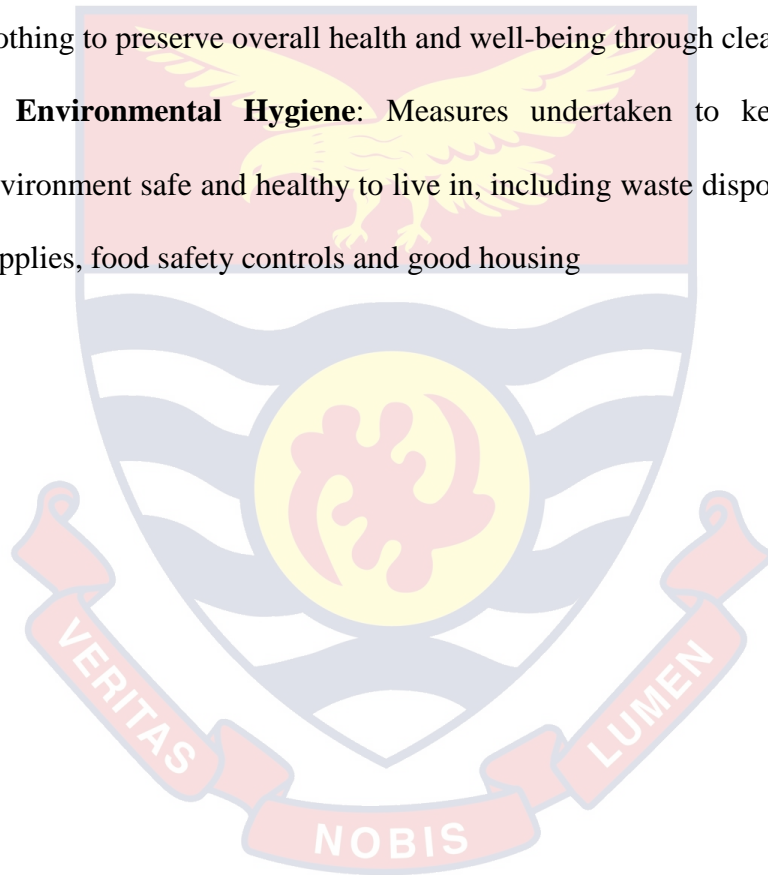
possible the contamination of food.

6. **Food Safety:** A scientific discipline describing handling, preparation and storage of foods in ways that prevent food borne illness.

7. **Food borne disease:** Is an infection or irritation of the gastrointestinal tract caused by food or beverages that contain harmful bacteria, parasites, viruses or chemicals.

8. **Personal Hygiene:** The act of preserving or maintaining the body and clothing to preserve overall health and well-being through cleanliness.

9. **Environmental Hygiene:** Measures undertaken to keep the human environment safe and healthy to live in, including waste disposal, clean water supplies, food safety controls and good housing



CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Street Foods

Food and Agriculture Organization (FAO,2008) defines street foods as ready-to-eat foods and beverages prepared or sold by vendors and hawkers especially in streets and similar public places as 2.5 million people eat street food daily. Tinker (1997) also defines street food as any minimally processed food sold on the street for immediate consumption. Global and local street vendors are a vital source of cheap food (De Waal and Rober, 2009). Many studies conducted in Africa on street foods has showed that, their boundless and unregulated growth has placed a serious strain on city resources, such as water, sewerage systems and interference with the city plans through overcrowding and littering adversely affecting daily life (Oghenekohwo, 2015). Street food accounts for a part of the daily diet and so contributes towards meeting nutritional requirements, even though the contribution differs (Ayeh-Kumi, 2009). In India during recent years there has been an increasing trend in the sale and consumption of foods on the road side. In many developing countries, such as India, street-food vending is a common part of urban lifestyle due to high unemployment and limited work opportunities. Vendors usually congregate in overcrowded areas where there are high numbers of potential customers. Such areas usually provide limited access to basic sanitary facilities. According to World Health Organization (WHO, 1998), food vendors personnel play an important role in ensuring food safety throughout the chain of food production and storage.

Mishandling and disregard of hygienic measures on the part of the food vendors may enable pathogenic bacteria to come into contact with food and in some cases survive and multiply in sufficient numbers to cause illness in the consumer. Most of the vendors are poorly educated, untrained in food hygiene. Most of the foods are not well protected from flies, which carry food borne pathogens. Potential health risks are associated with contamination of food during preparation, post cooking and other handling stages. Food borne illness associated with the consumption of street vended foods has been reported in several places. In India and elsewhere *Salmonella spp.* is a postmodern pathogen which belongs to important food contaminating bacteria, causing a high number of human infections worldwide, (WHO, 2009). Salmonella have been isolated from several raw vegetables from many countries and these foods have been implicated in outbreaks of Salmonellosis in U.S. (Beauchat,1997).To instill professional face to street food operators, the street food safety management needs a Hazard Analysis Critical Control Point (HACCP) and the pre-requisite system as good manufacturing practices (GMPs) and good hygienic practices (GHPs). Microbial hazards and their solution, critical points, practical control processing measures and monitoring procedures as well as principles of food microbiology and food safety need to be incorporated for the safe street food preparation. In Ghana, incidence of food-borne diseases or food related disease like cholera was first reported in 1970. It was widely spread in many towns and villages as well as in the study area (Epidemiological Unit MOH, 1991).

2.2 Food Hygiene Standard

World Health Organization (WHO,2009) food hygiene covers not only the proper handling but of every variety of foodstuffs and drinks, all the utensils and equipment used in the preparation, serving and consumption, but also care and treatment of food known to be contaminated with food poisoning bacteria. According to (Iragunima, 2006), food hygiene represents those factors which influence the health and wellbeing of an individual. Inadequate food hygiene can lead food-borne illnesses due to improper food handling practices and in extreme events, even the death of a customer, (Tavonga, 2014). However, food itself can pose a health threat, a problem that is serious in developing countries due to difficulties in securing optimal hygienic food handling practices. The public health objective of food hygiene and safety is the prevention of illness attributable to consumption of food. This is because of adequate supply of safe, wholesome and healthy foods are essential for the health and well-being of humans (FAO, 2008).

The two main principles of food hygiene are to prevent and control contamination (Jacob, 1998). Food poisoning can originate in a spotlessly clean kitchen, while the dirtiest kitchen can also produce completely unsafe food. Visible physical cleanliness is an important aspect of good food hygiene, but it can be rendered ineffective by an invisible and unsuspected source of contamination, so methods handling and storage come into play. According to Food Hygiene General Regulation (1970) stated that, “In essence the regulations require a suitable standard of construction and cleanliness in food premises, the hygienic handling of food, cleanliness on the part of employees and suitable facilities for them. According to Cracknell, Kaufmann and Nobis

(1983) “most outbreaks originate in meat or poultry which is already infected with salmonella or clostridium perfringens when delivered”. Nevertheless, salmonella organisms are killed at temperature of 70°C and above. According to World Health Organization (WHO, 2010), salmonella can be transmitted from food to another by houseflies, cockroaches, or rats. Once contaminated food is eaten symptoms show up after 5-72 hours depending on the quantity of food ingested and the rate of digestion of the food.

Samuel *et al.* (1993) stated that “It is often easy to see when food is contaminated, and it can then be thrown away, but sometimes the micro-organisms have not caused much decay and the food may appear normal. When food is eaten, any micro-organism in it enters the gut and causes illness or even death. A rare type of food poisoning which is fatal in 50% cases is botulism (FAO, 2008). Food vendors have an important role to play in food trades to ensure that meals served are hygienic for public consumption. According to (Annor & Baiden, 2011), mention that conscious or intentional contamination of street foods, places buyers in a dangerous situation of suffering from food borne illness. Food Handlers, therefore, are under obligation to undergo basic training in food hygiene before licensing and further training as required by the appropriate authorities (FAO/WHO, 2006 & Chukuezi, 2010).

2.3 Preventing Food Contamination

According to World Health Organization (WHO, 2009), consumption of contaminated or unsafe foods may result into food-borne disease. Food-borne diseases remain a major public health problem across the globe. Even in developed countries, an estimated one third of the populations are affected by microbiological food-borne diseases each year. Kaferstan and Abdussalan

(2010) reported that up to 10% of the population of industrialized countries might suffer annually from food-borne diseases. An estimate 70% of cases of diarrheal diseases is associated with the consumption of contaminated food. Statistics, show that every year, there are estimated 76 million food-borne illness in the United States (26,000 cases for 100,000 inhabitants) and 2 million in the United Kingdom (3,400 cases for 100,000 inhabitants). Diarrheal diseases mostly caused by food-borne or water borne and microbial pathogens, remain the leading causes of illness and deaths in these countries, killing an estimate 1.9 million people annually worldwide (WHO, 2005). According to Jacob (1998) reported that a large number of illnesses remain under-reported and it's only those serious cases are usually investigated which can lead to food contamination by affected food vendors.

Food contamination in developing countries is caused by many factors including traditional food processing methods, inappropriate holding temperatures, and poor personal hygiene of food vendors according to Feglo *et al.* (2014). Further, the prevalence of food-borne disease in developing countries is intertwined with other economic and developmental issues, namely, legislation, infrastructure and enforcement mechanisms. Specific examples include inadequacy of food safety laws, laxity in regulatory enforcements, and the lack of education for food vendors reported by DeWaal, *et al.* (2014). The incidence of food- and water-borne diseases is estimated at 3.3–4.1 episodes per child per year in Africa and food and water-borne diarrhoeal diseases are estimated to cause between 450,000 and 700,000 deaths in Africa annually and with many more sporadic cases going unrecorded. In most of these cases, pathogens such as *Escherichia coli*, *Bacillus cereus*,

Salmonella, Hepatitis, *Shigella*, *Brucella*, *Staphylococcus aureus*, *Campylobacter*, rotavirus and enteric bacteria are identified (Santos *et al.*, 2014). Improvement in food safety systems have not been fully realized and this is observed in recent reports of food borne illness and contamination of street foods with enteric bacteria in various parts of the country (Todd, E.C.*et al.*, 2014). A number of outbreaks have recently been reported in Ghana. For example, four persons died in Sheho (Upper East Region of Ghana) after eating contaminated meat reported by (GNA, 2013). Also, a cholera outbreak in Atebubu (Brong Ashafo Region) claimed nine lives reported by (Ghana Web, 2013) while another such outbreak resulted in the death of one person in Obuasi (Ashanti Region) and the hospitalization of over 50 reported by (Joy news 2013) and the same cholera outbreak cases of 590 and 60 cases of food poisoning at Coaltar Township (EHSD/GHS, 2014). It has been estimated that about 5000 children under five years of age die from diarrhoea each year in Ghana (Graphic online, 2013). Despite these alarming statistics, only few surveys have been done to understand and correlate the causes of food-borne illnesses in Ghana.

2.4 Food Borne Disease

Food-borne diseases remain a major public health problem across the globe. Even in developed countries, an estimated one-third of the population is affected microbiological food borne diseases each year (WHO, 2008). Majority of food borne illnesses are caused by eating food or drinking water which is contaminated by faeces. In the case of food, the key cause of impurity is often poor personal hygiene among food handlers (Esen & Owusu, 2013). Kaferstan and Abdussalan reported that up to 10% of the population of

industrialized countries might suffer annually from food borne diseases. Food borne illness is a general term often used to describe a disease or illness caused by eating contaminated foods or drinks. Almost all reported cases of food borne illness are caused by bacteria or by the toxins produced bacteria. The toxin is formed in food before it is eaten and cannot be detected by taste, odor, or color; (Talaro & Talaro, 1999).

