

**UNIVERSITY OF EDUCATION, WINNEBA**  
**COLLEGE OF TECHNOLOGY EDUCATION, KUMASI**

**COMPARATIVE STUDY OF THE HYGIENIC KNOWLEDGE AND  
PRACTICES BETWEEN URBAN AND RURAL FOOD VENDORS AT LORRY  
PARKS IN THE VOLTA REGION**



**2016**

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**A Dissertation in the Department of HOSPITALITY AND TOURISM EDUCATION,  
Faculty of VOCATIONAL EDUCATION, submitted to the School of Graduate Studies,  
University of Education, Winneba, and in partial fulfillment of requirement for the award  
of the Master of Technology (Catering and Hospitality) degree.**

**2016**

## DECLARATION

### STUDENTS DECLARATION

I, MAKAFUI SEGBEDZI, declare that this Dissertation, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

SIGNATURE.....

DATE.....

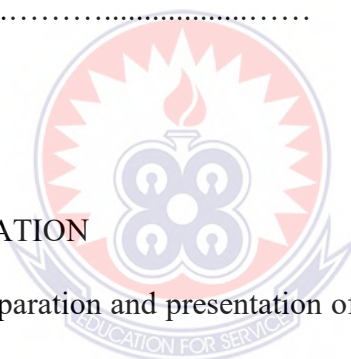
### SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this Dissertation was supervised in accordance with the guidelines for supervision of dissertation as laid down by the University of Education, Winneba.

NAME OF SUPERVISOR: GILBERT OWIAH SAMPSON (PhD.)

SIGNATURE:.....

DATE:.....



## ACKNOWLEDGEMENT

I Thank God for the grace and mercy that has brought me this far, in starting and successfully completing this Master's programme. I will forever be grateful to him. I am most grateful and appreciative of the invaluable guidance, comments and suggestions of my supervisor; Dr. Gilbert Owiah Sampson which made the study a success. May the Almighty God bless him and give him good health and long life. My profound appreciation also goes to Mr. and Mrs. Acolatse and family for their support and encouragement throughout my study.

I am equally grateful to Mr. Raphel Dovlo, and Emmanuel Akakpo for assisting in administering the questionnaire. And to all the food vendors at Ho and Sogakope in the Volta Region who provided the needed data for this research work.



## **DEDICATION**

I dedicate this work to my mother; Mrs. Nora K. Segbedzi, and my children; Esinam and

Esime Foli



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## ABSTRACT

The risk of food getting contaminated depends largely on the health status of the food handlers, their personal hygiene, knowledge and practice of food hygiene. To this effect the aim of the study was to evaluate the hygienic knowledge and practices between urban and rural food vendors at lorry parks. The objectives of the study is to evaluate the hygienic knowledge level of food vendors at the lorry parks, assess the level of hygienic practices among food vendors at the lorry parks and determine the ways of improving the hygienic knowledge and practices of food vendors at the lorry parks. A descriptive cross-sectional study was used to evaluate the hygienic knowledge and practices between urban and rural food vendors at lorry parks. Two hundred and sixty (260) food vendors were randomly selected for the study, comprising one hundred and thirty (130) food vendors at Ho market (Urban) and one hundred and thirty (130) food vendors at Sogakope (Rural) lorry parks in the Volta Region. A self-designed structured questionnaire was used to collect data from 260 food vendors. Data collected through various methods were inputted, processed and analysed by using IBM SPSS-20.0 Statistics. The study found that majority of urban (72.0%) food vendors have knowledge on how to store leftover food to avoid food poisoning as compared to the rural (32.6%) food vendors. The study affirmed that 15.2% of the urban and 4.1% of the rural food vendors ensure proper food hygienic practices by washing utensil in hot water. Based on this it was concluded the urban food vendors demonstrated good knowledge on hygienic than rural food vendors, but low in hygienic practices. It was recommended that safety and hygienic inspectors at Ho municipality should advice the vendors on using hot water for utensils and hand-washing. Regular inspections should be carried out in order to improve the knowledge level and hygienic practices of the food vendors and funding on Environmental Health activities.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the Study

