

UNIVERSITY FOR DEVELOPMENT STUDIES, TAMALE

**FOOD HYGIENE PRACTICES AMONG STREET FOOD VENDORS IN THE
SAGNARIGU MUNICIPALITY OF THE NORTHERN REGION OF GHANA.**

ALHASSAN YAKUBU

**THESIS SUBMITTED TO THE DEPARTMENT OF COMMUNITY
HEALTH AND FAMILY MEDICINE, SCHOOL OF MEDICINE AND
HEALTH SCIENCE, UNIVERSITY FOR DEVELOPMENT STUDIES, IN
PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD
OF MASTER OF PUBLIC HEALTH**

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DECLARATION

Student's Declaration

I hereby declare that, this thesis is the result of my original work except for references which have been duly acknowledged. It contains no materials previously presented by another person which has been accepted for the award of any diploma or degree elsewhere.

NAME: ALHASSAN YAKUBU

Signature:.....

Date:/...../.....

Supervisor's Declaration

I declare that the preparation and presentation of the dissertation was supervised in accordance with the guidelines on supervision of dissertation laid down by the University for Development Studies.

NAME: SHAMSU-DEEN ZIBLIM

Signature:

Date:/...../.....



DEDICATION

This work is dedicated to my lovely parents; Mr. and Mrs. Alhassan for their love and care.



ABSTRACT

Food hygiene is the conditions and measures necessary to ensure the safety of food from production to consumption. The Sagnarigu municipality in particular, majority of people depend mainly on street food and this accounts for the numerous food related health conditions within the municipality in most recent times. The research sought to assess the level of knowledge of food hygiene practices by street food vendors within the Sagnarigu municipality of the northern region of Ghana. The study adopted a cross sectional descriptive studies with mix methods that sampled 200 street food vendors using simple random sampling method. A structured questionnaire, interview guide as well as observational checklist were the main tools for data collection. The data which was obtained was cleaned using Microsoft excel and transported into SPSS version 24.0 for analysis. Pearson chi-square test was used to determine the relationship between socio demographic characteristics and hygiene practices. The findings indicated that most of the street food vendors were females comprising of 98% and about 48.4% had no form of formal education. Washing of dishes in clean soapy water and the use of apron were also significant with formal training on food handling ($p < 0.05$). The findings also showed that majority (88.9%) of food vendors have sufficient and appreciable knowledge when it comes to food hygiene. The study recommends that government should develop training programmes for food vendors to enhance their knowledge as well as capacity building of the food vendors and monitoring officials.



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CHAPTER ONE

INTRODUCTION

1.0 Background:

Food hygiene is the conditions and measures necessary to ensure the safety of food from production to consumption. Food safety and hygiene for decades has been the subject of scholarly research, and vending of food on the street is a weak link in food safety supervision. Street food does not only provide expediency for larger portion of the population, but it also provides a means of income for millions of low income people, creating a great contribution to the economy of many developing countries. Some people have promoted it to the level of a national security matter (FAO, 2009)

The *Food and Agriculture Organization* have defined street food as “ready-to-eat foods and beverages sold and prepared by vendors or hawkers in streets or other public places” Street food provides convenience in the choice of diet for larger number of the population living in developing countries. An estimated population of close to 2.5 billion people consume street food every day. This consumption supports the livelihood of majority of people with low income and helping significantly to enhance the economy (FAO, 2012) Food is a basic necessity of life without which human cannot survive. The entire life of a human being from development to productivity including whether a person becomes ill or healthy depend on what the person eats. According to Dr. Edith Clarke of the *Ghana Health Service* (GHS), the accessibility and obtainability of wholesome food is a fundamental human right. More so, it leads to an improvement in the health of people, contributing to productivity and providing an active basis for improvement of lives of people and alleviating poverty (Clarke, 2005).



Assessment of the street food vending environment is one pragmatic approach in understanding the nature and extent of the discrepancies in the availability of nutritious and affordable diet to populations and also helps in undertaking healthy food retail initiatives (center for disease control, 2014). Food hygiene practices involves the protection of supply from microbial, chemical, as well as physical hazards which could occur in the processes of food preparation, handling, serving, storing and consuming to protect food borne diseases.

Foodborne illnesses do not only impact the health and well-being of people but they also have some economic implications for individuals, families, communities, businesses and even nations. These diseases put a significant burden on the health-care delivery systems and greatly brings down the productive activities of the economy. Poor people tend to live from hand to mouth, and loss of income as a result of foodborne illness perpetuating the cycle of poverty (WHO, 2002)

Street vended foods have become one of the most common dangers associated with the increase in outbreaks of food-borne diseases in developing nations. There have been several documented cases of food poisoning outbreaks due to street foods.

Good food hygiene practices improve access to healthy foods through the gentrification of food retail venues (Center for Disease Control, 2014) thus, makes healthy food retail a determinant of health in the contemporary world (WHO, 2006c). Unfortunately, some food retail venues are associated with the emergence of NCDs (WHO, 2006c). Also, modern retail emergence has brought marked nutrition and health impacts through food price reduction, assortment and ease of access to junk foods (Rockefeller Foundation, 2013).

The U.S. Centers for Disease Control and Prevention (2014) has released a report showing that the counts of several types of food poisoning infections climbed in



2018, but that the increases could be the result of new diagnostic tools that help identify more cases. Overall, the agency believes food poisoning rates have remained largely unchanged.

Among North American populations, food environment influences the dietary behavior of consumers and subsequently obesity (Cummins & Macintyre, 2002).

Street foods are gaining increasing patronage as a result of urbanization and modernization which is compelling many urban dwellers to eat their major daily meals out of home. Street food vending is a common feature of most cities and towns in developing countries including Ghana.

Though, the sector is being faced with dangerous activities which have been widely known to pose serious concerns over the safety and wellbeing of the practitioners, particularly the health of the consumers (Muyanja et al., 2011). These unwholesome and unsafe actions have traversed the entire chain of street food enterprise ranging from agricultural raw materials to the final retail street foods and have been fingered in the epidemics of diseases and illnesses (Sakiru, Akinbode. Adewale, 2011). The prevention, maintenance and treatment of diseases from street food borne illnesses were reported to result in heavy drain on the purse of individuals and governments in the developing countries due to huge spending involved (M. R. El-Sherbeeney et al, 1985) . The scarce resources which could have been channeled in to infrastructural development are being used to treat preventable diseases due to the unwholesome activities mentioned above.

However, hygienic practices should go along with the various perceptions that people have in order to achieve safety in street-vended local foods. Literature is Limited on how actors define safety So that there is continued Patronage of Street foods in urban areas despite the concerns raised regarding vendors' unhygienic practices.



In Europe, a lot of scientific research work have been done especially to look at the perception of the public on the dangers of food and its associated risks. Even though, these studies showed that an appreciable number of the general public still do not consider the risk associated with food seriously, yet people developed their own means and tactics in order to handle food quality issues (Frewer et al., 2010)

In India, CII Institution in charge of the safety and quality of food, has developed a policy which will intensively create and even increase awareness among the consumers and street food vendors and it has given out a simple informative checklist of hygienic practices, called the “CII-14 point worksheet on the safety of street vended food” that put a lot of importance on implementation and practice of good hygienic standards by the street vendors (Rane, 2011).

A study that was conducted on the perception of food safety among consumers and street food vendors in Kumasi, Ghana employing qualitative tools, (Rheinländer, 2006) it was revealed that though vendors and consumers demonstrate a certain level of knowledge on food safety, generally they based their perception not on hygienic practices but on aesthetics, appearance and presentation of food and also the personal trust between vendors and consumers. Haleegoah et al., 2015 also noted that food vendors did not put their knowledge about food safety into practice. Thus, to achieve the safety of street vended foods (SVFs) in general, hygienic practices should go along with these perceptions.

The issue is that, if there are problems with safe and hygienic practices among street food vendors as alluded by Rheinländer, 2006 and (Haleegoah et al., 2015) then the foods become a risk to those who consume them on regular basis in urban areas. The FAO advocated five key points to ensure food safety from farm to plate: keep everything clean, separate raw and cooked, cook thoroughly, cook foods at safe



temperatures, and use safe water and raw materials (FAO/WHO, 2003). Knowledge and practice of these five key points ensures the safety of street foods at all times.

There are several health perils which are related to this sector of the economy. Multiple lines of evidence revealed that foods displayed on the roadside for sale could become contaminated either by spoilage or pathogenic micro-organisms (Odonkor et al., 2011; WHO, 1984). It is evident that most street vended foods have shown epidemiological links with illness (M. R. El-Sherbeeney, 1985). FAO, 1997 further instructs that street foods have some level of anxiety and fear with respect to their possibilities for serious food poisoning epidemics.

Ghana is a developing country which is generally known for its nice, enjoyable and diverse street foods. The numerous types of food available in Ghana do not only fulfill the eating habits of urban residents, especially in low income areas in the cities such as Sagnarigu municipality, but also attract the curiosity of tourists. The number of food poisoning outbreaks related to street foods have significantly increased in recent years. These outbreaks have been associated with various responsible agents which range from pathogens to chemical contaminants. According to Rane (2011), the poor knowledge and improper food handling of street food vendors in basic food safety practices and poor knowledge and awareness among handlers about the potential hazards associated with certain foods could explain the health and safety issues that street foods may pose (Rane, 2011). Moreover, it is important to state that the costs of food-borne illness include the cost of medical treatment, productivity loss, pain and suffering of affected individuals, industry losses, and losses within the public health sector (Harris, 1997).

Small to medium sized food processing facilities face challenges in effective execution of any food safety system. In many cases, this group of people are



susceptible to contamination, especially if there is little or no knowledge on food hygiene practices (Smigic et al., 2016)

Food and Agricultural Organization (FAO, 2009) and World Health Organization(WHO) 2005 regional report on food safety for Africa recorded microbiological hazards as the most eminent risk from street foods.

1.1 Problem statement

Food safety is a fundamental element of good health and essential for sustainable development. In very recent times, the street food vending business has attracted a lot of interests from public health practitioners, local and international organizations including social science researchers. Despite its importance in terms of providing employment and meeting the food needs of many people in developing countries, many have expressed concerns over the quality and safety of street vended food. It is an undeniable fact that there are millions of microorganisms that are found in the environment at any given time. Hence, there is the possibility of food being contaminated at all stages of its preparation and serving. This statement is quiet true considering the fact that food is being prepared and served in the open spaces.

Street food is often considered unhygienic and low in quality partly due to the poor environmental conditions under which it is prepared or sold, and also because food vendors lack adequate knowledge on food preparation and handling (FAO, 2009; Rheinlander, 2006; Annan-Prah, A. et al., 2011) .

Inadequate food hygiene practices can result to foodborne illnesses and even death of the consumer. This is why the *World Health Organization* helps Member nations and states in advocating for safer food handling via well thought-out disease prevention strategies and health education programmes which are directed to food handlers, including the consumers. Consumers in most developing countries have access to only



foods that are desirable and affordable to them and therefore, are exposed to unhealthy foods in their diet (Rockefeller foundation, 2014).

It has been further indicated that food vending increases the concerns with regard to the possibility of serious food poisoning outbreaks as a result of not using additives properly; the presence of adulterants including environmental contaminants as well as poor food handling practices among food vendors. There are people who prepare and sell food along roadsides yet are not trained with the right skills and knowledge to handle food, these people do not practice food hygiene protocols even the condition of the environment where they operate is very unsanitary. (FAO 1996).

It is estimated that water and foodborne illnesses are one of the major causes of illness and even death in under developed nations causing the death of close to 1.8 million people yearly (WHO, 2002). Thus, have the possibility of seriously endangering the health status of the people and subsequently creating a huge social burden on the communities and their health system.

In this study however, the focus of the research is on the external factors. The enterprise of selling food on the street is mostly outside the regulation and protection of the governments in most developing nations. The 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 has been observed to contribute to the low hygiene level of street vended food (ISSER, 2002). According to FAO (2009), unhygienic street food is associated with the outbreak of serious food poisoning in most parts of the world. Several epidemics of foodborne illnesses with some high level of severity have been documented across the globe in the past few years, indicating both the



public health and social relevance of these diseases. Consumers all over the world view foodborne disease epidemics with ever-increasing concern (WHO, 2012).

The morbidity trends as a result of foodborne diseases in Ghana indicates that two of the food related illnesses which are reported to the health centers namely diarrhea in children and tuberculosis among adults are among the top five leading causes of deaths (Clarke, 2005). Any ignorance or least mistake done on the part of the food handler may lead to the spread of infectious micro-organisms, such as *Escherichia coli*, *Salmonella typhi*, and *Vibrio cholerae*.

Most cholera outbreaks in Ghana have been associated to eating contaminated street vended food. For instance, a combined team from the Food and Drugs Board and the Ghana Health Service traced the source of the cholera outbreak involving 49 cases in the Akwapim South Municipality in 2012 to eating of contaminated street food called “waakye” (rice and beans) from Nsawam (Ministry of Health/Ghana Health Service Report, 2012). This is not different from recent happenings in the Sagnarigu municipality.

Multiple lines of evidence reveals that foods exposed for sale on the roadsides may become contaminated either by -spoilage or pathogenic micro-organisms ((Odonkor et al., 2011).

More worrying is the fact that, it is a common practice in the streets of Sagnarigu municipality to see food vendors not observing the basic sanitary and hygienic practices of food safety. It is very common to see a food vendor using her bare hands to cut and serve food and still use that same bare hand to collect money from consumers not thinking twice about the health consequences to the consumer. This I believed is responsible for the numerous complaints of food related ailments reported more often in our health facilities. This study therefore sought to examine the current



hygiene practices among street food vendors in Sagnarigu municipality from an integrated perspective of food vendors, consumers and also regulatory institutions in the municipality.

1.2 Major research question

What is the level of food hygiene practices among street food vendors in the Sagnarigu Municipality?

1.2.1 Specific research questions

1. What is the level of knowledge of food hygiene among street food vendors in Sagnarigu Municipality?
2. What is the status of the environment where food is prepared and sold in relation to food hygiene and health among street food vendors in Sanarigu Municipality?
3. How food is handled in relation to food hygiene and health among street food vendors in Sagnarigu Municipality?
4. What is the role of government agencies on food hygiene and health among food vendors in the Sagnarigu Municipality?

1.3 Main objective of the study

The main objective of the study was to assess the level of food hygiene practices among street food vendors in the Sagnarigu Municipality

1.3.1 Specific research objectives

The specific research objectives of the study are:

1. To assess the level of knowledge of food hygiene practices among street food vendors in the Sagnarigu Municipality



2. To investigate the status of the environment where the food is prepared and sold in relation to food hygiene and health among food vendors in Sagnarigu municipality
3. To assess how food is handled among street food vendors in the Sagnarigu municipality
4. To examine the role of environmental health workers in relation to food hygiene and health among street food vendors in the Sagnarigu municipality

1.4 The significance of the study

This study will serve as a pool of knowledge to researchers interested in food hygiene and health in Ghana and beyond. It will also aid policy makers in the formulation of policies and programmes especially in the street food vending industry.

The study would also help to contribute to knowledge especially in the area of environmental health and food hygiene.

It will also influence policy decision regarding the regulation of food vending in the Sagnarigu Municipality and beyond.

The study will again help improve upon the quality of food sold by street food vendors in the Sagnarigu Municipality.

More so, the study will aid in streamlining the activities of food vendors in the Sagnarigu Municipality and beyond.

1.5 Conceptual Framework

This conceptual framework seeks to explain the factors that are related to food hygiene practices among street food vendors in Sagnarigu municipality. A street food vendor is considered to have good or poor food hygiene practices based on a number of factors. Some of these factors include how knowledgeable the person is in terms of food related issues such as cross-contamination, hygienic state of the environment



where food is prepared and sold and governmental policies as well as the socio-economic factors of the vendor. The level of personal hygiene practices, and the person's knowledge on food hygiene (food preparation and handling) all influences the vendors behavior in relation to food handling.

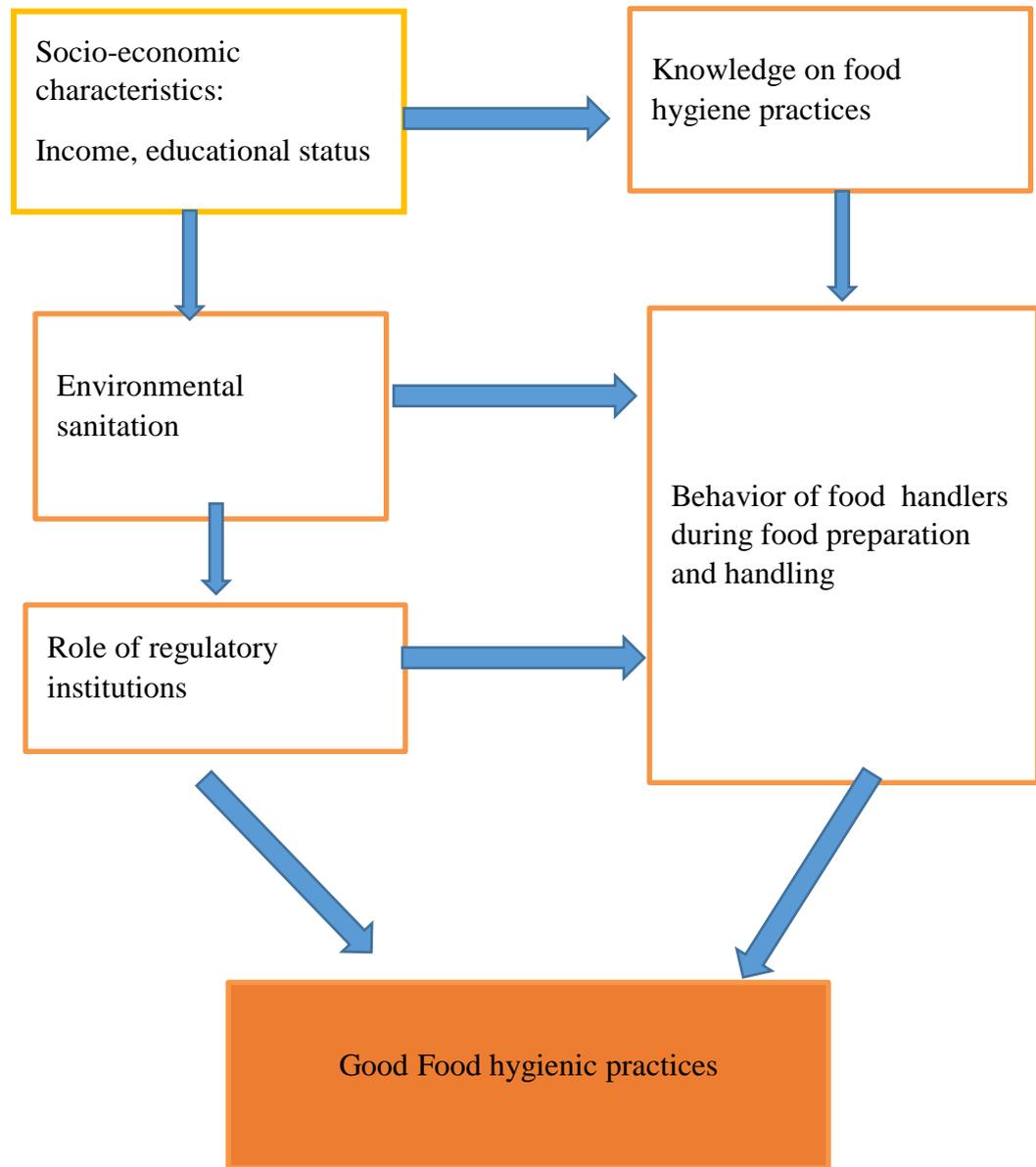
A person with good hygiene practices will surely not do things that can cause cross contamination of food; such person will not prepare or sell food under unhygienic conditions. A person's personal hygiene practices also influences his or her behavior in relation to good hygiene practices. A person's socio-economic factors equally have an influence on his knowledge of food hygiene practices.