World Health Organization (WHO, 2000) stated that, some of the germs that cause food borne- disease can spread through improper handling, preparing, and storing of food and poor personal hygiene habits of food vendors, and the food vendors who are carriers can easily transmit disease to other people also falling sick. According to (Esen & Owusu, 2013), headaches also fall within the symptoms of non-typhoidal salmonellosis and typhoid fever which are both categorized under bacterial food borne diseases. A study has also revealed that one of the best means of averting food-borne disease is through education and training of food vendors (Clayton & Griffith, 2008). A study has also found that most food handlers have barely any formal education which are also essential factors contributing to food borne related diseases as they are considered to be of very little or no educational background and hence have low understanding of food safety issues and as such the need for training of food handlers about proper ways of handling food to prevent food contamination (Ababio & Lovatt, 2015).

Three Main Types of Food borne Disease

2.5.1 Food Infection

This type of food borne illness occurs when germs are present in foods and are allowed to multiply until there are enough of them to cause sickness.

According to Food and Agriculture Organization (FAO, 2002) figures, over 1.8 million people from developing and under-developing countries die from food borne diseases annually. For example, Salmonella is caused by a microorganism, which after ingestion, grows in the intestine. The main source of the food borne salmonella poisonings are humans and other warm-blooded animals. The organism reaches food by contamination from food vendors or in the case of foods such as eggs and other poultry products. Cooking poultry to 165 degrees F for at least 15 seconds will eliminate the presence of the salmonella (FAO, 2002).

2.5.2 Food Intoxication

This type of food borne illness occurs when microorganisms that are present in food produce a toxin and the toxin causes the illness rather than the actual microorganisms. Some toxins are not killed by temperatures and cannot be detected because the flavor, appearance, or odor of food does not change; only prevention for food poisoning is to keep germs out of food and to keep food stored at the proper temperature. Staphylococcus is the most common type of food intoxication. It produces an enterotoxin. If the toxin is ingested, within a few hours, severe reactions will occur including nausea, vomit and diarrhea. These germs cause common boils and may be the reason for infected pimples. Staphylococcal food poisoning can be prevented by careful sanitation methods such as washing hands and cleaning work areas. Foods refrigerated at 41 degrees F and below will prevent staphylococcus germs from multiplying. Foods at risk for staphylococcal food poisoning are: ham salad, chicken salad, tuna salad, sandwiches, meat products, dairy products; and food that have been improperly thawed or improperly reheated (Mckane, 1996). Botulism is the

most severe type of food intoxication. It is caused by the consumption of food containing toxins produced by microorganism, Clostridium botulism. Foods at risk for botulism food poisoning are: acidified foods, baked potatoes, and smoked fish and meat (Prescott, 1999).

2.5.3 Chemical food borne illness

This type of food borne illness occurs when chemical substances enter the body through contaminated food and water. According to Talaro *et al.* (1996), these chemicals when ingested in large amounts can cause serious food borne illness. All poisonous chemicals and cleaning compounds should be carefully labeled and stored in an area separate from foods. Galvanized containers should never be used for storage of acid foods such as lemonade and tomatoes (Foskett *et al.*, 2003). Numerous studies have also indicated that most of the food-related illnesses and death could have been prevented or controlled through the use of appropriate food handling techniques (Hapala & Probart, 2004).

2.6 Safe Food Practices

Food service employees who demonstrated good health habits and practice food safety provide more and sanitary food service. Food borne illnesses can also be spread if employees are not properly trained how to receive and store food. It is very important that food employees are knowledgeable in all food handling areas (Hayes, 1999). World Health Organization (WHO, 2010) reported that, factors such as the general insanitary standards of the house, the improper use of sanitary facilities like latrines, improper hand washing after lavatories, improper refuse management system

and improper dishwashing facilities affect food safety in food establishments. According to Rhinlander (2006) reported that, the absence of potable water and lavatory facilities as well as dustbins negatively affects good personal hygiene practices among the street food vendors.

Food handling, preparation, and service practices are other important factors in determine the safety of food. Conditions of cooking utensils, food storage systems time and temperature, as well as food vendors' knowledge and practice similarly affect food safety directly or indirectly. Food received or used in service establishments must be from sources approved or considered satisfy by the health department and must be clean, wholesome free from spoilage, adulteration and misbranding and safe for human consumption. According to (Hayes, 1999), food must be prepared, processed, handled, packaged and stored in a hygienic manner so as to be protected from contamination and spoilage.

2.7 Pest Control and Its Effect on Food Safety

Eating premises must be kept clean, free from rodents' infestation and Reasonably Preventable Conditions (RPC's). Rodents and insects are particularly attracted to premises where bad housekeeping habit and untidiness are common (Jacob, 1998). The eating premises should also be clean, smooth walls and floors for easy cleansing and the ceiling should be free from cobwebs to prevent it from harbouring pathogens which can easily lead to contamination of intakes of foods. A food service establishment must be free of all pests, particularly flies, roaches, ants, mice, and rats and insects walk and feed on all kinds' filth, pick up germs on their feet and bodies, and then deposit germs on any food and utensil touch. Pest can be control by the following methods: seal

cracks and keep screens closed; keep foods covered and clean up spilled foods immediately; dispose of trash and garbage promptly; close all openings around wiring, drain pipes, vents, and flues to make them rat and insect proof. Good housekeeping is a must in controlling pests. No amount of pesticides can replace good daily housekeeping. Good housekeeping means keeping the entire establishment clean and sanitary at all times-making it a pleasant place for the customer to visit as well as a better place in which to work. Good housekeeping breaks the chain of infection from the source of the disease to the customer and to the employee (Hayes, 1999).

2.8 Personal Hygiene of Food Vendors

According to (WHO, 2000), a food vendor is a person with any job that requires him or her to handle unpackaged foods or beverages and be involved in preparing, manufacturing, serving, inspecting, or even packaging of food and beverages items. It has also been identify that factors such as vendors “knowledge and awareness of good hygiene practices, vendors level of formal education and other similar conditions affect how vendors approach and practice good hygiene during their food preparation and vending (Wuliyeng, 2013). Practicing good personal hygiene is very useful in preventing food borne diseases. Good personal hygiene encompasses all measures that ensure the safety and quality of food during its handling (Jay, 2000). To prevent germs from getting into food, it is very important for food vendors to be mindful of personal hygiene and cleanliness. Personal hygiene and cleanliness include bathing, the keeping of all body parts and clothing clean and as much as possible free from germs (Mwangi, 2004).

All the fingernails must be kept short because germs and foods may get trapped in them. Clean and remove all nails polish. Artificial nails should be avoided in food premises. Dirty clothes used to harbor germs to multiply and may contaminate food if they come into contact with them. Therefore, all protective clothing and underclothes should be washed at all times (WHO, 2008). Rane (2002) reported that “*Salmonella*, non-typhi salmonellae, *Campylobacter* and *E. coli* can survive on finger tips and other surfaces for different periods of time, and in some instances even after hand washing”. Food vendors should always keep their finger nails short and clean to prevent them serving as a vehicle for transmission of pathogens (Musa & Akande, 1998).

The World Health Organization (2000) has, however, asserted that as a practice, the use of aprons and hair restraints by food vendors has more to do with food aesthetics and stimulating consumer assurance that food safety. According to (Alcock, 1986), “Human beings are rich source of potential contamination of food. Personal hygiene as far as food hygiene is concerned consists of essential measures aimed at preventing human beings themselves from contaminating the food stuff others eat”. According to Kassa (2001), poor hand hygiene has been known as a critical threat factor in increasing food-borne illness. According to (Lah, 2016) reported that, there is a high possibility of food service workers to transmit pathogens to food with hands that are polluted with organisms from their gastrointestinal tract which can lead to food-borne illness.

This makes it very important to ensure that food handlers take hand washing practices very serious in the fight against food borne illnesses.

According to (Center for Disease Control and Prevention, 2013) stated that poor personal hygiene of food handlers and inappropriate temperature control of food are the most substantial factors leading to food borne illness. Center for Disease Control Prevention again laid emphasis on washing hands with soap after defecating and after cleaning the bottom of a baby or a child who has defecated before handling food. Davey *et al.* (1999) emphasized that “Low standard of hygiene both personal and public are responsible for a vast amount of preventable diseases everywhere in the world and particularly in the tropics where primitive living conditions are so common.

In the disease considered here, man is either the sole principal host of the parasite and transmission results from contamination of the environment by his excretion or body discharges. In some cases, unhygienic food habits play a greater part in disease transmission as compared to insanitary disposal of human excreta. Over the last decade, studies in Ghana on various aspects of food hygiene revealed that, most food vendors have inadequate food hygiene knowledge and attitudes that affect the personal hygiene of the vendors (Annor & Baiden, 2011). Hygienic practices such as washing hands after using the toilet, proper cleaning of dishes and reheating of cold food among were also observed by vendors. It is further supported by the account of Stephenson (2002) that the relatively high presence of parasites transmissible by faecal contamination and poor sanitation standards. In stressing the need for proper personal hygiene, the Volta Regional Minister, Ms. Helen Adowa Ntoso (2013) mentioned that people should be sure to wash their hands with soap to avoid diarrhea and cholera.

2.9 Equipment Use in Food Preparation

Equipment in food premises refers to the physical items used in cooking and serving of food. Examples are stoves, pots, bowls, ladles, kitchen knives, plates, frying pans and so on. These equipment's play a vital role in promoting hygiene if it is well designed to handle. Conversely if it is not well designed and it is poorly handled, it can seriously cause food contamination or food poisoning. Equipment where food particles can lodge and allow germs to multiply and cause food contamination should be thoroughly cleaned. For high standard of food hygiene to be achieved, equipment used in cooking must be well designed to allow easy cleansing. (Hayes, 1985) also observed that equipment should be designed and constructed so that cleaning, maintenance and inspection are facilitated. Washing of hands, utensils and dishes are often done in bowls or pots of water.

It is worth noting that disinfection is occasionally carried out and this eventually attracts pests to the vending sites especially when there is inadequate refuse disposal (Kok & Balkaran, 2014). Parts of the equipment that come into contact with food should be capable of being easily dismantled thoroughly, cleaned and if necessary sterilized or disinfected. Equipment should protect the food from both external and internal contamination as well as to perform the functions for which it was originally designed. According to (Jacob, 1999), "equipment for food preparation should be kept in good condition and must be frequently cleaned and disinfected. Equipment must also be in good state for cleansing and possibly to be sanitized". The suitable detergents must be chosen to avoid contaminating food with chemicals. One way of destroying bacteria that are likely to cause disease to man through food contamination is by

thoroughly heating utensils after use” reported by Awake Magazine (2001). Also, Hobbs *et al.* (1998) stated that “various groups of food should be displayed separately and kept apart by display dividers. Individual spoons and handling equipment must be provided for each product. Different colors of equipment are suggested”.

According to Bhaskar *et al.*, (2000) revealed that bacteria from dirty dishwashing waters and other sources on utensil surfaces constitute a risk for contamination during food vending. A similar study was undertaken in India by Singh, *et al.*, (2016) on the impact of health education intervention on food safety and hygiene of street food vendors revealed that only a small number of the street food vendors (12%) used soapy water for washing of utensils. According to Lah (2016) recommended that, food service workers desist from the use of fabrics, cloths, dish towels or aprons for hand drying because it can quickly accumulate a large population of microorganism, especially when left moist and their use can actually increase food contamination rather than reduce it.