Street Food has been an essential aspect of urban and rural living for years, especially in developing countries (Abdussalam & Kaferstein, 1993). All kinds of food are sold by food vendors, presenting the options for variety and choice for customers. Foods sold by these food vendors have significant nutritional implications (nutritionally balanced diets, sufficient in quantity and quality) (FAO, 1997). It is estimated that 2.5 billion people world-wide consume street food on a daily basis, mainly as a result of its low cost and ease of access (Fellows & Hilmi, 2012). In addition to its importance as a source of food and nutrients, street food also serves as an important source of employment for residents (Meagher, 1995). Particularly for women in the developing world, street-vended foods also serve as a major source of livelihood providing a means of self-employment and the opportunity to develop business skills with low capital investment (Lues et al., 2006). Street foods are ready-to-eat foods prepared and/or sold by vendors and hawkers, especially in streets and other similar public places (Codex, 1999). These foods provide a source of inexpensive, convenient and often nutritious food for both the urban and rural poor as well as attractive and varied food for tourists (Afele, 2006).

Notwithstanding, the numerous benefits provided to people, street-vended foods can also be a source of foodborne illnesses resulting from poor hygiene knowledge and practices by vendors, insanitary conditions at food vending points, among others (Ashenafi, 1995; Bryan et al., 1992). According to Chapman et al. (2010), about 70% of disease outbreaks have been linked to street-vended foods while evidence provided by

Mensah *et al.* (2002), point to the fact that, street foods are potential sources of enteropathogens. Estimates by the World Health Organisation (2008) suggest that, food-borne illnesses account for about 2.2 million deaths annually, out of which about 86% are children. In Ghana, about 65,000 people die annually from food-borne diseases resulting in the loss of some US\$ 69 million to the economy (Ministry of Food and Agriculture/World Bank, 2006). More often than not, street food vendors are always at the end of accusing fingers for the spread of food-borne diseases, particularly cholera outbreaks, across the country and are sometimes banned momentarily as a desperate measure to control the outbreak (Ansah, 2014).

It has been further stipulated that food vending raises concerns with respect to their potential for serious food poisoning epidemic due to improper use of food additives, the presence of adulterants and environmental contaminants as well as improper food handling practices among food vendors. Studies have shown that most food vendors are often untrained in food hygiene and sanitation and work under crude unsanitary conditions (FAO, 1996).

A community deserves the full benefits of street-vended foods, government intervention to ensure quality standard of safety for such foods. The world is becoming rapidly more urban and the population of the developing countries is projected to double from 1.7 to 3.4 billion in 2020 (FAO, 2007). Deprivation in urban areas including poverty, food insecurity and malnutrition is increasing faster and urban growth now presents a serious challenge in developing countries (Maxwell *et al.*, 2000). Sale and consumption of street food are on the increase and this will continue to grow (WHO, 2006). In developing countries especially Ghana, there is a noticeable increase in the number of street food vendors as a result of dwindling economy and unemployment.

Street foods have been an important area of research in Ghana over the years, with the sector attracting the research interest of academics, research bodies, government agencies, and other international and Non-Governmental Organisations (NGOs) (Johnson and Yawson, 2000; King, Awumbila, Canacoo, and Ofosu-Amaah, 2000; Ntiforo, 2000; Mensah *et al.*, 2002; Afele, 2006; Rheinlander, Olsen, Bakang, Takyi, Konradsen, and Samuelsen, 2008). However, the available research has focused largely on the safety and hygiene of street vended foods. For instance, Mensah *et al.* (2002) assessed the microbial and lead content of street foods, while Rheinlander *et al.* (2008) investigated the social perceptions of safety of street vended foods. Other studies have focused on food handling practices and their implications for food-borne diseases (King *et al.*, 2000), called for an improved hygiene for street food vendors (Afele, 2006), and discussed ways of improving the safety and quality of street food with an aim of promoting the safety of street food for the urban poor (Johnson & Yawson, 2000).

## **1.2 Statement of the Problem**

The issue of food hygiene covers a broad area including the selection and handling of raw foodstuffs, personal hygiene of food vendors and sanitation of place of cooking, waste management and treatment of leftovers as well as prevention of contamination. Food vendors at Lorry parks in Ho market and Sogakope in the Volta Region had a predominantly poor level of food hygiene knowledge. Food vendors are often poor and uneducated and lack appreciation for safe food handling.