How food vendors conduct themselves during food preparation and selling can negatively or positively impact on the wholesomeness or otherwise of the food being vended. Many people change or obey rules only when they are being directed to. This implies that when the sanitation officer actually goes to the field the food vendors will comply and do the right thing by adhering to the food hygiene protocols.

The educational level and the income status of street food vendors also determine whether they are even aware of certain basic practices or even have the ability to acquire equipment such as apron and head covers.



Conceptual Frame of Food Hygiene Practices



Source: Author's Own Framework

Figure 1.1 A Conceptual Frame Work on Factors Associated With Food Hygiene Practices

1.6 Organization of the Study

The study is structured into six chapters. Chapter one deals with the background of the study, statement of the problem, the objectives of the study and the research questions that guides the direction of the study. The chapter concludes on the



significance of the study as well as the conceptual frame work.

Chapter two deals with the review of both theoretical and empirical literature on the vending of street food which also helps in shaping the study.

Chapter three deals with the profile of the municipality and background characteristics of the study area, research methodology, method of data collection, technique for sampling as well as method of data analysis.

Chapter four presents the results of study. This is done based on the socio-demographic characteristics as well as the objectives of the study.

Chapter five presents the discussion of the findings based on the results and supported by literature.

Chapter six looks at the summary of the findings recommendations and end with a conclusion

Chapter four covers a profile of the district and background characteristics of the study area,



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter gives a review of similar surveys done in the aspect of street food vending. It begins with first reviewing of experts' thoughts as well as their perspectives regarding the study topic and also looks at empirical findings and conclusions that arise as a result of these works. Some areas to review include; the perspective of street food vending, food hygiene knowledge and practices, hygiene and street vended food, hygiene status of food vending site, food handling practices and economic importance of street vended food. Institutional role and gaps in theories would also be looked at.

2.2 The Perspective of Street Food Vending

According to the FAO, 2009 street food is any ready to eat food which is prepared and sold by people stationed at public places specifically on the streets.

It is estimated that about 2.5 billion of the world's population worldwide consume street vended foods daily (Samapundo et al., 2016). In a comparative study done on street vended foods among four West African nations by the Food and Agricultural Organization of the United Nations,(2012) noticed that street food vendors mostly vend food that are staple from their various countries.

Street foods refer to foods and beverages prepared and or sold by vendors on the streets and other public places for immediate consumption or to consume at a later time without processing or preparation again. This includes fresh fruits and vegetables (WHO, 1996).



Street food vending is a common phenomenon in both middle and low income countries mostly associated with the informal sector. Food safety is a crucial public health concern, as large number of individuals consume meals outside the home and thereby exposing them to food borne illnesses. Food handlers are essential key players when it comes to food safety. This runs throughout the food value chain including storage, production, preparation and retailing. Rahman et al (2016), argues that knowledge, attitude and practice of food safety among food vendors in Kuching City, Sarawak and the factors affecting them are vital.

Food and Agricultural Organization of the United Nations (FAO) reported that a great majority of women in the food vending business do so primarily to improve the food security of their family and to a larger extent increase financial independence. It says that patrons (consumers) of these food vendors on the street come from diverse background in the society, ranging from low income to high income earners. It include but not limited to the following; households, travelers, school children, construction workers etc. The issue of food safety and food borne illness has therefore led to global health concern (FAO, 2012).

Many people now consume street food because of convenience and the need for time. Street vended food now have a lot of high patronage as a result of urbanization and modernization which is compelling a lot of people to consume their main meals from outside of their homes. (Alamo-tonelada et al., 2018)

Street vended foods are seen to be a significant public health risk as a result of non-availability of basic infrastructure and services, challenges with regard to effectively dealing with huge numbers of street food vendors because of their diversity, mobility including the temporary nature of the business. The conditions under which many of



the street food vendors do the business is usually seen to be not suitable for both the preparation and selling of wholesome food for public consumption (Tra et al., 2017)

Thousands of millions of people normally become sick while many perished due to eating unsafe food. As a result, in May 2000, the world health organization adopted a resolution requesting member countries to see food safety as an important public health issue so that the burden of food borne diseases can be reduced (WHO, 2002)

An estimated 2 million people die of food and waterborne diseases annually, most profound in developing countries and involving many children. Some basic errors in food preparation or food handling either in food joints or at home is the result of many cases of foodborne diseases. It is said that individuals who have direct role in food preparation whether directly or indirectly have increase vulnerability to foodborne diseases. Therefore, health promotion, education and advocacy interventions targeting food handlers and consumers all together is imperative to reverse or reduce the burden of foodborne illnesses and effects of disease outbreak and thereby ensuring improved public health and safety (Boatema et al., 2018; Dajaan et al., 2018).

2.3 Socio- Demographic Characteristics and Street Food Vending

In a survey conducted on food vendors by Dajaan et al., 2018 of 100 food vendors showed that, for gender 97% were female food vendors, 10% were between the ages of 15-25 years while 41 percent were between the ages 36-45. Majority representing 58% had no formal education, 18% were primary school leavers and as low as 6% were SHS school leavers. So generally per the survey the education level of the food vendors was low (WHO/FAO, 2009)

With regard to gender distribution, females were the majority (65%) and the men accounted for 34%. The larger proportion of food handlers (55%) had attained



secondary level education; 15% also attained tertiary level education, 6 per cent did not go beyond primary or elementary level, while only 1% did not have any form of formal education. (Thelwell-reid, 2014)

2.4 Food hygiene knowledge and practices

It has been argued that sufficient knowledge of food hygiene would result in proper handling of food and good preparation practices by food vendors. On the other hand insufficiency of the knowledge of food hygiene would lead to poor handling of raw materials for food. During food preparations, food handlers have direct contact with food and some wear jewelries; others fondle their bodies during preparations which can all lead to contaminations of the food leading to food poisoning. It is therefore important to equip food handlers with the requisite knowledge on good hygiene practices and the need to tidy the environment to avoid contamination from the environment (Kibret & Abera, 2012)

Food borne illnesses exist because there are contaminated foods that are being consumed. It is a considered view that the situation of foodborne diseases is a major public health problem with significant influence on economic loss. Millions of people fall ill each year and hundreds to thousands of them die after consuming contaminated foods due to poor food handling and safety practices by food handlers. Food poisoning and food related diseases caused by intestinal parasites and pathogenic bacteria can occur as a result of improper handling of food and food products, food preparation and storage through which contamination can occur. Involving infected individuals in food preparation would lead to increase chance of contamination of food through fingers which serves as reservoir to most microorganisms. Consumption of contaminated foods is a major reason for more than half of diarrheal disease in



most communities in developing countries. As a result, knowledge, attitude and food hygiene practices are crucial to food safety and hygiene at food establishments or joints (Galgamuwa et al., 2016).

According to a study done by (Thelwell-reid, 2014), food handlers who are formally trained had a statistically significant higher mean knowledge score (65.61% vs. 59.0%, $p < 0.05$) and mean practice score (67.40% vs. 60.35%, $p < 0.05$) than food handlers who had no formal training. Results of this study could aid policy makers to design effective training programs for food handlers, which could surely lead to a safer food supply for the consuming public and further reduce the food-borne disease epidemics in Jamaica.

Almost all the respondents (80%) similarly did not have any training on food hygiene and safety and did not even know of food hygiene and safety regulations. This means that food vendors are primarily interested in the economic benefits they stand to get from the street vending of food. And so depend solely on their own knowledge to prevent and protect people from the health risks they may be exposed to (Alamotonelada et al., 2018)

“From farm to the plate”, food vendors play critical role in food safety a continuum that is important for the prevention and control of food borne diseases. As such lack of proper understanding of safety protocols by people involved in food vending poses a serious challenge to food safety. (Iwu et al., 2017) conducted a study in Nigeria and reported that great majority of the participants representing 87% had knowledge of food hygiene.

Food is susceptible to contamination at any point during harvesting, processing, distribution, transportation, preparation and storage. Inadequate food hygiene practice



can result in foodborne illnesses or even death of the consumer(Boatema et al., 2018; Dajaan et al., 2018)

In Sri Lanka, a knowledge assessment study was conducted by Galgamuwa et al, 2016 among food vendors on food hygiene and found that some respondents have never used proper hand washing methods such as the use of soap and water during the food preparation process. It said majority however used soap and water after defecation. In the same study a little above half (54%) of the respondents' apply disinfectants on food preparing equipment all the time while 28% clean the place they prepare the food all the time. Only a few of the participants habitually trim their fingernails on regular basis, using of protective dress such as aprons while preparing food protecting food from reach of rodents by covering. The study revealed that proper waste management were not practiced by food vendors in many instances by food vendors and at the same time raw vegetables were not cleaned using the best possible methods. The level of education of participants had was a major determinant on the practice of food safety and hygiene(Galgamuwa et al., 2016)

In a similar study conducted by Mathew, 2019 indicated that personal hygiene is crucial and should be observed by any food establishment. Food vendors must practice personal hygiene because human beings constitute the majority of food contamination sources. Handling food with bare hands may result in cross contamination, hence introduction of microbes onto the food. Personal hygiene practices of food vendors were observed to be generally good as majority of the food vendors had neat appearance; short finger nails and covered their hair during selling. The requirement of food handlers to wear aprons or to wear hair covering during preparation and sale of food is very important; wearing apron can help prevent the risk of cross contaminating the food with germs. More than half of the food vendors



representing 59% have their hair covered during selling, less than half of the food vendors did not have apron on during selling of food.

It has been reported by a study in Nigeria that knowledge was closely associated with the practice of food hygiene which has been attributed to the fact that certain socio-cultural factors probably had greater impact on individuals' practice of food hygiene and safety. However, knowledge has positively influenced the individuals' personal and environmental hygiene and subsequent reduction in food contamination. Despite the aforementioned there exist prevailing gap and need for improvement in terms of hygiene conditions and access to requisite sanitary facilities for food vendors (Iwu et al., 2017).

A study done in Nairobi on hygiene practice of street food vendors indicated that vendors did not have the requisite training on food preparation. About 62% obtained food preparation skills through observation while 33% got their knowledge from their parents through the non-formal settings (Muinde & Kuria, 2005).

In a study done by (Samapundo et al., 2016) it was realized that significant proportion of the consumers (17.5%, 21/120) had no or poor food safety and hygiene knowledge level (score <50). There was no significant difference ($p < 0.05$) occurred in food safety knowledge in relation to gender ($p < 0.66$). Meanwhile with regard to age there was significant difference that occurred in food safety knowledge level ($p < 0$), educational level ($p < 0$).

Unwholesome food has been a human health problem since history was first recorded, and several food safety issues faced today are not new. Although governments around the world are doing what they can to enhance the safety of the food supply, the



prevalence of foodborne disease remains an important public health problem in both developed and developing countries.

Again a study conducted by(Samapundo et al., 2016) indicated that most of street food vendors did not have high educational levels and did not also have any formal training on food hygiene and safety, which could reasonably impacted on their insufficient food hygiene knowledge levels, attitudes and unhygienic practices. Another great concern with the findings was the fact that more than half (52.5%) of the vendors did not wash their hands before handling, preparing and serving foods, while 80% used their bare hands during the handling, preparation and serving of foods.

In the same study, it was revealed that almost all of the vendors (97.5%, 39/40) did not cover their hair with head covers or with caps and 70% (28/40) exchanged money during the handling and serving foods. Money is dirty and may cause contamination of food. It was observed that 57.5% (23/40) of the street food vendors used the same (dirty) cloths to clean the stalls (repeatedly) and 52.5% (21/40) wore uncovered jewelry(Samapundo et al., 2016).

In a study conducted at university of Ghana campus food vendors found out that as a result of food vendors not adhering to food safety practices on the university campus, most students after consuming the food usually suffer serious complication as a result of food poisoning(Manko, 2018)

A similar study conducted in Cape Coast- Ghana revealed that the microbial contamination levels were way above acceptable levels since some major fungi such as *Aspergillus candidus*, *Aspergillus flavus*, *Cladosporium herbarum*, *Necrospora*



crassa, *Aspergillus niger*, *Penicillium citrinum*, *Fusarium*, *Mucor* and *Rhizopus* species including yeasts were found in the food tested (Jour et al., 2011).

In Ghana, the burden of foodborne diseases are more profound in the slum areas which are characterized by poor environmental conditions, improper sanitary practices, lack of or no enforcement of food safety laws, low financial capacity to invest on safer equipment, and lack of education for food vendors. One of the easiest ways food contamination can occur is through contact with the hands of an infected person as such hand washing becomes a basic precautionary measure towards protecting the spread of diseases. Essentially, therefore, it is one of the primary practices to reduce the transmission of bacteria from individuals to food contact surfaces. It is of utmost importance to reduce contact between ready-to-eat foods and individuals hands to prevent the introduction of viruses or bacteria that already present in infected human bodies into foods.

Dajaan et al, (2018) concluded that food selling has become an integral part of the school setup and for that matter it is imperative to take the food hygiene situation at schools very serious as this become a major diet of school going children. They concluded that it is relevant to develop food safety interventions in educational institutions, especially, in the area of school health education programme on proper food hygiene at school setting.

Awareness of poor sanitary conditions and unsafe hygiene, and poor food hygiene practices can lead to food contamination. Good knowledge level of safe food hygiene practices among street food vendors could help to alleviate the disease burden associated with food contamination (Boatema et al., 2018).



Street food selling has become an area of public health concern because of the enormity of the risk associated with food patronized on the streets especially among low income earners in developing countries. Unsafe sanitary conditions, personal and food hygiene practices are accountable in many cases for the high rate of foodborne illnesses in parts of developing countries. In developing countries, street food vendors are often ignorant of proper food hygiene protocols. The lack of knowledge results in low or no adherence to standard food hygiene practices opens a gap through which pathogenic microbes and mycotoxins are disseminated in foods.

According to the world health organization, there are five keys to safer foods. Paramount among them is keep clean, by ensuring the following at all times to prevent diseases ; Wash hands after visiting the toilet, Wash and as well sanitize all surfaces and items used for the preparation of food, Wash your hands before handling food and often during food preparation then lastly Protect kitchen areas and food from insects, pests and other animals(WHO, 2006)

2.5 Food Safety and Hygiene of Street Vended Food

The WHO defined food safety as the assurance that when food is consumed in the usual manner, it does not cause any harm or discomfort to the health and general wellbeing of the individual. Food joints are major sources of food borne diseases and individuals in the food value chain sometimes contribute in diverse ways to outbreak of food borne illnesses (WHO, 2017).

People irrespective of age have actually lost their lives as a result of diseases especially such diseases which are caused by either our food consumption or our daily activities. Food hygiene and safety remain a threat to public health all over the globe. It is obvious and worldwide accepted that unhygienic food including contamination of what we take in daily have claimed the lives of millions of the world's population



more especially in Africa where there is poor or low level of education, poverty, lack of strict enforcement and adherence to public health policies, inadequate qualified personnel, poor financing health care system making Africa and for that matter Ghana vulnerable to foodborne diseases (Dun-Dery, 2012).

Iwu et al., (2017), concluded that, in spite of the low level of food hygiene practice observed, improvement in the practice of food hygiene such wearing of aprons and covering of the hair can be realized with increase in knowledge of food vendors.

According to WHO, 2019 hazardous substances such as chemical, physical as well as radioactive and microbial agents in food are one of the main causes of foodborne illnesses. These hazards may as part of other things comprises of viruses, bacteria and parasites. The nature of these diseases could range from acute (e.g. diarrhea, allergy, meningitis, miscarriage) and sub-acute (e.g. arthritis, renal failure) through to chronic conditions (e.g. cancer, epilepsy) symptoms.

The surest way of reducing the amount of microorganisms in order to make food wholesome is by proper cooking of the food to recommended minimum temperature levels (Guilford County Department of Public Health, 2011). While cooking can reduce microorganisms, it will not destroy the spores or toxins they may have produced. For this reason, it is critical to handle food safely before it is cooked.

High temperature coupled with humidity and proper lack of refrigeration provides favorable conditions for bacteria to multiply to unsafe levels. This makes the transmission of entero- pathogens via food and food spoilage become possible. According to Mensah et al., (2002) about 15-70% of most diarrhea cases in young children are food related.

The world health organization in 2001 introduced the Five Keys to Safer Food. The Five Keys to Safer Food poster incorporated in it all the messages of the previous



Ten Golden Rules for Safe Food Preparation under headings very easy to understand and also includes some details for the people to understand why these ideas were suggested.

The core messages of the Five Keys to Safer Food by the WHO are: (1) keep tidy and clean; (2) do not mix raw food and cooked food; (3) cook food thoroughly; (4) food must be kept at safer temperatures; and (5) use potable and safe water and raw materials for cooking (WHO, 2006b)

In Terchimam Municipality, a survey was carried to examine food vendors compliance to this WHO guide for safer food, it revealed that more than half (70%) of the participants in the municipality did not have practices consistent with the WHO safer food policy (Techiman Municipal Assembly, 2010).

Lack of proper personal hygiene including the washing of hands have been recognised to be one of the main source of foodborne epidemics around the globe which is attributed to low levels of knowledge by some food vendors. Proper hand washing with soap can remove transient micro flora from the hands and prevent gastrointestinal infections. In the study, it was found out that majority of respondents had no practices of washing hands with soap and water during food handling process (Galgamuwa et al., 2016).

Microbes can easily be transferred from food handlers to contaminate the food during food handling and preparation (Samakupa, 2003).

2.6 Environmental Hygiene- Pathogenic Transmission

The possibility of food-handlers to transmit disease is associated with the level of contact that the handlers may have with certain sorts of food. This may have varying risks which raises the issue of whether all such food handlers should be handled in the



same manner. Investigations of food borne disease outbreaks in the whole world revealed that, in almost all instances, it is as a result of strict adherence to satisfactory standards in the food value chain(Achempong, 2014)

Food joints of urban communities are obesogenic, it is less costly and characterized by high energy dense food, and processed or fast foods. Socio demographic conditions such as living condition and educational background of individuals play significant role in the food hygiene practices. Household and groups living in poor conditions with low educational level are less likely to maintain good sanitary conditions at joints and in the food preparation process. Some food joints in Ghana are poorly organized for food preparation which exposes the consumer to the risk of food poisoning and contamination. According to Boatemaa et al (2018), more than half (58%) of the urban population reside in poor communities also known as inner cities with poor drainage facilities, lack of portable water, among others(Boatemaa, Badasu & D- Graft Aikins, 2018).

Poor personal and environmental hygiene mostly contributes to foodborne diseases which points to the fact that food vendor's need to enhance upon their knowledge on food handling practices. In Ethiopia for instance not much work has been done regarding the conditions of food as well as drinking spots. Among food handlers in Bahir Dar town, that most of them were positive of enteric bacteria and parasites.

