SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

HYGIENIC PRACTICES AMONG FOOD VENDORS IN THE UNIVERSITY OF GHANA.

BY

IRENE ESSUMANBAH ADDISON

(10246533)

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEOGN IN PARTIAL FULFILMENT OF THE REQUIREMNT FOR THE AWARD OF MASTERS OF PUBLIC HEALTH DEGREE

JULY 2015

DECLARATION

I hereby declare that apart from specific references which have duly been acknowledged, this work was produced from research undertaken by supervision.

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Irene Essumanbah Addison

(Student)

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Dr. Mawuli Dzodzomenyo

(Supervisor)

DEDICATION

This work is proudly dedicated to the Almighty God through whose grace I am alive to present this dissertation. To my wonderful parents, siblings, fiancé and all my loved ones need a special mention for their support during my entire Master of Public Health programme

ACKNOWLEDGEMENT

I thank the teaching staff of the School of Public Health, University of Ghana especially

My lecturers for their guidance and support during the Master of Public Health programme.

I wish to express my indebtedness and sincere gratitude to Dr. Mawuli Dzodzomenyo my supervisor for his interest and zeal, warmth, patience and hard work. His support made it possible for this study to be successfully completed.

I am also indebted to the authors whose works were consulted in the course of this work and also grateful to all persons who in one way or the other contributed to make this project a success.

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LIST OF ABBREVIATIONS

CDC	-	Centers for Disease Control and Prevention
FAO	-	Food and Agriculture Organization
FDA	-	Food and Drugs Authority
MCD	-	Municipal Corporation of Delhi
GH-ERC	-	Ghana Health Service Review Committee
PDMSD	-	Physical Development municipal services directorate
WHO	-	World Health Organization

DEFINITION OF TERMS

1.Food Vendor – A food vendor is one who sells food. However a food vendor could also be a food handler or vice-versa.

2.Food Handler – A food handler is a person who works with packaged or unpackaged food, food equipment or utensil, or food- contact surfaces for a food service establishment.

3.Hygienic Practices –A set of practices performed for the preservation of health.

4.Street Vended foods –Foods and beverages prepared and/or sold by vendors on streets and other public places for immediate consumption or consumption at a later time without further processing or preparation.

5.Food Hygiene –It is the action taken to ensure that food is handled, stored, prepared and served under hygienic conditions, as to prevent as far as possible the contamination of food.

6.Food Safety – A scientific discipline describing handling, preparation and storage of foods in ways that prevent foodborne illness.

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

8.Personal Hygiene –Involves those practices performed by an individual to care for one's bodily health and well-being through cleanliness.

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

ABSTRACT

Background

According to the World Health Organization currently illness resulting from contaminated food is the most widespread health problem. Food and Drugs Authority in 2013 stated that schools contributed 77% of all traceable food borne illness in Ghana. For this reason the study was carried out to document the food hygiene practices of food vendors in the University of Ghana.

Objectives

The objective of this study was to assess the adherence of food vendors to hygienic practices and sanitary conditions on the University of Ghana campus.

Methods

The study was descriptive cross sectional in nature using both quantitative and qualitative methods of data gathering. The study was conducted among 208 food vendors and 2 environmental health officers in the University of Ghana. Data collection tools used were structured questionnaire (used among food vendors) and an interview guide (used among environmental officers for in-depth interviews). SPSS software was used for analysis, this involved the use of frequency distributions as well associations by the use of chi-squared tests. (5% significance level) as well as frequency distributions which were used to analyze the data obtained from the survey.

Results

Generally, street vendors displayed adherence to sanitary and hygienic practices. Though more than half of the food vendors on campus had been licensed most of them did not know the importance of having a license (85.1%).

The study also revealed that gender, marital status and length of service were significantly associated with the use of protective clothing during work (chi-squared; $p < 0.05$). A large number (76%) of food vendors were found to wash their dishes in bowls of water as compared to washing under running water and for those who washed their dishes in bowls there was a significant relationship between length of service and how often they changed the water (chi-squared $p<0.05$) . In addition, instead of vendors emptying their bin whenever it was full more half of them (56.7%) waited till the close of day before emptying them.

Conclusion

In conclusion authorities of the University of Ghana should provide adequate infrastructure such as sinks and proper education can help with the improvement of hygienic practices of food vendors.

CHAPTER ONE

INTRODUCTION

1.1 Background

The World Health Organization (WHO) defines street foods as ready-to-eat foods and beverages prepared and / or sold by vendors on the street and in public places that can be consumed right away or eaten at a later time. These foods comprise of meat, fish, fruits, vegetables, grains, cereals, frozen produce and beverages (Apanga, 2014). Street food feeds millions of people daily with a wide variety of foods that are relatively cheap and easily accessible. Most of the time, many people prefer consuming foods from vendors to preparing food at home (Rahman, 2012). The street food industry offers a substantial amount of employment, often to people of lower educational levels (Muinde and Kuria, 2005). In cooking for large populations, food passes through various hands, thereby increasing the chances of food contamination due to inappropriate handling. Deliberate or unintentional contamination of food during large production might jeopardize the wellbeing of buyers, and have very expensive repercussions on a country, as such outbreaks feature prominently in national statistics (Annor & Baiden, 2011). Food hygiene probably put too much importance on cleanliness but food safety requires much more than a clean premises. All around the world there is increase in concerns about food safety due to the high incidence of food borne illness Rahman (2012). Several food-borne disease outbreaks have been reported to be associated with poor personal hygiene of people handling foodstuffs.

In Ghana, street foods are diverse and include cooked beans,“koko”, “kenkey”, “banku”, soups, stews, rice,’ “waakye”, salad, “fufu” and plantain. In Accra , the capital city of Ghana , there is an estimated 60,000 food vendors who sell ready to eat foods (Odonkor et al., 2011). Due to modernization and less free time, demand for processed and ready to

eat food is increasing on daily basis. These foods are relatively cheap, easily accessible and also saves one's time from standing in the kitchen for long hours, (Ccebdm et al., 2013). Customers of street foods are much more concerned about convenience than the safety, quality and hygienic status of the food they buy (Nicolas et al., 2007).

There is an increase in food borne diseases in both developed and developing countries. It appears that in Ghana food vendors have been allowed to work without any periodic checks to determine whether they are practicing food hygiene (Odonkor et al., 2011). In a related study by King *et al*., (2008) results indicated that, among 160 street food stalls in Ghana, only three (1.85%) of the proprietors met the requirements for basic hygiene based on a five-point check-list. Food borne microbial pathogens which cause diarrhoea, are leading causes of illness and deaths in the developing countries, killing an estimated 1.9 million people annually at the global level. Another study conducted in Malaysia also showed that approximately 10-20% of food-borne disease outbreaks are due to contamination by the food handlers.(Mudey, 2010)

According to (Food And Agriculture Organization, 1997) the risk of serious food poisoning outbreaks as a result of street foods continues to remain as a threat in many parts of the world, with microbiological contamination being one of the most significant problems. Food-borne pathogens are recognized as a major health hazard associated with street foods, the risk being dependent primarily on the type of food, and the method of preparation and conservation. A lack of knowledge among street food vendors about the causes of food-borne disease is a major risk factor. Poor hygiene, inadequate access to potable water supply and garbage disposal, and unsanitary environmental conditions (such as proximity to sewers and garbage dumps) further exacerbate the public health risks associated with street foods. Improper use of additives (often unauthorised

colouring agents), mycotoxins, heavy metals and other contaminants (such as pesticide residues) are additional hazards in street foods. Although many consumers attach importance to hygiene in selecting a street food vendor, consumers are often unaware of the health hazards associated with street vended foods.

According to (Monney et al., 2013), food vendors may contaminate food by poor personal hygiene, cross-contaminating raw and processed food, as well as inadequate cooking and improper storage of food . Maintaining high food safety levels in school food services is very important because any incidences of it can affect a high number of students. In the University most students and staff purchase their meals from food vendors. Street foods provide students and other customers with a wide variety of foods that are relatively cheap and easily accessible. Therefore it is necessary to investigate the operations of food vendors to determine whether they are adhering to good hygienic practices. The objective of this study therefore is to evaluate the hygienic practices and sanitary conditions of food vendors and their environments in the University of Ghana.

1.2 Problem Statement

Food vending is a prevailing and distinctive part of a large informal sector in both developed and developing countries. Food safety is an important aspect of public health, because a large number of people take their meals outside their home therefore predisposing them to food borne illness (Rahman et al. , 2012). Globally food borne illness is a growing public health concern which result from food contaminated by pathogenic microorganisms, mycotoxins or chemical hazards. This concern is intensified by the fact that, there seems to be a transformation in life-style and food consumption patterns resulting in frequency of ‘eating out’ while commitment to food preparation at home is declining (Monney et al., 2013).

Ababio and Lovatt (2015) indicated that 1 in every 40 Ghanaians suffer serious food borne illness per year 420,000 cases are reported with a yearly death rate of 65,000. This report does not reflect the true picture in developing countries due to reasons such as low report rate and inadequate calculation of cost. In developing countries, cost measured are usually the ones borne by the individual through hospitalization and medication whiles the developed countries take into account the cost to employers, institutional bodies like laboratories, surveillance, disability cost and cost from other family members who take care of the sick member and premature mortality (Ababio& Lovatt, 2015).

At the University of Ghana the authorities of the University have put measures in place to improve hygienic practices amongst food vendors such as medical screening, organizing food health programmes for the food vendors located in the University community amongst other interventions. Despite the institution of these measures, reported cases of foodborne illness in the school is on the rise, (Personal communication 2015). Reports from the students' clinic reveal periodic food-related illnesses among students and staff. Therefore the hygienic practices of food vendors in the University need to be further looked at since most students purchase their meals from these vendors. This study highlights the hygienic practices of vendors in University of Ghana and also provides insight on hygienic status of the food. Findings from this study will provide useful information for policy formulation and improve strategic interventions.

1.3 Justification

Modernization, urbanization and growth in population have influenced people to move from rural to urban areas, forcing them to have their meals at any place usually of a relatively cheaper price. In urban areas there is an increase in food service establishments due to increase demand.

Street vended foods usually have high chances of getting contaminated by food vendors; this most often depends on the health status of the food handler and also on their hygienic behaviors and practices. Food borne illness is a vital public health concern, in developing countries for example an estimated 1.9 million deaths are recorded every year as a result of food borne diseases.

Most studies carried out globally, in Africa and also in Ghana on hygienic practice of food vendors usually prove that street vended foods were usually contaminated by food vendors. This study therefore seeks to find out the hygienic practices of food vendors in the University of Ghana and see if the findings correlate to similar studies concerning food vendors. Also to provide the findings to the policy makers in the University so as to improve the hygienic practices of food in the University if there is a positive correlation with previous studies.