2.10 Importance of Storage of Food

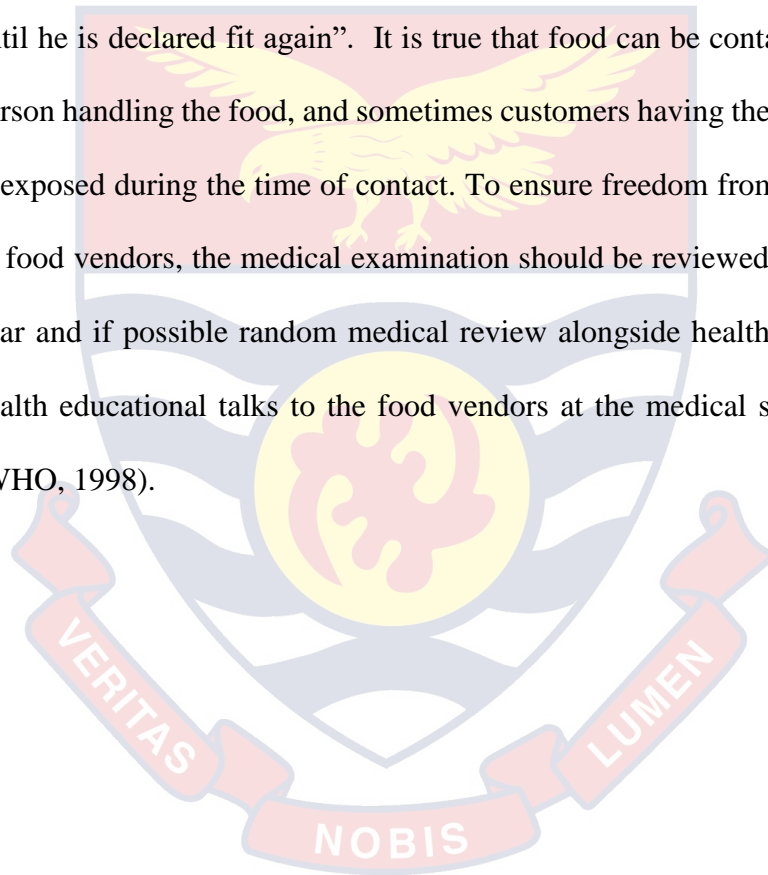
The storage of food is important to ensure adequate preservation throughout the year and overcome fluctuation in supply. Correct storage of food is fundamental to the hygienic operation of any food business. Failure to ensure satisfactory conditions of cleaning, temperature can result in problems of spoiled food. This includes mold, slime, discolorations and staleness or insect and rodent’s infestation. With this, food must be properly stored to avoid invading of bacteria which are likely to cause harm to man. Refrigerator is also important in food hygiene standard. To ensure that, refrigerators, cold rooms

and deep freezers are always in good working order; it should be kept clean and should be used efficiently and effectively. The refrigerator should be very clean and effective all the time to prevent food been stored at ambient temperature that can promote bacteria growth (Jacob, 1998). The eating premises must be kept clean and free from rodents' infestation and Reasonably Preventable Conditions (RPC's). Rodents and insects are particularly attracted to premises where bad housekeeping habit and untidiness are common (Jacob, 1998). The premises should also be clean, smooth walls and floors for easy cleansing and the ceiling should be free from cobwebs to prevent it from harbouring pathogens which can lead to contamination of intake foods.

2.11 Medical Examination for Food Vendors

Food can be contaminated in several ways. This cuts across from preparation up to the point of serving to the final consumers. During all these processes it is being handled by human beings due to the greater role they play in handling food. In this regard their health status cannot be taken for granted. Conversely, Abdulssalam and Kaferstein (2010), argue that medical examination of food vendors prior to licensing, or at intervals afterwards do little towards ensuring food safety and should not be mandatory. According to Section 286 of the Criminal Code, (Amendment Act 2003), (Act 646) of Ghana charges all food vendors to be examined to ensure they do not infect consumers with communicable diseases. According to Hayes (1999) "all applicants seeking employment in the food industry, who are likely to come into direct or indirect contact with foods should be examined medically to ensure their fitness for work". He further explained that examination should include answering a questionnaire recording the past medical history of the applicant.

Detail of information should be obtained on infection on the digestive track including typhoid fever, paratyphoid, salmonellosis, bacillary and amoebic dysenteries and gastro-enteritis involving symptoms of sickness and diarrhea. Similarly, Betty *et al.* (1998) stated that, medical examination test is usually required for every food vendor to establish freedom from tubercle infection, intestinal pathogens and skin infection (Jacob, 1998). According to Dewberry (1999) “persons so affected ought not to continue to handle food until he is declared fit again”. It is true that food can be contaminated by the person handling the food, and sometimes customers having the disease, if food is exposed during the time of contact. To ensure freedom from contamination of food vendors, the medical examination should be reviewed at least twice a year and if possible random medical review alongside health promotion and health educational talks to the food vendors at the medical screening points (WHO, 1998).



CHAPTER THREE

METHODOLOGY

3.1 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 to be covered include research design, research approach, the target population, sample size, sampling procedure and technique, the research instruments used, data collection procedure, ethical procedures, test for validity and reliability, data analysis procedure and limitation of the study. A research method is a set of systematic procedures for conducting a study so as to get the most valid findings (Kannae, 2004). It comprises the description of the study area, population, sample, data source, sampling techniques, research design, and research instrument, validation of instrument, data collection procedure and analysis of data, answering research questions, ethical considerations. A descriptive survey design was used to answer questions concerning the current status of food hygiene and sanitation practiced by vendors of street foods. Hygiene and sanitation were determined by the use of structured interview and through observations. Practices such as acquisition of cooking skills, place of preparation, environmental conditions, methods of washing utensils and preservation methods were studied.

3.2 Description of the Study Area



The Ayensuano District is one of the newly created Districts in the Eastern Region of Ghana which was carved out of the then Suhum Kraboa

Coaltar District Assembly by Legislative Instrument Number 2052 and was inaugurated on 28th June, 2012. The District has its capital at Coaltar. The District lies within Latitudes $5^{\circ} 45'N$ and $6^{\circ} 5' N$ and Longitudes $0^{\circ} 15'W$ and $0^{\circ} 45'W$. It is located in the southern part of the Eastern Region and shares boundaries with Suhum Municipality to the North; Nsawam Adoagyiri Municipality to the South; Akwapem South District to the East and Upper West Akim District and West Akim Municipality to the West. The District has a total land area of $499km^2$. Economically, the District can be described as agrarian because it has majority of its labour force in the agricultural sector. This is followed by commerce, industry, transport and clerical respectively. The agricultural and forest resource base of the District facilitates the establishment of manufacturing and processing industries. However, there is no large-scale manufacturing setup in the District. Manufacturing is therefore restricted to the small-scale industries and crafts which include; saw milling and wood fabrication, metal fabrication, food processing, alcohol (akpeteshie) distillation, soap making and handicrafts among others.

The District has various market centres for commercial activities especially for marketing farm produce. The main markets areas for trading activities are at Amanase, Anum Apapam, and Dokrochiwa markets which are bi-weekly. The informal sector of the District's economy has a lot of service providers such as hairdressers and beauticians, barbers, dressmakers, cobblers etc. There are also mining, quarrying and sand winning activities in the District. Mining is mainly of the alluvial type in the basin of the Ayensu by both formal sector company and artisan miners also known as the galamsey operators. There are many quarrying sites in the District which are yet to be exploited. There is

also a great potential for the quarry industry in the District given its proximity to Accra. Tourism in the District is completely under developed though there are some potential tourist attraction sites. Among them are waterfalls and snake-like palm tree at Obuoho Nyarko.

The area has a few highlands with the Atiwa range which stands at about 610m above sea level being the highest elevation in the District. This range is the catchment area of the major rivers and streams in the District, namely Ayensu and Kua. The major underlying rocks in the District are economically important as it contains most of the valuable minerals such as Gold and Bauxite which can be exploited for foreign exchange. The rocks found in the District are also suitable for both building and constructional purposes and can therefore be exploited to the benefit of the District. Coaltar is a cosmopolitan town. The most indigenous ethnic group is Akuapims. The other languages spoken are Ewe, Fante, Krobo, Ga Adangme, Mole and Dagbani. There is one Government Hospital, two clinics and two Private clinics, twelve government basic schools, eight private basic Schools, two government senior high schools and one private senior high school and also a commercial school from (AyDA/ GESSD 2014). According to AyDAEHSD (2013) Annual Report, Coaltar can boast of three public water closet (WC) latrines, and sixteen public ventilated improved pit (VIP) latrines. In addition, 40% of household use WC and 60% use VIP Latrines. Eighty-seven (87) eating premises are established.

3.3 Research Method

In conducting research, three main methods are involved; these are the qualitative method, quantitative method and mixed method (Creswell & Plano, 2007). Qualitative methods basically explain how people's thoughts and

feelings influence their behaviour (Creswell, 2008). Qualitative research is aimed at gaining a deep understanding of a specific organization or event rather than a surface description of the large sample of a population (Creswell, 2008). A quantitative method, on the other hand, helps to identify the number of people who exhibit certain behaviours (Sutton & Austin 2015). Alvesson and Skoldberg (2017) and Harwell (2011) explain that the quantitative study consists of standardized variables which describe people's experiences or opinions that are given numbers through the usage of response alternatives that are determined before-hand. A mixed method, however, combines both the qualitative and quantitative methods to explain social phenomena (Creswell *et al.*, 2003). Mixed method approach was adopted in conducting the research. The value of mixed methods is the integration component. Integration gives readers more confidence in the results and the conclusions they draw from the study (O'Cathain, Murphy, & Nicholl, 2010). This approach was also adopted based on the assumption that collecting both data will help in understanding the research problem better. Moreover, knowing that all approaches have 28 limitations, Johnson and Onwuegbuzie, (2004) argue that mixed methods approach help researchers to avoid the limitations of qualitative and quantitative

3.4 Research Design

The study adopted a descriptive research design. According to Labree (2103), descriptive design best aims at describing, observing and documenting situations as they naturally occur rather than explaining them. Descriptive design attempts to establish the range and distribution of some social characteristics and to discover how these characteristics may be related to

certain behaviour patterns or attitudes (Zainal, 2007; Labree, 2013). A descriptive design was appropriate to examine the hygienic practices of food vendors at Coaltar Township. According to Gay (1992), descriptive research is a type which specifies the nature of a given phenomenon. It determines and report the way things are. It involves collection of a data in order to test hypothesis, or answer research questions concerning the current status of the subject of the study. Babbie (1990) states that descriptive survey is for the purpose of generalization so as to make inferences about some characteristics or behaviour of the people. This type of research design is mainly concerned with the description of some existing phenomenon. The sample survey was chosen because it is considered to be the most appropriate for this study. Since the population is large, it would enable the researcher to make generalization based on the sample chosen.

3.5 Target Population

The study was confined to the Ayensuano District at Coaltar Township. The study population consisted of 430 food vendors in the Ayensuano District, precisely food vendors at Coaltar Township. This population was also targeted because people served are regarded as high-risk populations; which are at a higher risk of suffering from food borne illnesses if food safety practices are not followed (Paolo & Allen, 2010). This population was chosen because they are regarded as high-risk populations; which are at a higher risk of suffering food borne illnesses if food safety practices are not followed by food vendors. All the target population chose also focused on the purpose of the 28 study to determine the food hygiene practices of vendors in the Coaltar Township.