And concluded that good personal hygiene and sanitation are essential in food handling practices and forming the basis for preventing the transmission of pathogens from sources (Food vendors) to consumers (Kibret & Abera, 2012).

A study done in Africa indicated that 85% of the vendors prepared foods such as fish, fruit salads and roasted maize in unhygienic conditions, there are a lot of waste



including garbage dumped closer to these vending sites. There are large quantity of rubbish which are hipped and serves as breeding and living place for insects and pets which are linked directly with the transmission of enteric diseases(Tra et al., 2017).

The hygienic conditions of the environment surrounding the food vending stalls were seen to be unsatisfactory in 87.5% (35/40) of the food vending stalls that were investigated. There were not also enough waste collection bins to properly dispose of their waste food. The consequences of this action was flies being attracted to the place and this is not only a sign of poor hygienic and sanitary condition but also fecal pathogen (Samapundo et al., 2016).

About 70 per cent of diarrheal diseases are linked to the eating of harmful food and poor sanitary conditions in many developing countries. Some food sellers prepare food under poor sanitary or environmental conditions. This has been associated with poor knowledge in environmental hygiene practices. Close to 65000 people perished from foodborne illnesses in Ghana annually resulting in excess of US\$60million income to the economy. In most cases, food vendors are mostly accused of the spread of foodborne diseases, specifically cholera outbreaks, across the nation and are sometimes even banned by authority as a desperate measure to control the outbreak(Boatema et al., 2018).

A study from the United States affirms that poor food handling practices and poor environmental conditions contribute to a great majority of foodborne diseases. Therefore, to reduce the burden of foodborne illnesses, it is imperative to acquire an in-depth understanding of the requisite knowledge and practices of food handlers. With limited information food safety knowledge of food vendors in Bahir Dar, (Kibret & Abera, 2012) emphasized that new knowledge on food safety and sanitary practices and conditions be ascertained.



It is important to understand and address the contribution of poor sanitation on the environment where food is prepared in communities and examine the beliefs of healthy and unhealthy food practices. Boatemaa et al, (2018) revealed that some communities such as Agbogbloshie, James town and Ussher town are where food is prepared and sold to people in very poor sanitary environment coupled with poor water supply, poor toilet facilities and refuse dump sites among others.

The preparation surfaces which are meant for preparing vegetables and other raw foods were not often washed especially with soap. Food that was already prepared was not kept at normal or appropriate temperature and were even put in open containers without covers. An appreciable number of the vendors had cabbage or refuse bins besides their shops yet most of them did not practice personal hygiene. Most did not use head covers, aprons and some even collect money and serve food with the same hand (Muinde & Kuria, 2005).

According to Schlundt et al., (2004) diarrheal diseases caused by food borne microbial pathogens are major causes of illness and death in developing countries, being responsible for an estimated 1.9 million death annually at the global level.

2.7 Food Handling and Hygienic Practices

Poor or improper handling of food is a great global public health concern and needs serious institutional support or interventions. Studies all over the world have shown that food vending and for that matter street food vending is gradually becoming one of the hottest industries.

Kibret & Abera, (2012), argues that improper handling and poor hygiene measures by food vendors may enable pathogenic bacteria to come into contact with food and in



some instances multiply in sufficient quantities to cause harm or illness to the consumer.

Food is a basic necessity for human survival, and for that matter the availability and access to safe food become a basic human right that subsequently reflect in improvement of the health and wellbeing of individuals who consume it. People are becoming alarmed by the health risk posed by pathogens and potentially hazardous substances in foods particularly those that maybe introduced during food preparation or serving. Current trends in food production, processing, distribution and preparation globally has presented uniquely, new challenges to food safety. Food grown in one country can now be transported and consumed halfway across the world (Umar et al., 2018).

According to Umar et al., (2018) the WHO developed a Global Strategy for reducing the burden of foodborne disease. Prevention and control of foodborne diseases were declared to be a public health priority by the WHA. Although estimates of illnesses, hospitalizations, deaths, and outbreaks related to foodborne diseases are available for developed countries, lack of effective surveillance systems hampers availability of similar estimates for developing countries, where food handling by food vendors is key to improving and promoting good health. Worldwide, there were a total of 816 foodborne disease outbreaks, with 80,682 cases, in which food handlers were implicated in the spread of such diseases (Umar et al., 2018).

The conditions under which street foods are prepared, especially the storage and reheating could contribute to the potential hazard of street foods. Information obtained on storage identified reheating (50%) and refrigeration (44%) as methods used to



preserve unsold food. Fifty-six percent (56%) of the vendors store food for vending the next day, 30% consumed it and 12% disposed of it (Odonkor et al., 2011)

In a study conducted on the safety of vendor – prepared food in Manhattan showed that majority of vendors (67%) were found to contact served foods their bare hands. Four vendors who were under observation were seen vending with visibly dirty hands or gloves and none of the vendors either washed their hands or changed gloves during the time of observation (Burt & Volel, 2003). Most of the vendors did not observe personal hygiene, because a number of the them did not cover their heads, handled money and food at the same time and they did not wear overcoats/aprons and handled food with bare hand (Dajaan et al., 2018).

Health hazards from street food vending according to Chukuezi, 2010 can be drastically reduced if food vendors can practice good food handling and main optimal personal hygiene from preparation to serving of the food. This is necessary to maintain and sustain the safety and hygiene of street vended food.

The outbreak of cholera in Ghana has almost become an annual routine in recent years. Particularly urban Ghana, unhygienic environmental conditions and activities of food vendors in such areas has enhanced the rather unwanted situation through contamination of food with pathogens transmissible through fecal-oral medium. Personal hygiene and sanitation have been linked with the spread of fecal-oral pathogens in communities. It is a common knowledge that in some communities food is served with bare hand and thereby elevating the risk of transmission of infectious agents through contaminated food. Infectious agents that is capable of infect ion without intermediate host to become infective are often responsible for food contamination and microbial food infection (Mensah et al., 2002).



2.8 Economic Importance of Street Vended Food

According to Street vended food contributes a lot in the lives of many people within urban and even peri-urban areas in developing countries(WHO, 1996). Street vended food serves as:

- ✓ Source of less expensive, convenient and often nutritious meal for poor city dwellers
- ✓ A source of attractive and different food for the affluent including tourists and the economically advantaged group of people in society
- ✓ A major source of income for a vast number of persons, particularly women
- ✓ A means for self-employment and an opportunity for the development of entrepreneurial skills with low capital investment.

The sale of street food supports the livelihood of millions of urban poor and can contribute significantly to the economies of countries which are still developing(Samapundo et al., 2016)

In a study conducted by of street food vending among four West African capitals including Accra, Abidjan, Bamako and Freetown by FAO (2012) indicated that in West Africa, women are the majority in the sale of street foods. However, it was also noted that consumers of street food cut across a variety of social backgrounds, income groups, gender, age and education.(Tra et al., 2018)

Another study indicated that there were generally higher proportions of female street food vendors which can be attributed to the fact that females are traditionally recognized for cooking and taking care of children. They are also known generally to have lower skills and educational levels which could be a reason why females dominate the street food vending industry(Samapundo et al., 2016)



In a study conducted in Owari, Nigeria argues that even though street vended foods contribute significantly in meeting the food needs of urban dwellers, there are a number of health issues which are associated with them. The study indicated that women made up 66.67% of the vendors were women while 33.33% were men(Chukuezi, 2010).

In a similar study conducted by Annan-Prah *et al* (2011) in the central region of Ghana indicated that street vended foods provide the food needs of many local residents as well as tourists who visit the region by offering them various indigenous foods and beverages. This goes to confirm the assertion by some researchers that street foods are a means of livelihood for the poor and low income people might not entirely be true in recent times.

Street food vending is associated with pre modern economic activities that could also induce the level of hesitation by allowing swain traders onto the street of urban areas. This may be as a result of certain forces which may include migration, urbanization and industrialization which are key components of the social structure that may establish its own market. This makes street vending not only become nuisance to city authorities but also causes disorderliness, traffic and obviously sanitation problems(Ghatak & Chatterjee, 2018)

According to (Anelich *et al.*, 2014) Millions of people worldwide often become sick as a result of food and waterborne diseases. Out of this number, about three million people lose their lives annually with close to 700000 deaths occurring only in Africa due to diarrhea which may be related to the contamination of both water and food. The emergence of such diseases could easily degenerate to a food safety emergency situation that could seriously affect national economies and livelihoods through the



reduction of available food for both domestic consumption and closure of export markets or even high cost needed to address the challenge.

A study conducted to assess the level of food hygiene practices among street food vendors in the Tamale Metropolitan area indicated that the number of street food vendors are on the ascendancy in Tamale due to high patronage from low income earners as a result of its affordability and acceptability nature. The food is gaining center role in the numerous social functions in the area and being cheap to operate provides ready employment to many unemployed youths especially women, most of who may be unaware of their own health status and standard food hygiene practices. Therefore, the handling of food by food vendors is significant in tackling issues of food hygiene and food contamination Danikuu, (F. M., Baguo, F. B., & Azipala, O. 2015).

2.9 Institutional Regulations on Food Vending

Street foods are perceived to be a major public health risk. If a community is to have the full benefits of street-vended foods with minimal risk of foodborne disease, government intervention is required to ensure that the standard of safety for such foods is the best attainable in the context of the prevailing local situation (WHO, 1996).

FAO (1997) recommends that every person vending food or assisting in the vending of food must go through some form of screening in order to be licensed before he or she can engage in the food vending business.

Environmental health officers are responsible for the enforcement of food hygiene and safety regulations that are paramount in the maintenance of food hygiene and safety standards. They are given the mandate to examine food handlers medically. This medical screening lay emphasis on illnesses which can easily be transmitted



through food. Some of these diseases include but not limited to typhoid, skin conditions and tuberculosis some of these diseases may even be zoonotic diseases (Musoke et al., 2016)

Basic training in terms food hygiene and safety should be seen as an important function to enable street food vendors adhere to basic food hygiene, safety and sanitation protocols. This should be done by the application of required regulations to ensure proper hygiene, safety and sanitation protocols through continuous training and education on proper hygienic practices. There should be the provision of code of practice for the people in the street food business to follow; such as the provision of potable water and waste management bins to improve both environmental and food hygiene practices.(Chukuezi, 2010).

In a study conducted by(Mariano et al., 2017) to make credible and sustainable legal and policy decisions, the decision-making process must be based on strong evidence. Considering the growing complexity of the food safety field, innovative approaches are required to improve prioritization, accounting for the overall available knowledge and the need to integrate new scientific developments quickly.

World health organization(WHO) member countries have demanded that the WHO should enforce a number of activities which will enhance and strengthen food safety and hygiene throughout the world, most recently in resolution WHA53.15 (2000), which resulted in the WHO global strategy for food safety: safer food for better health, issued in 2002;3 and resolution WHA63.3 (2010), that ended up in the WHO strategic plan for food safety foodborne zoonosis as well , 2013–2022(WHO, 2019).

A study conducted on food vendors in the university of Ghana campus unveiled that the number of training on food hygiene and safety which is being organized for food vendors is not enough and adequate to well equip these vendor with the requisite



knowledge and skill needed to ensure strict compliance to safety practices(Manko, 2018).

In Uganda, environmental health practitioners (EHPs) play an important role in enforcing food safety for households and the community. The work of the EHPs is so important such that they move from house to house to inspect household water, sanitation and hygiene hence are engaged in mitigating the nuisances at households that could lead to foodborne illnesses and among vendors. Their contribution towards enforcement of public health legislation is key in promoting public health and wellbeing in Uganda(Musoke et al., 2016).

In recognition of the critical role of environmental health professionals Musoke et al (2016) recommended that officers of environmental health should be involved as key stakeholders in global, national and local level health initiatives to contribute towards ensuring consumers safety from food poisoning.

There are various international and national organizations that are in divergent ways involved in promoting and preserving personal and food hygiene including but not limited to the following; WHO, food and Agriculture Organization, International Food Safety Authorities Network and United Nations Children's Fund. Others include the Standards Authority and the Food and Drug Authority of Ghana.

These organizations have come out with certain interventions to improve personal and food hygiene among food vendors. Notable about the interventions are; Global foodborne infection Network, Global Environmental monitoring system, foodborne disease epidemiology reference group, hazard analysis and critical control point system. The Department of environmental health sanitation of ministry of environment, national agency for food and drug administration and control; and



standard organization of Nigeria are the organizations mandated to ensure food safety. However, Umar et al, (2018) bemoaned the continues proliferation of street food vendors and posing threats to their prospective consumers that are likely to be served unwholesome food from them

In most African countries especially in Ghana there a lot of laws and regulations set by bodies such as the Food and Drug Authority, the Standards Authority and the District assemblies to ensure that the activities of street food vendors are controlled and regulated. This is always not realized as a result of limited resources including inadequate personal for monitoring (Monney et al., 2013)

There are sufficient national legislations to ensure food safety regulations. Statutory bodies like the District Assembly, the food and Drugs Authority as well as the Ghana Standards Authority, are devoted to enforce food standards; however, it remains a challenge to fully realize the objective of ensuring food safety. This is contained in reports of foodborne illness and contamination of vented foods with enteric bacteria in most parts of the country.



CHAPTER THREE

3.0 STUDY AREA AND RESEARCH METHODOLOGY

3.1 Introduction

This chapter is divided into two sections: the first section deals with the geography of the study area such as the land mark, health and educational infrastructure while the second part deals with the methodology that was adopted in conducting the study. This includes the research design, type of data, sources of data, tools for data collection and approaches used for data analyses.

3.2 Background of the Study Area

The Sagnarigu Municipality is one of the infant municipalities in the Northern region of Ghana. It was created out of the Tamale metropolis in 2012. The Sagnarigu municipality has a total population of 148,099. This is in accordance with the 2010 population and housing census. And this represents 6 per cent of the total population of the northern region. It covers a total land mark area of 200.4km² and shares boundaries with the Savelugu municipality to the North, the municipality on the South East shares boundaries to Tamale metropolis, Tolon district to the West while Kumbungu district is to the North West. Geographically, the municipality falls between latitudes 9^o16' and 9^o34' North and longitudes 0^o36' and 0^o57 West.



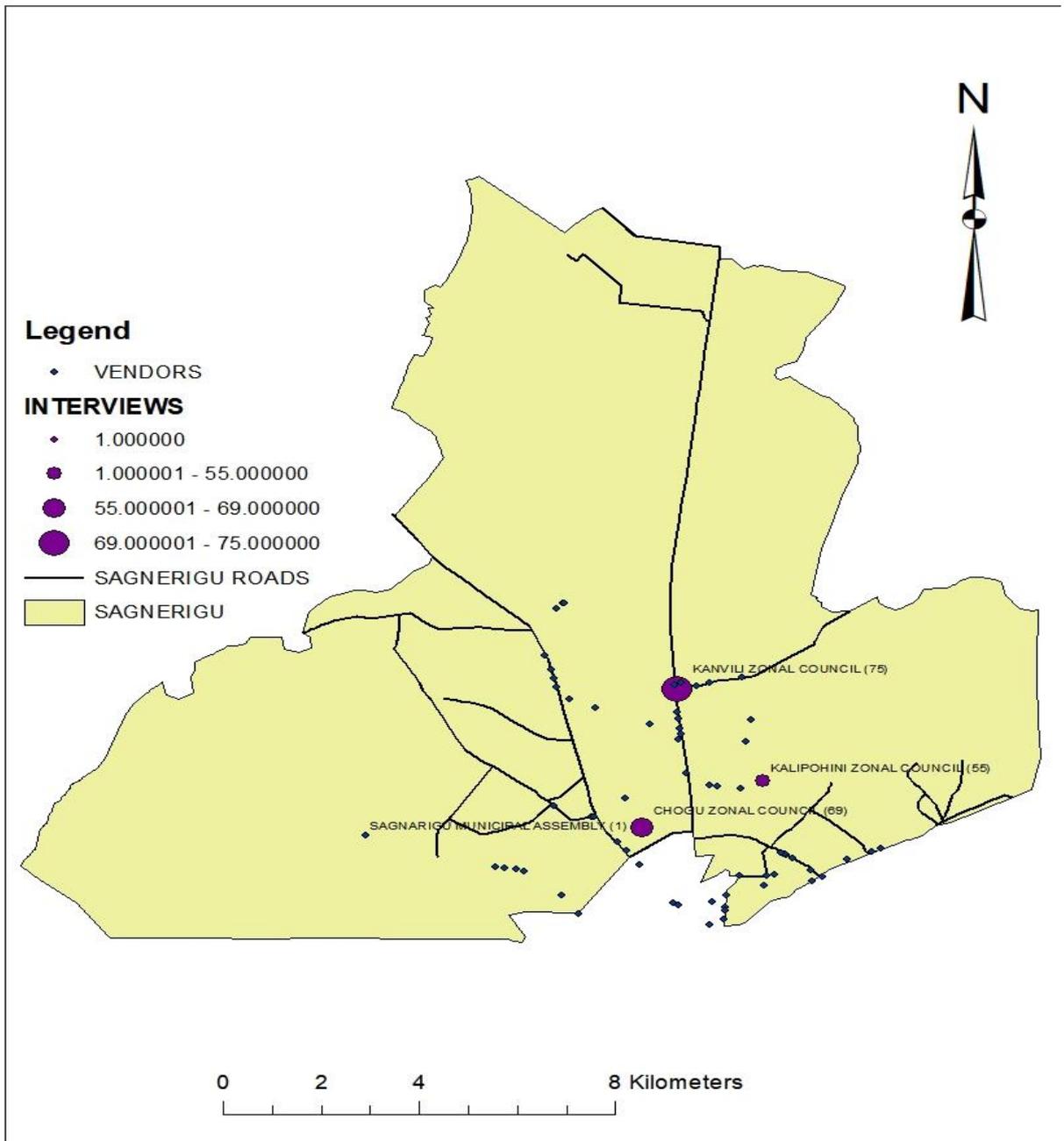


Figure 3.1 District map of Sagnarigu Indicating Street Food Vendors

Source: field data 2020

3.2.1 Economic Status of Sagnarigu Municipality

Close to 59.0 percent of the population of Sagnarigu aged 15 years and above are economically active while 41.0 per cent are economically not active. For those within the youthful and active age category, majority (92.1%) are employed while only 7.9 percent are not employed. For the economically not active population, a larger percentage of them constitute students (58.2%), 22.3 percent perform household duties and 2.1 percent are physically challenged or too sick to work. Most (54.6%) unemployed are job seekers for the first time. About 27.0 percent of the employed are engaged as service and sale workers, 22.0 percent engaged in craft and related trades, 21.5 percent engaged as skilled agricultural forestry and peasant farmer and 16.0 percent are engaged as managers, professionals, and technicians. For persons 15 years and older, 57.2 percent are self-employed without employees, 25.6 percent are employees and 6.0 percent constituting family workers. The private informal sector is the largest employer in the district, engaging majority (77.5%) percent of the population followed by the public sector with only 15.9 percent.

3.2.2 Educational infrastructure in the municipality

The Sagnarigu municipal is considered the education hub of Northern Region and Tamale for that matter. The municipality is a host to a lot of tertiary institutions namely, the University for Development Studies, the Tamale Technical University, Bagabaga College of Education and Tamale College of Education. The Community Health Nurses Training School and the School of Hygiene, are some of the public health training institutions in the Municipality. There are about six public senior high schools including dozens of basic schools.