Moreover, food vendors prepared food in unhygienic conditions, do not use aprons, handled food with bare hands, handled money while serving food and wore no hair coverings. The practice of stirring and reheating left over food by food handlers, having a lot of effects on a substantial number of people who patronize their services.

Unhygienic conditions under which food vendors at the various lorry parks at Ho market and Sogakope in the Volta Region most often leads to the spread of faeco-oral diseases like Typhoid fever, Cholera among others and the amount that the government and individuals spend on the treatment of these diseases.

Available research in Ghana, most of which was conducted in Ho does not provide in-depth information on hygienic knowledge and practices among food vendors. This is the reasons this study sought to evaluate the hygienic knowledge and practices between urban and rural food vendors at lorry parks.

### **1.3 Objectives of the Study**

The main objective of the study was to evaluate the hygienic knowledge, practices between urban and rural food vendors at lorry parks.

The specific objectives of the study were:

1. Evaluate the hygienic knowledge level of food vendors at the lorry parks
2. Assess the level of hygienic practices among food vendors at the lorry parks
3. Determine the ways of improving the hygienic knowledge and practices of food vendors at the lorry parks.

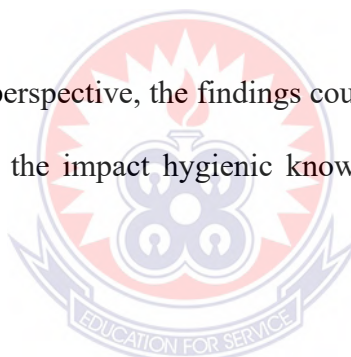
### **1.4 Research Questions**

The study was guided by the following research questions:

1. What are the hygienic knowledge level of food vendors at the lorry parks
2. What are the hygienic practices among food vendors at the lorry parks
3. What are the ways of improving the hygienic knowledge and practices of food vendors at the lorry parks

### **1.5 Significance of the Study**

- Findings from this study will provide insights into a fairly new but evolving research area in hygienic knowledge and practices among urban and rural food vendors.
- The study will contribute to knowledge especially in the dimension of Community Health and help streamline food vendors activities in the Ho market and Sogakope in the Volta Region.
- Moreover, the findings of the study will influence policy decision regarding the regulation of food vending in the Ho market and Sogakope in the Volta Region. Also, it will help improve upon the quality of food sold by street vendors in the Volta Region.
- From the academic perspective, the findings could be used to further research and to better understand the impact hygienic knowledge and practices among food vendors.



### **1.7 Scope of the Study**

This study is limited to rural and urban food vendors at Ho Market and Sogakope in the Volta Region, Ghana. The study therefore evaluates the hygienic knowledge and practices and ways of improving the hygienic knowledge and practices of food vendors at the lorry parks. However, there is no reason to believe that the food vendors would differ from those working in other lorry parks or hygienic knowledge and practices of vendors in these operations are unique from those in other lorry parks in Ghana.

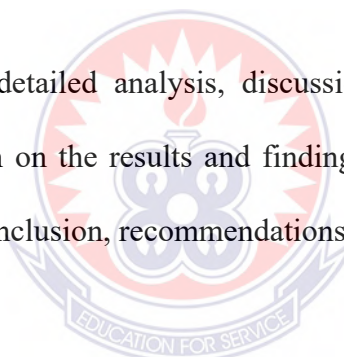


## **1.8 Organisation of the Study**

The study was organised in five chapters. Chapter one deals with the introduction. It gives the background to the study, statement of the problem, the purpose and objectives of the study and research questions. It also examined the scope of the study and the significance of the study.

Chapter two also reviewed the related literature on the concept of food hygienic practice, food hygiene knowledge and practices and ways of improving hygienic knowledge and practices of food vendors. Chapter three discusses the methodology of the study. This is divided into research design, study area, population, sample size and sampling techniques, data collection instrument, data collection procedure and data analysis.

Chapter four is a detailed analysis, discussion and presentation of the data collected and the discussion on the results and findings. Finally, chapter five presents the summary of findings, conclusion, recommendations and areas for further research.



## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter discusses the literature reviewed for this study. This literature has been reviewed from the journals, books, dissertation both published and unpublished. The review is organized into; concept of food hygienic practice, food hygiene knowledge and practices and ways of improving hygienic knowledge and practices of food vendors.

#### 2.2 Concept of Food Hygienic Practice

Food hygiene is the science and practice of preserving health and is one of the most important subjects for all persons working in the hospitality industry (Foskett *et al.*, 2003). Food hygiene refers to the measures food handlers use to ensure the safety of food during preparation, storage, cooling and service. Lack of adequate food hygiene can lead to food poisoning and death of the consumer. The five key principles of food hygiene, according to World Health Organisation (WHO) are prevention of contaminating food with pathogens spreading from people, pets, and pests, separation of raw and cooked foods to prevent contamination, cooking foods for the appropriate length of time and at the appropriate temperature to kill pathogens, storage of food at the proper temperature and the use of safe water and cooked materials. To ensure food hygiene means food handlers must pay attention to personal hygiene, food preparation and storage as well as the service of food (Wikipedia, 2014).

For decades and through various evolutions man has always made efforts to avoid diseases and find ways to cure existing ones in order to improve and prolong life. Various diseases have led to the loss of human life irrespective of age. Diseases especially those caused by daily intakes and activities, such as food and hygiene,

continue to be a threat to human health and life. It is obvious and globally acclaimed that unhygienic food and other forms of contamination of our daily consumables have led to the death of millions of people throughout the world, especially in Africa where lack of education, poverty, poor public health policies, lack of qualified personnel, poor financing health system among other reasons have left Africa and for that matter Ghana at the mercy of every outbreak from unhygienic food (Dun-Dery, 2012).

Globally, it is accepted and noticed that contaminated food and water causes serious health hazards to human and even animal life. It is therefore not surprising that diseases such as Cholera, Diarrhea, Typhoid and Hepatitis A exist and are of great concern to public health professionals especially in West Africa where access to quality education on hygiene is merely a dream, especially for food vendors. Unclean, insufficiently or inadequately cleaned cooking equipment have been identified as a source of bacterial contamination in processed food. Containers, pumps or tanks used for holding or transporting unprocessed raw materials, have occasionally been used for processed products without any cleaning and disinfection. It is therefore necessary that equipment in the processing establishment, coming in contact with food, be constructed in such a way as to ensure adequate cleaning, disinfection and proper maintenance to avoid the contamination.

Transfer of microorganisms by food handlers particularly from hands, is of vital importance. During handling and preparation, bacteria are transferred from contaminated hands of food workers to food and subsequently to other surface (Samakupa, 2003). Low infectious doses of organisms such as *Shigella* and pathogenic *Escherichia coli* have been linked to hands as a source of contamination (Snyder, 1998). Poor hygiene, particularly deficient or absence of hand washing has been identified as the causative mode of transmission.

Food vendors undoubtedly are one of, if not the main source of contaminated food. In Ghana it is not uncommon to notice that most health centers are filled with patients of various ages suffering from different food related diseases (Agyei-Takyi, 2012). Contaminated or unhygienic food can lead to various complications and diseases. From the food vendors' perspective, the variety, quality, preparation of foods and services are meant to just satisfy the needs of the consumer and not to waste resources and run at a loss. Street food vendors are known to contribute a significant amount of money to the economy. Dr. Paa-Nii Johnson, Head of Processing and Engineering Unit of the Food Research Institute, told the Ghana News Agency that the socio- economic survey of 334 vendors and a mini census indicated that street-vended foods made an important contribution to the economy of Accra. The street foods sector employs more than 60,000 people with an estimated annual turnover of about 100 million dollars and a profit of 24 million dollars (Agyei-Takyi, 2012).

A study conducted by Rheinlander (2012), found that although vendors and consumers demonstrated basic knowledge of food safety, the study did not emphasize on basic hygiene practices such as hand washing, cleaning of utensils, washing of raw vegetables, and quality of ingredients. Instead, four main food selection criteria could be identified and were related to (1) aesthetic appearance of food and food stand, (2) appearance of the food vendor, (3) interpersonal trust in the vendor, and (4) consumers often chose to prioritize price and accessibility of food-not putting much stress on food hygiene. Hence, consumers relied on risk avoidance strategies by assessing neatness, appearance, and trustworthiness of food vendor (Rheinländer, 2012).