3.6 Type and sources of Data

For the purpose of this study primary data was used. The primary data, made up of qualitative and quantitative data was used to elicit information from food vendors on the food hygiene practices of food vendors in the Coaltar Township. The primary data was collected to cover every aspect of the study which helped to achieve the purpose of the study.

3.7 Sample Size

According to (Kannae, 2004), sampling is the method of selecting some part of a group to represent the total group; the total group is the population while the part is the sample. Therefore, out of about 430 populations of female and males' food vendors at Coaltar Township, 115 of them were randomly chosen as the sample size for the study, which amount to 84.3 percent of females and 15.7 percent of males of the total population. These enabled the collection of adequate views on the objectives of the study prior to food vending, food safety training, food poisoning and challenges in training food

3.8 Data collection Instrument

Taking the objective into consideration, the appropriate research instrument was a questionnaire to assess the food hygiene practices of food vendors. The research also made use of observation and interview as source of instrument for data collection. Collins and Hussey (2003) contend that questionnaire is made to come out with the doing, thinking or feeling of a selected group of individuals. Three data collection instruments were employed. These include; a structured questionnaire reflecting the objective of the study, a structured interpersonal interviews and observation. Respondents were assured of their confidentiality and the responses.

3.8.1 Observation

According to Creswell and Plano (2007), Observation helps to describe activities as they naturally occur in their environment. One strength of observation is that it allows the researcher to directly observe the many nuances and contingencies of human behaviour as they become manifest in a „natural“ setting. Observation can also serve as a stand-alone tool for examining participants experiences, whether or not the researcher is inclusive in the process (Patton, 2002). Besides, it allows the researcher to see things that routinely may escape the awareness of the researcher using a different method (Jackson, 2014) the researcher specifically adopted a naturalistic observation to examine the hygienic practices of food vendors during their food selling process at Coaltar Township. According to Boateng (2016), naturalistic observation is the act of observing the individual in their natural environment, making no effort to manipulate or control the activities of the participants, but simply to observe. This approach was useful to the study because the researcher needed to observe how food vendors practice hygiene in their activities. The naturalistic observation helped the study to throw more light on the information gathered from the questionnaire and the interview.

3.8.2 Questionnaire

Taking objective one into consideration, the appropriate research instrument was a questionnaire to examine the level of food hygiene practices among food vendors. Collis and Hussey (2003) contend that the questionnaire is made to come out with the doing, thinking or feeling of a selected group of individuals. For the purpose of this study, a structured questionnaire made up of 28 questions was administered to student food vendors. The questionnaire

was structured into two (2) areas, namely: socio-demographic characteristics of respondents which were close-ended. The socio-demographic section asked questions about respondents' gender, age, number of years in the business and level in education. The second section asked questions on food hygiene practices among food vendors. This section included both closed-ended and open-ended questions. The questionnaire had an introductory section.

There was a section for ethical assurance and consent. An open-ended questionnaire was also used to elicit information on food vendors.

3.8.3 Interview

The researcher conducted a face-to-face interview with the food vendors to gather essential information that the observation was not able to provide. Boyce et al. (2006) describe interview as an open-ended question and thorough investigation yielding in-depth responses about people's experiences. Researchers may use structured and unstructured or semi-structured interview approach (Creswell & Plano, 2017). Unstructured or semi-structured interviews may begin with some questions, but the interviewer has the ability to adapt questions to the specific direction of responses. Structured interviews rely upon an advanced list of questions set systematically to guide the interviewer. This approach has the advantage of ensuring uniformity among participants (Patton, 2002). The face-to-face interview with the vendors was important in order to examine the nature and effectiveness of food safety training needs of food vendors. The interview guide consisted of 28 questions which covered areas such as; what qualifies food vendors.

3.9 Sampling Procedure

In order to get as close as possible to the true image of the population to eliminate substantial errors and also to be able to achieve the set target, random, purposive, and accidental sampling techniques were employed.

3.10 Data collection Procedure

Data collection is an essential part of the research process in education and the humanities. Data collection techniques allow the researcher to methodically collect information about their object of study and of the setting they occur (Cln, 2013). Data collection was done in the Ayensuano District at Coaltar Township. A period of four (4) weeks was used to collect the entire data. The study consisted of two phases. The first phase of the study involved the use of a questionnaire to gather information on food vendors' demographic characteristics. The third phase of the study involved the use of a questionnaire to elicit information from food vendors after seeking their consent through interview. The questionnaire distribution was done by the researcher with the help of a field assistant who was trained in that regard.

3.11 Pre-testing Instrument

The researcher embarked on separate pre-testing to check for the clarity of expressions and appropriateness of the research instruments. The aim of the pre-test was mainly to eliminate ambiguity and ensure that respondents understood the questions as intended by the researcher. Pre-testing in this study was done in two phases. The first phase which was the initial draft of the research instruments was reviewed by two Msc. students in the Environmental Health and Sanitation department to access the content and constructions. They checked whether the instrument was clearly worded, free from major biases,

and

appropriate for the type of information needed. The second phase of the pre-testing was performed with five food vendors, in order to improve the research instruments. The final instruments were administered to selected food vendors who prepare and sell food in Coaltar Township.

3.12 Instrument for Data Analysis

The data were analyzed both quantitatively and qualitatively. Quantitative data in the form of answered questionnaires were checked, verified and then entered into the computer. Completed questionnaires were entered into the computer for final analysis. Data were entered into Excel statistical software and later exported to Statistical Package for the Social Science (SPSS) version 20 for further analysis. The quantitative data were analyzed and interpreted with the use of descriptive statistics. The descriptive statistics was made up of frequencies and percentages derived from the structured questionnaire to analyze and Interpret the findings. Statistical parameters: pie charts and graphs were also used to present quantitative data. The use of pie charts, tables and bar graphs helped the researcher to provide pictorial evidence of the statistics. This method of qualitative data analysis is the procedure for identifying, analyzing and reporting patterns within data (Braun & Clarke, 2006). It helped the researcher to address the objectives in a non-statistical way.

3.13 Ethical Issues and Clearance

The study was purely for academic purposes and in no way endangered the profession of food vendors that were involved in the study. All data gathered was treated with high-level confidentiality. Ethical clearance was

obtained from the office of the Ayensuano District Assembly, Environmental Health and Sanitation Department of the Ayensuano District. Research. Permission to conduct the study was also sought from individual food vendors and the study was solely for academic purposes; hence participants were not identified by names but rather coded during the dissemination of results.



CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter is concerned with the characteristics of the respondents studied, analysis of the data collected on food hygiene practices from respondents at Coaltar Township, interpretation of the results from the analysis, and the discussion of the results.

Demographic of the respondents

Presented below are the demographic characteristics of the respondents. The demographic characteristics considered by the study are; gender, age, the level of the participants in their education and number of years the participants are in the business. The presentations of the demographic characteristics of the participants of the study are presented in the Tables. In view of this, the sampled respondents of the study can be said to be representative of the food vendors population sampled for the study and as such, their views and opinions as far as the study is concerned are relevant to the stated aims and objectives of the study.

4.2.1 Sex and Age

The result of the study shown in Table 1 indicates that majority of the street food vendors were females 84.3% whilst 15.7% were males. According to Lues *et al.*(2012), street food vending is the common income generating revenue particularly, for women in developing countries. Also women dominate in terms of food preparation in the house.

Table 1 :Sex of Respondents

Sex	Frequency	Percent
Female	97	84.3
Male	18	15.7
Total	115	100.0

Source: Field Survey (2020)

Majority of the food vendors, 41.7% were 26-35 years of age while 5.2% were in the age group of above 55 years as shown in Table 2. The food vendors below 18 years were not considered during the study, as it is regarded as child labour. This confirms a study by Musa and Akande (2009), who found a low level of involvement of under- aged food vendors in educational Ilorin, Nigeria. This means that, children below 18 years are not supposed to prepare and sell for public consumption, as it is against human traffic laws. This is depicted in Table 2.

Table 2:Age of Respondents

Age	Frequency	Percent
18-25	14	12.2
26-35	48	41.7
36-45	37	32.2
46-55	10	8.7
above 55	6	5.2
Total	115	100.0

Source: Field Survey (2020)

The Knowledge of Food Vendors on Food Hygiene

4.2.2 Educational Background of Food Vendors

Majority of the food vendors 41.7% had attained Junior High School (JHS) education, 115.7% of the respondents had no educational background. This implies that, their understanding of food hygiene concept will be very low. While, 6.1% had attained Vocational education, 5.2% had attained Senior High School (SHS) education, and 1.7% had attained Tertiary education as stated in Table 3.

Table 3: Level of Education the Respondents

Level of education	Frequency	Percent
None	18	15.7
Primary	34	29.6
JHS	48	41.7
SHS	6	5.2
Vocational	7	6.1
Tertiary	2	1.7
Total	115	100.0

Source: Field Survey (2020)

4.2.3 The Number of Years the Respondents Is in The Business

A good proportion of the respondents 68.7% had been in the business for more than five years, while less than five years 13.9%. A quite number of food vendors 11 representing (9.6%) were in the business for more than fifteen years. This implies that some of the food vendors had experienced in food business. The proportion of respondents reduces with increasing number of years 7.9%. This indicates that, some of the food vendors had less experience

in food business. Whilst, the food vendors 7.8% had been in the business for more than ten years as shown in the Table 4. In Coaltar the study area, the street food businesses have been booming for quite long. This trend is similar to that reported by Abdalla *et al.* (2008) which confirm the assertions that, the food vending business in developing countries is rapidly expanding and serves as a form of employment for urban residents.

Table 4: Number of Years the Respondents Is in Business

For how long have you been in this business	Frequency	Percent
less than 5 yrs	16	13.9
5-10 yrs	79	68.7
11-15 yrs	9	7.8
more than 15yrs	11	9.6
Total	115	100.0

Source: Field Survey (2020)

4.3 Acquisition of Education on Food Hygiene by Food Vendors

It was important to know how the vendors acquired their cooking skills to establish their knowledge of handling street food. Majority 71.3% of the vendors were taught by their parents, friends and through observations, 13.0% of the vendors acquired cooking skills from training institutions and workshops, this will assist the food vendors to know how handle food for public consumption without contamination, and while 15.7% gained the skills by trial and error (self-taught) which can be detrimental to public health. According to FAO (2005), food vendors should have the necessary knowledge and skills to enable them to handle food hygienically. FAO also recommended

that, every vendor or helper of food should undergo a basic training in food hygiene before licensing. This is indicated in Table 5.

Table 5:Kinds of Education on Food Hygiene

Respondents	Frequency	Percent
Informal education	82	71.3
Formal education	15	13.0
None	18	15.7
Total	115	100.0

Source: Field Survey (2020)

4.4 The Respondents' Awareness of Rules and Regulation on Food Hygiene and Safety

Regarding the level of knowledge on food hygiene and safety, 80.9% of the food vendors had no knowledge thereof and this could lead to the prosecution of the vendors. While, 19.1% of the food vendors had some knowledge on rules and regulations regarding food hygiene and safety. This implies that, some of the food vendors abide by the rules and improved on food hygiene. In Ghana, the Food and Drugs Law (PNDC Law 305B), Amendment Act 523 and various bye – laws on food hygiene aim at ensuring that only safe and wholesome food, drugs and other substances are made available for public consumption. As per these rules and regulations, the sale of food under insanitary conditions is an offence. This is shown in Table 6.