1.4 Conceptual Framework

The conceptual framework addresses factors that can influence the hygienic practices of a food vendor. For a food vendor to be considered as having good or bad hygienic practice certain factors would have to be looked at. Some of these factors are how the person maintains his or her personal hygiene as well as environmental hygiene, also if the person is licensed to be able to sell food for commercial purposes, the health status of the vendor could affect this or her hygienic practice. Other important factors that also influence hygienic practice amongst food vendors are how the vendor practices hand washing and also the use of protective clothes.

All these factors mentioned above are influenced to a large extent by the age, level of education and even sex of the food vendor. Also one's work position can influence his or her hygienic practice, the duration the person has worked as a vendor and also food

training programmes attended could all affect hygienic practice amongst food vendors. Based on this the outcome or dependent variable is hygienic practices which is determined by the independent variables: health screening, licensing of food vendor, personal and environmental hygiene practice, use of protective clothes as well as socio-demographic characteristics.

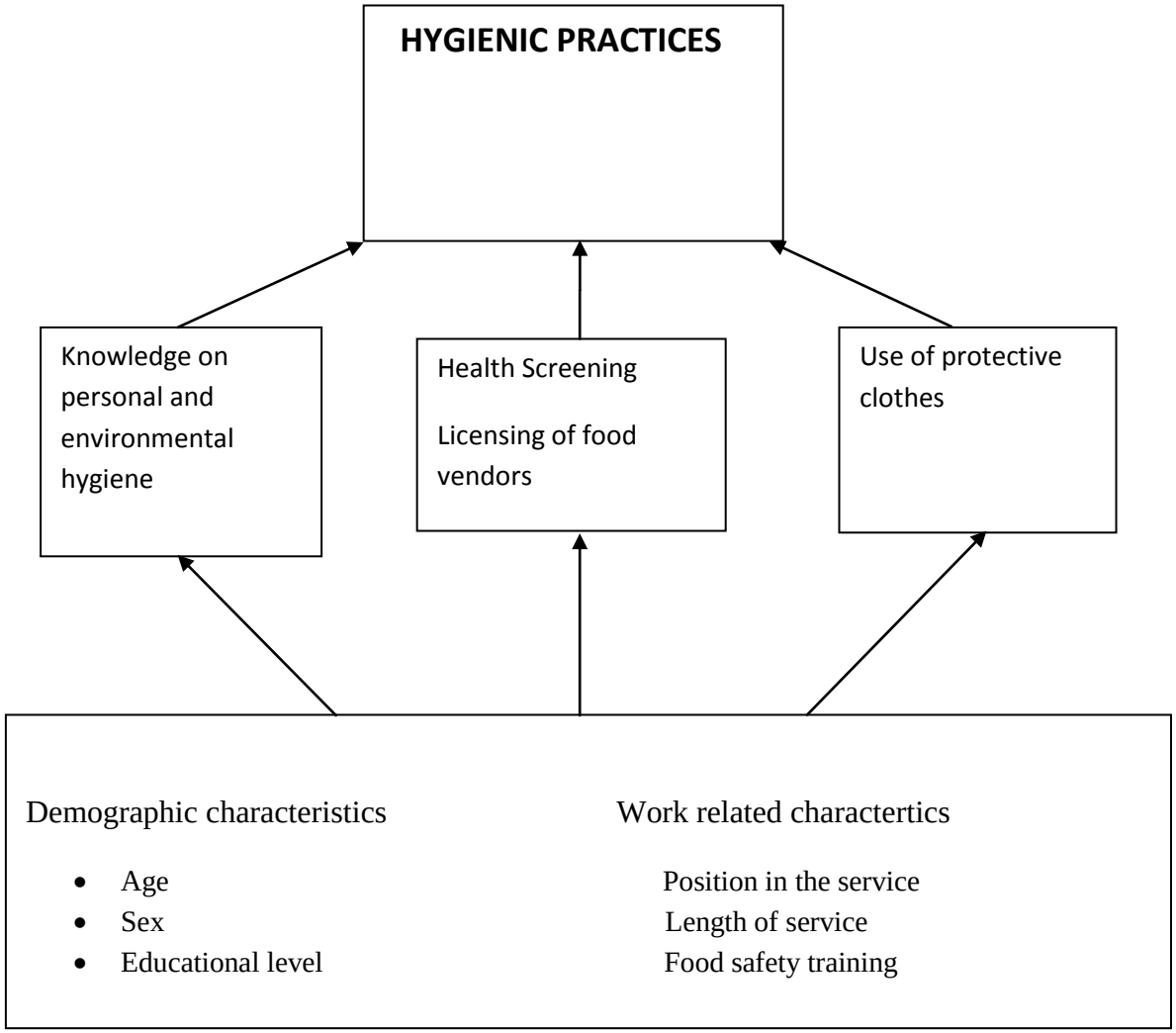

Figure 1: Conceptual framework on hygienic practices among food vendors

1.5 Objectives

1. 5.1 General Objectives

To assess adherence to hygienic practices and sanitary conditions of food vendors in the University of Ghana.

1.5.2 Specific Objectives

- To assess the processes involved in health screening and licensing of food vendors in the University of Ghana
- To determine the protective clothes used by food vendors in the University of Ghana.
- To assess the personal and environmental hygiene practices amongst food vendors.

CHAPTER TWO

LITERATURE REVIEW

2.1 Effects of Food Hygiene

According to the World Health Organization food hygiene are the conditions and measures necessary to ensure the safety of food from production to consumption. Lack of adequate food hygiene can lead to foodborne disease and death of the consumer.

Mayo Clinic (2014) reported that all foods naturally contain small amounts of bacteria. But poor handling of food, improper cooking or inadequate storage can result in bacteria multiplying in large enough numbers to cause illness. Parasites, viruses, toxins and chemicals also can contaminate food and cause illness.

Food borne diseases are a major health problem in both developed and developing countries. According to the World Health Organization diarrheal diseases, mostly as a result of food or waterborne microorganism remain one of the leading causes of illness and death in these countries, killing an estimated 1.9 million people globally. It is however expected that a large number minor cases are not reported only the serious ones are usually reported (Ifeadike et al., 2014). According to Center for Disease Control and Prevention, while physicians and other health care professionals have a critical role in surveillance for and prevention of potential disease outbreaks, only a fraction of the people who experience gastrointestinal tract symptoms from foodborne illness seek medical care.

Food hygiene remains a critical issue with regards to outbreaks of foodborne illness which results to substantial costs to individuals, the food industry and the economy (Kaferstein, Motarjemi and Battcher, 1997).

2.2 Benefits of Street Food

The term street food includes different ready-to-eat foods and beverages sold and most often than not, cooked in a street or in other public places (FAO, 1997). These street-vended foods have gained popularity because of their accessibility (Mensah et al., 2002; Oranusi and Braide, 2012) and affordability (WHO, 2003). In a survey conducted by Barro et al. (2002) it was found that the majority of the population of Ouagadougou (Burkina Faso), had their breakfast, lunch and dinner in street food shops.

There is a noticeable increase of food vendors in Ghana. This is clearly evident in towns and cities in the country, where they sell both raw and cooked food items along the various streets. It has been instigated by rapidly growing and changing food demands alongside the need to diversify and/or employ more income sources in the face of declining incomes (Mwangi. 2002). Food vendors in Ghana are particularly known for providing food at reduced prices, thus providing nutritional meals for people away from home. Apart from being a source of affordable meals, street vending also serves as a source of income for vendors. In Nairobi for instance, most food vendors earn an income above the official minimum wage (Mwangi, 2002)

Street foods can be broadly classified as finger food and fast food and are cheaper on average than restaurant meals. Street food vending may be consumed on the premises or it can be taken away and eaten elsewhere (WHO, 1996). While it is expected that street food meets the nutritional needs of consumers, it is also necessary to ensure its safety from contaminants and microorganisms (Chakravarty, 2001).

Food importation has steadily increased to meet the demand for seasonal and non-seasonal foods. Conditions of production and harvest may be unsupervised or uncontrolled, with resultant importation of contaminated foods. Raw manure is

frequently used as fertilizer, causing contamination of fresh produce. If improperly cleaned, the fertilized produce may cause illness

2.3 Licensing Of Food Vendors

In May 2007, the Municipal Corporation of Delhi placed a ban on street food vending with the hopes of reducing the risks associated with poor hygienic practices of food vendors (Ramesh, 2007). As expected many critics disagreed with this directive as did both national and international media houses who argued that the ban would not encourage the preservation of the ancient food culture in Delhi (Dhariwal, 2007; Ramesh, 2007; Sanghvi, 2007; Sengupta, 2007).

Prior to the ban in 2007, licensing was the principal technique for preventing food hygiene risks. In addition to this, regular inspections were conducted at food joints. Food vendors were to put on protective clothing including head gears, gloves and aprons and should have been declared medically fit by a health practitioner (MCD, 1979).

Unfortunately, most of these licensing agreements had designs that did not benefit street food vendors. Additionally, most of these rules and regulations had grown outdated and were not responsive to economic and social change. A typical example of such is the Municipal Corporation of Delhi requires food handlers to be vaccinated against typhoid, cholera and small pox.

The licensing rules were perceived by critics as partial in that they privileged a number of large-scale enterprises, as they had provisions that were biased towards some businesses based on their facilities. For instance, the Health Department linked the issue of licenses for water trolleys with the cooling capacities of and storage space available at the water plant sites. This resulted in the concentration of water trolley businesses among plant owners to the demise of small business entrepreneurs who did not have the

adequate capital to set up such facilities. Similarly, licenses for ice-cream trolleys were only issued to ice-cream factories (MCD, 1999).

In 2000, an evaluation by the MCD of restaurants, eating houses, roadside eateries and hotels revealed that a large number of such businesses were still running without a license (MCD, 2000). Also, nearly 60 to70 percent of residential buildings did not comply with land use or building regulations (Government of India, 2006). Some other problems including the subjective nature of measuring compliance of food vendors with hygienic criteria remained a headache for the government. This was because the food hygiene officers had not yet developed any scientific approach to measuring food hygiene criteria.

The Municipal Corporation of Delhi (MCD) increased extensively, the amount of money charged vendors as fines for selling foodstuffs without a health trade license (under Section 421). However, this measure did not have the desired effect as inspections were not conducted frequently enough (probably due to human resource constraints as against the hefty workload) and the tendency of municipality officials to succumb to bribery attempts by food vendors was imminent. As a last resort, the Health Department workers carried out daily raids affecting 10–15 street food vendors (per zone) and evicting 50–60 vendors for months at a time. Raiding teams consisting of food inspectors and six to eight strong workers, chased and caught food vendors. Vendors' property rights were blatantly infringed upon, as their food stuffs, vending carts and cooking equipment were destroyed or confiscated to their dismay (Dolf, 2008).

Thus, the May 2007 ban will not necessarily improve food hygiene, but will merely safeguard public spaces from permanent encroachment by the urban poor (Voyce, 2007). In the light of this, food vendors have remained present in unauthorized vending sites,

despite being unlicensed or banned, because of the continued demand for their affordable, tasty and convenient foods provided.