3.2.3 Health infrastructure of the municipality

The municipality has a lot of clinics and health centers including the Chogu Health Center, Kalipohini Health Center and Kanvili Health Center. Others include the Bagabaga Health Center and some CHPS compounds. Habanna hospital, Tizaa hospital, God's care community hospital are some of the private hospitals in the municipality. All these health institutions are coordinated by the municipal health directorate.

3.2.4 Religious composition of the municipality

The major religious group in the municipality are Islam (which is the dominant religion), Christianity and Traditional religions. Dagombas constitute the largest ethnic group in the municipality and are predominantly Muslims while the rest of the ethnic groups who come from other regions of the country but reside in the municipality are largely Christians.

3.3 Research Design and Methodology

The study is a descriptive cross sectional study employing mixed method of (qualitative and quantitative) data gathered using structured questionnaire, observation check list and interview guide. The data gathered comprises of the socio-demographic characteristics of the respondents as well as their knowledge level on food hygiene practices.

3.4.1 Sources of data

Data for the study was sourced from both primary and secondary sources.

3.4.1.1 Primary Data Sources

In this study, primary data was collected in Sagnarigu municipality among street food vendors, and representatives of regulatory institutions. Among street food vendors,



data was gathered using a structured questionnaire consisting of closed ended questions with the aid of a web based software known as *kobocollect*. Both qualitative and quantitative data were collected for the purposes of validation. An interview schedule was used to collect data from the regulatory institutions. The questions were sectioned according to the study objectives. The interviews were tape-recorded and later transcribed for analysis and interpretations.

3.5 Data Collection Methods

3.5.1 Questionnaire

For the quantitative data, questionnaire was the key tool used since it was seen as the most appropriate and effective way of reaching the target population. The street food vendors are scattered across the length and breadth of the municipality, so for convenient sake the questionnaire was used. Because of accuracy the questionnaire was designed using computer assisted personal interviewing (CAPI). The CAPI was programmed using web based software known as the *Kobocollect*. In this process of questionnaire administering, there is no non response rate because the interviewer only completes a form in the presence of the respondent; thus interviews were done face to face. The questionnaire was administered to only street food vendors in the Sagnarigu municipality.

3.5.2 In-depth interviews

In-depth interview was one of the tools employed in this study to gather qualitative data. This tool was used to strategically cross examined and validate the quantitative data collected from the street food vendors. In all there were ten (10) in-depth interviews that were conducted. Nine (9) were administered to street food vendors while the remaining one was designed and administered to the environmental health officer of the Sagnarigu municipal assembly as a key informant. He was actually used



as the key informant because of the role played by his office and his knowledge level as someone who has over side responsibility of street food vendors in the Sagnarigu Municipality.

3.5.3 Direct Observation

The third data collection approach used to gather data for this was direct observation. In addition to using structured questionnaire and in-depth interview, direct observations were made on vendors behavior during questionnaire administration on issues such as hand washing among vendors, holding of money, serving food with bare hands, covering of hair, the use of aprons by vendors, and the environment where food is been prepared and sold. This direct observation on vendor's hygiene behavior was used to validate vendors reported hygiene practices

Table 3.1 Summary of Study Design and Methodology

Type of data	Sources of data	Tools for data collection	Population, size of respondents
Quantitative	Primary data	1. Structured questionnaire 2. Key interview guide	190 10
Qualitative	Primary data	Interview guide	(2) above
Documentary	Secondary data	1. Report from the environmental health unit. 2. Internet sources 3. Published students' thesis. 4. GHS, FDA	
Observation	Primary data	Observational guide	

Source: Author's own construct



3.6 Pretesting of Data Collection Instruments

In this study, the questionnaires were pre-tested on street food vendors using smart phones with android version 4.6 or more at Kalariga, a town in the Tamale metropolis. The pretesting drew the researcher's attention to some limitations of the instruments such as difficulty in understanding and answering some questions due to the wording of the questions and layout of questionnaire, phones going off as a result of low battery. These issues were therefore rectified on the final questionnaire and three new android phones were purchased for the data collectors to use in the field work.

3.7 Study Population and Sample Size

The target populations for this study were all street food vendors who sell cooked foods on the major streets within the Sagnarigu municipality during the day but excluding restaurants and big chop bars which clearly are being monitored by the tourism authority. The municipality was divided into three zonal councils: Kanvili, Chogu and Kalipohini. The vendors are located in various parts of the municipality. The sample consisted of 213 street food vendors who sell cooked food and one government official: the municipal environmental health officer.

Checks from both the environmental health unit of the Sagnarigu Municipality and the Food and Drugs Authority revealed that there was no data on street food vendors and so the researcher conducted a census of street food vendors to get their population in order to determine the sample size. Population size of 480 was gotten and out of that 214 street food vendors were sampled to take part in the study.



3.7.1 Sample Size Determination and Sampling Technique

Cochran's sample size formula was used to calculate the sample size of the street food vendors from the total population of 480. Desired Cochran sample size was gotten by using the formula

$$no = \frac{z^2 pq}{e^2}$$

Where no =Cochran sample size

Z = confidence level, at 95% with a corresponding z score of 1.96

P = proportion of the population of interest = 0.5

.e = level of precision (margin of error) = 5% = 0.05

.q = 1 – p = 1-0.5 = 0.5

Putting the values into the formula

$$\begin{aligned} .no &= (1.96)^2(0.5)(0.5)/(0.05)^2 = (3.8416 \times 0.25)/0.0025 = 0.9604/0.0025 \\ &= 384.16 \approx 384 \end{aligned}$$

And for a smaller population as in the case of street food vendors in Sagnarigu municipality

$$\text{Cochran uses } n = \frac{no}{1 + \frac{(no-1)}{N}}$$

.n = the new sample size

.no = Cochran's desired sample size (384)

N = population size (480)



$$n = \frac{384}{1 + \frac{(384-1)}{480}} = n = \frac{384}{1 + \frac{383}{480}}$$

$$n = \frac{384}{1.7979} = 213.58$$

$$.n \approx 214$$

The actual sample size for the study was 214 street food vendors

Table 3.2 Summary of sampled Population

Zonal council	Respondents
Kalipohini	64
Kanvili	75
Chogu	65
Qualitative data (9 in-depth interview)	Respondents
Kalipohini	3
Kanvili	3
Chogu	3
One key informant interview	1
Total respondents	214

Source: field survey 2020

3.7.2 Sampling Technique

In this study, a non-probability sampling method was used to select respondents. This was informed by the lack of a sampling frame of street food vendors in Sagnarigu municipality. The sampling procedure followed a two-stage approach; first, the study area was classified into clusters, thus three zonal councils, namely Kanvilli, Kalpohini and Chogu zonal councils. The second stage involved selecting the respondents



randomly. This was done on an online site: www.random.org, where you fill in the range thus minimum and maximum figures and then run the system. The process is repeated until the last sample gotten.

3.7.3 Selection of Respondents

Every street food vendor had the opportunity of being selected for the study. On the online site the minimum number which is one and maximum which is 480 were keyed into the system. Then when the system is run it displays a number within the range of 1-480. This activity was repeated severally until the researcher got all the 213 street food vendors. The environmental health officer was selected purposively as a key informant since his office was directly involved in the monitoring and supervision of street food vendors at the local level by the Sagnarigu municipal assembly.

3.8 Techniques for Data Analysis

In this study, both quantitative and qualitative approaches were combined. Quantitative data from the field were cleaned using Microsoft excel and then transported into SPSS for analysis. Codes were given to some of the variables before it was put into SPSS version 24 to run the analyses. Frequencies were used to compare continuous variables and the Pearson Chi- squared test for discrete variables. P- Values of less than 0.05 were taken as statistically significant.

Also point estimates were compared and presented as means and percentages. Nominal 2 sided p-values were reported with statistical significance defined at $p\text{-value} < 0.05$ at 95% confidence interval.

Percentage or proportion was calculated for discrete variables while the mean with its standard deviation (SD) were computed for the continuous variables.



Qualitative analysis was undertaken through content analysis. The audio recorded was played and transcribed into thematic areas based on the objectives of the study. This enables the researcher to make sense out of the data gathered. The qualitative data was used as a checker to validate the quantitative data

3.9 Ethical consideration

Ethical clearance was sought from the ethics committee of the Ghana health service through the northern regional health directorate. Introductory letter from the department of community health and family medicine, school of medicine and health sciences of the University for Development Studies was given. Then also, a consent form designed by the researcher for respondents to read and either agree or not to be part was also there for respondents' perusal. Questionnaires and observational guide had no space for names of respondents or their shops. Also, informed verbal consent was obtained from the food handlers before the interview. The researcher also in clear terms explained to respondents that the purpose of the study was purely academic. Above all, participation in this study was 100% voluntary.

3.10 Inclusion and exclusion criteria

Only street food vendors in and around Sagnarigu municipality were used in the survey. Any food vendor whose vending site is located outside the geographical demarcation of Sagnarigu municipality was not part of the study. Big chop bars and restaurants were not also part of the study. Food vendors who sell cooked food were the only ones part of the study.

3.11 Limitations of the Study

Social science researchers encounter different challenges at different times which affect their studies. In carrying out this study, there were some challenges and



limitations the researcher encountered. Major among these limitations were limited time, financial constraints, difficulty in getting vendors cooperation during field work and difficulty in translating questionnaire in to various languages for all vendors to understand and most respondents demanding pay after or before taking part in the study for their involvement. Another major constraint was the covid-19 pandemic which led to enforcement of restrictions on the citizenry by the president leading to the closure of most food vending sites. These challenges affected both the scope and depth of the study. The use of focus group discussion and participant observation could have enriched the outcome of this study but due to time limitation it was only limited to closed ended questionnaire, observation and in depth interview. Again, night street food vendors could not also be included in the sample due to time and financial limitations. Despite these challenges, thorough data collection and analysis were done and the quality of this study is not affected in any way.

I decided to work throughout the week including both Saturdays and Sundays to ensure that I get to interview all the respondents. Again, my family supported me financially to acquire nose masks for all my respondents which is one of the COVID-19 protocols. I and my research assistants were given means of transportation to all three zonal councils to locate all the respondents within the municipality.

3.12 Conclusion

This chapter presented the methodological design adopted in this study. The study employed a mix method approach. The chapter also outlined the target population for the study and sampling procedure that was used in selecting respondents for the study. It described preparations put in place to ensure the validity and reliability of the data collection tools. The chapter outlined the constraints the researcher encountered and how they were addressed in order to produce quality work



CHAPTER FOUR

PRESENTATION OF RESULTS

4.1 Introduction

This chapter presents the results and analyses of the data that was collected from the field. It starts by examining and analyzing the socio-demographic characteristics of the respondents. It gives a clear analysis of the stated objects of the study. The municipality was clustered into three zonal councils; the Kalipohini zonal council, Chogu zonal council and the Kanvilli zonal council. The study recorded a response rate of 93% bringing the number down to 200. And out of the 200 respondents, 190 were for the quantitative data while the remaining 10 constituted the qualitative part of the survey.

4.2 Socio- Demographic Characteristics of Respondents

The Socio- demographic characteristics such as sex, age, educational level, marital status and religion of respondents are presented and analyzed. These characteristics give a concise description of the respondents and how their differences could influence the overall objectives of the study. There were 200 respondents sampled for this study from the Sagnarigu municipality of the northern region of Ghana. The results obtained revealed that majority (37.9%) of the respondents were between the ages 30-39 while only 5 per cent of the respondents were below age 20. The educational level of the respondents were generally low as only 5.3 percent of the respondents attained tertiary level of education while 32.1 percent had secondary level education, majority (48.4) of the respondents had no formal education.

On marital status of respondents, it was realized that, majority (78.4%) of the respondents were married while only 3.7 per cent were widows. However divorced and never married were 4.2 and 13.7 percent respectively. Almost all (98.4%) of the



respondents were females, this means that street food vending in the Sagnarigu municipality is associated with women. The study found out that muslims dominated in the district and for that matter street food vending representing 86.8 per cent of the total respondents while only 13.2 per cent of the respondents were Christians. This result is not surprising since majority of the population of the Northern region are muslims.



Table 4.1 Socio-Demographic Characteristics of Street Food Vendors

Variable	Frequency	Per cent (%)
Age category		
Below 20	11	5.8
20 – 29	35	18.4
30 – 39	72	37.9
40-49	48	25.3
50-59	24	12.6
Total	190	100
Educational status		
No formal education	92	48.4
Non-formal	1	0.5
Primary	26	13.7
Secondary	61	32.1
Tertiary	10	5.3
Total	190	100
Sex of respondents		
Female	187	98.4
Male	3	1.6
Total	190	100
Marital status		
Married	149	78.4
Never married	26	13.7
Widowed	7	3.7
Divorced	8	4.2
Total	190	100
Religious affiliation		
Christianity	25	13.2
Islam	165	86.8
Total	190	100

Source: Field survey, 2020



4.3 Knowledge Level of Street Food Vendors on Food Hygiene

To determine the level of knowledge of street food vendors on food hygiene, a number of questions on a likert scale format were administered to ascertain their knowledge level with regards to food hygiene. On the question of whether fresh meat has microbes on the surface, majority of the respondents selected both strongly agreed and agreed: 43% and 40% respectively while only 5% and 12% selected disagreed and don't know respectively.

On the issue of whether healthy people can carry germs to food, 41% and 35% responded in the affirmative while 9% disagreed, 4% strongly disagreed and 11% for don't know.

With regard to the question of whether food prepared (hot) has microbes, almost all the respondents (91%) indicated they strongly disagreed to the statement.

For the question of whether raw vegetables such as lettuce have harmful organisms, a higher percentage (60%) of the respondents strongly agreed to the statement, 29 per cent of the respondents also agreed to this statement. Only 3 per cent and 7 per cent responded: disagreed and don't know respectively.

For the statement of whether food that has been prepared too long in advance can give microbes time to grow, 10 per cent and 35.8 per cent alluded to strongly agreed and agreed respectively while 33.7 per cent, 7.8 per cent and 12.6 per cent selected disagreed, strongly disagreed and don't know respectively.

When respondents were asked whether viral diseases such hepatitis B and HIV/AIDS can be spread through food, 21 per cent and 25 per cent responded strongly agreed and agreed respectively to the statement, 21 per cent don't know, 24 per cent and 10 per cent respectively disagreed and strongly disagreed to the statement.



On the question of whether cholera can be spread through food, as high as 64 per cent strongly agreed to the statement and 26 per cent also agreed. Only 6 per cent disagreed while 3 per cent indicated that they did not have any knowledge on it.

With regard to the question of whether food preparation surfaces can contaminate food, majority of the respondents alluded to strongly agreed and agreed (30% and 56%) while only 5 per cent and 9 per cent disagreed and did not have any knowledge respectively.

For the knowledge question of whether soap and water can be used to kill all harmful organisms on food preparation surfaces after preparing fresh meat, almost all (56% and 39%) of the respondents alluded to strongly agreed and agreed. While only 1 per cent disagreed and strongly disagreed and only 3 per cent said they don't know the answer to the statement.

When respondents were asked as to whether they can prepare food with a wound on the hand if the wound is bandaged, only 6 per cent of them strongly agreed and 35 per cent agreed. Majority (45%) of the respondents disagreed and 7 per cent strongly disagreed to the statement. Only 6 per cent did not know the answer to the statement.

Majority (73%) of the respondents alluded to strongly agreed when they were asked whether food vendors should properly wash their hands with soap after sneezing or coughing and 26 per cent said they agreed to the statement. While those who disagreed and also did not know the answer to the statement were only 1 per cent.



Table 4.2 Knowledge Level of Street Food Vendors

Knowledge on food hygiene	strongly agreed		agreed		Disagreed		strongly disagreed		don't know		Total (%)
	Freq	(%)	Freq	(%)	Freq	(%)	Freq	(%)	Freq	(%)	
	There are always microbes on the surface of fresh meat.	82	43%	76	40%	10	5%	0	0%	22	
Canned food harbors disease causing organisms.	25	13%	67	35%	70	37%	4	2%	24	13%	100%
Healthy people may cause illness by carrying germs to food	78	41%	66	35%	17	9%	8	4%	21	11%	100%
Cooked foods(hot) contain microbes	0	0%	0	0%	30	91%	3	9%	0	0%	100%
Green leafy vegetables have disease causing organisms	114	60%	56	29%	6	3%	0	0%	14	7%	100%
Microbes can grow on food that is prepared in advance	19	10%	68	36%	64	34%	15	8%	24	13%	100%
HIV and Hep B including other viral diseases	39	21%	48 ⁵⁴	25%	45	24%	19	10%	39	21%	100%

may spread through food												%
Diarrhea/cholera may be spread through food	122	64%	50	26%	11	6%	1	1%	6	3%		100%
Food preparation surfaces can contaminate foods	57	30%	107	56%	9	5%	0	0%	17	9%		100%
Soap can be used to disinfect the surface of food preparation surfaces after preparing raw meat	107	56%	74	39%	2	1%	2	1%	5	3%		100%
When you bandage the wound on your hand you can still prepare food with it.	12	6%	66	35%	86	45%	14	7%	12	6%		100%
Hands should be correctly and adequately washed after blowing your nose or sneezing	139	73%	49	26%	1	1%	0	0%	1	1%		100%

Source: Field Survey 2020



4.3.1 Knowledge Level of Street Food Vendors

Out of the likert scale type of questions, the correct answers were all in the affirmative (yes) while the rest of the responses were not in the affirmative, so no response for that matter (no). The responses which were initially categorized as strongly agreed, agreed, disagreed, strongly disagreed and don't know were now regrouped in to only two categories, yes and no. 'Yes' comprising of strongly agreed and agreed while 'no' comprising of disagreed, strongly disagreed and don't know.

The marks of individual questions for respondents were then aggregated for both 'yes' and 'no' then percentages were computed out of the totals. So those with the 'yes' responses were seen to have sufficient knowledge while those with the 'no' responses were seen to have insufficient knowledge on food hygiene.

Generally, considering the individual knowledge level indicators, it is realized that majority (88.9%) of the street food vendors in the Sagnarigu municipality have sufficient knowledge on food hygiene while only 11.1 per cent have poor or insufficient knowledge on food hygiene.