Table 6: Awareness of Rules and Regulations on Food Hygiene and Safety

Respondents	Frequency	Percent
Wearing of protective clothing	10	8.7
Personal hygiene	12	10.4
None	93	80.9
Total	115	100.0

Source: Field Survey (2020)

4.5 The Acquisition of Training on Food Hygiene by The Respondents

Majority of the food vendors 77.4% had no training on food hygiene and this could pose threat to public health. Whilst, 22.6% asserted that they had received on- the- job training on food hygiene by the Food and Drugs Authority and District Assembly. According to FAO/ WHO (2009) report, food vendors are required to undergo basic training in food hygiene before licensing and further training as required by the relevant authority”. This is because inadequate hygiene training, instruction and supervision of all people involved in food related activities pose a potential threat to the safety of food and its suitability for consumption. This is depicted in Table 7.

Table 7:Kinds of Training on Food Hygiene

Respondents	Frequency	Percent
Training on personal hygiene	11	9.6
Training on food preparation	15	13.0
None	89	77.4
Total	115	100.0

Source: Field Survey (2020)

4.6 Obtaining of Permit by Food Vendors for The Commencement of Business

Table 8 below shows that, most of the respondents 88.7% had no permit to operate at their vending points, and these lead to vendors selling near drains and unauthorized places which could attract flies and accumulation of dust on the food. This act is against the public health law section 296 sub – section 1 and 2 of Act 29/60 of the criminal codes. It states that, all food vendors shall have a permit at their vending points. This clearly shows that the District Assembly in collaboration with Environmental Health and Sanitation Unit are not enforcing the bye-laws efficiently and effectively. Environmental Health Officers are not proactive in disseminating information on the need to have permit before operating food businesses which have negative impact on public health. Whilst, 11.3% had permit at their vending point and these could protect public health.

Table 8: Permit to Operate Business

Response	Frequency	Percent
None	102	88.7
District Assembly	13	11.3
Food and Drugs Authority	0	00.0
Total	115	100.0

Source: Field Survey (2020)

The Personal Hygiene of Food Vendors on The Street

4.7 Wearing of Headgears by The Respondents

Majority of the respondents 57.4% do not wear headgears or caps and this could lead to food cross contamination leading to food poisoning as their hairs fall into the food, whilst 22.6% wear headgears with a reason of attracting customers and the respondents, 20.0% admitted that could prevent food contamination. With regards to importance of wearing headgears, the various institutions especially Environmental Health and Sanitation Department of the District should sensitize street food vendors more. This will help to reduce food cross contamination and food poisoning. This is shown in Table 9.

Table 9: Importance of Wearing Headgear

Response	Frequency	Percent
None	66	57
Attraction of customers	26	23
Prevention of food contamination	23	20
Total	115	100.0

Source: Field Survey (2020)

4.8 Wearing of Protective Clothing by The Respondents

In the Table 10 below, most of the food vendors 56% wear protective clothing, 29.6% gave a reason that to attract customers, 20% of the respondents, said to save their dresses, and 6.1% of the respondents, said to prevent cross contamination, this made them look smart, decent, and attractive, while 44% do not wear any protective clothing and therefore do not know the importance it. This implies that, street food vendors need more education on essence of putting on protective clothing by the government institutions such as Environmental Health Officers, Food and Drugs Authority, and Ghana Health Service.

Table 10: Importance of Wearing Protective Clothing

Response	Frequency	Percent
Do not wear protective clothing	51	44
Attraction of customers	34	20
To save their dresses	23	20
To prevent contamination	7	6
Total	115	100.0

Source: Field Source (2020)

4.9 Dishing Out Food for Customers by The Respondents

It was important to know how the street food vendors dish out food for customers as they use the same hand in the collection of money. This becomes necessary due to bacteriological loads in our hands and the money as well. Majority 51.3% of the vendors used their bare hands in dishing out food for customers and this can lead to cross contamination and food poisoning. The

39.1% of the vendors used ladles, while 9.6% of the street vendors used spot which is more hygienic and these can prevent food contamination. This is indicated in Table 11 below.

Table 11: Means of Dishing Out Food for Customers

Respondents	Frequency	Percent
Bare hands	59	51.3
Ladles	45	39.1
Spot	11	9.6
Total	115	100.0

Source: Field Survey (2020)

4.10 The Critical Conditions of Washing Hands During Food Preparation

It was important to know how the vendors acquired their cooking skills to establish their knowledge of handling street food. Majority representing 51.3% of the vendors were taught by their parents, representing 39.1% of the vendors acquired cooking skills from observation, and while, 9.6% gained the skills by trial and error (self-taught) which can be detrimental to public health. According to FAO (2005), food vendors should have the necessary knowledge and skills to enable them to handle food hygienically. FAO also recommended that, every vendor or helper of food should undergo a basic training in food hygiene before licensing. This is indicated in Table 12 below.

Table 12: Most Critical Points of Hand Washing During Food Preparation

Respondents	Frequency	Percent
After private	59	51.3
Before food preparation	45	39.1
After handling raw food and objects	11	9.6
After wash room		
Total	115	100.0

Source: Field Survey (2020)

4.11 The Sources of Water Use by The Food Vendors

All the street food vendors interviewed and observed had water at their vending point. Majority of the food vendors 86.1% use pipe-borne as water a source which is welcoming news. This implies that most of them use potable water. Some of the food vendors 7.0% use boreholes as a water source, whilst 5.2% of wells as water sources and 1.7% use river as their water source, and this is not safe for human consumption. According to FAO/WHO (2009), the provision of water at food vending points is necessary to ensure that food vendors have access to water for washing hands and used bowls. This is depicted in Figure 1.

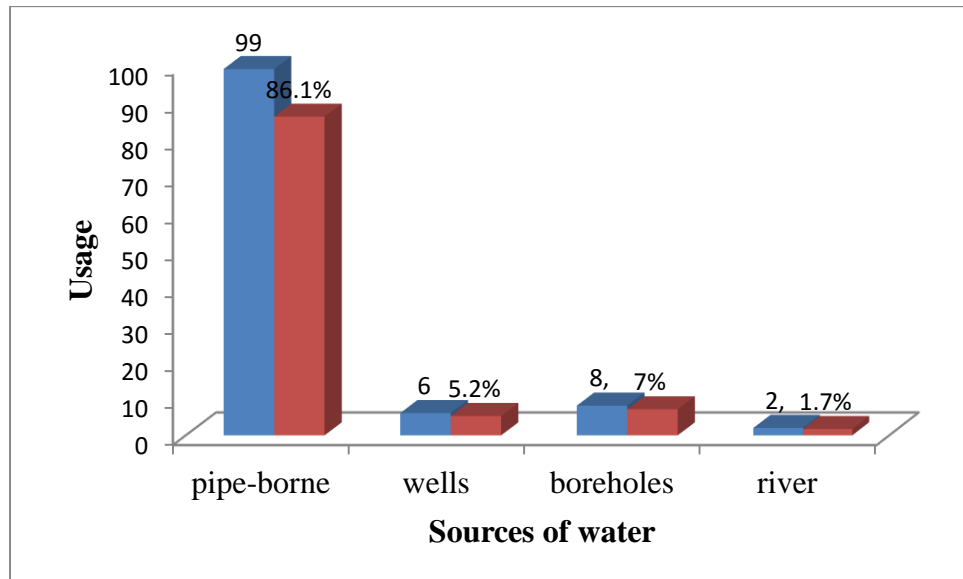


Figure 1:Source of Water Use in Food Preparation (see label source of water /Use of water

Source: Field Survey (2020)

4.12 The Type of Facility Uses by The Respondents in Storing Water

Majority of the vendors interviewed 62.6% said that, they usually store their source water in a barrel without fitting covers. This implies that most of the water used in the food preparation can be contaminated which is likely to cause typhoid disease. The respondents 26.1% also said that, they store their water in a barrel with fitting covers. This signifies the protection of water from contamination, whilst, 11.3% said that, they their store water in buckets and bowls without fitting covers and this can also lead to water contamination. This implies that, some of these foods are little bit contaminated due to unsafe water. This shows that, street food vendors need more health education on water preservation. This is depicted in Table 13 below.

Table 13: Water Storage Facilities

Respondents	Frequency	Percent
Barrel without fitting cover	72	62.6
Barrel with fitting cover	30	26.1
Bowls and Buckets	13	11.3
Total	115	100.0

Source: Field Survey (2020)

4.13 The Type Storage Facility Use by The Respondents Before Disposal of Waste

It was important to know how the vendors store their waste before disposing them off. Majority representing 51.3% of the vendors stored their waste in dustbin without fitting covers; this is unhygienic which can attract houseflies to the vending points. These houseflies are mechanical carries which can transmit these pathogens, causing communicable diseases like cholera and typhoid. These practices are against the Public Health Law of Section 851 Sub-Section 54-56 of Act 2012 for prosecution. The respondents, representing 39.1% acquired a dustbin with fitting covers which prevent attraction of flies especially houseflies, and while 9.6% of the vendors stored their waste in bowls and buckets without covering it. This also attracts flies and other vermin at the vending point which can also scare the customers. This is indicated in Table 14.

Table 14:Storage of Waste Before Disposal

Respondents	Frequency	Percent
Dustbin without fitting cover	59	51.3
Dustbin with fitting cover	45	39.1
Bowls and Bucket	11	9.6
Total	115	100.0

Source: Field Survey (2020)

The Compliance of Food Vendors in Acquisition Of medical Examination Certificate

4.14 The Reasons for Food Vendors to Undergo Medical Examination

Majority of the respondents 76.6% had been medically screened and had been issued with medical certificate of fitness to sell food for public consumption. This implies that, majority of the street food vendors understand the need of undergoing medical examination, periodically as a result of possible spread of food-borne diseases, communicable diseases and prevention of contamination during preparation and serving of food. As stated by (Hayes1999) “All applicants seeking employment in food industry, which are likely to come into direct and indirect contact with food should be examined medically to ensure their fitness to handle food”. A significant number of food vendors 23.5% had not been medically screened to ascertain their fitness to sell food for the public. These vendors may be healthy carriers of food-borne diseases like, typhoid, hepatitis and are likely to contaminate food during preparation and serving. This is shown in Table 15.

Table 15:Need for Food Vendor to Undergo Medical Examination

Response	Frequency	Percent
Prevention of communicable disease	80	69.6
Prevention of contamination	8	7.0
None	27	23.4
Total	115	100.0

Source: Field Survey (2020)

4.15 The Recent Dates of Medical Examination Acquire by The Respondents

Table 16 shows that, the respondents 30.4% exhibited their medical examination certificate as evidence during the study, while the remaining 11.3% could not readily produce their certificate at the time of the interview. The reason being that, it will be spoiled or may get missing. The food vendors 23.5% had not responded to that, because of lack of knowledge. In this case there is a need for institution in charge especially Environmental Health Officer to intensify more education on carrying along medical examination certificate as a food vendor to ascertain the actual number of food vendors that have been screened. According to Public Health Law section 851 sub-sections 1 and 2 of Act 2012 states that, all food vendors must always carry their medical examination certificate along, while operating or selling as evidence.

Table 16: Evidence of Recent Dates of Medical Examination

Response	Frequency	Percent
2017	35	30.4
2018	13	11.3
2019	27	23.5
None	27	23.5
Total	115	100.0

Source: Field Survey (2020)

4.16 The Difficulties That the Respondents Encounter in Obtaining Medical Certificate

Majority of respondents 70.0%, complained of being expensive, 23.5% said delay of the results, while, 4.3% did not complain about any difficulties, and 1.7% said poor laboratory services rendered in terms of human relations. According to the food vendors, these among other factors which discourage them from availing themselves for screening. This is shown in Table 17.