In 1984, a joint FAO/WHO Expert Committee on Food Safety, in its report on the role of food safety in health and development, noted that: "It is not easy to maintain control over food handlers. There is often a rapid turnover and it may be difficult to keep

track of them. Medical examinations are costly and do not guarantee the detection of more than a small proportion of carriers of pathogenic organisms. Also infections may occur after the examinations. Screening for pathogens in stool specimens from food-handlers is not cost-beneficial and is not recommended, and the identification of a carrier is not likely to make a significant contribution to the control of food borne diseases. A much more effective preventive measure, the education of food-handlers in hygienic practices, is most often neglected." These views were reinforced in 1987 by the second meeting of the WHO Regional Working Group on Food Safety, held in Kuala Lumpur, Malaysia, which questioned the relevance of the routine medical examination of such personnel. Despite the conclusions of these meetings, the debate has continued among health professionals and public health authorities on the relative merits, costs and benefits of the health surveillance of food-handling personnel, and there is no uniformity in the procedures adopted by countries in undertaking such surveillance.

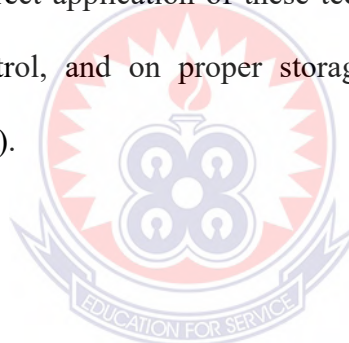
### **2.2.1 The potential of food-handling personnel to transmit diseases via food**

The term food-handling personnel, in its broadest sense, include all those who may come into contact with part or all of an edible end-product at any stage from its source, from the farm to the consumer. This concept is embodied in the definition contained in the report on the WHO Working Group on Health Examinations of Food Handling Personnel: "... a person in the food trade or someone professionally associated with it such as an inspector who, in his routine work, comes into direct contact with the food itself in the course of its production, processing, packaging or distribution, including producers of raw milk for direct consumption." This definition recognizes that responsibility for the application and control of food-handling techniques extends from management to the consumer. Not all, however, actually come into contact with food;

equally, those who do have such contact are not necessarily in a position to transfer pathogenic organisms from themselves to food in such a way that illness might result. A distinction between those whose work could allow such transfer to occur and those for whom such a risk does not exist is in order. Those who present a risk of transmitting pathogenic organisms in this way can be defined as persons whose work involves touching unwrapped foods to be consumed raw or without further cooking or other forms of treatment. This category will include people involved in such activities as the preparation of salads, sandwiches, and cooked foods to be served cold, and the handling of cooked meats and meat products and of certain dairy products, including fresh cream and egg-based foods. In the wider context, workers in water-treatment plants should also be included. Street vendors, common in both developing and industrialized countries, also fall into this group, and may present special problems related to their way of life and difficulties in determining whether they have complied with control measures (Rheinländer, 2012). The nature of the work that they are to carry out must be taken into account in the assessment of, and training provided to, food handlers. The food that is contaminated is not treated in such a way as to destroy the organisms before they reach the consumer. Either the number of organisms on the food constitutes an infective dose or the nature of the food or its conditions of storage are such as to allow the organisms to multiply and produce an infective dose or to produce toxins in quantities sufficient to cause illness (WHO, 1989).

The ability of food-handling personnel to transmit disease is related to the degree of contact that they are likely to have with particular sorts of food. The risks they pose clearly vary widely, which raises the question whether all such personnel should be treated in the same way (Samakupa, 2003). According to Nigusse and Kumie (2012), outbreaks of food borne disease throughout the world show that, in nearly all instances,

they are caused by failure to observe satisfactory standards in the preparation, processing, cooking, storing or retailing of food. Organisms may be introduced into the food chain from a variety of sources, and at different stages. Gastrointestinal pathogens may be derived from animal sources, the environment or, occasionally, from humans (WHO, 1989). Many raw foods, particularly of animal origin, are heavily contaminated with organisms of various kinds and attempts to reduce microbial loads at various stages of production have generally been unsuccessful (WHO, 1989). The elimination of pathogenic organisms therefore depends largely on the correct application of processing technologies, such as pasteurization, irradiation, cooking, freezing and pickling at the industrial, retail and domestic levels. Thus the prevention of outbreaks of foodborne disease depends on the correct application of these technologies, especially in terms of time and temperature control, and on proper storage and the prevention of cross-contamination (WHO, 1989).