In South Africa, the government in an attempt to safeguard street food and vending activities, approved the implementation of some by-laws at the municipality levels. In order to enforce these, municipalities registered all food vendors within their jurisdictions and allocated food vending sites to be strictly used for food vending activities. These food-vending sites are limited to the indicated areas to serve as a control measure with respect to the number of vendors per area. The rationale behind this arrangement is to ensure that effective monitoring and coordination of food vendors is carried out. In the Ethekwini Metro street food vendors operate in allocated areas, thus resolving the problem of public nuisance in Durban City to an extent.

In addition to these, periodic training sessions and food hygiene awareness programs are organized for the benefit of food vendors. Moreover, the vending sites are inspected as part of compliance monitoring procedures. Today The Metro ensures that before vendors are issued with certificates of acceptability, they have undergone the required food hygiene training, which informs them of the safest food handling procedures and helps them appreciate the various regulations surrounding food vending (Anon., 2000). In an attempt to ensure that vendors do not store prepared meals for longer than necessary, the use of refrigerators have been restricted. This is to ensure shorter holding times and ensure the safety of street vended foods (Mosupye and von Holy, 2000).

In the Western Cape of South Africa, authorities depend largely on the National Hygiene Regulations as a regulatory mechanism (Anon, 1999). Vendors within this area are also expected to possess a Certificate of Acceptability.

2.4 Hygienic Practices Among Food Vendors

Food hygiene is the set of basic principles used to control environmental factors during production, preparation, selling and serving food in such a way to ensure that food eaten is of good quality. Food hygiene depends largely on the personal hygiene practices and habits of personnel working in a food establishment (Ifeadike et al., 2014).

Gordon –Davis (2011) also interprets hygiene as the preservation of health involving all measures that ensure the safety and quality of food during its handling and identifies these measures as adequate storage of both raw and cooked foods including the right preparation and cooking procedures. Foods cooked under unhygienic conditions provide plenty of opportunity for transfer of bacteria as well as growth or survival of bacteria and other pathogens. The hygiene and sanitation aspect is the most important factor that could possibly have a negative impact on food quality (Gordon, 2011).

According to Kok & Balkaran (2014) street food stands are made of simple structures where running water, toilets and washing facilities are rarely available in most countries around the world. Washing of hands, utensils and dishes are often done in bowls or pots of water. It is worth noting that disinfection is occasionally carried out and this eventually attracts pests to the vending sites especially when there is inadequate refuse disposal (Kok & Balkaran, 2014).

Furthermore, foods prepared at these sites put consumers' health at risk as food is often not refrigerated at the right temperatures. In a research conducted by Annor and Baiden (2011), it was found that despite the efforts of the government to regulate the activities of vendors and other catering institutions, some hotels in Accra were not compliant. The microbial count from the hotel with the worst food hygiene checks, that is; no head gears or gloves worn by food handlers were the highest but were least at the hotel with the best

observed food hygiene checks. This observation suggests that when food hygiene checks are strictly followed, contamination could be reduced and the efforts of the government in this regard could prove beneficial if adhered to. Most studies conducted in Ghana concerning various aspects of food hygiene over the past decade, have revealed poor food hygiene knowledge and attitudes of street food vendors, with personal hygiene least observed by the least educated (Acheampong, 2005). Most of the vendors have either no formal education or few years of schooling and therefore are simply ignorant of proper food handling and their tendency to transmit pathogens is higher (Mensah et al., 2002).

It is not entirely possible to pin point the exact causes of such incidences arising from food contamination. According to Annor (2011), there is strong statistical evidence that 70% of all bacterial food poisoning is caused by caterers. This is greater than occurrences reported from any other food sector. Most of these food poison outbreaks are due to the inadequate time and temperature control of food, whereas the remaining thirty percent are as a result of cross contamination (Annor & Baiden, 2011). A number of studies have found that such foods are sometimes held at improper temperatures, or mishandled by food vendors and sold in dirty environs (WHO, 2001, 2003; Muinde and Kuria, 2005; Ghosh et al., 2007). These all contribute to the infection of seemingly tasty food by different disease causing parasites. Multiple lines of evidence have shown that foods exposed along busy roads may become contaminated either by spoilage or pathogenic micro-organisms (Bryan et al.,1992; Ashenafi & Mehari 1995).

Hygiene practices among food handlers, mostly food vendors and catering services, have been found to be below standard. Research covering the hospitality industry has been around hotels, restaurants and street food vendors mostly in the capital city, Accra. Levels of total bacterial counts in street vended food are significantly beyond the acceptable reference levels set by the Ghana Standards Authority for Ready to Eat Foods

(Foriwaa & Lovatt, 2015). In the Ghana's capital, the Greater Accra Region, it is estimated that there are about 60,000 vendors of ready-to-eat foods (Odonkor et al., 2011). In a related study by King et al. (2000) results indicated that, among 160 street food stalls in Ghana, only three (1.85%) of the proprietors met the requirements for basic hygiene based on a five-point check-list.

2.5 Food Handling

In large scale cooking, many kitchen staff are usually employed to sped up the processes and ensure customers are served in good time. Thus, food passes through many hands, thereby increasing the chances of food contamination due to improper handling. As recommended by Annor and Baiden (2011) in their study, food must never be defrosted at room temperature (United States Department of Agriculture, 2006). Keeping meat and poultry cold while it is defrosting is essential to prevent the growth of harmful bacteria. There is greater danger of bacterial growth and food spoilage for food thawed at room temperature, hence the best way to safely thaw meat and poultry is in the refrigerator. In spite of these useful directives, food vendors in Ghana have been found to refrigerate food stuffs at inadequate temperatures exposing them to the risk of contamination (Annor and Baiden, 2011)

A consumer's chance of getting food borne illness depends largely on the health status of the food handlers, their personal hygiene, knowledge and practice of food hygiene. Infections can also be gotten through contaminated unwashed fingers, insects, and circulation of banknotes and by wind during dry conditions (Isara AR, 2009). Personal hygiene is important because according to (Odonkor et al., 2011) human beings are the largest contamination sources of food. Illness resulting from contaminated food has also been reported as the most widespread health problem in the modern world, and one of the main reasons for reduced economic productivity (Käferstein, 2003). This is not

surprising, considering the advancements in technology and different lifestyles adopted in this twenty first century that do not allow enough time for the preparation of home cooked meals.

2.6 Training of Vendors

Lots of efforts have been made by health ministries of developing countries in the field of food safety and hygiene education amongst street food vendors. Although these efforts have led to an increase in awareness and knowledge levels of food safety and hygienic practices, this knowledge is however not always translated into actual practice (Apanga et al., 2014). Similarly, Annor and Baiden (2011) who conducted a research on the hotel industry in Accra found through a microbial analysis though respondents were found to have satisfactory food hygiene attitudes it did not produce strict food hygiene practices. Likewise, (Donkor et al. 2009) hold the same opinion about this relationship between education and food safety practices among vendors.

A research conducted by some polytechnic students to assess the level of hygienic practices among street food vendors in Sunyani revealed that large numbers of the vendors practiced minimal hygiene. It was also found that most of the vendors did not receive any training on personal, food and kitchen hygiene. However, other scholars have proposed that even though training leads to increased knowledge of food safety, it does not necessarily imply positive food handling behavior (Howes et al., 1996)

2.7 Food Safety

Food safety is a vital issue both in developed and developing countries; given that food borne illnesses cause a lot of distress and thousands of deaths each year (Pilling et al, 2008). In view of this, the issue of food safety is becoming a key public health priority considering the large number of people who take their meals outside the home. As a result of this change in lifestyle, many people are exposed to food borne illnesses that

originate from food stands, restaurants and other food outlets. Food service employees are a very crucial link between food and consumers (Rahman et al., 2012), as there are high contamination tendencies on their part. Considering the numerous people who patronize food from vendors worldwide, that is about 2.5 billion people (as identified by Nyarango et al., 2008), the World Health Organization (WHO) has established five main keys to safer food including keeping clean hands, separating raw and cooked food, cooking thoroughly, keeping food at safe temperatures, and using safe water and raw materials (WHO, 2007). These five keys to safer food are of utmost importance in developing countries, and equipping food vendors in countries with such information could impact significantly on food safety.

Food poisoning occurs from different places, this could be from their homes, work places, schools, hospitals or other catering services patronized. Commercial catering services included restaurants, hotels, finished products from retailers and food vendors. The Food and Drugs Authority (FDA) is the national regulatory body under the Ministry of Health with the responsibility of implementing food policies and ensuring the safety and wholesomeness of food for consumers. FDA roles include food manufacturing and processing site inspections, licensing, product registration and monitoring. They also provide good hygiene practices training for food handlers. In the light of these efforts it appears that foods served within the canteens of some educational institutions still do not meet healthy standards.

Attempts have been made severally to classify food-borne disease outbreaks into those contracted from home-made meals and those contracted from street food. In the United States for instance, research has implicated food from commercial or institutional establishments (79%) and 20% from homes. An estimated 25% of these reports could have been avoided by safe food handling practices (Haapala and Probart, 2004).

However, as popularly proposed by researchers, identifying the exact number of cases has proven a difficult task as incidents of illnesses are usually underreported (McCarthy, 2007)

2.8 Food Borne Diseases

According to studies done in Africa on street foods, their tremendous unlimited and unregulated growth has placed a severe strain on city resources, such as water, sewage systems and interference with the city plans through congestion and littering adversely affecting daily life (Canet and N'diaye, 1996; Chaulliac and Gerbouin-Renolle, 1996). FAO states that, street foods raise concern with respect to their potential for serious food poisoning outbreaks due to improper use of additives, the presence of adulterants and environmental contaminants and improper food handling practices amongst street food vendors (FAO, 1997).

The food handler has a vital role to play in food businesses, and that is to guarantee that meals served are hygienic for consumption. Conscious or inadvertent contamination of such foods, places buyers at risk of suffering from food- borne illnesses (Annor & Baiden, 2011). Foods that are usually related with food borne diseases include salads (potato, tuna, chicken, and macaroni), raw vegetables, bakery products (e.g., cream-filled pastries), sandwich fillings, milk, dairy products and poultry. Most cases of food borne illness are caused by eating food or drinking water which is contaminated by feaces. In the case of food, the main cause of contamination is often poor personal hygiene among food handlers (Esena & Owusu, 2013). Reliable statistical evidence reveals that 70% of all bacterial food poisoning is caused by caterers whilst the remaining thirty percent can be attributed to cross contamination (Wilson, 1997).

Over two hundred different diseases have been found to be spread by food. Several factors have been identified as contributory to the transmission of such food borne

diseases. The main ones are as proposed by Paiva de Sousa, (2008) include: i) inadequate food manipulation; ii) improper holding temperatures (failing to properly refrigerate food); iii) inadequate cooking; iv) contaminated equipment (failure to clean and disinfect kitchen or processing plant equipment) and v) poor personal hygiene. Other factors that may contribute to the food borne illness include: vi) preparing food a day or more before serving with improper holding and reheating; vii) cross contamination (from raw to cooked products) and viii) adding contaminated ingredients to previously cooked food.