Table 17: Nature of Difficulties in Acquisition of Medical Certificate

Response	Frequency	Percent
Expensive	81	70.4
Delay of results	27	23.5
No responses	5	4.4
Poor laboratory services	2	1.7
Total	115	100.0

Source: Field Survey (2020)

Nature of Difficulties in Acquisition of Medical Certificate

4.17 Sanctioning of Respondents by The Various Institutions

Majority of the street vendors 79.1% did not complied with the food hygiene and safety laws which are bad gesture. This will lead to increase in food borne illness, food poisoning and other food borne related diseases in the town. Sanctioning of food vendors for non – compliance or adherence to local food hygiene and safety bye-laws was generally high at the study area. This implies that, the Environmental Health Officers are not enforcing the bye-laws. Overall, only 24 20.9% of the street food vendors reported ever being sanctioned by health officers and other authorities. This showed that, the Environmental Health Officers, being the only institution that dealt directly with street food vendors, need to do more in terms of prosecuting food vendors who violated the rules and regulations of food hygiene and safety practices should be dealt with in order to serve as deterrent to others. This is depicted in Table 18.

Table 18:Sanction of Food Vendors by Institutions

Response	Frequency	Percent
Food and Drugs Authority	0	0
Environmental Health	91	79.1
Tourist Board Authority	0	0
None	24	20.9
Total	115	100.0

Source: Field Survey (2020)

The Food Vendors Knowledge on Food Borne Diseases

4.18 The Respondents' Knowledge of Food Borne Diseases

It was an established fact that, most of the food vendors interviewed did not know much about food-borne diseases or food related diseases. The majority 56.5% of the respondents were not able to mention any of the food borne diseases. This implies that more health education needs to be done. These will help the vendors pay much attention and safety measures when handling food to avoid contamination. The respondents, 24.3% can only mention cholera, 11.3% of the respondents mentioned typhoid, and 7.9% of the respondents named dysentery. This is depicted in Table 19.

Table 19: Knowledge of Food-Borne Diseases

Response	Frequency	Percent
None	65	56.5
Cholera	28	24.3
Typhoid	13	11.3
Dysentery	9	7.9
Total	115	100.0

Source: Field Survey (2020)

4.19 The Common Illness Experience by The Respondents

Majority of the respondents, 92.2% reported experiencing various illnesses often time. These reported illnesses were usually dominated by malaria 36.5% as most of them sell close to drains, cough and headache 27.0%, typhoid 11.3%, waist pains 7.8%, while 7.8% had not experienced any of these illnesses. According to Elena and Ntoso (2013), headaches also fall within the symptoms of non-typhoid salmonellosis and fever. Moreover, despite the

general low prevalence of coughs and sneezes they are not supposed to sell food for public consumptions, while experiencing these illnesses. Illnesses can easily spread pathogens from one person to another, as reported by Wangled et al (2012), that is from food vendor to the consumer. This is depicted in Figure 2.

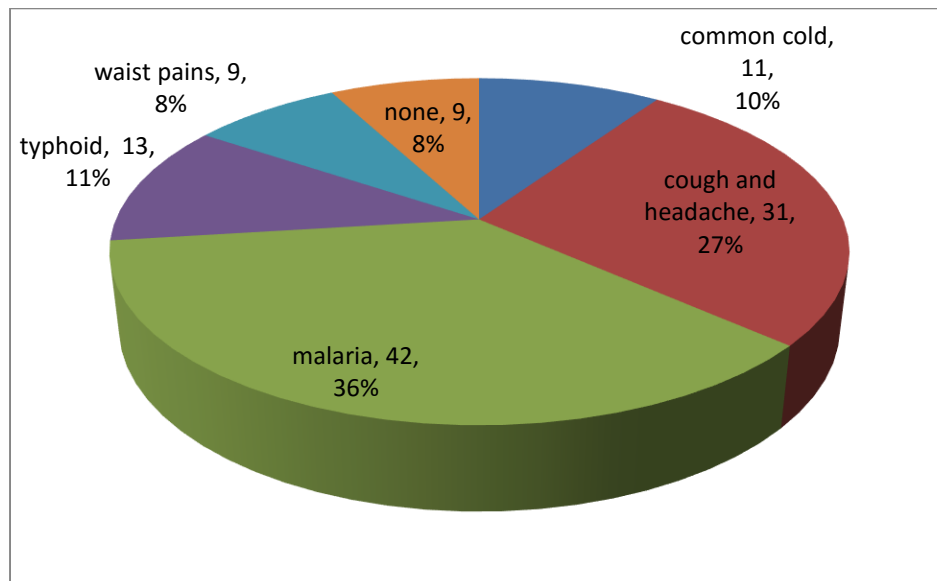


Figure 2: Experiencing of Common Illness

Source: Field Survey (2020)

4.20 What the Food Vendors Do When Experiencing Common Illness

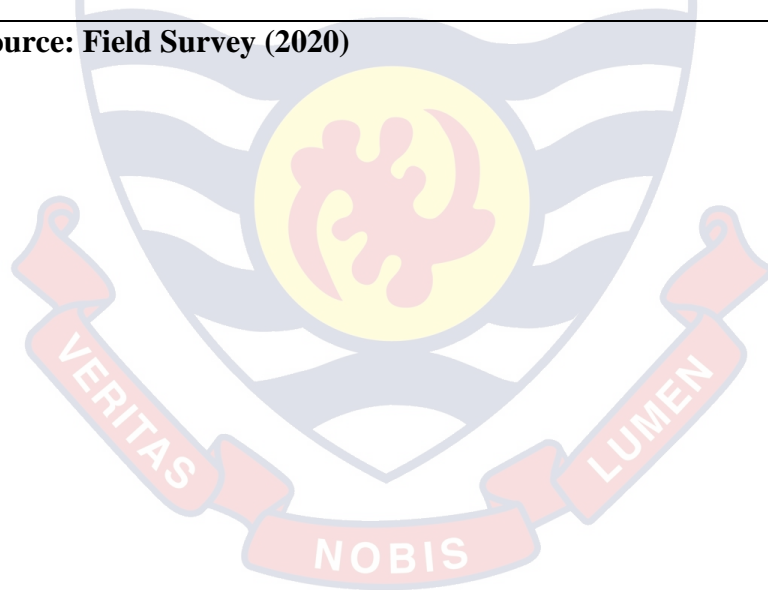
It was an established fact that, most of the food vendors 48.7% interviewed did not attend hospitals, clinics or go to drug store for proper medication and treatment whenever they fell sick, rather self-medication as they do not earn much from their business and also fear that they will be admitted. This gesture can pose threat to public health as some of these vendors can be healthy carriers. The few 26.1% of the respondents seek proper medication or treatment at hospitals and clinic, which is very healthy as a food vendor to curtail the transmission of communicable diseases. The respondents 17.4% buy drugs from license store for treatment, while 7.8% do not seek any

medication any time they fall sick, and this means that some of the food vendors have strong immune system which naturally take of them whenever they fall ill. This is depicted in Table 20.

Table 20:What Food Vendor Does When Experience Common Illness?

Respondents	Frequency	Percent
Hospital	18	15.7
Clinic	12	10.4
Self-medication	56	48.7
Buy drugs	20	17.4
None	9	7.8
Total	115	100.0

Source: Field Survey (2020)



CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This concluding chapter of the thesis looks at recommendations that were suggested by the respondents of the study concerning what can be done to enhance food hygiene practices among street food vendors in the Ayensuano District, implications of the study taking into consideration the researcher's perspective as to what can be done as far as policy, practice and research are concerned to enhance food hygiene practices among street food vendors in the Ayensuano District. The limitations and conclusion of the study.

5.2 Summary

The specific objectives of the study was to examine the knowledge of food hygiene among food vendors during food preparation and the selling process, to assess the personal hygiene among food vendors on the street, to assess the level of compliance to acquire medical examination certificate by the food vendors and to ascertain the knowledge of food-borne diseases among food vendors. The study established that food vendors did not practice positive food handling behaviour which affected the quality and sanity of food consumed by public resulting in food-borne diseases. The negative attitudes of food vendors in their food preparation and service was due to but not limited to lack of regular monitoring and supervision, inefficient training, gross disobedience of food vendors among others.

5.3 Conclusions

Street food vendors practiced minimal hygienic and sanitary practices. The hygienic practices in question included food preparation, handling of

utensils; place for food preparation, personal hygiene and methods of storing cooked food. Majority of the respondents, 76.6% were medically screened and issued with medical certificate of fitness to handle food for public consumption. This implies that, most of the food vendors understand the need for undergoing medical examination periodically to avoid communicable diseases. A significant number of respondents representing, 23.5% were not medically screened to ascertain their fitness to handle food for public consumptions. This could also mean that, some of the food vendors may be healthy carriers of communicable diseases.

Most of the street food vendors representing, 22.6% underwent some kind of training on food hygiene which is welcome news. The study found that street food vendors at Coaltar generally did not adhere to proper food hygiene practices with regards to regular medical examination, protection of food from flies and dust, serving of food, hand hygiene, use of protective clothing and headgears. The study pointed out that there is no significant association between the vendors' level of education and their acceptance to undergo medical examination. Also, no statistically significant relationship was found between the education level and food hygiene practices. Training of food vendors on food hygiene and safety had a significant association with crucial food hygiene and safety practices, such as medical examination, hand hygiene and protection of food from flies and dust. This underscores the importance of training among food vendors to ensure perpetuation of best practices in the street food vending business thereby protecting public health.

Most of the vendors representing, 44% did not wear protective clothing whilst, 57.4% did not wear headgears or caps, and 51.3% handled food with

bare hands and this could lead to contamination of the foods. This implies that, the various institutions such as Environmental Health and Sanitation Department and Food and Drugs Authority, responsible for health educating the street food vendors on personal hygiene are not proactive. Majority of the street food vendors representing, 86.1% used potable water as their source in preparation of food. Without enough water, hygiene and sanitary practices cannot be met. It was an established fact that, most of the food vendors interviewed did not know much about food-borne diseases or food related diseases. The majority, 56.5% of the respondents were not able to mention any of the food borne diseases. This implies that more health education needs to be done. These will help the vendors pay much attention and safety measures when handling food to avoid contamination.

Recommendations

Stated below are the implications of the study which looked at implications for policy, implications on research and implications on a practice that if adhered to, will enhance safety food hygiene practices and reduce food borne diseases in the Ayensuano District and across the country.

1. Through the Ministry of Health and Local Government, legislation should be developed to recognize the street food industry by developing code of practice for street food vending.
2. It is recommended that the street food vendors prepare enough food for the day, so that they can sell all the food since most of them do not have good storage facilities.
3. The Environmental Health and Sanitation Unit should embark on intensive health promotion and hygiene educational talks. They should educate food

vendors as how to prevent food contamination through personal hygiene practices.

4. Enforcement of food hygiene bye-laws in the District by the Environmental Health Officers and other institutions.

5. All food should be adequately protected from flies and dust with the provision of fly and dust proofs.

6. Medical examination and certification should be made compulsory to every food vendor and the purpose of undergoing medical examination should be explained to them.

7. The District Assembly and other NGOs in hygiene education sector should organize refresher workshops and seminars for the Environmental health staff to be current on the issues of food hygiene practices and standards.