### **2.2.2 Personal hygiene**

Research carried out from 1998-2000 showed that in 100 reported food poisoning outbreaks, the vast majority were attributed to inadequately trained staff (Food Safety Authority of Ireland [FSAI], 2001). This represented an improvement on the situation found by Tebbutt (1992) eight years earlier when 22 per cent of food businesses had failed to train operatives in hygiene. Poor personal hygiene causes more than 90% of the food safety problems. Statistics showed that improper hand washing alone accounts for more than 25% of all food borne illnesses (Weinstein, 1991). Proper hand washing includes using water at least 100°F, applying enough soap to build a good lather, vigorously scrubbing hands together for a minimum of 20 seconds assuring that you scrub under your nails and between fingers, rinsing thoroughly under running water, and



drying with a single use paper towel or warm air dryer (Snyder, 1998). Hand washing should always be completed after using the restroom; touching raw foods; touching the hair, face or body; sneezing, coughing, or using a tissue; smoking, eating, or chewing gum or tobacco; handling chemicals; taking out or handling trash; bussing or cleaning a table; touching clothing or aprons; and touching anything else that may contaminate hands (National Restaurant Association Educational Foundation [NRAEF], 2004).

Manning and Snider (1993) found that some personal hygiene and handling practices of food handlers did not support their knowledge and attitudes about hygiene and cross contamination. Even though the food handlers indicated frequent and thorough hand washing to be important, only one person was observed washing their hands, including food handlers handling food and money. As Chatterjee (2005) highlighted that unsafe and inefficient practices followed by food vendors were due to unhygienic practices and lack of personnel hygiene knowledge. A study in the U.S. suggested that improper food handler practices contributed to approximately 97% of food borne illness in foodservice establishments and homes (Howes *et al.*, 1996). Education, training, and the development of food safety certification examinations are key components in the process of ensuring that food handlers are proficient in and knowledgeable about food safety and sanitation principles (Jacob, 1989).

As a consequence of humans also containing microorganisms naturally or from the surrounding environment it is important to maintain an appropriate personal hygiene.

Important hygienic aspects related to Personal Hygiene includes:

1. Food vendors practicing hand washing before handling food and often during food preparation.
2. Food vendors washing hands after going to the toilet (WHO, 2010).
3. Food vendors' drying hands after hand washing procedure.



4. Food vendors wearing clean protective clothing.
5. Food vendors wearing head covering.
6. Food vendors avoiding wearing of personal effects such as jewelry, watches, pins or other items in food handling areas.
7. Food vendors ensuring that cuts and wounds are covered by suitable waterproof dressings.
8. Food vendors avoiding personal behavior such as smoking, spitting,
9. chewing or eating, sneezing or coughing over unprotected food

Food vendors not handling food if you know or suspect to be suffering from or to be a carrier of a disease or illness likely to be transmitted through food (FAO Corporate Document Repository, 1999).

### **2.2.3 Environmental hygiene**

Primary food production should not be carried out in areas where the presence of potentially harmful substances would lead to an unacceptable level of such substances in food. Potential sources of contamination from the environment should also be considered by food vendors to safe food production. Dangerous microorganisms are widely found in soil, water, animal and people and these microorganisms are carried on hands, wiping cloths and utensils, cutting boards and the slightest contact of these microorganisms to food can cause food borne diseases (WHO, 2012). These following points are means of ensuring hygienic environment according to WHO (2010) and FAO (1999);

1. Protection of food and food ingredients from contamination by pests or by chemical, physical or microbiological contaminants or other objectionable substances during handling, storage and transport.