In rare cases where infected people seek medical care and submit specimens, bacteria are more likely than other pathogens to be identified as causative agents. Bacterial agents most often identified in patients with foodborne illness are *Campylobacter*, *Salmonella*, and *Shigella* species, with substantial variation occurring by geographic area and season. Testing for viral etiologies of diarrheal disease is rarely done in clinical practice, but viruses are considered the most common cause of foodborne illness (CDC, 2013).

A research conducted by medical students of the University of Ghana to investigate the prevalence of intestinal parasitic infections among food vendors in Accra revealed that the high prevalence was as a result of poverty or low socio-economic conditions, poor personal and environmental hygiene, over-crowding, limited access to clean water and limited knowledge about parasite transmission. The lavatories used by food vendors also played a role in the carriage and transmission of the parasites identified in the study. The researchers posited that since some food vendors had no access to adequate toilet facilities, they did not observe proper toilet manners. Also, those that had these facilities did not clean themselves properly after toilet use. These findings are similar to that of Stephenson (2002) who found that the relatively high presence of parasites transmissible by fecal matter are representative of high levels of environmental fecal contamination and poor sanitation standards.

Constantly hot weather conditions and poor environmental conditions in Ghana such as the dusty roads along which food vendors operate provide good conditions for bacterial growth. Several factors have been found to influence the risk of food contamination. According to Campbell, (2011) these include but are not limited to food type, pH, method of preparation, water availability, degree of handling, exposure temperature, and holding time (Campbell, 2011). A study conducted in Abeokuta, Nigeria, showed that different parasites and the degree of worm infections depended largely on the area in which food was sold (Idowu, 2006). Considering the similarity in environmental conditions between Ghana and Nigeria, it could be deduced that the high humidity levels may contribute to the transmission and maintenance of infective stages of these intestinal parasites in food in both communities (Ayeh-Kumi, 2009).

The presence of litter and domestic animals in and around vending areas have been observed in some of these areas where food tested showed parasitic contaminations. Food vendors who did not have adequate means of disposing of refuse dumped them in nearby gutters, the end result being the presence of flies at the vending site with inadequate food protection. Another source of contamination was the transfer of germs from money to food as vendors in an attempt to multi task ended up contaminating food with bacteria on currency notes and coins (Ayeh-Kumi, 2009)

Most of the time food vendors handle food equipment under highly unsanitary conditions. Utensils are washed in a container of water with soap. The water is rarely ever changed. Under such conditions, certain food borne organisms could be transmitted and cause cross-contamination. Schools located in the cities for example, usually have students eating from such serving plates placing them at high risk of contracting food borne diseases. On issues relating to the use of raw vegetables, it is known that some food vendors treat them with vinegar or salt solution; but most of the time these

vegetables are washed with only water or cleaned with napkins. Under such conditions most of the disease causing organisms still remain on the fresh vegetables and cause food borne diseases once they are ingested. In most cases these food vendors usually do not have training in food handling and on hygienic ways of handling food. This trend of affairs might be attributed to the fact that majority of the food vendors were only trained at home from parents or guardians (Esena & Owusu, 2013).

CHAPTER THREE

METHODS

3.1 Study Area

The University of Ghana is the oldest and largest of the thirteen Ghanaian universities and tertiary institutions. It was founded in 1948 as the University College of the Gold Coast. The University of Ghana located on a park - like campus in Legon about 12km from the centre of Accra, the capital. Due to its excellent reputation, it attracts foreign students from all over the world especially students from United States. The University has departments that oversee the institution, execution and maintenance of health issues such as the hospital, Students clinic, Environmental and Sanitation Unit. Food vendors in the University of Ghana are however under the Environmental and Sanitation unit.

3.2 Study Design

A descriptive cross sectional study was carried out to study hygienic practices amongst food vendors in the University of Ghana. The study collected both qualitative and quantitative data on hygienic practices amongst food vendors in the University as well as assessed the processes the University has put in place for granting certification for food vending, including monitoring measures. It also assessed health screening undergone by food vendors, use of protective clothes as well as personal and environmental hygiene practices amongst food vendors using a structured questionnaire. Key informant interview was also carried out.

3.3 Study Population

The target population of this study was food vendors who have been working on the University campus selected from food establishments and environmental health specialists in the University.

3.4 Inclusion and Exclusion Criteria

3.4.1 Inclusion Criteria

Food handlers who had direct contact with food and food contact surfaces were included in the study

3.4.2 Exclusion Criteria

Individuals who did not have direct contact with food and food contact surfaces were excluded from the study.

3.5 Variables

Independent Variable

- Age of food vendor
- Educational level of food vendor
- Gender of food vendor
- Marital Status
- Length of service as a food vendor

Outcome Variable

- Hygienic practices

3.6 Sample Size Determination

A Confidence Interval for a finite population was used to calculate the sample size. Calculation was done by a pi phase calculator.

Formula- $n = \frac{Z^2 * P * (1 - P)}{d^2}$

n – Population of food vendors in the University of Ghana 450

Z - standard normal deviation=1.96

p - Prevalence 0.5 that is 50%

d- Standard error=0.05

w (Margin of error or level of precision or maximum error to committed) = 5%

Sample size = 208.2

3.7 Sampling Method and Procedure

The population of food vendors in the University of Ghana was estimated to be 450. A sample size of 208 was calculated using the pi phase calculator. The researcher targeted 208 food vendors who were selected by using simple random technique; vendors were made to pick folded papers which had “Yes” or “No” indicated on them. Vendors that picked “Yes” were included in the study whiles those that pick “No” were excluded. The researcher also conducted face to face interviews with two environmental health officers on questions related to hygienic practices of food vendors in the University.

3.8 Instrument Development and Data Collection Procedure for Quantitative Data

A structured and modified questionnaire was developed for the quantitative study. The questionnaire was divided into four parts consisting of socio-demographic characteristics, medical examination amongst food vendors, use of protective clothes,

personal and environmental hygiene. Part I was designed to determine the food handlers' socio-demographic characteristics including age, gender, academic qualification, ethnicity and income. Part II was on processes involved in health screening and licensing of food vendors in the University of Ghana and included 12 questions. These questions covered health screening, decisions on medical examination, knowledge about disease testing. Part III of the questionnaire included 16 questions which determined the use of protective clothes amongst food vendors the questions included the types of protective clothes used, how often it is changed and reasons that influenced that decision. Part IV measured the personal and environmental hygiene practice amongst food vendors. The questions in this section consisted of 16 questions which include activities of daily living, nail care, hair care, hand washing practice, waste disposal habits and care of items used by customers.

3.9 Data Collection Techniques/Methods & Tools for Qualitative Data (Key Informant Interviews)

Key informant interview was used to collect qualitative data whiles questionnaire was used to collect quantitative data.

The Senior Environmental health specialist and other environmental officers in the University were interviewed on the following

(i) The existence of hygienic practice policy set for food vendors.

(ii) Budget allocation for things such as allocation of money for training programmes for the food vendors, improving the work environment of the food vendors in the University for example ensuring access to safe water.

(iii) In service training of Food vending staff on hygienic practices.

(iv) Explanations on some of the responses from the quantitative data

The interview guide will include questions to enable the researcher get the actual responses.

3.10 Pretest or Pilot Study

To evaluate the authenticity of the study tools, pretesting of study instruments was done in a representative Tertiary School facility which was not part of the study.

3.11 Data Processing and Analysis

The data entry started immediately after completion of data collection. The collected data was checked, verified and then entered into the computer. Only fully completed questionnaires was entered into the computer for final analysis. Data was entered into Excel statistical software after which was exported to Statistical Package for the Social Science (SPSS) version 17 for further analysis. Descriptive statistics of the collected data was done for most variables in the study using statistical parameters: frequencies and percentages. Cross tabulations and chi-squared tests (5% significance level) was used to check which variables are associated with the dependent variable.

3.12 Ethical Issues

Ethical clearance was obtained from the Ethical Review Committee of the Ghana Health Service (GHS). Permission to conduct the study was sought from Estate Division of the University of Ghana and the Environmental and Sanitation unit. Also individual food vendors selected gave a written or verbal consent if they agree to participate. The study was solely for academic purposes; hence food vendors were not identified by names but rather coded during dissemination of results.

The privacy and confidentiality of the respondents was assured. All information provided by the respondents was kept confidential and data were locked in cabinet and on computers protected by passwords.

The respondents' involvement in this study was only through an interview and not exposed to any form risks. The subjects' participation in the study was voluntary and was not given any monetary or any kind of reward. All the information provided by the respondents was used for the study.

CHAPTER FOUR

RESULTS

This chapter focuses on both quantitative and qualitative research concerning the determinants of hygienic practices amongst food vendors and guided by the objectives of the study. This chapter is presented in 7 sections, starting with a socio-demographic description and ending with data gathered from two separate interviews with two environmental officers from the University of Ghana. A total of 208 respondents were part of the study, with all respondents giving valid responses to most questions asked.

4.1 Socio-demographic distribution of respondents

Table 1 shows the demographic characteristics of food vendors in the University of Ghana. The percentage of respondents aged 18 and below was 6.3%, those between the ages of 18 to 30 years made up 48.6.3% whiles those between 31 to 45 and 46 to 60 years made up 35.1% and 9.1 % respectively and those above 60 years constituted 1% of the total sample. Females made up 82.7% of the total population whereas males were about 17.3%.

For educational level, it was found that 3.8% of the respondents had no formal education, 38.9% were primary school graduates, 43.3% were secondary graduates whiles 13.9% had tertiary education. A large proportion of the vendors were Akans 38.0% and Ewes 32.2% , Ga's and Hausa's formed a smaller proportion of 9.6% and 7.2% respectively whiles people who belonged to other ethnic groups made up 13% of the total population. In terms of religion, Christians constituted 93.3% of the sample whiles Muslims made up 6.7% of the total population.

In relation to marital status, majority of the population were single 53.8%, followed by those who were married 39.4% the divorced vendors made up 3.8% and the least, were

the widowed 2.9%. In terms of length of stay vendors who had worked in the university for less than a year were 28.4% , those who had worked for 1to 5 years formed majority of the sample with39.9%,vendors who had worked for 6 to 10 years were 13.5% whiles 18.3% had worked for more than 10 years [Table 1]

Table 1: Socio demographic Characteristic of Food Vendors (N =208)

Variables	Frequency	Percentage
Age		
Below 18	13	6.3
18-30 years	101	48.6
31-45 years	73	35.1
46-60	19	9.1
Above 60 years	2	1.0
Gender		
Male	36	17.3
Female	172	82.7
Highest level of education		
None	8	3.8
Basic (Primary/JHS)	81	38.9
Secondary (SHS/Vocational/Tech)	90	43.3
Tertiary (/Polytechnic)	29	13.9
Ethnicity		
Akan	79	38.0
Ewe	67	32.2
Ga	20	9.6
Hausa	15	7.2
Other	27	13.0
Religion		
Islam	14	6.7
Christian	194	93.3
Marital Status		
Single	112	53.8
Married	82	39.4
Divorced	8	3.8
Widowed	6	2.9
Length of service		
Less than a year	59	28.4
6-10 years	28	13.5
1-5 years	83	39.9
More than 10 years	38	18.3

4.2 Licensing and health screening of food vendors.

When food vendors where asked how they acquired a license 36.1% of food vendors said they had no idea about how to acquire for a license to sell food. Majority of the vendors said they applied for one themselves 41.3% followed by 19.7% of them who said they were called by the University authorities whiles the remaining 2.9% gained it through other means [Table 2]. About 40% of the food vendors had no knowledge of health screening or had not undergone one. Most food vendors said they undertook health screening once a year 59.1%. Nevertheless (99.0%) of all the food vendors said it was important for a vendor to be screened. [Table3].