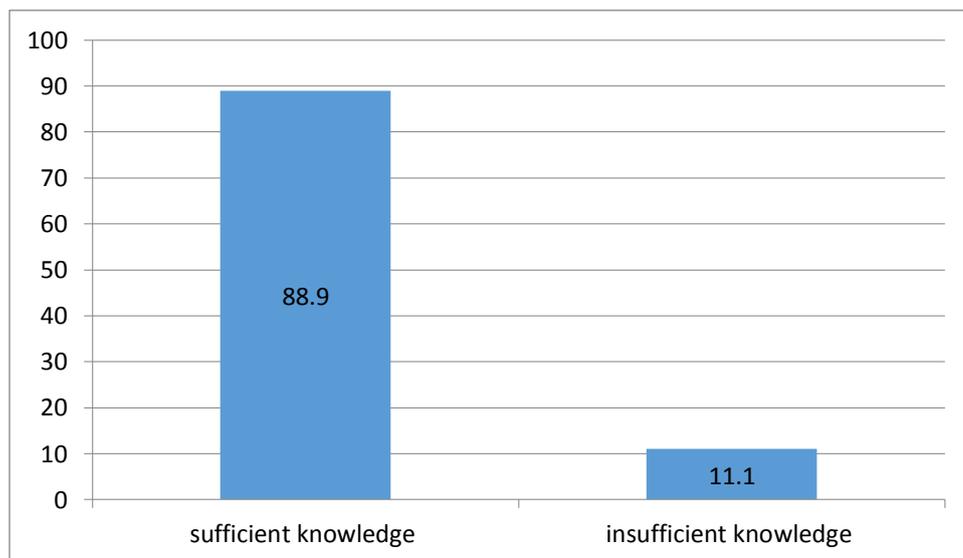


Figure 4.1 Knowledge Level of Food Vendors

Source: Field Data 2020



4.4 Association Between Socio Demographic Characteristics And Hygiene of Vending Site

Cross tabulating marital status against whether there are cup webs or dirt in vendors kitchen showed that 91.9 % of the food vendors who were married did not have cup webs or dirt in their kitchens while only 8.1 per cent had dirty kitchens. The test of association did not show any statistical significance ($X^2 = 4.263; p = 0.234$) at $\alpha = 0.05$. Again, marital status against cooking in the open and vending close to an open gutter that could contaminate the food in the process of handling the food did not see any evidence of relationship. There was no statistical significance ($X^2 = 0.169; p = 0.681$) and ($X^2 = 0.169; p = 0.681$) respectively at $\alpha = 0.05$.

For vendors religious affiliation and whether there are cup webs or dirt in vendors kitchen indicated that 90.5% of vendors who were Muslims did not have a dirty kitchen whereas 9.1 per cent had dirty kitchens. There was no statistical significance ($X^2 = 0.214; p = 0.643$) respectively at $\alpha = 0.05$. Also, religion against vendor cooking in the open and vending close to open gutter did not also show any evidence of association ($X^2 = 0.139; p = 0.709$) and ($X^2 = 0.008; p = 0.927$) respectively at $\alpha = 0.05$.

The cross tabulation between educational attainment of street food vendors and whether vendors kitchen is dirty or has cup webs in it shows that, majority (94.6%) of vendors without any form of formal education did not have dirty kitchens while only 3.8 % of the vendors without formal education had their kitchen being dirty and the test of association indicated evidence of relationship ($X^2 = 9.711; p = 0.046$) at $\alpha = 0.05$. For educational status against vending cooking food in the open and vendors vending close to open gutter both did not show evidence of association ($X^2 = 5.353; p = 0.253$) and ($X^2 = 4.840; p = 0.304$) respectively at $\alpha = 0.05$.



For the cross tabulation between whether vendor had formal training on food preparation and handling and whether the vendor cooks in the open revealed that 65.8% of respondents with formal training on food handling were actually cooking in the open while 34.2% of them were not cooking in the open. The chi-square test indicated evidence of association ($X^2 = 9.388; p = 0.002$). The outcome chi-square indicates a statistically significant p-value at $\alpha = 0.05$.

However, vendors having formal training on food handling as against whether vendors kitchen is dirty or has cup webs and whether vendor is operating close to an open gutter were both not seen to have any evidence of association and was not statistically significant ($X^2 = 0.752; p = 0.386$) and ($X^2 = 1.550; p = 0.213$) respectively.

Table 4.3 Hygiene Status of Food Preparation and Vending Site

Marital status of respondents	Are there cup webs or dirt in the kitchen		Chi- squared test of association
	Yes (%)	No (%)	
Divorced		8(100)	X²=4.263^a p-value= 0.234
Married	12(8.1)	137(91.9)	
Never married	5(19.2)	21(80.8)	
widow	1(14.3)	6(85.7)	
Marital status of respondents	Cooking being done in the open		Chi squared test of association
	Yes (%)	No (%)	
Divorced	6(75.0)	2(25.0)	X²=3.615^a p-value=0.306
Married	125(83.9)	24(16.1)	
Never married	19(73.1)	7(26.9)	



widow	7(100)		
Marital status of respondents	Is vending point close to open gutter		Chi squared test of association
	Yes (%)	No (%)	
Divorced	3(37.5)	5(62.5)	X²=0.798^a p-value=0.850
Married	66(44.3)	83(55.7)	
Never married	11(42.3)	15(57.7)	
widow	2(28.6)	5(71.4)	
Religious affiliation of respondents	Are there cup webs or dirt in the kitchen		Chi squared test of association
	Yes (%)	No (%)	
Christianity	3(12.0)	22(88.0)	X²=0.214^a p-value=0.643
Islam	15(9.1)	150(90.5)	
Religious affiliation of respondents	Cooking being done in the open		Chi squared test of association
	Yes (%)	No (%)	
Christianity	20(80.0)	5(20.0)	X²=0.139^a p-value=0.709
Islam	137(83.0)	28(17.0)	
Religious affiliation of respondents	Is vending point close to open gutter		Chi- squared test of association
	Yes (%)	No (%)	
Christianity	11(44.0)	14(56.0)	X²=0.008^a p-value= 0.927
Islam	71(43.0)	94(57.0)	



Educational status of respondents	Are there cup webs or dirt in the kitchen		Chi squared test of association
	Yes (%)	No (%)	
No formal education	5(5.4)	87(94.6)	X²=9.711^a p-value=0.046*
Non-formal education		1(100)	
Primary	1(3.8)	25(96.2)	
Secondary	9(14.8)	52(85.2)	
Tertiary	3(30.0)	7(70.0)	
Educational status of respondents	Cooking being done in the open		Chi squared test of association
	Yes (%)	No (%)	
No formal education	80(87.0)	12(13.0)	X²=5.353^a p-value=0.253
Non-formal education	1(100)		
Primary	23(88.5)	3(11.5)	
Secondary	46(75.4)	15(24.6)	
Tertiary	7(70.0)	3(30.0)	
Educational status of respondents	Is vending point close to open gutter		Chi squared test of association
	Yes (%)	No (%)	
No formal education	37(40.2)	55(59.8)	X²=4.840^a p-value=0.304
Non-formal education		1(100)	
Primary	15(57.7)	11(42.3)	
Secondary	24(39.3)	37(60.7)	
Tertiary	6(60.0)	4(40.0)	
Formal training on food	Are there cup webs or dirt in the		Chi squared test of



preparation and handling	kitchen		association
	Yes (%)	No (%)	
Yes	5(13.2)	33(86.8)	X²=0.752^a p-value=0.386
No	13(8.6)	139(91.4)	
Formal training on food preparation and handling	Cooking being done in the open		Chi squared test of association
	Yes (%)	No (%)	
Yes	25(65.8)	13(34.2)	X²=9.388^a p-value=0.002*
No	132(86.8)	20(13.2)	
Formal training on food preparation and handling	Is vending point close to open gutter		Chi squared test of association
	Yes (%)	No (%)	
Yes	13(34.2)	25(65.8)	X²=1.550^a p-value=0.213
No	69(45.4)	83(54.6)	
Age groupings of respondents	Are there cup webs or dirt in the kitchen		Chi squared test of association
	Yes (%)	No (%)	
Below 20	2(18.2)	9(81.8)	X²=1.347^a p-value=0.853
20-29	4(11.4)	31(88.8)	
30-39	6(8.3)	66(91.7)	
40-49	4(8.3)	44(91.7)	
50-59	2(8.3)	22(91.7)	
Age groupings of respondents	Cooking being done in the open		Chi squared test of association
	Yes (%)	No (%)	



Below 20	10(90.9)	1(9.1)	$\chi^2=4.065^a$ p-value=0.397
20-29	26(74.3)	9(25.7)	
30-39	59(81.9)	13(18.1)	
40-49	43(89.6)	5(10.4)	
50-59	19(79.2)	5(20.8)	
Age groupings of respondents	Is vending point close to open gutter		Chi squared test of association
	Yes (%)	No (%)	
Below 20	6(54.5)	5(45.5)	$\chi^2=3.856^a$ p-value=0.426
20-29	18(51.4)	17(48.6)	
30-39	29(40.3)	43(59.7)	
40-49	22(45.8)	26(54.2)	
50-59	7(29.2)	17(70.8)	

Source : field survey 2020

During observation, it was revealed from the study that about 45 per cent of the respondents prepare and sell food close to open gutters. And almost 30 per cent of these opened gutters are not distilled.

According to one Waache seller in an in-depth interview said that, when it comes to personal and environmental hygiene, we clean, wash bowls then we pick all the rubbish around the vending site.

In another in-depth interview with rice and beans seller reported that “*the first thing I do is to clean the inside of my shop then the outside before the food is transported to the vending site*”



The study also revealed that most of the street food vendors prepare their food in the open, they do not have enclosed kitchen. In an in-depth interview with one Tuubaani seller, it was indicated that even though most of the food vendors did not have enclosed kitchens they keep the place very tidy and neat so that they can prepare and serve safe food to their customers. *“We clean the preparation site throughout the process of preparing the food even though there is no enclosed kitchen”*

The study as well revealed, through observation that most of the street food vendors have knowledge and practice both personal and environmental hygiene.

In an in-depth interview with the acting Sagnarigu Municipal Environmental health officer,

“Food must be prepared in a clean environment that is not close to: Opened gutter, Public toilet, Chocked gutter including Places that could obstruct public movement”

People are advised not to sell close to opened gutters and if there is the need they must cover the gutter before selling. And also provide flies proof to protect the food from flies then distill chocked gutters which are close to vending site.

4.5 Food Handling Practices and Street Food Vending

The study looks at some hygienic practices in terms of the way food is handled during serving food to customers by food vendors and/or sellers. It was unveiled that majority of food vendors (95%) do not handle money with their bare hands at the same time serving food with it. Only 5.0 per cent of vendors or sellers end up receiving money with their bare hands and at the same time serving food with it.

During an in-depth interview with a kenkey seller on the issue of whether she collects money with her bare hands. This was what she reported. *“I used my left hand to collect*



money with a rubber covering my hand. And I washed my hands after serving between three to five customers”

Another Kenkey seller said, for me I know that money is poison so I don’t collect money while selling; it is my daughter who collects the money from customers.

One Aduwa seller also reported “even though I use a ladle to serve my customers, I don’t take money with my bare hands. I always rub my left hand with a rubber and use it to collect money from my customers”

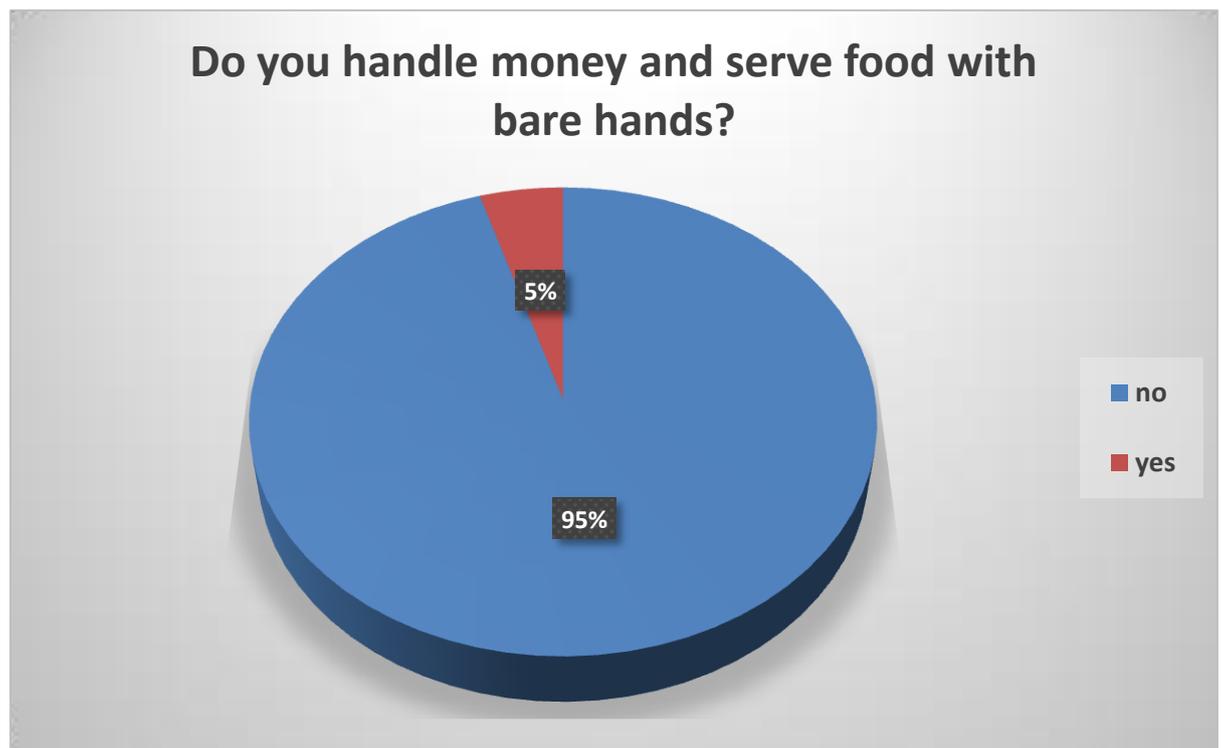


Figure 4.2 Presents Whether Vendors Handle Money and Food with the Same Hand

Source: Field Data 2020



4.6 Medical examination and certification to sell food

The study sought to find out whether street food vendors go through medical examination and are certificated to sell food to the general public. The study revealed that majority (51.1%) have never done medical examination while only 48.9 per cent have at some point undergone medical examination.

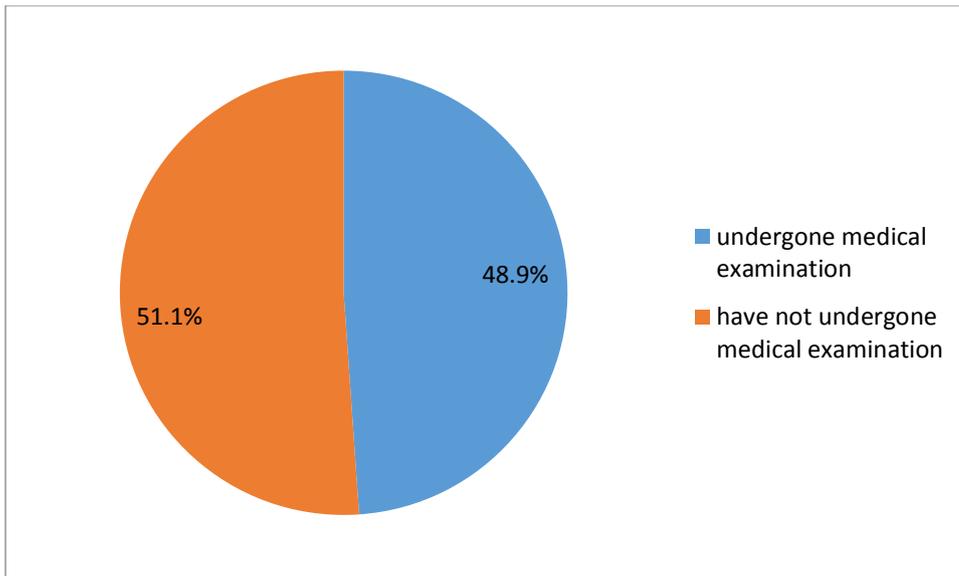


Figure 4.3 Medical Examination Status of Food Vendors

Source: Field Data 2020

4.6.1 Certification

The acting environmental health officer during an in-depth interview reported ... *“It is compulsory for all food vendors to be certificated. Food vendors are not allowed to sell without certificates. The office announces to the general public its intention to undertake a screening exercise of food vendors within the municipality leading to the award of a certificate. This is normally done around March every year and if after the screening, a person is found positive of the set conditions he or she is asked to treat himself before the certificate is issued but if he or she is negative the certificate is issued”*



Food vendors without certificates are taken on by the law, so certification is a serious issue in the vending of food.

Source: Field Data 2020

4.7 Reasons Why Street Food Vendors Do Not Have Certificates

The study attempts to find out why street food vendors in the Sagnarigu municipality do not have certificates to prepare and sell food to the general public, yet they are on the streets vending food. It was realized that majority (45.1%) of the respondents felt it was not necessary to have a certificate in order to sell food while only 2.0 per cent indicated that they did not have time to go for it. As high as 43.4 per cent of the food vendors said they did not know where to get it. 2.5 and 7.0 per cent of the vendors alluded to the fact that it was expensive and also very bureaucratic.

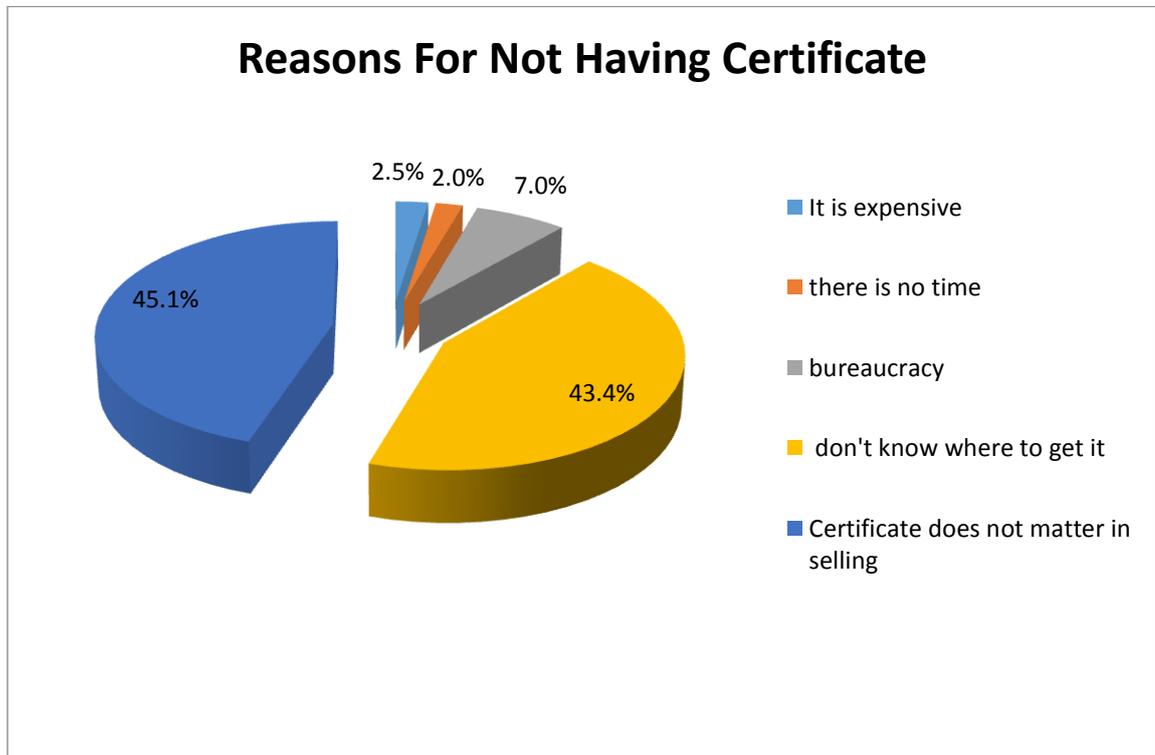


Figure 4.4 Reasons Why Food Vendors Do Not Have Certificates

Source: Field Data 2020



4.8 Distance from Kitchen to Vending Site

The Figure below basically introduces the distance from kitchen where food is prepared to the point of sale of the food. It was revealed that most of the vendors (74.0%) take less than 10 minutes to convey the food from the kitchen to the vending point while 0.8 per cent said they use an hour or more to transport their food to the vending point. Others use approximately 10 – 20 minutes (22.9%) to convey their food to the vending point and 2.2 per cent of the respondents used more than 30 minutes to convey their food to the vending site.