8. The street food vendors should be well educated by the appropriate Authorities such as Environmental Health Analyst and other institutions on the importance of HACCP whilst preparing food for public consumptions.

9. Food vendors need to be taken through regular and thorough training programmes for them to be abreast with new developments in food hygiene and 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.

10. Training should be done at no cost to the food vendors and a certificate should be awarded at the end of each training programme to serve as a motivation by the District Assemblies.

11. All food vendors must be required to get a sanitary permit from the Health Authorities. The regulation could compel the food vendors to comply with sanitation standards and requirements related to sanitary practices in food services to forestall or avoid food borne and waterborne illness due to food contamination or poisoning. The imposition of sanitary permits ensures inspection of the quality of food served by street vendors. Strict compliance with getting a sanitary permit by street food vendors doing business should be regularly monitored by the Health Authorities.

12. The District Assemblies should collaborate with NGOs and Environmental Health Officers to come out with a comprehensive food safety policy and guidelines to guide food vendors on the dos and don'ts on food preparation and sales with their roles and responsibilities clearly stated.

13. The NGOs and Environmental Health Officers should take it upon themselves to teach and explain the rules and roles governing food hygiene to food vendors on their various points to ensure a positive food handling behaviour.

14. The Assembly should make the effort to have more environmental health officers and further train them extensively on environmental and on food safety and food management.

When this is done, food vendors can be broken into cells and effectively trained and monitored by supervisors or officers assigned to them. This process can ensure effective training and monitoring at the same time and can effectively cause a behavioural change among food vendors.

REFERENCE

- . Available online: [http://www.epa.gov.gh/ghanalex/acts/Acts/ Food and Drug Board.pdf](http://www.epa.gov.gh/ghanalex/acts/Acts/Food%20and%20Drug%20Board.pdf) (accessed on 22 May 2013).
- Ababio, P. F. & Lovatt, P. (2015). A review on food safety and food hygiene studies in Ghana. *Food Control, Vol. 47, 92 – 97.*
- Ababio, P.F., & Adi, D.D. (2012). Evaluating food hygiene awareness and practices of food handlers in the Kumasi Metropolis. *Internet Journal of Food Safety, 14, 35-43.*
- Abdalla, M.A.; Sihm. E.S.; Alian, Y.Y.H.A.; Amell. O. B. (2008) *Food safety Knowledge and Practices of street food Vendors in Khartoum City.* Sudan J. Vet-Sci Anim Husb.2008, 47, 126-136.
- Agyei-Takyi, S., Monney, I. & Braimah, I. (2012). Human resource capacity in Ghana's water, sanitation and hygiene sector: analysis of capacity gaps and policy implications. *Water Policy.* doi: 10.2166/wp.2014.293.
- Alcock P.A. (1986). *Food Hygiene: A study guide England:* Stanley Thomas Ltd 4th Edition, London: Akande, P., Forbes, M. P., & Hall, G. (2009). The annual cost of foodborne illness in Australia: Australian Government Department of Health and Ageing. Document Number) Edward Arnold Ltd.
- Alvesson, M., & Sköldbberg, K. (2017). *Reflexive methodology: New vistas for qualitative research.* Sage.
- Annor, G.A., & Baiden, E.A. (2011). Evaluation of food hygiene knowledge, attitudes and practices of food handlers in food businesses in Accra, Ghana. *Food and nutrition*

Available online:

<http://www.modernghana.com/news/203772/1/contaminated-food-watercauses-700000-deaths-in-af.html> (accessed on 19 April 2013).

- Ayeh-Kumi, P. F., Quarcoo, S., Kwakye-Nuako, G., Kretchy, J. P., Osafo-Kantanka, A., & Mortu, S. (2009). Prevalence of intestinal parasitic infections among food vendors in Accra, Ghana. *The Journal of Tropical Medicine and Parasitology*, 32(1), 1-8
- Babbie, E. (1990). *Survey Research Methods: Bemam*: C.A. Woodworth Press.
- Beauchat, M., Murray, A. E., Black, M. A., & McDowell, D. A. (1997). The implementation of hazard analysis and critical control points in hospital catering. *Managing Service Quality: An International Journal*, 7(3), 150-156.
- Betty & Hobbs ('1997) *Food Poisoning and Food Hygiene 4th Edition*, London: Edward Arnold Ltd.
- Bhaskar J, Usman M, Smitha S, Bhat G.K. (2004) Bacteriological profile of street foods in Mangalore. *Indian J. Med. Microbiol*, 22: 197-197.
- Boateng, R. (2016). *Research made easy*. Create Space Independent Publishing Platform
- Boyce, C. & Neale, P. (2006) "Conducting in-depth Interviews: A Guide for Designing and Conducting In-Depth Interviews", *Pathfinder International Tool Series*
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.

- Bryan, M.B., Caroline, V. & Madelon, F. (2003). Safety of vendor-prepared foods: Evaluation of 10 processing mobile food vendors in Manhattan. *Public Health Reports*. 118, pp. 470-476
- CDC (2013). Attribution of Foodborne Illness, hospitalizations and deaths to food commodities by Outbreak Data, United States, Vol (19) 3.
- Chukuezi, C.O. (2010). Food safety and hygienic practices of street food vendors in Owerri, Nigeria *Studies in the sociology of science*, 1 (1), 50.
- Clayton, D.A., Griffith, C.J., Price, P., & Peters, A.C. (2002). Food handlers' beliefs and self-reported practices. *International journal of environmental health research*, 12 (1), 25 – 39.
- Chn, L. I. S. (2013). Data collection techniques a guide for researchers in humanities and education. *International Research Journal of Computer Science and Information Systems (IRJCSIS)* Vol. 2(3) pp. 40-44.
- Collins, J., & Hussey, R. (2003). Business research, Hampshire, UK: Palgrave Macmillan Cracknell Kaufmann Nobis (1998) *Practical Professional Catering*. Hong Kong: MacMillan Press P. 301
- Creswell, J. W., & Plano Clark, V. L. (2007). Designing and conducting mixed methods research. Sage publications.
- Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. *Handbook of mixed methods in social and behavioral research*, 209, 240.
- Creswell, J.W. (2014). *Research Design: Qualitative, Quantitative & Mixed Methods Approaches*. 4th edition: Los Angeles, SAGE Publications, (International student edition).
- Davery, H.H & Light body, (1998) *The Control of Disease in the Tropics* 2nd

edition London: H.K. Lewis Ltd.

Dewaal, C, S; Rober, N. *Global and Local: Food Safety around the World.*

Available Online: <http://safety Food internal. Org/Local-global-pdf>

(access on 16). April 2014.

Dewberry E. (1997) *Food Poising* 4th edition Manchester; Leonard Hill Ltd.

Epidemiological unit (1998) *A Hand Book on Cholera*. Accra: MOH. P.

I.

Epidemiological unit (1991) *A Hand Book on Cholera*. Accra: MOH. P.

Esen, R.K. & Owusu, E. (2013). Quality of Cooked Foods in Urban Schools in

Ghana: Review of Food Borne Diseases and Health Implications.

International Journal of Scientific & Technology Research Volume 2,

Issue 10.

FAO (2008), International conference on nutrition, plan of action for nutrition.

Rome.

FAO/WHO. Assuring Food Safety and Quality: Guide lines for strengthening

National Food Control System: Available Online:

WHO://www.who.int/food_safety/published_capacity/en/English.

Guidelines. Food-Control IPolf (accession 4 April (2015).

Feglo, P; Sakyi, K. (2014). Bacterial Contamination of street vending food in

Kumasi, Ghana, J. Med. Biomed. Si. 2012, 1, 1-8.

Food and Agricultural Organization of the United Nations (FAO). (2009). *Good*

Hygienic Practices in the preparation and sale of Street Food in Africa,

Tools for Training

Food and Drugs Act (PNDC Law 305 B); Parliament of the Republic of Ghana,

Accra, Ghana, and 1992.

Fosket, D. and Ceserani, V. (2007). *The Theory of Catering* (11th Ed.). London.

Hodder Arnold.

Gadugah, N. (2014). Cholera epidemic: GHS call for a ban on food vending.

Availableonline: <http://www.myjoyonline.com/news/2014/September-2nd/cholera-epidemic-ghs-call-for-nationwide-ban-on-food-vending>

Gay L.R. (1992.) Educational Research Competencies for analysis and application. Merrill publishing company, Toronto.1982: 246.

Ghana News Agency. Contaminated Food, Water Causes 700,000 Deaths in Africa Annually.

Ghana Web. Four Dead after Eating Contaminated Food. Available online:

<http://www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=195505#> (accessed on 22 May 2013).

Graphic Online. Global Study Suggests Solutions to Childhood Diarrhoea.

Available online: <http://graphic.com.gh/Health/global-study-suggests-solutions-to-childhood-diarrhoea.html> (accessed on 22 May 2013).

Haapala, I., & Probart, C. (2004). Food safety knowledge, perceptions, and behaviours among middle school students. *Journal of Nutrition Education and Behaviour*, 36 (2), 71 – 76.

Harwell, A., Amewovor, D. H. A. K., Osei-Kofi, J., Amoono, S. E., Akorli, S.

Y., Saka, E., & Ndadi, H. A. (2011). „Street foods: Handling, hygiene and client expectations in World Heritage Site Town, Cape Coast, Ghana“. *African Journal of Microbiology*

Hayes (1999) Food Microbiology and Hygiene, New York: Elsevier Science publisher Ltd. 348.

Hobbs, B.C. & Roberts, D. (1993). Food poisoning and food hygiene. (6th ed.).

London: Edward Arnold.

- Ifeadike, C. O., Ironkwe, O. C., Adogu, P. O., & Nnebue, C. C. (2014). Assessment of the food hygiene practices of food handlers in the Federal Capital Territory of Nigeria. *Tropical Journal of Medical Research*, 17(1), 10.
- Institute of Statistical Social & Economic Research (ISSER). 2002. *Street foods in Ghana: Types, Environment, Patronage, Laws and Regulations*. Proceedings of a Roundtable Conference: ISSER, University of Ghana
- Iragunima (2006) Iragunima, M. W. (2006). Fundamentals of primary health care. *Port Harcourt: Paulimatex Printers. Google Scholar*.
- Jackson, S. L. (2014). *Research methods: A modular approach*. Cengage Learning
- Jacob and Michael (1999): Training safe Food Handling Guide for Managers of Food Establishment, Geneva World Health Organization Page 62, 66, 80, 83.
- Jay, J. M. (2000). Bioassay and Related Methods. In *Modern food microbiology* (pp. 237- 249). Springer US.
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher*, 33(7), 14-26.
- JoyNews. Nine Confirmed Dead in Cholera Outbreak at Atebubu. Available online: <http://edition.myjoyonline.com/pages/news/201207/89610.php> (accessed on 22 May 2013).
- Kannae, LA. (2004), 'Research Capacity Building for National Organization. Kinton R ed Vceserani the theory of catering Butler and tanner Ltd, London 1992; 4440-476.