Table 2: Acquisition of license and knowledge on health conditions (N=208)

Variables	Frequency	Percentage
Acquisition of License		
No idea	75	36.1
I applied (U.G)	86	41.3
I was called by the University	41	19.7
Knowledge of screened		
Health Conditions		
Typhoid	37	18.0
Tuberculosis	23	11.2
Hepatitis	19	9.4
Other	21	10.1

A great number of food vendors did not offer any response to the diseases they knew they were being screened for (52%), however highest diseases mentioned was typhoid which had only 18%. (Table 2).

In Figure 2, shows that 80% of food vendors were of the view that it was important for food vendors to be licensed, however as much as 85.1% of them had no idea why it was important to be licensed. The remaining 14.9% gave reasons concerning health, work efficiency and legal matters as reasons why it was important for a vendor to be licensed (Table 3).

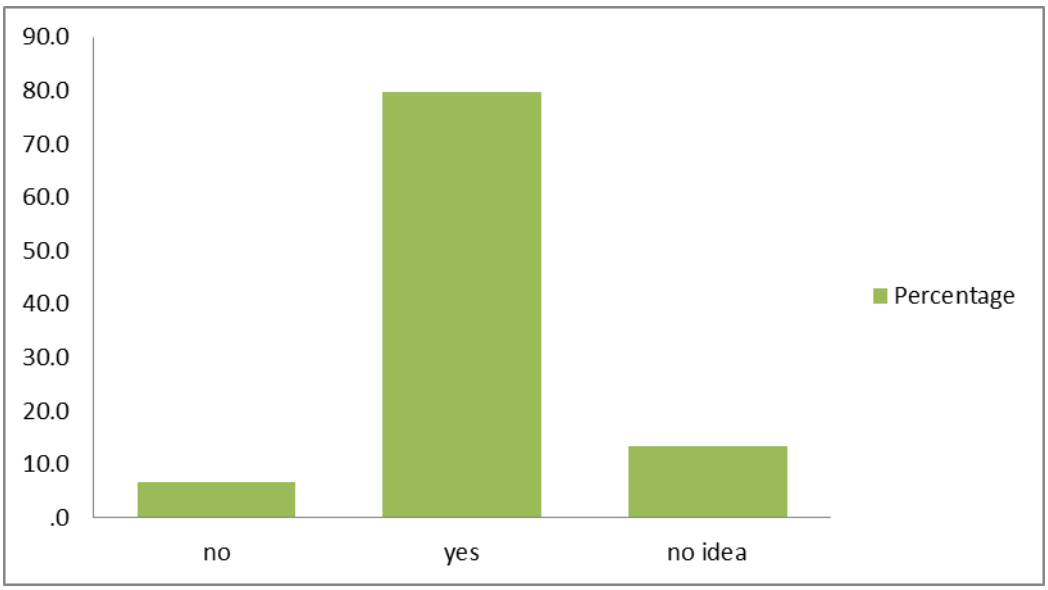

Figure 2: Importance of licensing

In Table 3, most food vendors said it was important to undergo health screening for two main reason, that is to ensure that the vendor is well and also to check for diseases forming 41.3% and 26.9% respectfully. In terms of the process involved in undergoing health screening; about 21.2% had no idea, however 52.8% of the food vendors said their blood samples were taken 52.8% during health screening, processes such as checking of stool, eyes and nails each contributed to 0 .5%, vendors who undertook urine test made up 9.6%, the remaining 14.9% of all the food vendors said did other investigations.

Table 3: Licensing and health screening of Food vendors (N=208)

Variables	Frequency	Percentage
Frequency of health screening		
No knowledge	21	10.1
No screening	19	9.1
Monthly	2	1
Every 6 months	19	9.1
Every 3 months	14	6.7
Yearly	123	59.1
2- 5 years	8	3.8
More 5 years	2	1
Perception of importance of health screening		
No	2	1.0
Yes	206	99.0
Importance of health screening		
To prevent diseases transmission	29	13.9
To ensure the vendor is well	56	26.9
To prevent and check for diseases	86	41.3
To detect and protect	9	4.3
Others	9	4.3
Prevent contamination of food	17	8.2
No idea	2	1.0
Processes involved in screening		
No idea	44	21.2
Blood	110	52.8
Stool	1	0.5
Eye test	1	0.5
Nails	1	0.5
Urine	20	9.6
Others	31	14.9
Explain why is it important for vendor to be licensed		
No idea	**177**	**85.1**
Health reason	**10**	**4.8**
Ensure work efficiency	**8**	**3.8**
Legal matters	**13**	**6.3**

Table 4: Association between knowledge of processes involved in screening and socio-demographic data

Variables	No Idea	Blood Test	Stool Test	Eye Test	Nails Test	Urine Test	Others	Chi square	p-value
Age									
Below 18	6	7	0	0	0	0	0	29.616	0.198
18-30 years	26	58	1	0	0	5	11		
31-45 years	11	33	0	1	1	12	15		
46-60	1	11	0	0	0	3	4		
Highest Educational Level									
None	1	5	0	0	0	0	2	16.674	0.546
Primary	25	35	0	1	0	7	13		
Secondary	15	52	1	0	1	8	13		
Tertiary	3	18	0	0	0	5	3		
Marital Status									
Single	32	61	0	1	0	4	14	26.957	0.172
Married	9	43	1	0	1	13	15		
Divorced	2	5	0	0	0	1	0		
Widowed	1	1	0	0	0	2	2		
Length of service on campus									
Less than a year	18	30	0	1	0	4	6	29.125	0.047
6-10 years	4	16	0	0	0	3	5		
1-5 years	20	47	0	0	1	7	8		
More than10 years	2	17	1	0	0	6	12		

Table 4, shows a cross tabulation between some socio-demographic data and the process involved in health screening. It can be seen from the table that there is a significant relationship between length of service (χ^2= 29.125; p=0.047) and the process involved in health screening but there was no significant relationships between age, highest educational status and marital status.

In terms of processes involved in getting a license most of the food vendors said they had no idea about how to acquire license 55.8%, however 28.9% said they gained one after announcements had been made by officials after which they undertook health screening. Table 5

Table 5: Processes involved in licensing of food vendors

What processes are involved in getting a license	Frequency	Percentage
No idea	116	55.8
Announcement by officials then health screening	61	28.9
Inspection by officials	4	1.9
Assessment of food	4	1.9
Other reasons	23	11.0

4.3 Use of protective clothes amongst food vendors

In Table 6, (81.3%) food vendors said they knew what protective clothes were, of which most used hair cups and aprons 46.2%, 34% said they used apron and gloves however 33.8% said they used all three (apron, hair cups and gloves) Table 7. (60.6%) of food vendors said they did not use gloves, 13.5% did not use hair cups whiles only 1.9% did used apron.

Table 6: Knowledge on Protective Clothes (N=208)

Do you know what protective cloths are	Frequency	Percent
No	39	18.8
Yes	169	81.3

For those who used gloves 13.9% said they changed it after each use, while 5.8% said it was changed on daily basis. 74.5% of hair cup users said they washed their hair cups every day whiles only 4.3% said it was done on weekly basis.

A large percentage of vendors (88%) said they washed their aprons on daily basis. When asked why it was important to wear protective clothes 53.9% said it was to prevent contamination of food, 27.9% also said to protect themselves from food spillage whiles 14.5% said it was because it was a requirement by the University. [Table 7]

Table 7: Use of Protective Clothes (N=208)

Variables	Frequency	Percent
Type of protective clothes used		
No response	2	1
Apron only	20	9.6
Apron and hair cap	96	46.2
Gloves and apron	7	3.4
All three	69	33.2
Others	14	6.8
Frequency of changing gloves		
After every use	29	13.9
Every hour	28	13.5
Every 6 hours	13	6.3
Daily	12	5.8
Frequency of washing or changing hair cup		
Daily	155	74.5
Weekly	9	4.3
Monthly	1	0.5
Other	15	7.2
Frequency of washing or changing apron		
Daily	183	88
Weekly	10	4.8
Monthly	6	2.9
Other	5	2.4

The table below shows a cross tabulation of socio-demographic data and use of protective clothes. It can be seen that there is a significant association between gender (χ^2=19.570; p=0.003), marital status (χ^2=72.43; p=0.00) and length of service (χ^2=40.024; p=0.002) with the use of protective clothes. Paradoxically, however age and educational level did not show any relationship with the use of protective clothes.

Table 8: Associations between Use of protective clothes and socio-demographic data

	Which protective clothes do you use when handling food							
Variables	**No response**	**Apron only**	**Apron and hair cap**	**Gloves and apron**	**All three**	**Suggested others**	**Chi square**	**P-value**
Age								
Below 18	0	2	5	2	2	2	26.97	0.305
18-30 years	1	14	38	4	37	7		
31-45 years	1	3	39	1	26	3		
46-60	0	1	12	0	4	2		
Above 60 years	0	0	2	0	0	0		
Gender								
Male	0	8	10	2	10	6	19.570	0.003
Female	2	12	86	5	59	8		
Highest Educational Level								
None	0	0	6	1	1	0	32.149	0.21
Basic	2	13	33	3	26	4		
Secondary	0	6	50	3	25	6		
Tertiary	0	1	7	0	17	4		
Marital Status								
Single	1	16	44	7	38	6	72.43	0.00
Married	0	3	45	0	29	5		
Divorced	0	0	4	0	2	2		
Widowed	1	1	3	0	0	1		
Length of Service								
less than a year	1	10	24	5	16	3	40.024	0.002
6-10 years	1	3	8	0	13	3		
1-5 years	0	6	35	2	33	7		
more than 10 years	0	1	29	0	7	1		

4.4 Hand washing Practices

Almost all food vendors (99.5%) said they used soap during hand washing, out of which 77 vendors said they did so to get rid of germs from their hands followed by 66 respondents who said it was done to remove dirt. All 208 food vendors said the use of soap during hand washing can reduce the risk of contamination.[Table 9]

Table 9: Hand washing Practices [N=208]

Variables	Frequency	Percentage
Use of soap during hand washing		
No	1	0.5
Yes	207	99.5
Reasons for hand washing		
Germs	77	37.7
Dirt	66	31.7
Prevent contamination	43	20.6
Look clean/neat	22	10.6
Knowledge on reduction of contamination with use of soap		
Yes	208	100

Table 10 shows a cross tabulation of socio-demographic data and reasons for hand washing. From the table it can be seen that there was no significant association between age gender and marital status .However there was a significant association between educational level (χ^2= 25.886; p=0.039) and length of service (χ^2= 31.316; p=0.008) on campus with the reasons why food vendors washed their hands.