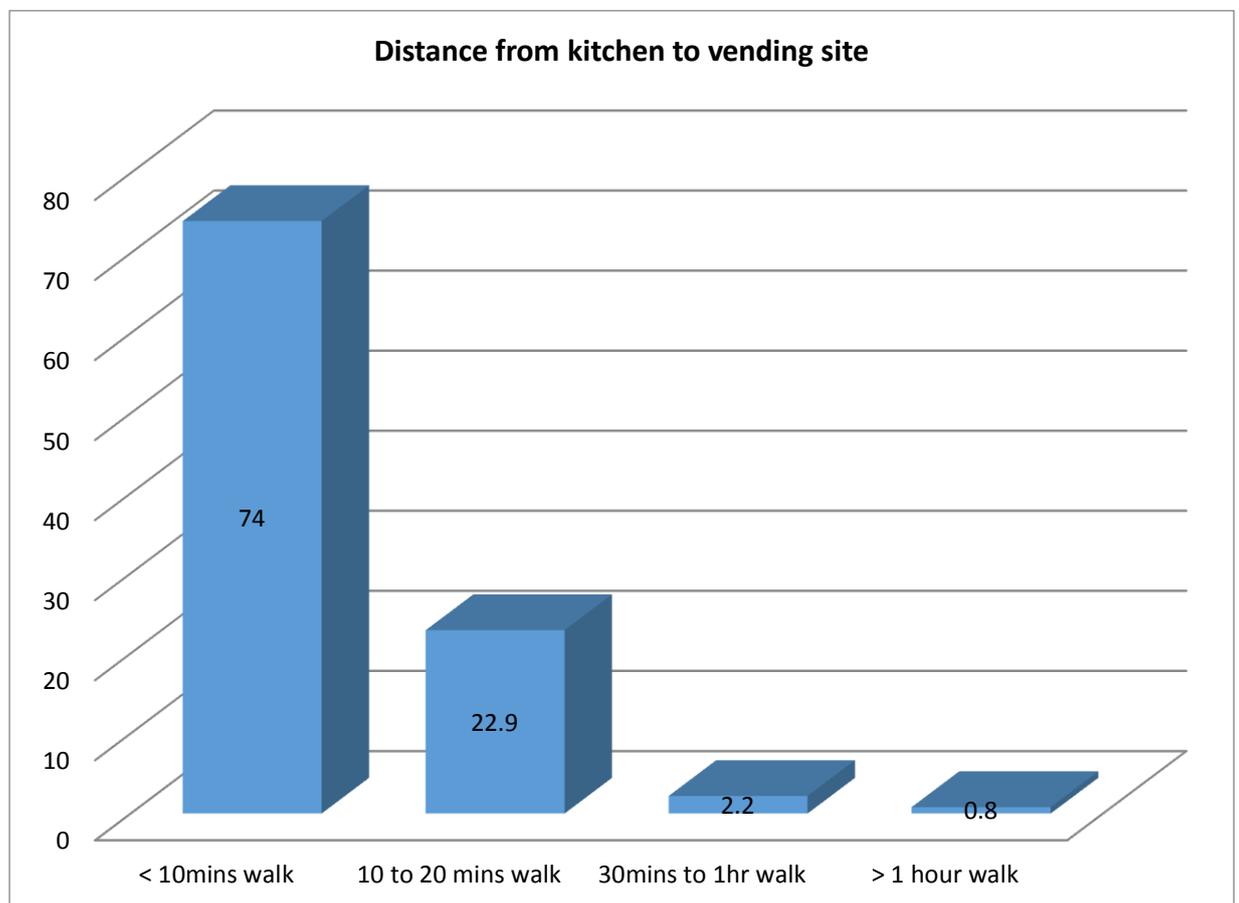


Figure 4.6 Distance From Kitchen To Vending Site

Source: Field Data 2020



One of the vendors in an in-depth interview reported that “we cook from the house and transport it to the vending site for sale. And because of the dusty nature of the road they have to cover the pot and basin containing the food very well to prevent the dust from entering in to the food”

Another food vendor who sells in front of her house reported that “because I cook and sell at the same place I am not really worried about dust contaminating my food since I don’t have to carry it from or to a long distance”

4.9 Formal Training on Food Handling

With regard to formal training of vendors in food preparation and handling, It was revealed that majority (79.4%) of the food vendors have not had any form of formal training in food preparation and handling while only 20.6 per cent had formal training.

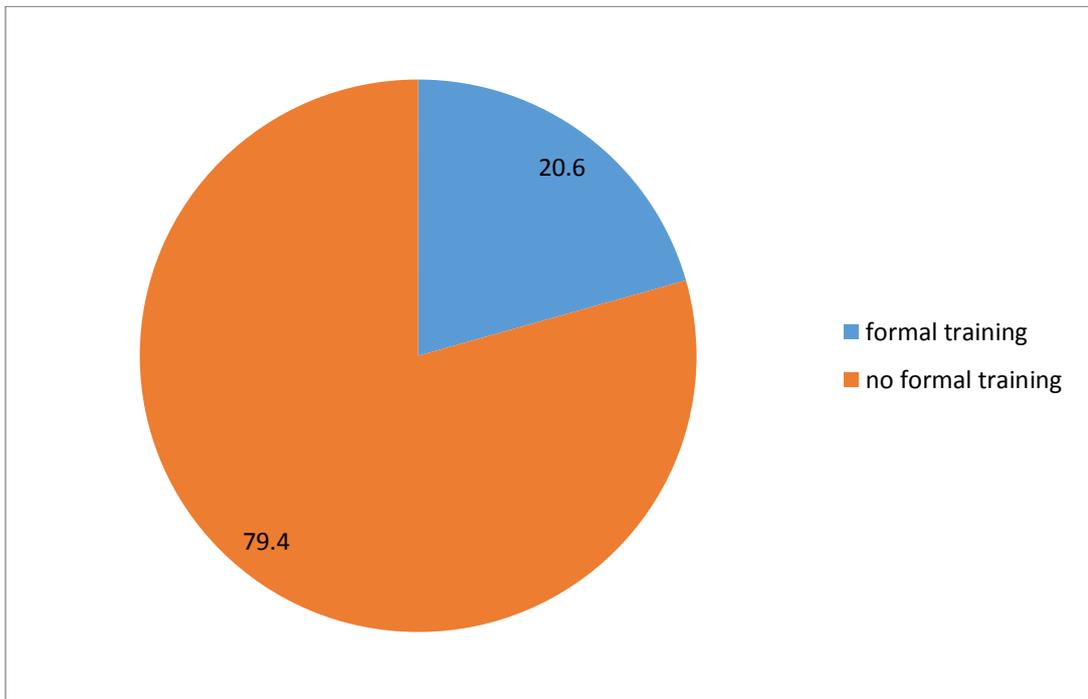


Figure 4.7 Formal Training on Food Handling By Vendors

Source: Field Data 2020



4.10 Formal training on food handling and food hygiene practices

Cross tabulating whether vendor has any formal training on food preparation and handling as against vendor wearing a head cover during food preparation and handling shows that about 94% of vendors who did not have any formal training on food handling wore head covers while only 5.3 per cent who did not have formal training did not also wear head covers during preparation and handling and the chi-square test did not show any evidence of relationship ($X^2 = 1.423; p = 0.233$). However, the wearing of apron against formal training of food vendors was seen to be statistically significant with outcome chi-square of ($X^2 = 12.648; p = 0.001$).

Again, cross tabulating whether vendor has formal training on food handling as against vendor washing dishes in clean soapy water and vendor undergoing medical examination were both seen to have evidence of relationship ($X^2 = 7.725; p = 0.005$) and ($X^2 = 11.631; p = 0.001$). The outcome chi-squares indicated a statistically significant p-value at $\alpha = 0.05$. However, formal training of food vendors on food handling and whether vendors serve food and collect money with the same bare hand was not statistically significant ($X^2 = 1.954; p = 0.162$).

During the in-depth interview with the environmental health officer on the issue of whether food vendors have adequate formal knowledge on food handling, he reported that *“people consider street food vending as an informal business as and when you have and wish to sell food you just get your few items and off you start. So apart from those who attained education beyond secondary level and were taught something related to food hygiene in school only a hand full of street food vendors have been trained formally on food handling”*



A wasawasa seller also reported that “*I have been doing this with my mother for a very long time now and I can prepare it the way it is supposed to be prepared so I don’t need anyone to teach me again*”

Formal training on food handling	Is the vendor wearing a head cover or cap		Chi- squared test of association
	Yes (%)	No (%)	
Yes	34(89.5)	4(10.5)	X²=1.423^a p-value= 0.233
No	114(94.7)	8(5.3)	
Formal training on food handling	Is the vendor wearing an apron		Chi squared test of association
	Yes (%)	No (%)	
Yes	23(60.5)	15(39.5)	X²=12.648^a p-value=0.001*
No	45(29.6)	107(70.4)	
Formal training on food handling	Are dishes being washed with clean soapy water		Chi squared test of association
	Yes (%)	No (%)	
Yes	35(92.1)	3(7.9)	X²=7.725^a p-value=0.005*
No	151(99.3)	1(0.7)	
Formal training on food handling	Vendor serving food and collecting money with the same bare hand		Chi squared test of association
	Yes (%)	No (%)	



Yes	4(10.5)	34(89.5)	X²=1.954^a p-value=0.162
No	7(4.6)	145(95.4)	
Formal training on food handling	Has vendor under gone medical examination		Chi squared test of association
	Yes (%)	No (%)	
Yes	28(73.7)	10(26.3)	X²=11.631^a p-value=0.001*
No	65(42.8)	87(57.2)	

Source: field survey 2020

4.11 Food Hygiene Training Status of Vendors

The figure represents the food hygiene training status of street food vendors in Sagnarigu Municipality and revealed that majority (51.6%) of the respondents have never gone through any form of on the job training regarding food hygiene even though some of them were being supervised by the environmental health officers. Only 48.4 per cent of the food vendors had undergone food safety and hygiene training by way of refresher course.



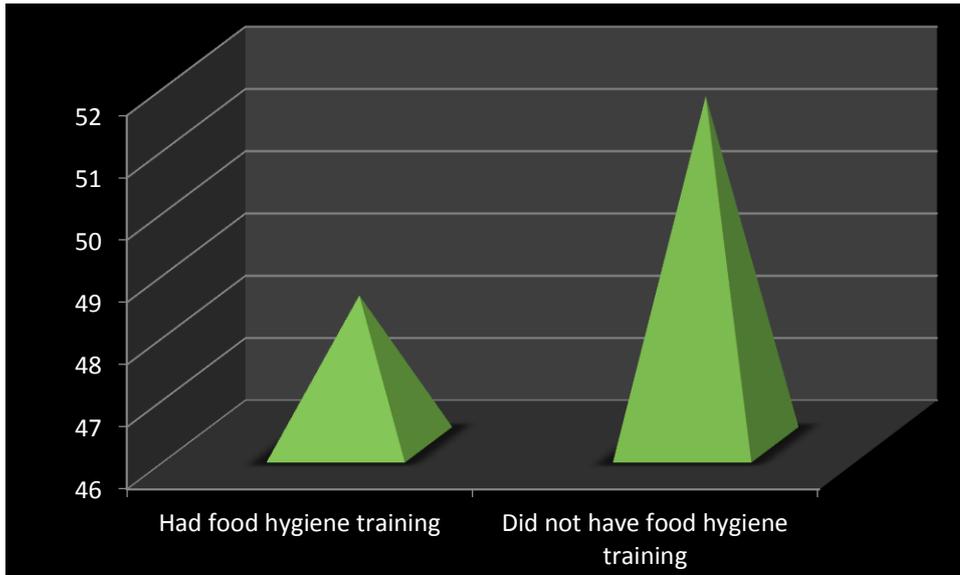


Figure 4.8 Food Hygiene Status of Vendors

Source: field data 2020

4.12 Type of Energy or Fire Used For Cooking or Preparing Food by Street Food Vendors

The study sought to find out the type of fuel or fire used for preparing food by food vendors. It was revealed that 50 per cent of the respondents use only charcoal, majority (53.6%) of the vendors use fire wood for cooking whiles 42.2 per cent use only gas stoves. For those who use charcoal and fire wood were 38.7 percent. About 16.9% cook using gas stoves and firewood. This was done to find out how food can be contaminated as a result of the contaminants generated from the source of energy used for cooking.



Table 4.5 Cross Tabulation of Various Forms of Energy/Fire Used For Cooking By Vendors

Type of fuel used for cooking	Charcoal F (%)	Fire wood F (%)	Gas stove F (%)	Electric cooker F (%)	Total
Charcoal	155(50.0)	120(41.5)	34(41.0)	1(50.0)	310
Fire wood	120(38.7)	155(53.6)	14(16.9)	0	289
Gas cooker	34(11.0)	14(4.8)	35(42.2)	0	83
Electric stove	1(0.3)	0	0	1(50.0)	2
Total	310	289	83	2	684

Source: Field Survey 2020



4.14 Relationship between Government Role and Street Food Vending

The study sought to find out whether government agencies monitor food vendors with respect to medical examinations in the Sagnarigu municipality. It was indicated that for those whose activities are monitored by government 79.1 per cent of the vendors have undergone medical examinations while 20.9 per cent of the respondents said they have not undergone any form of medical examinations. Also, for those who have not had any form of monitoring from government agencies, 21.2 per cent of the vendors have done medical examination while majority (78.8%) have not undergone any form of medical examinations.

The chi-squared test of association between government supervision and whether they have been monitoring to ensure that food vendors under take medical examinations, revealed that there is strong evidence of relationship. ($X^2 = 63.630; p = 0.001$). The outcome chi-squared indicates a statistically significant p-value at $\alpha = 0.05$.

On the issue of whether government agencies have oversight responsibility on the training of food vendors in the Sagnarigu municipality. It was unveiled that for vendors whose activities are monitored by government had 27.5 per cent of the vendors saying they have had formal trainings on food handling while majority (72.5%) said they had not received any formal training on food hygiene and handling.

However, for those who are not monitored by government agencies, 13.1 per cent revealed that they have had formal trainings on food hygiene and preparation while 86.9 per cent said otherwise.

The chi-squared test of association between government supervision and whether they have been training food vendors on food hygiene indicated a strong evidence of



association. ($X^2 = 6.095; p = 0.014$). The outcome chi-squared indicates a statistically significant p-value at $\alpha = 0.05$.

With regard to monitoring by officials of the environmental health unit and adherence to the wearing of head cap or head cover by food vendors showed that as high as 93.4 per cent of the vendors who were being monitored do wear head caps while only 6.6 per cent of the said respondents do not wear head caps. Again, food vendors who are not being monitored but wear head caps constitute 93.9 per cent while the remaining 6.1 per cent are made up of respondents who were not being monitored by any government officials and did not also wear head caps.

The chi-squared test of association between government supervision and whether there is strict adherence to the wearing of head caps during preparation and selling of food indicated that there is no association. ($X^2 = 0.023; p = 0.880$). The outcome of the chi-squared test indicates that there is no statistically significant p-value at $\alpha = 0.05$.

In the cross tabulation between whether the activities of the vendor are being monitored by any government officials and whether food vendors wear apron during preparation and selling of food. It clearly revealed that for respondents whose activities are being monitored 44.0 per cent of them wear apron while 56.0 per cent do not wear apron during food preparation and handling. Then, for respondents whose activities are not being monitored by any government agency had 28.3 per cent of them wear apron while majority (71.7%) of vendors do not wear apron during food preparation and handling.

The chi-squared test of association between government supervision and whether there is strict compliance to the wearing of apron during food preparation and selling



revealed that there is evidence of relationship. ($X^2 = 5.068; p = 0.024$). The outcome chi-squared indicates a statistically significant p-value at $\alpha = 0.05$.

With regard to the issue of whether government agencies monitor food vendors with respect to food vendors preparing, handling and selling food in the open in the Sagnarigu municipality. It was indicated that for those whose activities are monitored by government 81.3 percent of the vendors preparing their food for sale in the open whiles just 18.7 percent of the response did not prepare and serve food in the open.

Also, for those who have not had any form of monitoring from government agencies, 83.8 per cent of the vendors prepare and serve food in the open whiles only 16.2 per cent of food vendors in the Sagnarigu municipality prepare and serve food in close structures.

The chi-squared test of association between government supervision and whether food vendors have been cooking and selling in the open showed that there is no evidence of association ($X^2 = 0.210; p = 0.647$). The outcome chi-squared indicates that there is no statistically significant p-value at $\alpha = 0.05$.

For the cross tabulation to show the relationship between government supervision and vendors vending close to open gutters in the Sagnarigu municipality, It was unveiled that for vendors whose activities are monitored by government had 45.1 percent of the vendors preparing and selling food close to open gutters whiles 54.9 per cent did not have their vending sites close to open gutter. Lastly, for those whose activities are not being monitored by government agencies, 41.4 percent revealed that they prepare and sell food close to open gutters whiles 58.6 percent did not have their vending sites close to open gutters.



The chi-squared test of association between government supervision and whether they have been compliance with the environmental hygiene protocol of not vending food close to an open gutter indicated no evidence of relationship. ($X^2 = 0.256; p = 0.613$). The outcome chi-squared test indicates no statistically significant p-value at $\alpha = 0.05$.

Table 4.6 Association Between Government Supervision and Adherence to Hygiene Protocols

Are your activities being monitored by government		Have you ever undergone medical examination		Chi- squared test of association
		Yes	No	
Yes		72(79.1)	19(20.9)	X²=63.630^a
No		21(21.2)	78(78.8)	p-value= 0.001*
Are your activities being monitored by government		Is the vendor wearing a head cap or cover- observe		Chi squared test of association
		Yes	No	
Yes		85(93.4)	6(6.6)	X²=0.023^a
No		93(93.9)	6(6.1)	p-value=0.880
Are your activities being monitored by government		Does the person preparing the food have formal training on food handling		Chi squared test of association
		Yes	No	
Yes		25(27.5)	66(72.5)	X²=6.095^a
No		13(13.1)	86(86.9)	



			p-value=0.014*
Are your activities being monitored	Is the vendor wearing apron (observe)		Chi squared test of association
	Yes	No	
Yes	40(44.0)	51(56.0)	X²=5.068^a
No	28(28.3)	71(71.7)	p-value=0.024*
Are your activities being monitored by government	Is cooking and selling being done in the open		Chi squared test of association
	Yes	No	
Yes	74(81.3)	17(18.7)	X²=0.210^a
No	83(83.8)	16(16.2)	p-value=0.647
are your activities being monitored by government	Do you sell close to open gutter		Chi squared test of association
	Yes	No	
Yes	41(45.1)	50(54.9)	X²=0.256^a
No	41(41.4)	58(58.6)	p-value=0.613

Source: Field Survey 2020



During the in-depth interview with one of the Fried Yam seller, when she was asked whether any government agency supervises or monitors the work they do. She reported, *“some people used to come from Kumasi to meet them in a group and teach them issues about food hygiene but now they are no more coming, and we don’t know why. It was very helpful; they used to teach us about how to prepare our food nicely to attract customers in order to make more money”*.