- Kassa, K. (2002). Enhancing product quality, Street foods in Ghana: a source of income but not without its hazards". *Ph Action News, the Newsletters of Global Post Harvest Forum*.
- Kimoni, R.; Cesenani, V. & Foskett, D. (2003). *The theory of Catering*. London: Hodder and Stoughton.
- Kok, R., & Balkaran, R. (2014). Street Food Vending and Hygiene Practices and Implications for Consumers. *Journal of Economics and Behavioral Studies, 6 (3), 188*.
- Labaree, R. (2013). Organizing Your Social Sciences Research Paper: Types of Research Designs. *USC Libraries Research Guides*.
- Lah, S., Addah, J. and Danso R.S. (2016). Food Safety Knowledge and Practice of Street Food
- Lues, J. F., Rasephei, M. R., Venter, P., and Theron, M. M. (2006). Assessing food safety and associated food handling practices in street food vending. *International Journal of Environmental Health Research, 16(5), 319-328*.
- Mckane L. & Kandel, K. (1996), *Microbiology; Essential and Applications* 2nd edition. McGraw Hill, U.S.A.
- Mensah, P., Yeboah-Manu, D., Owusu-Darko, K., & Ablordey, A. (2002). Street foods in Accra, Ghana: how safe are they? *Bulletin of the World Health Organization, 80(7), 546-554*.
- Ministry of Food and Agriculture / World Bank (2006). *Revised Food Safety Action Plan*.

- Ministry of Health/Ghana Health Service (2012): *Report on Cholera outbreak investigation in the Akuapem South Municipality, Eastern Region: 19th to 20th June, 2012.*
- Ministry of Health/Ghana Health Service (2014): *Report on Cholera outbreak investigation in the Ayensuano District, Eastern Region: 5th to 16th July, 2014.*
- Monney, I., Agyei, D. & Owusu, W. (2013). Hygienic Practices among Food Vendors in Educational Institutions in Ghana: The Case of Konongo. *Foods*; 2, 282-294; available on www.mdpi.com/journal/foods (accessed: May 24, 2018).
- Mosupye, F.M., & von HOLY, A.L.E.X.A.N.D.E.R (1999). Microbiological quality and safety of ready – to – eat street – vended foods in Johannesburg, South Africa. *Journal of Food Protection*, 62 (11), 1278 – 1284.
- Mufa, O.I, Akande, T.M. Food hygiene practices of food vendors in secondary Schools, in Ilorin Niger. *Posgrad. Med. J.* 2003, 10, 192-196
- Mukhopadhyay, P., Joardar, G.K., Bag, K., Samanta, A., Sain, S., and Koley, S. (2012). Identifying key risk behaviors regarding personal hygiene and food safety practices of food handlers working in Mwangi, (2004) A Nutritional, hygienic and social-economic dimensions of street foods in urban areas: The case of Nairobi. (Unpublished Doctoral thesis): University of Wageningen, The Netherlands. 2002: 43, 91 and 108 eating establishments located within a hospital campus in Kolkata. *AlAmeen J Med Sci*, 5(1): 21-28.
- O’Cathain, A., Murphy, E., & Nicholl, J. (2010). Three techniques for

- integrating data in mixed methods studies. *British Medical Journal*, 341, 4587. doi:10.1136/bmj.c4587
- Odonkor, S.T. (2012). Food Safety risks associated with tertiary students in self-catering hostels in Accra, Ghana. *International Journal of Biology Pharmacy and Allied Science*, 1 (14): 537 – 550.
- Oghenekohwo, J.E. (2015). The pattern of Food Hygiene and Environmental Health Practices among Food Vendors in Niger Delta University. *European Journal of Food Science and Technology*, 3 (1), 24 – 40.
- Patton M., (2002). *Qualitative Research and Evaluation Methods*. Thousand Oaks (CA): Sage Publications Ltd
- Prescott LM. (1999) *Microbiology* 4th edition McGraw Hill, U.S.A.
- Rane, S. (2011). Street vended food in the developing world: hazard analyses. *Indian journal of microbiology*, 51(1), 100-106.
- Rheinlander, T. (2006). Street Food Quality, a Matter of Neatness and Trust: A Qualitative Study of Local Practices and Perceptions of Food Quality, Food Hygiene and Food Safety in Urban Kumasi, Ghana". *Denmark: University of Copenhagen*.
- Samuel. & Samuel. Y. (1996): Hygienic practices among food vendors in educational institutions in Ghana: the case of Somanya. *Foods*. 2:282 – 294.
- Santos, M.-J.; Nogueira, J.R.; Patarata, L.; Mayan, O. (2014) Knowledge levels of food handlers in portuguese school canteens and their self-reported behaviour towards food safety. *Int. J. Environ. Health Res.* 2008, 18, 387–401.

Section 286. The Criminal Code of Ghana (Amendment) Act, 2003 (Act 646);
Available online: <http://www.refworld.org/docid/44bf823a4.html>
(accessed on 22 May 2013).

Stephenson, L.S., Latham, M.C, & Ottessen, E.A. (2002). *Malnutrition and parasitic helminthes infections. Parasitological, 121 (S1), 523 – 538.*

Subtratty A. H1 Becharry P; Cham-sum, (2004). “A survey of hygiene practices among Food Vendors in rural areas in Mauritius; Nutrition and Food Science, Vol. 34 Iss:5, pp.203-205.

Sutton, J., & Austin, Z. (2015). Qualitative research: data collection, analysis, and management. *The Canadian journal of hospital pharmacy, 68(3), 226.*

Talaro K. & Talaro, A. (1996), Foundations in microbiology 2"d edition. McGraw-Hill, U.S.A.

Tavonga, N. (2014). Operations of street food vendors and their impact on sustainable

Tinker, I. (1997). Street foods: Urban food and employment in developing countries, Berkley: *Oxford University Press.*

Todd, E.C. (2014) Epidemiology of food borne diseases: A worldwide review. *World Health Stat. Q.1997, 50, 30–50.*

Tovonga, N. (2014). Operation of street food vendors and their impact on sustainable urban life in high density suburbs of Harare, Zimbabwe. *Asian Journal of Economic Modeling, 2 (1) 18-31.*

urban life in high density suburbs of Harare, in Zimbabwe. *Asian Journal of Economic Modelling, 2(1), 18-31*

Vendors in Rural Northern Ghana. *Food and Public Health 4(3): 99-103.*

- Wangled, K. & Slatter, J. (2012). International food hygiene. *Journal of the Chartered Institute of Environmental Health*. 13(3), 5.
- WHO (2008). *Five keys to safer food manual*. Geneva. World Health Organization.
- World Health Organization (1998), *Food Safety Issues: Essential Safety Requirements for Street-Vended Foods*. Geneva.
- World Health Organization (2000). *Food safety: an essential public health issue for the new*
- World Health Organization (2005). *Health surveillance and management procedures of food-handling personnel*. Geneva. Technical report series no. 785.
- World Health Organization (2006), Essential Safety Requirement for Street Vended Food. Available online; [http://www. int/food safety/publications lffs. Management/en/street ven. Pdf](http://www.int/food safety/publications lffs. Management/en/street ven. Pdf). (Access on 29/04/2015).
- World Health Organization (2010). *Essential safety requirements for street vended foods*. Geneva: World Health Organization. World Bank. Better health in Africa. World Bank, Washington.
- World Health Organization of the United Nations. (1998). *Street foods (WHO food and nutrition paper)*. Rome, WHO.
- Wuliyeng, G.T. (2013). Examining the Hygiene Practices Among Street Food Vendors in Nsawam and Adoagyiri. Master's. Thesis Submitted to University of Ghana.
- Zain M, Naing N, (2007). **Socio** demographic characteristics of food handlers and their knowledge, attitude and practice towards food sanitation: a

preliminary report. *Southeast Asian J Trop Med Public Health*,
33(2):410-417.

Zeemaps. Available online: [http://ww.Zeemaps. Com](http://ww.Zeemaps.Com) (accessed on 22nd May
2015).

Zeru, K., & Kumie, A. (2007). Sanitary conditions of food establishments in
Mekelle town, Tigray, North Ethiopia. *Ethiop.J.HealthDev*, 2(1):1-9



APPENDIX A

PRESBYTERIAN UNIVERSITY COLLEGE, GHANA

Faculty of Development Studies

Department of Environmental and Natural Resources Management

M.Sc. Environmental Health and Sanitation

Dear Sir/Madam

I am a Master of Science Student in the above department of Environmental and Natural Resources Management in the above University. I am conducting a questionnaire to assess food hygiene practices among street food vendors at Coaltar Township in the Eastern Region, Ghana. I would be very grateful to have you participate in this assessment. Please, be assured that any information given is solely for the purpose of the research and would be kept very secret and confidential.

Socio-demographic characteristics of the study subject

1. Gender: female [] male []
2. Age group: less than 18 [] 18-25 [] 26-35 [] 36-45 [] 46-55 [] greater than 55 []
3. What is your highest level of education: none [] primary [] JHS [] SHS [] Vocational []
4. How long have you been in the business: less than 5 yrs. [] 5-10 yrs. [] 11-15 yrs. [] more than 15 yrs. []

Education on food hygiene, safety and registration of business

5. What kind of education do you have on food hygiene and safety? formal education [] informal education [] none []

6. Do you know rules and regulations governing food hygiene and safety?
wearing of protective clothing while preparing food or selling []
observation of personal hygiene [] None []
7. What kind of training on food hygiene and safety have you acquired?
training on personal hygiene [] training on food preparation []
none []
8. Which of the following institutions do you obtained permit before
commencing your business? District Assembly [] Tourism Board
Authority [] Food and Drugs Authority [] None []
9. What is importance of wearing head gear during preparation and serving
of food? to prevents hairs falling into the food [] to prevents cross
contamination [] to attracts customers [] none []
10. Why should one be in protective clothing before handling food? to
prevent cross contamination [] to attract customers [] to save
one's dresses [] none []
11. Why should food vendor not allowed to use make-up while preparing or
serving food? to prevent contamination [] to scare customers []
none []
12. What source of water do you use in the preparation of food? pipe-borne
[] wells [] boreholes [] Aryans river []
13. Where do you store your water for food preparation? barrel without cover
[] barrel with fitting cover [] bowls and buckets
14. By what means do you dish out food for customers? bare hands []
ladles [] spot []

15. What is the most critical point for hand washing during food preparation serving or handling? after private before food preparation after handling raw food and other objects after wash room
16. Why food vendor should wear hand gloves during preparation and serving of food? to prevent cross contamination to prevent pathogens for functioning none
17. How often do you think a food vendor should change his/her hand gloves during preparation and serving of food? daily when dirty when torn
18. What is the essence of providing sanitizers/disinfectant at the food premises? for the customers hand to smell good to prevent any pathogens in the customer's hand to prevents contamination None
19. Which method of waste disposal do you adopt? separation crude dumpings burning
20. Where do you store your waste before disposal? dustbin without fitting cover dustbin with fitting cover bowls or basket
21. What are some of the food borne diseases do you know? Cholera Typhoid Dysentery None

Information on medical screening respondents

22. Why is it necessary for a food vendor to undergo medical examination? to prevent communicable diseases to prevent contamination none
23. What is the most recent date of medical examination you have undergone? 2017 2018 2019

24. What is the nature of difficulty you encountered in acquiring medical examination certificate? delay in results [] expensive [] poor lab services []

Sanctioning of food vendors and common illness experienced

25. Which of the following institution sanction you when preparing or selling food? Environmental Health Officers [] Food and Drugs Authority officers [] Tourist Board Authority Officers [] none []

26. Which of the following institutions have prosecuted you before? Environmental Health Officers [] Food and Drugs Authority Officers [] Tourist Board Authority Officers [] none []

27. What common illness do you experience since you started this business? common cold [] cough and headache [] malaria fever [] typhoid [] cholera [] None []

28. What do you do when experienced any of these illnesses? hospital [] clinic [] self-medication [] buy drugs [] none []