Table 10: Associations between reasons for hand washing and socio-demographic data

Variables	Germ	Dirt	Prevent Contamination	Neat or Clean	Personal Hygiene	Chi square	p-value
Age							
Below 18	5	2	5	1	1	25.967	0.167
18-30 years	41	24	26	9	6		
31-45 years	23	27	8	14	4		
46-60	8	8	3	0	2		
above 60 years	0	2	0	0	0		
Gender							
Male	7	8	10	2	3	5.344	0.375
Female	70	58	33	20	10		
Highest Educational Level							
None	5	1	0	0	1	25.886	0.039
Primary	21	30	15	13	6		
Secondary	42	31	14	8	4		
Tertiary	9	4	14	1	2		
Marital Status							
Single	47	29	26	12	7	13.914	0.532
Married	23	32	16	10	6		
Divorced	6	2	1	0	0		
Widowed	1	3	0	0	0		
Length of Service							
less than a year	19	20	9	5	6	31.316	0.008
6-10 years	8	15	7	2	0		
1-5 years	39	22	20	12	2		
more than 10 years	11	9	7	3	5		

4.5 Personal Hygiene

In Table 11, (99.5%) of food vendors said they trim their nails and ensure they were clean at all times. In terms of hair care 65.4% said they washed their hair weekly followed by 13.9% who did daily then those who did it once in a month or occasionally. None of the food vendors reported having an open wound.

Table 11: Personal Hygiene [N=208]

Variables	Frequency	Percentage
Trimming of nails		
No	1	0.5
Yes	207	99.5
How often do you wash your hair		
Once a week	136	65.4
Twice a week	13	6.3
Once a month	15	7.2
Occasionally	15	7.2
Daily	29	13.9
Do you have an open wound		
No	208	100

Table 12, shows a cross tabulation between age, gender, educational level length of service and frequency of washing hair. It can be seen that there was no association between any of the socio-demographic data and frequency of hair washing.

Table 12: Associations between frequency of Hair washing and socio-demographic data

Variables	Once a week	Twice a week	Once in a month	Occasionally	Daily	Chi-square	p=value
Age	9	1	1	0	2	14.736	0.544
Below 18							
18-30 years	66	7	8	8	12		
31-45 years	50	4	6	4	9		
46-60	11	1	0	2	5		
Above 60 years	0	0	0	1	1		
Gender							
Male	24	1	1	1	9	7.042	0.134
Female	112	12	14	14	20		
Highest Educational Level							
None	4	3	0	1	0	22.663	0.31
Primary	49	6	5	7	14		
Secondary	59	4	8	7	12		
Tertiary	24	0	2	0	3		
Length of Service on campus							
Less than a year	35	7	5	4	8	21.478	0.44
6-10 years	18	0	1	3	6		
1-5 years	57	6	9	2	9		
More than 10 years	26	0	0	6	6		

4.6 Environmental Hygiene

In terms of washing of utensils 76% said they washed it in a bowl of water while 17% washed it under running water. 22% of the vendors said they washed their utensils themselves whiles 76.4% said they had employees that washed the utensils. Respondent that washed it in a bowl of water 44% said they changed the bowl of water less than 30minutes after first using the water, 15.4% also said it was changed by the close of day. Most of the food vendors [204] said their source of water was from a tap whiles the

remaining 4 said from boreholes.94.2% of food vendors covered their water at sales point.

Table 13: Environmental hygiene practices

Variables	Frequency	Percent
Washing of utensils		
In a bowl of water	158	76.0
Under running water	37	17.8
Other	13	6.3
Person responsible for washing		
Self	46	22.1
Employee	159	76.4
Other	3	1.4
Frequency of changing bowl of water		
Less than 30 minutes	93	44.7
Every hour	19	9.1
Every 6 hours	20	9.6
Daily	32	15.4
Other	2	1.0
Storage of water at sales point		
In a tank (uncovered)	3	1.4
In a tank (covered)	196	94.2
Others	9	4.3

Table 14 shows a cross tabulation between socio-demographic data and frequency of changing bowl of water for cleaning, it can however be noticed that there was a significant relationship between length of service (χ^2= 29.125, p=0.047) and how often the bowl of water for washing is changed but the remaining socio-demographic data did not have any significant relation with the frequency of changing water used in cleaning.

Table 14: Associations between frequency of changing bowl of water and socio-demographic data

Variables	Less than 30 minutes	Every Hour	Every Six hours	Daily	Other	Chi square	p-value
Age							
Below 18	6	1	1	3	0	14.935	0.529
18-30 years	46	14	8	14	0		
31-45 years	33	3	8	10	2		
46-60	8	1	2	4	0		
Above 60 years	0	0	1	1	0		
Gender							
Male	15	1	5	7	0	3.782	0.436
Female	78	18	15	25	2		
Highest Educational Level							
None	4	1	0	2	1	16.674	0.546
Primary	37	6	9	18	0		
Secondary	37	8	9	12	0		
Tertiary	15	4	2	0	1		
Marital Status							
Single	48	14	10	14	2	24.435	0.071
Married	41	5	7	14	0		
Divorced	2	0	2	1	0		
Widowed	2	0	1	3	0		
Length of Service on Campus							
less than a year	28	6	8	8	1	29.125	0.047
6-10 years	11	2	3	3	0		
1-5 years	35	8	6	16	1		
more than 10 years	19	3	3	5	0		

In terms of refuse disposal 150 food vendors said they disposed of it in a faraway bin whiles 57 said in a nearby bin. However 37.5% of food vendors emptied their bin whenever it was full whiles most of them said by the close of day (56.7%).Most of the food vendors said they covered their bins 93.8% whiles 6.3% did not. However all the food vendors said they carried out daily cleaning of the premises.

Table 15: Disposal of refuse and cleaning of premises

Variables	Frequency	Percent
Place of refuse dispose		
In a bin nearby	57	27.4
In a bin far away	150	72.1
Other	1	0.5
When do you dispose of your refuse		
When it is full	78	37.5
By close of the day	118	56.7
Every other day	6	2.9
Other	6	2.9
Covering of refuse		
No	13	6.3
Yes	195	93.8
Daily cleaning of the premises		
Yes	208	100.0

Table 16 shows a crosstab between socio-demographic data and frequency of emptying bin, it can be seen that there is a significant association between age(χ^2=40.708; p=0.000) and gender(χ^2=3.782; p=0.004) and how often the bin is emptied whereas there is no significant relationship between educational level, marital status and length of service with frequency of emptying their bins.

Table 16: Associations between frequency of emptying bin and socio-demographic characteristics.

Variables	When it is full	By close of the day	Every other day	Other	Chi square	p-value
Age						
Below 18	6	5	0	2	40.708	0.000
18-30 years	40	57	1	3		
31-45 years	24	47	1	1		
46-60	8	8	3	0		
Above 60 years	0	1	1	0		
Gender						
Male	6	27	0	3	3.782	0.004
Female	72	91	6	3		
Highest Educational Level						
None	3	5	0	0	7.136	0.623
Primary	32	41	4	4		
Secondary	30	57	2	1		
Tertiary	13	15	0	1		
Marital Status						
Single	38	67	1	6	16.092	0.065
Married	37	41	4	0		
Divorced	2	6	0	0		
Widowed	1	4	1	0		
Length of service on campus						
Less than a year	22	33	0	4	14.871	0.95
6-10 years	8	18	2	0		
1-5 years	31	50	1	1		
More than10years	17	17	3	1		

4.7 Interview with Environmental Officers.

This section presents qualitative assessment of hygienic practices of food vendors in the University of Ghana by interviewing two environmental health officers in University of Ghana. The researcher in analyzing first read thoroughly through the transcripts of the interviews and identified important words and essential narratives through coding, which were merged into meta-narratives that formed the categories. These categories presented

the specifics of respondents perceptions of various issues relating to hygienic practices amongst food vendors and related categories were synthesized into sub-themes and further themes.

This synthesis enabled the researcher to describe the typical phenomenon by providing excerpts as examples of the generalizations that were made for instance, EO1 represents Environmental Officer 1. Both respondents were males with the highest qualification being a Bachelor's degree. Both respondents preferred to speak English for the interview.

Licensing

In relation to licensing of food vendors in the University of Ghana, it was found out that the University of Ghana did not necessarily license food vendors but rather used medical examination to grant vendors the opportunity to sell.

> ''As I can see it here (the interview guide) licensing carries certain legal connotations we within the University of Ghana campus we don't license per say'' (EO1)
>
> "The process involved first obtaining a medical certificate with that process you pick a form from the environmental health office with two passport picture and then with that we fill your personal information on the form then you take that form to the hospital" (EO2)
>
> ''What we do is we ensure that any potential food vendor who operate on campus is made to undergo medical examination at a recognized government hospital'' (EO1)
>
> "We don't recognize any other hospital but University of Ghana Hospital" (EO1)

After being examined by a qualified doctor and the vendor passes the screening he or she is declared fit and allowed to sell. However if the vendor does not pass the medical exam he is then treated, after treatment the vendor undergoes the health screening again and if he passes would be issue with the license.

> "…so that a qualified medical officer will examine the person and then declare the person fit to operate yeah any food business and when we get that report based on that we clear the person or we allow the person to operate."(EO1).
>
> "There is a portion on the form the doctor will recommend whether you are fit to sell or not, if not they will give you medication that is the agreement. So they take care of you give you medication until you are fit then they will pass you." (EO2)

Screening

Both environmental health officers said licensing a food vendor in the University of Ghana is basically the same as health screening by a qualified medical doctor from the University of Ghana.

> "You get yourself screened to obtain the license" (EO 2).

Here food vendors undergo some investigations during health screening.

> "Then you go to lab your urine your stool they check your spine or chest to see whether" (EO2)

Health screening was supposed to be undertaken every 6months or the license is supposed to be renewed every 6months but due to financial constrains food vendors on the University campus were allowed to do so yearly.

> "Ideally it's supposed to be every 6 months, ideally every 6 months but we are in Ghana, I mean hard times monetary wise so we allow them to do it every year" (EO 1).

Budget

The researcher sought to find out if the environmental officers had any annual budget that enabled them to fund for things that help in improving hygienic practices of food vendors on campus such as with organizing of programmes such as health talks or health education

> "how do I put it…we don't have budget per say"(EO 1).
>
> "Here it rest on the directorate is PDMSD is the Physical Development municipal services directorate so all market are under this directorate and since their business is purely personal the University comes in means of providing structures" (EO 2)
>
> "In other words there is no specific annual budget for people who sell on the University campus. They are purely private business operated" (EO 2)

Training

Food vendors are ideally supposed to undergo in-service training so as to be updated with current issues concerning food handling the researcher sought to find out if training was done for the vendors on campus.