One other Fufu seller reported that *“Yes, the environmental health officers do come for visits but it is not regular. When they come, it takes about six to nine months sometimes even one year before you see them again”*

During the interview, when TZ and Rice balls seller was asked about what officers normally tell them when they visit. She reported that *“they normally asked us to always keep the surrounding clean, make sure we wash our bowls and utensils with clean soapy water and try to cover our food to protect it from flies and other contaminants”*

The acting Sagnarigu municipal environmental health officer also said in an interview when he was asked about the role of the unit with regard to food vendors. He reported, *“The environmental health officers are to ensure that food vendors observe basic sanitation protocols that will enhance hygiene condition of food storage, processing, preservation, preparation all the way to consumption”*.

“The challenge we have is the fact that food vendors are scatted around the municipality which is a very large one, and so bringing them together for workshops and trainings is problematic since the office cannot even take care of their transportation cost. So we resorted to visiting them at their various vending points and trying to do the education with individual vendors. But we are not many at the



office so monitoring is actually not effective since officers only make stop overs by vendors they find conveniently either on their way to the office or for other official duties". He added.

"For me since I started this my business, nobody has ever come to me to see what I am doing except for the revenue collectors, and for them they are interested in their money even our gutters are choked when you tell them they will not even mind you" (banku seller)

4.15 Socio-Demographic Characteristics and Food Hygiene Practices

The cross tabulations below shows the association between some demographic characteristics and some indicators of food hygiene practices by street food vendors in the Sagnarigu Municipality of the Northern region of Ghana. For age groupings and vendor wearing apron during food preparation and handling showed for ages below 20, 9 respondents representing about 80 per cent of the food vendors within that age category did not wear apron. For age category 30-39, 35 respondents representing 48% of the food vendors in the category. The test of association revealed that there was evidence of relationship. ($X^2 = 14.661; p = 0.005$). The outcome chi-squared test indicates statistically significant p-value at $\alpha = 0.05$.

For age grouping and vendor wearing a head cover to protect the hair from falling into the food and contaminating it, it was revealed that for 30-39 years 95.8 per cent of them put on head cover while 47% did not wear head cover during food preparation. The test of association indicated that there is evidence of relationship. ($X^2 = 11.914; p = 0.018$). The outcome chi-squared test indicates statistically significant p-value at $\alpha = 0.05$.



For age category and vendor washing dishes in clean soapy water did not indicate any association. ($X^2 = 4.032; p = 0.402$). The outcome of the chi-squared test indicates that there is no statistically significant p-value at $\alpha = 0.05$.

The chi-square test of association did not indicate any statistically significant relationship between age groupings and vendors serving food and collecting money with the same bare hand also age categories and vendor undergoing medical examination to see if he or she has any infectious diseases or not was not also seen to be significant statistically ($X^2 = 8.191; p = 0.085$).

The cross tabulation of marital status of food vendors and whether food vendors within the Sagnarigu municipality wear apron during food preparation and handling showed that for married women who do not wear apron during food preparation are about 62 per cent while 37.6% did not wear protective gears. There was no statistically significant relationship between marital status and wearing of apron ($X^2 = 2.038; p = 0.565$).

Again, for marital status of vendors and wearing of head cover to protect their hair from falling into the food during food preparation and handling, the cross tabulation indicated that for married respondents 94.6 per cent of them wear head covers while only 5.4 per cent did not wear head covers. All seven widow respondents wore head covers. The test of association did not show any statistical significance ($X^2 = 2.413; p = 0.491$).

Also cross tabulating marital status and whether dishes are being washed with clean soapy water showed that all 8 and 7 divorced and widow food vendors were all washing their dishes in clean soapy water. The chi-square test of association between



marital status and washing in clean soapy water was not statistically significant ($X^2 = 0.711; p = 0.871$).

Marital status of vendors as against vendors serving food and collecting money with the same bare and whether vendors have undergone medical examination both did not show any evidence of relationship; ($X^2 = 1.112; p = 0.774$) and ($X^2 = 3.351; p = 0.341$) respectively.

Cross tabulating educational attainment of street food vendors in Sagnarigu municipality against vendor serving food and collecting money with the same bare hand shows that for those without formal education, 93.5 per cent of them did not serve food with bare hand and still collect money with the same bare hand while only 6.5 per cent were actually serving food and collecting money. The chi-square test of association was statistically significant ($X^2 = 14.820; p = 0.005$) at $\alpha = 0.05$.

Vendor wearing of head cover and the use of apron as against vendors educational level were both not statistically significant; ($X^2 = 3.924; p = 0.416$) and ($X^2 = 6.858; p = 0.144$) respectively. Also medical examination of food vendors and washing in clean soapy water were not related and did not have any statistical significance; ($X^2 = 7.059; p = 0.133$) and ($X^2 = 3.955; p = 0.412$) respectively.

For vendors religious affiliation and wearing of head cover by food vendors during food preparation and handling, the cross tabulation shows that 95.8 per cent vendors practicing Islamic religion put on head covers while only 4.2 per cent of them did not wear head covers during food preparation and handling. There was evidence of association ($X^2 = 9.111; p = 0.003$). The outcome chi-square indicates a statistically significant p-value at $\alpha = 0.05$. Also, about 76 % of vendors practicing Christianity underwent medical examination while only 24 per cent did not undergo medical



examination. There was as well evidence of association ($X^2 = 8.431; p = 0.004$), the association was therefore statistically significant at $\alpha = 0.05$.

However, vendors religious affiliation as against vendors wearing of apron, washing dishes in clean soapy water and serving and collecting money with the same bare hand were all not seen to be statistically significant ($X^2 = 3.292; p = 0.070$), ($X^2 = 0.619; p = 0.431$) and ($X^2 = 0.169; p = 0.681$) respectively at $\alpha = 0.05$.

Table 4.7 Socio Demographic Characteristics and Hygiene Practices

Age groupings of respondents	Is the vendor wearing an apron		Chi- squared test of association
	Yes (%)	No (%)	
Below 20	2(18.2)	9(81.8)	X²=14.661^a p-value= 0.005*
20-29	13(37.1)	22(62.9)	
30-39	35(48.6)	37(51.4)	
40-49	16(33.3)	32(66.7)	
50-59	2(8.3)	22(91.7)	
Age grouping of respondents	Is the vendor wearing a head cover/cap		Chi squared test of association
	Yes (%)	No (%)	
Below 20	8(72.7)	3(27.3)	X²=11.914^a p-value=0.018*
20-29	31(88.6)	4(11.4)	
30-39	69(95.8)	3(4.2)	
40-49	47(97.9)	1(2.1)	
50-59	23(95.8)	1(4.2)	



Age of respondents	Are dishes being washed with clean soapy water		Chi squared test of association
	Yes (%)	No (%)	
Below 20	10(90.9)	1(9.1)	X²=4.032^a p-value=0.402
20-29	35(100)		
30-39	70(97.2)	2(2.8)	
40-49	47(97.9)	1(2.1)	
50-59	24(100)		
Age groupings of respondents	Vendor serving food and collecting money with the same bare hand		Chi squared test of association
	Yes (%)	No (%)	
Below 20	2(18.2)	9(81.8)	X²=3.452^a p-value=0.485
20-29	2(5.7)	33(94.3)	
30-39	4(5.6)	68(94.3)	
40-49	2(4.2)	46(95.8)	
50-59	1(4.2)	23(95.8)	
Age groupings	Has vendor under gone medical examination		Chi squared test of association
	Yes (%)	No (%)	
Below 20	4(36.4)	7(63.6)	X²=8.191^a p-value=0.485
20-29	13(37.1)	22(62.9)	
30-39	44(61.1)	28(38.9)	
40-49	23(47.9)	25(52.1)	



50-59	9(37.5)	15(62.5)	
Marital status of respondents	Is the vendor wearing an apron		Chi- squared test of association
	Yes (%)	No (%)	
Divorced	2(25)	6(75)	X²=2.038^a p-value= 0.565
Married	56(37.6)	93(62.4)	
Never married	9(34.6)	17(65.4)	
Widowed	1(14.3)	6(85.7)	
Marital status of respondents	Is the vendor wearing a head cover/cap		Chi squared test of association
	Yes (%)	No (%)	
Divorced	7(87.5)	1(12.5)	X²=2.413^a p-value=0.491
Married	141(94.6)	8(5.4)	
Never married	23(88.5)	3(11.5)	
Widowed	7(100)		
Marital status of respondents	Are dishes being washed with clean soapy water		Chi squared test of association
	Yes (%)	No (%)	
Divorced	8(100)		X²=0.711^a p-value=0.871
Married	146(98)	3(2.0)	
Never married	25(96.2)	1(3.8)	
Widowed	7(100)		
Marital status of respondents	Vendor serving food and collecting money with the same bare hand		Chi squared test of association
	Yes (%)	No (%)	



Divorced		8(100)	$\chi^2=1.112^a$ p-value=0.774
Married	9(6.0)	140(94)	
Never married	2(7.7)	24(92.3)	
Widow		7(100)	
Marital status of respondents	Has vendor under gone medical examination		Chi squared test of association
	Yes (%)	No (%)	
Divorced	3(37.5)	5(62.5)	$\chi^2=3.351^a$ p-value=0.341
Married	78(52.3)	71(47.7)	
Never married	9(34.6)	17(65.4)	
widow	3(42.9)	4(57.1)	

Educational status of food vendors	Is the vendor wearing a head cover or cap		Chi- squared test of association
	Yes (%)	No (%)	
No formal education	88(95.7)	4(4.3)	$\chi^2=3.924^a$ p-value= 0.416
Non-formal education	1(100)		
Primary	24(92.3)	2(7.7)	
Secondary	57(93.4)	4(6.6)	
Tertiary	8(80)	2(20)	
Educational status of food vendors	Is the vendor wearing an apron		Chi squared test of association
	Yes (%)	No (%)	



No formal education	29(31.5)	63(68.5)	X²=6.858^a p-value=0.144
Non-formal education		1(100)	
Primary	6(23.1)	20(76.9)	
Secondary	29(47.5)	32(52.5)	
Tertiary	4(40.0)	6(60.0)	
Educational status of food vendors	Are dishes being washed with clean soapy water		Chi squared test of association
	Yes (%)	No (%)	
No formal education	91(98.9)	1(1.1)	X²=3.955^a p-value=0.412
Non-formal education	1(100)		
Primary	25(96.2)	1(3.8)	
Secondary	60(98.4)	1(1.6)	
Tertiary	9(90.0)	1(10.0)	
Educational status of food vendors	Vendor serving food and collecting money with the same bare hand		Chi squared test of association
	Yes (%)	No (%)	
No formal education	6(6.5)	86(93.5)	X²=14.820^a p-value=0.005*
Non-formal education		1(100)	
Primary	2(7.7)	24(92.3)	
Secondary		61(100)	
Tertiary	3(30.0)	7(70.0)	
Educational status of food vendors	Has vendor under gone medical examination		Chi squared test of association
	Yes (%)	No (%)	



No formal education	39(42.4)	53(57.6)	X²=7.059^a p-value=0.133
Non-formal education		1(100)	
Primary	13(50.0)	13(50.0)	
Secondary	33(54.1)	28(45.9)	
Tertiary	8(80.0)	2(20.0)	
Religious affiliation of food vendors	Is the vendor wearing an apron		Chi- squared test of association
	Yes (%)	No (%)	
Christianity	13(52.0)	12(48.0)	X²=3.292^a p-value= 0.070
Islam	55(33.3)	110(66.7)	
Religious affiliation of food vendors	Is the vendor wearing a head cover/cap		Chi squared test of association
	Yes (%)	No (%)	
Christianity	20(80.0)	5(20.0)	X²=9.111^a p-value=0.003*
Islam	158(95.8)	7(4.2)	
Religious affiliation of food vendors	Are dishes being washed with clean soapy water		Chi squared test of association
	Yes (%)	No (%)	
Christianity	25(100)		X²=0.619^a p-value=0.431
Islam	161(97.6)	4(2.4)	
Religious affiliation of food vendors	Vendor serving food and collecting money with the same bare hand		Chi squared test of association
	Yes (%)	No (%)	
Christianity	1(4.0)	24(96.0)	X²=0.169^a



Islam	10(6.1)	155(93.9)	p-value=0.681
Religious affiliation of food vendors	Has vendor undergone medical examination		Chi squared test of association
	Yes (%)	No (%)	
Christianity	19(76.0)	6(24.0)	X²=8.431^a
Islam	74(44.8)	91(55.2)	p-value=0.004*

Source: Field Data 2020



CHAPTER FIVE

DISCUSSION OF STUDY RESULTS

5.1 Introduction

This chapter discusses the results that are presented in chapter four. It seeks to provide clear explanation of the results. The discussions were done taking into consideration the socio-demographic characteristics and the objectives of the study.

5.2 Socio-Demographic Characteristics and Food

In table 4.1 the socio-demographic factors of the study participants were analyzed. And for age groupings the findings showed that majority (37.9%) of the food vendors were in the age category of 30-39. And 20-29 accounted for 18.4% this is similar to the findings of a study conducted by Dajaan et al., 2018 where majority (41%) of the vendors were between the 36-46 and 10 per cent were between 15-25. This means that people in their active age are mostly involved in this business of street food vending.

The findings of the study has revealed that almost all (98.4%) of the respondents were females which actually supports the findings of Dajaan, et al., 2018 where 97% of the respondents were females. Again, the findings is in consonance with another study which indicated that there were generally higher proportions of female street food vendors which can be attributed to the fact that females are traditionally recognized for cooking and taking care of children. They are also known generally to have lower skills and educational levels which could be a reason why females dominate the street food vending industry(Samapundo et al., 2016)

This also confirms the FAO, 2012 report that a great majority of women in the food vending business do so basically to enhance the food security of their family and to a larger extent increase financial independence.



The findings in this study showed that a larger number (48.4%) of the people vending food on the street in Sagnarigu Municipality had no formal education. This revelation is in consonance with the findings of a study done in Ghana by (Dajaan et al., 2018) on “Food Hygiene Awareness and Environmental Practices among Food Vendors in Basic Schools at Kintampo Township, Ghana” 58 per cent had no formal education and about 86.7% of the vendors learned their trade through apprenticeship and personal intuition and informal education from friends and parents whereas 13.3% learned their skills formally from either vocational institutions or senior high schools. The finding is however contrary to the findings of a study done in Jamaica by Thelwell-reid, (2014) which indicated that as high as 55% of the food vendors attained secondary level education, this is in sharp contrast to the situation in Ghana. The low level of education among street food vendors in Ghana could account for some poor food handling practices such as being screened medically and having license in order to prepare and sell food to the general public. Even the hygiene practice of washing the hands frequently while serving food was also observed to be poor and this could be attributable to the low level of education of the food vendors.

5.3 Food Hygiene Knowledge and Practices

The first objective of this study was to determine the level of knowledge of food hygiene practices among street food vendors in the Sagnarigu Municipality. The results from the study indicated that most street food vendors have high knowledge levels with regard to food hygiene practices. The results showed that majority (88.9%) of food vendors have sufficient and appreciable knowledge when it comes to food hygiene.

The data revealed that about 89% of the respondents know that green leafy vegetables also have diseasing causing organisms and can result into food borne disease when



consumed. Again, the data shows that a greater number of the respondents (76%) have some appreciable level of knowledge with regard to whether healthy people may cause illness by carrying germs to food. This means that food vendors are fully aware of the fact that if proper care is not taken germs can easily be transmitted from their bodies or as a result of their activities to food especially during food preparation and handling.

The study also found out that, a lot of the food vendors are aware of food borne diseases and how they can be transmitted to other people. About 90 per cent of the food vendors know that cholera can be spread through food, so there is the need to practice good personal hygiene to ensure the safety of the populace.

The FAO indicated that it is imperative for all food vendors to have some level of knowledge and skills in order to enable them prepare and handle food in a more hygienic manner FAO (2008). There should be guidelines which will help enhance the process of ensuring that food handlers adhere to certain laydown procedures to maintain the safety and hygiene of food. FAO (1997) recommends that every vendor/helper of food should undergo a basic training in food hygiene before licensing. In this study only 20.6% of the food vendors who took part in the study had formal training on food handling as indicated in figure 4.7. This is similar to findings of (Muinde & Kuria, 2005) which was done in Kenya where only a few of vendors had formal training on food handling while majority learned by observing from their parents. This could be dangerous since these parents may not be practicing good food hygiene practices or may not even know what the good practices are. People who obtained their knowledge through this crude way could lead to food contamination and subsequently results into foodborne illnesses.



When food vendors do not have sufficient food hygiene knowledge it is a recipe for food contamination as emphasized by (Galgamuwa et al., 2016) who concluded that Consumption of contaminated foods is a major reason for more than half of diarrheal disease in most communities in developing countries. As a result, knowledge, attitude and food hygiene practices are crucial to food safety and hygiene at food establishments or joints.

Food vendors with formal training on food had significant p-value of 0.005, this means that when people are trained on proper ways of preparing and handling food then there will not be issues with regard to foodborne diseases. This is supported by a study done by (Thelwell-reid, 2014) whose findings depicts that food handlers who are formally trained had a statistically significant high mean knowledge score (65.61% vs. 59.0%, $p < 0.05$) and mean practice score (67.40% vs. 60.35%, $p < 0.05$) than food handlers who were not formally trained. This implies that, it is necessary to regularly organized food hygiene and safety training for players within the street food vending industry to enhance the knowledge level of vendors.

5.4 Hygiene Status of Food Preparation and Vending Site

Cooking in the open is one of the ways by which food can be contaminated. Food is supposed to be covered within an enclosed place where it will be protected from foreign substances including pathogens from falling into. When these harmful substances find their way into the food they contaminate the food thereby causing food poisoning and foodborne illnesses for that matter. The study revealed that as high as 125 married food vendors representing 83.9% prepare food for sale in the open. This study is consistent with the findings of (Boatemaa, Badasu & D- Graft Aikins, 2018) who found out more than half of the population of urban Ghana (58%) live in poorly organized environment which predisposes the consumer to a higher



risk of contamination and food poisoning. The findings are also consistent with that of (Tra et al., 2017 ;(Samapundo et al., 2016) who found that about 85.7% of the stalls investigated were untidy and un- kept which could lead to food contamination and foodborne diseases.

Also by observation, the findings revealed that most of the conditions under which food is prepared and sold are not suitable since the vending sites are closed to open gutters that harbor a lot of pathogens that can easily find their way into the food thereby contaminating it and possibly causing foodborne illness to consumers. This finding were consistent with the findings of (Tra et al., 2017) who concluded that most vending sites are not suitable for both preparation and selling of wholesome food to consumers.

Most of the food vendors have knowledge about environmental and food hygiene, so they keep the immediate surroundings clean as reported by one Waache seller in an in-depth interview said that, when it comes to personal and environmental hygiene, we clean, wash bowls then we pick all the rubbish around the vending site.

In another in-depth interview with a rice and beans seller reported that *“the first thing I do is to clean the inside of my shop then the outside before the food is transported to the vending site”* One Tuubaani seller also indicated that even though most of the food vendors did not have enclosed kitchens they keep the place very tidy and neat so that they can prepare and serve safe food to their customers. *“We clean the preparation site throughout the process of preparing the food even though there is no enclosed kitchen”*.

“Food must be prepared in a clean environment that is not close to: Opened gutter, Public toilet, Chocked gutter including Places that could obstruct public movement” (Sagnarigu Municipal Environmental health officer)



The finding of this study is in sharp contrast to a study done in Africa which indicated that 85% of the vendors prepared foods such as fish, fruit salads and roasted maize in unhygienic conditions, there are a lot of waste including garbage dumped closer to these vending sites. There are large quantity of rubbish which are hipped and serve as breeding and living place for insects and pets which are linked directly with the transmission of enteric diseases (Tra et al., 2017).

5.5 Food Handling and Hygienic Practices

The results of this study unveiled that majority of food vendors (95%) do not handle money with their bare hands at the same time serving food with it. Only 5.0 per cent of vendors or sellers end up receiving money with their bare hands and at the same time serving food with it. *“I used my left hand to collect money with a rubber covering my hand. And I washed my hands after serving between three to five customers”* (kenkey seller in an in depth interview). This means that street food vendors in Sagnarigu Municipality have knowledge and also observe good food hygiene practices. The findings of the research also showed that 69 and 47 respondents aged 30-39 and 40-49 wore head covers to protect their hair from falling into the food so as not to contaminate the food which will cause diarrhea or cholera diseases after it has been consumed. There was statistically significant association between age groups and wearing of apron ($X^2 = 14.661$: $P = 0.005$). However, this is not in consonance with the findings of a study by Muinde & Kuria, (2005) which indicated that eighty-five per cent of the vendors had refuse or waste bins beside the food stalls. Personal hygiene was not also observed, as the vendors never covered their heads, collect money and food at the same time and also did not wear overcoats/aprons and handled food with bare hand.



It is necessary for all food vendors to undergo medical examination to declare them fit and not enable to transmit certain diseases through handling of food. *“It is compulsory for all food vendors to be certificated. Food vendors are not allowed to sell without certificates (Sagnarigu Municipal Environmental Health Officer).*

In this study, the findings revealed that majority (51.1%) of street food vendors have never done medical examination. Food vendors are given some form of education after the medical examination then certificates are awarded to them certifying that they are healthy enough with good food hygiene knowledge to be able to prepare and sell food to the general population. The findings in this study is however contrary to the FAO (1997) recommendation that every person vending food or assisting in the vending of food must go through some form of screening in order to be licensed before he or she can engage in the food vending business.

It was also revealed from the study that majority (79.4%) of the food vendors did not have any form of formal training in food preparation and handling (fig 4.7). New trends including food hygiene and safety measures will be discussed and vendors will be informed on good food hygiene practices which when adopted will be reduce the prevalence of foodborne diseases. This finding is consistent with the finding by Monney et al., (2013) which revealed that approximately 86.7% of the vendors learned their trade through their own personal intuition and informal education from friends and parents whilst 13.3% acquired their skills formally from vocational institutions and senior high school.

Refresher course or training, otherwise known as on the job training is very vital in the development of human capital. It helps to equipped the food vendors who even though did not have any formal training on food handling to abreast themselves with some form of health education that will assist them prepare and sell food which is safe



and healthy for consumption. This study have found out that more than half (51.6%) of the food vendors in Sagnarigu Municipality have never undergone any form of food hygiene training either organized by the Food and Drugs Authority or the Environmental health division of the district assembly who have been given the mandate per the public health act of Ghana (fig 4.8). This finding is however in contrast with the finding that as high as 65% of the food vendors asserted that they had received on-the-job training or refresher training on food hygiene by either the Food and Drugs Authority or the Municipal Assembly through the Environmental health unit (Monney et al., 2013).

5.6 The Role of Government; Environmental Health Officers and Street Food

Vending

Maintenance of law and regulations is paramount in ensuring that food vendors in the street food vending industry since by our nature, most of us need to be inspired, monitored or even supervised before we do the needful. The public health act is the mother of all health laws in Ghana, other bodies such as the Ghana health service, food and drug authority, Ghana tourism authority including the district assemblies all enact laws and by-laws formulated out of the public health act to ensure and enhance the safety and hygiene of food sold to the general public.

Environmental health officers are responsible for the enforcement of food hygiene and safety regulations that are paramount in the maintenance of food hygiene and safety standards. They are given the mandate to examine food handlers medically. This medical screening lay emphasis on illnesses which can easily be transmitted through food. Some of these diseases include but not limited to typhoid, skin conditions and tuberculosis some of these diseases may even be zoonotic diseases (Musoke et al., 2016)



The chi-squared test of association between government supervision and medical examinations was statistically significant ($X^2 = 63.630; p = 0.001$). This means that if the government agencies such as the environmental health officers or the food and drugs authority actually do proper supervision, it will ensure that all food vendors will adhere and undergo medical screening before they vend food. This finding is consistent with Musoke et al., (2016) who concluded that environmental health officers have been given the mandate to examine food handlers medically and that they should focus on diseases that can be spread through food easily.

Government supervision and training of food vendors on food hygiene indicated a strong evidence of association. ($X^2 = 6.095; p = 0.014$). Aduwa seller reported *“the environmental health officers do not visit me regularly, the last time an officer came to me is more than a year now. Nobody has ever taught me anything about food hygiene and safety but ones in a while I hear of it on the radio”* Sagnarigu Municipal environmental health officer also reported *“training of food vendors is part of our mandate as sanitation officers but we are handicapped in terms of personnel. The officers are not many and cannot be everywhere within the municipality at all times and because the food vendors are scattered across the municipality it is difficult to bring them together for a workshop”*

This is an indication that when government agencies monitor the activities of street food vendors regularly they will come to the realization that food vendors need a lot of training which will enhance the safety of the food sold to the general public. The finding of this study is been supported by Mariano et al., (2017) realized that the growing complexity of the food safety field, innovative approaches are needed to enhance prioritization, accounting for the overall available knowledge and the need to integrate new scientific developments quickly avert foodborne illnesses.



CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Introduction

This final chapter summarizes the major findings of the study. It gives conclusions based on the findings and as well gives policy recommendations which will guide the conduct of the street food business and enhance good food hygiene and safety in the Sagnarigu Municipality. The thesis work will help contribute to the existing pool of knowledge regarding food hygiene practices within the Sagnarigu Municipality of the Northern Region of Ghana. A number of studies for instance Dajaan et al., (2018) and the FAO, 2012 have all contributed to the knowledge and creation of awareness of good food hygiene practices in Ghana. The study focuses on assessing the food hygiene practices among street food vendors in the Sagnarigu Municipality.

This study employed the mixed method research which solicited both quantitative and qualitative data in order to obtain creditable and comprehensive data from the study participants to enrich the quality of the research. There have been some studies done both locally and globally regarding the conduct of the activities of food vendors. For instance in Sagnarigu Municipality, the few works that have been done in the area of food vendors was done in educational institutions little have been done on the area of street food vendors.

6.2 Summary of Major Findings

The study revealed some of the key findings as stipulated below:

The study indicated that majority of the street food vendors within the Sagnarigu Municipality were between the ages of 30-39 and were more likely to adhere to good food hygiene practices. It was further realized that the older you are as a food vendor the more likely you to adopt and adhere to good food hygiene practices.



The study also revealed that the street food vending industry was highly dominated by women and majority of these women were married. This finding is in consonance with a study which indicated that there were generally higher proportions of female street food vendors which can be attributed to the fact that females are traditionally recognized for cooking and taking care of children. They are also known generally to have lower skills and educational levels which could be a reason why females dominate the street food vending industry (Samapundo et al., 2016).

The findings also realized that a larger number (48.4%) of the street food vendors in Sagnarigu Municipality had no form of formal education. This revelation is in line with the findings of a study done in Ghana by Dajaan et al., (2018) on “Food Hygiene Awareness and Environmental Practices among Food Vendors in Basic Schools at Kintampo Township, Ghana” 58 per cent had no formal education and by approximately 86.7% of the vendors learned their trade through their own personal intuition and informal education from friends and parents whilst 13.3% acquired their skills formally from vocational institutions and senior high school.

The study indicated that most street food vendors have high knowledge levels with regard to food hygiene practices. The results showed that majority (88.9%) of food vendors have sufficient and appreciable knowledge when it comes to food hygiene.

The study also found out that majority (79.4%) of the street food vendors in Sagnarigu Municipality did not have any formal training on food preparation and handling. Most of them learn the trade from their family members and friends.

The findings again revealed that majority (51.1%) of street food vendors have never done medical examination to declare them fit or healthy enough to prepare and sell food to the general public. This is largely dependent on the fact that the government



agencies responsible to enforce certain practices are not discharging their duties as required.

The finding also revealed that the environmental health officers do not visit the street food vendors within the Sagnarigu Municipality regularly and this could be why most of the food vendors do not practice most of hygiene practices. The environmental health officer lamented that the department does not get the needed support from other government agencies which are supposed to work hand in hand with them including even the Assembly itself.

6.3 Recommendations

The findings of this study have some implications as far as policy formulation is concerned. So the following recommendations for policy formulation and implementation will help improve the hygiene practices of street food vendors within the Sagnarigu Municipality and Ghana at large. Below are some of the recommendations:

6.3.1 Stake holders such as the Municipal Assembly and NGOs need to organize food hygiene training for street food vendors in the municipality.

On the job training (in-service training) on hygiene and food safety for food vendors should be done by stake holders on regular basis to well-equipped people in the street food vending business with the requisite knowledge to help them prepare and serve wholesome food to the general public.

Since most of the vendors did not have any formal training on food handling, it will enhance their knowledge level so as to make them prepare and sell safer food to the general public. More so, the Assembly should provide favorable conditions that



will enhance food safety and hygiene practices among street food vendors within the municipality.

6.3.2 Authorities should regularize the street vending of food into the main stream food vending

There should be regular education given to the general public who may want to venture into the street food business so that prospective vendors could go through all the hygiene and safety protocols before starting the business. When the business is formalized it will afford the government the opportunity to even register and assign appropriate locations suitable for vending food to ensure that the environment does not contaminate the food being sold to the general populace.

6.3.3 Municipal Assembly needs to empower the regulatory departments by providing training and logistics

Municipal Assembly needs to ensure that they provide all the necessary logistics needed by the department to facilitate its activities. Their officers must be regularly trained to empower them do proper monitoring and education of all street food vendors in the Municipality. Logistics such as motorbikes and tablets should be given to the environmental health officers to enable them perform their duty effectively and efficiently.

6.3.4 Encourage collaboration between institutions at local levels

Government should come clear as to which organizations are directly involved in the monitoring and supervision as well as have overall responsibility of street food vendors in Sagnarigu and the country at large. And these agencies should foster a comprehensive collaboration between and or among to ensure food vendors have the requisite knowledge and also adhere to food safety protocols.



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UNIVERSITY FOR DEVELOPMENT STUDIES

APPENDIX A: CONCERT FORM

Assessing the level of knowledge on food hygiene practices among street food vendors in the Sagnarigu Municipality of the Northern Region of Ghana.

Introduction

I am a student of university for development studies, a masters student conducting a study on the assessment of food hygiene practices among street food vendors in Sagnarigu municipality of the northern region of Ghana. This is in partial fulfillment for the award of a master of public health degree. All the information you may provide would be strictly confidential and used for only scientific purposes. Your participation is voluntary yet I would be most grateful if you could assist me by answering the following questions. All information given would be treated confidentially.



APPENDIX: B QUESTIONNAIRE

1. What is your age?	
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SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

2. What is your sex ?	A) male	1
	B) female	2
3. Marital status	A) never married	1
	B) married	2
	C) devoiced	3
	D) widowed	4
	E) separated	5
4. Which religion do you belong	A) Islam	1
	B) Christianity	2
	C) African tradition	3
5. What is the highest level of education attained?	A) Primary or elementary school	1
	B) High or secondary school	2
	C) College or university	3
	D) Non-formal	4
	E) No formal education	5



SECTION B: FOOD HANDLERS KNOWLEDGE ON FOOD HYGIENE

PRACTICES

Thick as appropriate

Transmission of food borne – disease	Strongly agreed 4	Agreed 3	Don't know 0	strongly disagreed 1	Disagreed 2
6. Fresh meat always has microbes on the surface					
7. Canned foods have harmful microbes					
8. Healthy people can cause illness by carrying germs to food					
9. Lettuce and other raw vegetables have harmful microbes					
10. Vegetables should be disinfected before use (wash with salt)					
11. Cooked foods do not have microbes(hot)					
12. Foods prepared too long in advance gives microbes time to grow					
13. viral diseases such as HIP, Hep B and TB can be spread through food					
14. Cholera can be spread through food					
15. Food preparation surfaces can contaminate foods					
16. Soap and water can be used to kill all harmful microbes on cutting boards after preparation of raw meat					
17. You cannot prepare food with a wound on the hand if the wound is covered with a bandage					



18. Hands should be properly washed after sneezing or blowing your nose					
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SECTION C: ENVIRONMENTAL/SANITATION STATE OF VENDING SITE

19. Is the vending point close to open gutter?	Yes	1	Observe and thick
	No	2	
20. If yes, are the gutters being distilled?	Yes	1	Observe and thick
	No	2	
21. Where do you live (place of residence)			
22. How far is vending site away from place of residence	a) less than 30min drive b) more than 30 min drive c) an hour or more drive time		
23. Do you have a kitchen	Yes	1	
	No	2	
24. Is the kitchen at vending site or home/preparation site	Yes	1	
	No	2	
25. Are there cup webs or dirt in the kitchen	Yes	1	Observe if at vending site
	No	2	
26. Is cooking being done in the open. Observe	Yes	1	Observe
	No	2	



SECTION D : FOOD PREPARATION AND HANDLING

28. The person(s) preparing the food, do they have any formal training on food preparation and handling?	Yes	1	
	No	2	
29..If yes, how did he/she acquire the knowledge on food preparation?	A. From relatives	1	
	B. Self-taught	2	
	C. Catering school	3	
	D. From other food vendors	4	
	E. Others (specify)	5	
30. How long have you worked in food handling/food services	6 months to 1 year	1	
	> 1 year	2	
31. Is the vendor wearing a head cover or cap	Yes	1	Observe and thick
	No	2	
32. Is the vendor wearing an apron?	Yes	1	Observe and thick
	No	2	
34. please indicate your source of water for your vending activities	A. Bore hole	1	
	B. Well	2	
	C. Reservoir	3	
	D. Others	4	
	E. Pipe borne water	5	



35. Which of these do you use to cook, select all that are applicable	A. Charcoal B. Fire wood C. Electric stove D. Gas cooker E. Others	1 2 3 4 5	
36. How do you serve food to customers	A. With bare hands B. With a clean rubber covering my hand C. With a ladle D. Other (specify)	Observe and thick	
37. Do you sometimes get food leftovers (unsold foods including stews, meat, fish etc)	Yes No	1 2	
38. If yes, how do you manage or preserve it?	A. Stored in refrigerator/freezer to be use the next day. B. Poured into a container and cover to be use the next day C. Poured into container and leave open to be use the next day Eat leftovers D. Throw it away E. Other (specify)		
39. Are dishes/ bowls washed in clean soapy water	Yes No	1 2	Observe and thick
40. Holding/handling of money/currency with bare hands (collecting or giving out change to customers) at the same time serving food with bare hands increases the risks of food contamination. To what extent do you agree or disagree with this	A. agree B. disagree C. don't know	1 2 3	



statement. Move to knowledge		
41. Does the vendor serve food with bare hands and at the same time collect money with bare hand	a) yes b) no	1 2

SECTION E: ENVIRONMENTAL/GOVERNMENTAL POLICIES

42. Have you ever undergone medical examination for purposes of food vending	Yes No	1 2
43. If yes, when was the last time you were medically examined?	A. less than a year ago B. 1-2 years ago C. more than 3 years now	
44. Have you received any health education on food hygiene	Yes No	1 2
45. Do you have a certificate to sell food	Yes No	1 2
46. If No, why	A. Don't know where to get it B. It is expensive C. Don't have time D. Bureaucratic E. others	
47. Are your activities being monitored by government agency	Yes No	1 2



48. If yes, select as applicable, which of these agencies do come to supervise your activities	A. Municipal assembly officers B. Environmental health officers C. Food and drugs authority D. Ghana health service E. Ghana tourism authority F. Others (specify)
49. What do they normally talk to you about	A) Personal hygiene B) Proper ways of food handling C) The need for environmental hygiene D) Collect tax E) Others(specify)
50. How frequent do they do this	A) every month B) every 3 months C) every 6 months D) yearly
51. What do they do to enforce compliance	A) threaten us with bye-laws B) can close down the vending site C) Make us pay more for non-compliance D) do not do or say anything E) Others (specify)



APPENDIX C: INTERVIEW GUIDE FOR STREET FOOD VENDORS

1. What type of food do you sell? And how is the food prepared? Probe further to get the sanitation situation of the environment where the food is prepared.
2. What are some of the things do you do to enhance hygiene at the place where the food is prepared and sold? (Probe further for wand washing item, nub kind, hand washing soap.
3. How do you serve food to customers? Probe further to find out whether she use the bare hands or equipment, how is meat taken for customers, the plate used, is it properly washed or she uses disposable plates.
4. How do you collect or take money from customers.
5. Why do you think people like your food (probe further to find out the environment where the food is sold, the people who serve the food and the containers where the food is kept.
6. How do you keep your environment clean including open gutter so that food prepared and served under this condition will be safe for consumption
7. Does the environmental health inspection team visit your place and if they do what are they doing? Probe to find out their activities, whether they give her and her team some kind of training.
8. Which of the government agencies do you think should be supervising the conduct of street food vendors and why?
9. Can you share with me your knowledge with respect to food hygiene? prove further to find out if she has adequate knowledge on food safety, components of food safety.

Thank you for your patience and participation



**APPENDIX D: INTERVIEW GUIDE FOR SAGNARIGU MUNICIPAL
ENVIRONMENTAL HEALTH OFFICER**

1. What are your basic roles as environmental health officers of the assembly
2. How do you determine good food hygiene practices
3. What is the ideal state of the environment under which food can be prepared and sold to people
4. Do you give food vendors some kind of training with respect to food hygiene? If yes how regular and are they benefiting from the training?
5. What advise do you give to food vendors who sell in front of gutters or place that are not environmentally friendly?
6. Who is qualified to prepare and sell food on the streets
7. What are the processes involve in the certification and licensing of food vendors
8. Do we have regular food hygiene training for food vendors and how is this done
9. How often do environmental health officers visit and supervise food vendors and what do they normally look out for?
10. What are the challenges faced by environmental health officers and what do you think can be done to remedy the situation
11. Is there any other government agency responsible for supervising street food vendors

Thank you for your patience and participation



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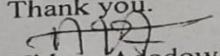
The Coordinating Director
Sagnarigu Municipal Assembly,
Sagnarigu, N/R

LETTER OF INTRODUCTION

Alhassan Yakubu

This is to introduce to you, Mr. Alhassan Yakubu, a Master of Public Health student of School of Medicine and Health Sciences of the University for Development Studies. Mr. Alhassan is currently working on his thesis titled: *Assessment food hygiene practices among street food vendors in the Sagnarigu Municipality*. Mr. Alhassan wants to have access to cooked food vendors in and around the municipality to carry out this important academic exercise. I would be grateful if could grant him access and any information he may need.

Thank you.


Yidana Adadow (PhD)
(HoD, CH&FM)

Dr. Yidana Adadow
SENIOR LECTURER HOD
DEP. OF COM. HEALTH & FAM MED
SMHS-UDS, TAMALE

Sagnarigu