> "So we do periodical visits to the market then we educate them one on one, then we organize err talk like for bush canteen and (claps his hands) alone we do that, for night market alone we do that there is another market at Common-worth Hall we organize it for them then we talk to them." (EO2)

> "Then once or twice in a year we group all of them together and do a general briefing on environmental err safety and practices for them." (EO2)

After the training they also carry out periodical inspection to ensure that the vendor is heeding to the education that they had received. Since the slightest mistake by the food vendor during handling of food can lead to food contamination which if care is not taken could became life threatening.

> "We do periodical inspection could be twice a week or once in a week we visit the market see how best they are going about their duties because, food handlers the least mistake will make or put the whole community into jeopardy."(EO1).

Assessment

In terms of assessment but environmental officers said they did not use an assessment or a measuring tool or guide in the assessment of food vendors in the University of Ghana such as the use of an observation checklist.

> "the issue is that we don't have any mechanical to devices to detect the wholesomeness of any food being prepared at the University premises, but what we do is that physical examination and the law allows it" (EO2)

However they did carry out physical examination or observation and inspection of the environs of the food vendor.

> "Yes you know for our work is basically observation. You go in there you observe with your (points to his eyes) eyes sometimes you may not even talk" (EO1)
>
> "we do visual inspection and then when there is a special report as in somebody tasting or taking a special or particular food and the person gets a reaction then

we move in to do vivid inspection of the things that comes together for the preparation of that food." (EO2)

Penalty

In terms of penalty, the researcher sought to find out if there was any penalty for food vendors who did not practice under hygienic conditions.

"what I can say is you go in and you see that the person is operating under poor hygienic (condition) this thing the person is rather advice the person"(EO1)

"You come back and verify the situation you come and the same the thing is there serve him with notice."(EO1)

"What we do currently is that not responding to our education we report you to the security and we will recommend that you are sent off."(EO2).

Suggestions

When the two environmental officers were asked what suggestion they had to improve hygienic practices of the food vendors,

"Well designated places for our markets eatery on campus now it's like we are doing an out lock thing, we don't have permanent place for them"(EO1)

"so the University of Ghana should I mean Authorities should as they have put effort in designating places for other structures that area should be of concern to them".(EO1)

"inspection we make sure they keep personal hygiene at its highest level, they cut their fingers short in order not to harbor disease causing organisms, you avoid putting your hands in your ears and other orifices as much as you can whiles serving food.(EO2)

We don't allow people with sore to sell the food and other things we tell them in the course of serving food you feel like visiting the urinal or toiletry you come back and wash your hands with soap and water"(EO2)

"So these are the things we keep on telling them and I can assure you assure you if these things are properly put into practice there is no need for the government using money to import Coartem."(EO2).

CHAPTER FIVE

DISCUSSION

5.0 INTRODUCTION

The current research seeks to assess the adherence to hygienic practices and sanitary conditions of food vendors in the University of Ghana. The study revealed that generally food vendors displayed adherence to hygienic and sanitary practices. Also these practices were noticed to be better performed among food vendors who had worked for longer periods of time. Four objectives regarding licensing and health screening, use of protective clothes, personal and environmental hygiene practice and hand washing practices were set up for the study. The results of these findings are thoroughly explored and interpreted in this chapter.

According to the FAO and WHO, food vendors are required to undergo basic training in food hygiene before licensing and further training as required by the relevant authorities In line with this food vendors in the University of Ghana were required to undergo health screening before licensing. According to the interview with the environmental officers on University of Ghana campus it was mentioned that department provided education on food hygiene for food vendors which was in accordance with a study done by (Monney et al., 2013) in Konongo by that revealed that the school provided education for the food vendors. Both finding were however in contrast to a study conducted in a school in Suyani which revealed that most of the food vendors did not receive any training on personal and environmental hygiene. Other researchers however proposed that even thou training leads to increased knowledge it does not necessarily lead to increased knowledge on food safety and positive food handling behavior (Annor & Baiden, 2011).

Majority (82.7%) of the vendors were females, an observation similar to findings by Donkor et al. (2009), Mensah et al(2002) and Odonkor et al.(2011),. In developing countries females seemed to play a dominant role in all stages of street food vending such as preparation, serving and selling. An increase in women's overall participation in street food vending had been reported in some parts of Africa. More than 80% of street food vendors in countries such as Kinshasa, Lesotho and South Africa were female .The high proportion of female vendors compared to male vendors is typical of most developing countries where women cooked the food they sell in the street themselves, thus promoting their own products. This however contrasts reports in India and Bangladesh where street food vending was male dominated and the percentage of male vendors ranged from 90-99% (Odonkor et al2011).

Almost half (43.3%) of food vendors had secondary education and (38.9%) had Basic (Primary/JHS) education this finding was in contrast to a study conducted by Mensah,2002 where he found out that most of the food vendors had no formal education or a few years of schooling. This study pointed out that there was no significant association between food vendors' level of education and process involved in medical screening this finding was similar to a study conducted in Konongo, Ghana.

A good proportion of respondent 68.3% had been selling food less than five years and the proportion reduces with increasing number of years. This trend is similar to the reported by (Abdalla et al.,2009) and confirms the assertion in available literature that the food vending business in developing countries is rapidly expanding and serves as a form of employment for urban residents.

Medical examination of food vendors according FAO and WHO is necessary if clinically or epidemiologically indicated. This is to ensure that vendors with infectious diseases are

excluded from food handling. However (Length, 2014) argued that medical examination of food vendors prior to licensing, or at intervals afterwards, does little towards ensuring food safety and should not be mandatory. As a precautionary measure Section 286 of the Criminal Code, (Amendment)Act, 2003 (Act 646) of Ghana states that all food vendors undergo medical examination to ensure they do not transfer communicable diseases. Thus it is recommended by the state that food vendors in the country must be screened every six months but due to monetary constrains as indicated by the environmental health officers, food vendors in the University are allowed to undergo health screening once a year. Results from the study proved that 99% of vendors said it was important to undergo health screening only 59.1% said they did it yearly as permitted by the authorities while 19.2% said they had no knowledge of health screening or had not undertaken one, this finding was in accordance with a study conducted in Ghana where all food vendors said it was important to be screened and 71% had actually undergone health screening. A similar study carried out by Monney et al.,(2013) showed that there was no statistical difference between the level of education and health screening, this finding was in accordance with this study where educational level had no significant association with health screening.

In terms of wound care none of the respondents in this study had an open wound this finding was similar to a study by (Ccebdm et al., 2013) which revealed only 4% of respondent with an open wounds. Almost all the food vendors in the University of Ghana said they trimmed their finger nails this finding was contrast to a study done by Vadodara (Ccebdm et al., 2013) showed a very poor picture in this aspect. In that city, only 5% of the vendors had short nails. The reason being that this huge difference can be the factor of being a metropolitan city as stated in another study done in Delhi (Ccebdm et al.,2013).It explains that the reason behind this difference could be as street vendors in

metropolitan cities are more exposed to health and hygiene related messages. According to (Rane,2011) *Salmonella*, non-typhi salmonellae, *Campylobacter* and *E.coli* can survive on finger tips and other surfaces for different lengths of time and even in some cases after hand washing. It is therefore appropriate for food vendors always to keep their nails short and clean to prevent them from serving as a vehicle for transmission of pathogens. Poor personal hygiene especially non washing of hands with soap has been found to be associated with the transmission of bacteria pathogens amongst street food vendors. A study conducted by (Apanga et al., 2014) found out that a large proportion of food vendors (88.5%) washed their hands before food services. This finding is similar to this study where all food vendors testified that they washed their hands before getting into contact with the food.

In terms of protective clothes a high proportion of food vendors used hair cups and aprons this finding was in agreement with that of (Musa & Akande, 2003) but in contrast with (Abdallah & Elneim, 2013) who reported a relatively low level of hair protection by food vendors. The fact that most vendors covered their hair during food sale as seen is this study is a reflection of the socio-cultural mode of dressing. This observation highlights the positive role of culture in the promotion of food safety in this community In a study conducted by (Ccebdm et al., 2013) it was observed that 97% of the vendors did not use hand gloves which was similar to the finding of this study which showed that only 3.4% of food vendors used hand gloves when handling food. However, the World Health Organization (WHO) has, affirmed that as a practice the use of apron and hair restraints by food vendors has more to do with food aesthetics and stimulating consumer assurance than food safety, this declaration by the WHO is seen to be in contrast to a study conducted in hotel by (Annor & Baiden, 2011),who discovered that the microbial

count from a hotel that does not ensure that food vendors wear protective clothes was more than hotels that ensured that their food handlers wore them.

According to a study conducted in Accra, It was found out that vendors washed their utensils in a container of water with soap and the water was rarely ever changed, under such conditions food borne organisms could be transmitted and cause cross contamination thus people who ate from such places had high risk of contracting food borne diseases. Also most of the food vendors (76%) said they washed their utensils in a bowl of water also but almost half of them (44.7%) said they changed the water every 30 minutes.

Many studies done have shown that street food vendors have sufficient information regarding hygiene and food safety principles and they are aware of the need to ensure safe practices in preparing foods for public consumption. The practices examined in these studies also indicate that street food vendors can provide food of good quality if emphasis is placed on hygienic practices and regulatory compliance.

CHAPTER SIX

CONCLUSION AND RECOMMENATIONS

This chapter focuses on the general overview of the research as well as conclusions and recommendations for future research in this area. The main purpose of the study was to find out the hygienic practices of food vendors in the University of Ghana. This main objective was to assess adherence to hygienic practices and sanitary conditions of food vendors in the University of Ghana.

6.1 Conclusion

Generally street food vendors displayed adherence to hygienic and sanitary practices. Even thou more than half of the food vendors on campus had been licensed most of them did not know why it was important to have a license or were not aware that passing the health screening and acquiring a certificate meant they were licensed to sell. Most vendors that used protective clothes such as aprons and hair cap washed or changed it on daily basis however very few food vendors were found to use hand gloves when handling food. A large number of food vendors were found to wash their dishes in bowls of water as compared to under running water even though most of these vendors testified to changing the water frequently. Also instead of vendors to empty their bin whenever it was full most of them waited to the close of day before emptying it.

6.2 Recommendations

- Food vendors should be properly educated on the acquisition of a license in order to understand it importance.
- University authorities should provide permanent structures for food vendors which include adequate amounts of sinks which can enable food vendors to wash their utensils under running water to ensure better hygienic state of the utensils.

- Food vendors should be educated on the essence of emptying their bins whenever they are full, in order to reduce the amount of flies and rodent that can be generated by these refuse.
- Health inspectors or sanitary officers should work out modalities to ensure that persons with any foodborne infection are restricted and treated.
- Periodic inspection of food premises by sanitary officers should be continued, to ensure compliance with minimum standards in terms of care of equipment and materials.
- Authorities should continue to work with long service vendors since most of the good hygienic practices were significantly associated with length of service.

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APPENDICES

Appendix 1: Consent Form

Title of Research: Hygienic practices among food vendors in the University of Ghana

Principal Investigator: Irene Essumanbah Addison

Address: P. O. Box LG 13, School of Public Health, College of Health Sciences, University of Ghana, Legon

Email: irene.addison1989@gmail.com

Mobile: 0245976804

Introduction:

This study aims at determining the hygienic practices of food vendors in the University of Ghana which was undertaken by Irene Esssumanbah Addison, a Master of Public Health student at the School of Public Health, University of Ghana. The study seeks to assess the processes involved in health screening and licensing of food vendors, determine the protective clothes used by vendors, to assess the personal and environmental hygiene practices amongst food vendors and to determine the hand washing practices of food vendors in the University of Ghana.

The study aims at providing policy makers in the University with interventions that can help improve hygienic practices amongst food vendors in the University of Ghana. This consent form contains all the information you will need to know about the study to be undertaken before you decide to consent to take part in the above mentioned study.

Confidentiality and Anonymity

You are been invited to participate in this study and your participation is voluntary. You will be given the opportunity to ask questions before you decide to take part in the study. If you agree to take part in the study, you will be asked to provide personal information

and other related information hygienic practices. All the information you provide will be kept confidential and the data will be locked in a cabinet. The information will be accessible only to the researcher and the research team. Your name and identity will not be needed for the study. The information you provide will only be identified by a code number and will be treated strictly confidential. Your name shall not appear or be mentioned in any part of the report that will come out of this study.

Benefits and harm

Your involvement in this study will only be through an interview and you will not be exposed to any form risks if you consent to take part. Your participation in the study or your decision to withdraw from the study, will not affect you in any way whatsoever. You will not be given any monetary or any kind of reward. All the information you will give to the researcher will be used for this study.

For further questions and clarification about the study, you contact the principal investigator on irene.addison1989@gmail.com.com or 0245976804 administrator of the Ghana Health Service Ethical Review Committee, Mrs. Hannah

Frimpong on 0243235225 or 0507041223.

Participant consent

As a respondent, I have read the forgoing information and the purpose of the study explained to me. I had the chance to ask questions about the study and all questions have been answered to my understanding. I have been informed and have understood that my participation is entirely voluntary and that I can withdraw my consent at any time if I wish so.

I consent voluntarily to participate in this study as a respondent.

Respondent signature:……..

Date:……

Statement by the Researcher

The researcher has clearly read out the information sheet to the participant and has answered any question about the study to the satisfaction of the respondent. The researcher confirms that the respondent was not in any way forced into giving consent and that the consent has been given freely and voluntarily

Signature of Researcher:……..

Date:……

SCHOOL OF PUBLIC HEALTH

UNIVERSITY OF GHANA, LEGON

RESEARCH WORK: HYGIENIC PRACTICE AMONGST FOOD VENDORS IN THE UNIVERSITY OF GHANA

QUESTIONNAIRE FOR FOOD VENDORS

Date: …… Unique ID No.: ……..

Dear respondents,

This research seeks to study the hygienic practice of food vendors in the University of Ghana. Please indicate your responses by ticking against your preferred choice(s) or fill in the boxes where required. It is of utmost importance that you give clear and concise responses that would facilitate smooth data analysis. All information provided will be treated as confidential.

SECTION A: DEMOGRAPHIC INFORMATION

Please tick the appropriate responses.

Characteristics	
1) Age	Below 18 **[ ]** 18-30 [ ] 31-45 [ ] 46-60 [ ] Above 60 [ ]
2) Gender	Male [ ] Female [ ]
3) Highest educational level	None [ ] Basic (Primary/ JHS)[ ] Secondary (SHS/Vocational/Technical) [ ] Tertiary (/Polytechnic) [ ]
4) Ethnicity	Akan [ ] Ewe [ ] Ga [ ] Hausa[ ] Others [ ]
5) Religion	Catholic [ ] Islamic [ ]

	Other Christians [ ] Traditional[ ] Other [ ]
6) Marital Status	Single [ ] Married [ ] Divorced [ ] Widowed [ ]
7) How long have you worked at Legon?	Less than 1 year [ ] 6 to 10 years [ ] 1 to 5 years [ ] More than 10 years [ ]

SECTION B:

Health Screening and licensing.

Please answer by checking *yes* or *no* where necessary.

8) How did you get the license to sell food on this campus?	a. I applied [ ] c. I looked for it[ ] b. I was called [ ] d. Others[ ]
9) How often do food vendors undergo health screening?	Monthly [ ] Every 6 months [ ] Every 3 months[ ] Yearly [ ] 2 to 5 year [ ] More than 5 years [ ]
10) Do you think it is important to undergo heath screening?	Yes[ ] No[ ]
11) What are the reasons (tick where applicable.	No idea [ ] To prevent transmission of disease [ ] To ensure the vendor is well [ ] To prevent and protect the customer [ ] To prevent contamination of food [ ] Others [ ]
12) What are the processes involved in health screening?	No idea [ ] Eye Test [ ] Blood Test [ ] Nail Inspection [ ] Stool Test [ ] Urine Test [ ] Other [ ]
13) Do you know any health condition that is being screened for?	Yes[ ] No[ ]
14) If yes, which health condition is it?	Typhoid [ ] Hepatitis[ ] Tuberculosis [ ] Others(specify) [ ]
15) Do you know if food vendors are supposed to be licensed?	Yes [ ] No[ ]
16) If yes, which is it? Tick where applicable.	No idea [ ]

	Legal matters [ ] Ensure work efficiency [ ] Health Reasons [ ] Others [ ]
17) What are the processes involved in getting a license?	No idea [ ] Assessment of food [ ] Health Screening [ ] Inspection by official's [ ] Others [ ]
18) Do you think it is important for a vendor to be licensed?	Yes[ ] No[ ]
19) If yes, which is it? (tick where appropriate)	No idea [ ] Preserve food hygiene[ ] Health reasons[ ] Others [ ] Legal matters [ ]

SECTION C: Use of Protective Cloths at work

The following statement describes the use of protective clothes among food vendors. Please indicate your agreement (YES) or disagreement (NO) with each and explain further where applicable.

20) Do you know what protective clothes are?	Yes[ ] No[ ]
21) Which protective clothes do you use when handling food?	Gloves [ ] Apron[ ] Hair caps [ ] None [ ] Other(Specify) ……..
22) If you wear gloves how often is it changed?	After each use[ ] Every 6 hours[ ] Every hour [ ] Daily Basis [ ]
23) If you wear hair caps how often do is it washed or changed?	Daily [ ] Monthly[ ] Weekly [ ] Other(Specify) [ ]
24) If you use an apron how often do you wash it?	Daily [ ] Monthly[ ] Weekly [ ] Other(Specify) [ ]
25) Why do you think it is important to use these gear(s)?	To prevent contamination of food [ ] To protect self from food spillage [ ] Because it is a requirement [ ] None of the above [ ] Other(Specify) [ ]

SECTION C- PERSONAL AND ENVIRONMENTAL HYGIENE

The questions below refer to measures for personal and environmental hygienic practices among food vendors. Please answer the following questions, by checking *always* or *occasionally* according to your use and explain further where applicable.

Personal Hygiene	
26) Do you wash your hands before touching food? 27) If yes, why do you wash your hands before touching food.	Yes[ ] No[ ] To remove dirt [ ] To look clean[ ] To get rid of germs[ ] Others [ ]
28) If no, explain why you do not wash your hands before touching food.	…… …… …… ……
29) Do you use soap for hand washing?	Yes[ ] No[ ]
30) Can hand washing before handling food reduce the risk of contamination?	Yes[ ] No[ ]
31) Do you trim your nails and ensure that they are clean?	Yes[ ] No[ ]
32) How often do you wash your hair?	Once a week [ ] Twice a week [ ] Once in a month [ ] Occasionally (Indicate time period) ……
33) Do you have an open wound?	Yes [ ] No[ ]
Environmental Hygiene 34) How do you wash your utensils?	In a bowl of water[ ] Under running water[ ]

35) Who does the washing of the bowls?	Self [ ] Employee [ ] Other (Specify) …….. Less than 30 minutes[ ] Daily[ ]
36) If you wash it in a bowl of water how often is it changed?	Every hour [ ] Every 6 hours [ ]
37) Does the frequency of changing the bowl of water affect the hygienic state of the utensils that are washed in it?	Yes[ ] No[ ]
38) What is your source of water supply?	Tap [ ] Borehole [ ] Unprotected well [ ] Protected well [ ]
39) How do you store water at the sales point?	In a tank (Uncovered) [ ] In a tank (Covered) [ ] Other (Specify) ……
40) Where do you dispose off your refuse?	In a bin nearby [ ] In a bin far away [ ] Other (Specify)……..
41) How often is the refuse bin emptied?	Whenever it is full [ ] By the close of day [ ] Every other day [ ] Other (Specify) ……
42) Do you cover your refuse	Yes [ ] No[ ]
43) Do you carry out daily cleaning on the premises?	Yes [ ] No[ ]

Thank you.

INTERVIEW GUIDE FOR ENVIRONMENTAL SANITATION OFFICERS AT THE UNIVERSITY OF GHANA.

I am ……. From the School of Public Health, University of Ghana. I am conducting a research as part of my academic work in trying to assess hygienic practices among food vendors. I am selecting environmental sanitation officers the University campus and you happen to be one of my respondents who will help me answer some questions on the issue. Confidentiality of this conversation is assured. But before I start I need to seek your permission and time to go ahead. Do you agree to be part of the study?

Yes, I agree/ No, I disagree

1) What are the processes involved in licensing a food vendor?

2) What are the processes involved in the health screening of food vendors?

3) What measures are put in place for budget allocation of things that would improve hygienic practice of food vendors?

4) Do you provide in-service training for the food vendors? Yes { } No { }

5) If yes how often is the training done?

6) Is there a monitoring or assessment tool to assess if food vendors are working under hygienic conditions?

7) What additional measures do you take to enforce good hygienic practices among food vendors?

8) What penalty measures are in place for vendors who do not practice good hygiene?

9) What suggestions can you give to improve hygienic practice among food vendors?

Themes and Categories

Themes	**Categories**
Licensing	• Organizational view • Pick a form, fill form, add passport pictures then go to the hospital • Screening at a recognized government (UHL) • Presenting of results to medical officer and declaration of fitness • Issuing of license
Screening	• Same process as licensing • Medical examination at U.G • Yearly renewal of license • Failure to follow guidelines • Monetary Challenges
Budget Allocation	• Rest on PDMSD • Non- existence of budget from environmental officers
Training	• Periodical Inspection • Education(individually) • Organize talk(individual) • General briefing
Assessment	• Non-existence of mechanical device • Observation • Physical examination • Visual inspection • Vivid inspection
Penalty	• Education • Advice • Verification of Advice • Disciplinary Actions • Security
Suggestions	• Adhering to hygienic practices • Well designated places