2. Waste must not be allowed to accumulate in food handling, food storage and other working areas and the adjoining environment. Waste stores must be kept appropriately clean.
3. Adequate drainage and waste disposal system and facilities should be provided. They should be designed and constructed so that the risk for contaminating food or the portable water supply is avoided (FAO, Corporate Document Repository, 1999).
4. Water use for cleaning should be from a safe source or made safe.
5. Wash and sanitize all surfaces and equipment used for food preparation (WHO, 2010).

The hands are the most important vehicle for transfer of organisms from faeces, nose, skin or other sites to food. Epidemiological studies of *Salmonella typhi*, non-typhi salmonellae, *Campylobacter* and *Escherichia coli* have demonstrated that these organisms can survive on fingertips and other surfaces for varying periods of time, and in some cases after hand-washing (WHO, 1989). *Staphylococci* may well not be removed from the hands by washing when they form part of the resident flora (WHO, 2002).

The serving utensils used at the vending site are often contaminated with *Micrococcus* spp. and *Staphylococcus aureus* spp. which may have originated from the vendors hands when they touched the food preparation areas, dishcloths, or the water during dish washing or hand washing which indicates cross contamination between dishwater, food preparation surfaces, and the food itself. It is reported that bacteria from dirty dish washing water and other sources adhere to the utensil surface and can constitute a risk during the food vending process (Rane, 2011).

#### 2.2.4 Cross contamination

The transfer of germs from one food items to another is called cross contamination. Approximately 10 to 20% of food-borne disease outbreaks are due to contamination by the food handler (Zain & Naing, 2002). The common cause of cross contamination in the kitchen is because of contaminated hands and equipments used to prepare cooked and raw food at the same time. Cross contamination can also occur when uncovered raw foods are stored directly adjacent to or above ready-to-eat foods in a refrigerator or other holding equipments. In a recent review (Djuretic *et al.*, 1995), cross-contamination was identified as an important contributory factor in 36.3% (147/405) outbreaks of food-borne disease. It is generally accepted that the hands of food handlers are an important vehicle of food cross-contamination and that improved personal hygiene and scrupulous hand washing would lead to the basic control of faces-to-hand-to-mouth spread of potentially pathogenic transient microorganisms (Allwood, *et al.*, 2004).

Food handlers often have little understanding of the risk of microbial or chemical contamination of food or how to avoid them (Hobbs and Roberts, 1993). A survey conducted by Williamson *et al.* (1992) revealed that unsafe use of kitchen utensils were common. Their result showed that 37% of the survey respondents would only rinse the knife and cutting board used to cut fresh meat prior to using the same items again to chop fresh vegetables for a salad. On the other hand, 5% of the respondents would simply start chopping the vegetables with the same knife and cutting board. They summarized that only 54% would wash the knife and cutting board with soap and water prior to chopping the fresh vegetables.

Simple measures such as washing and peeling the food may reduce the risk of contamination with microorganisms from raw food. Also, proper cooking kills almost all dangerous microorganism, thus, studies have shown that cooking food to a temperature

of 70°C can help ensure it is safe for consumption (WHO, 2006). Microorganisms can multiply very quickly if food is stored at room temperature. By holding at temperature below 5°C or above 60°C, the growth of microorganisms is slowed down or stopped but some dangerous microorganism will still grow below 5°C (WHO, 2010). Depending on the nature of the food operations undertaken, adequate facilities should be available for heating, cooling, cooking refrigerating and freezing food, for storing refrigerated or frozen foods, monitoring food temperatures, and when necessary, controlling ambient temperatures to ensure the safety and suitability of food (FAO, 1999). Important hygienic aspects related to Food Safety as stated in WHO, (2010):

1. Separating raw meat, poultry and seafood from other foods.
2. Using separate equipment and utensils such as knives and cutting board for handling raw foods.
3. Storing food in containers to avoid contact between raw and prepared foods.
4. Washing fruits and vegetables, especially if eaten raw.
5. Removing outer leaves of leafy vegetables.
6. Cooking food thoroughly; make sure that the temperature has reached 70°C
7. Reheating cooked food thoroughly
8. Avoid leaving cooked food at room temperatures for more than 2 hours.
9. Refrigerating promptly all cooked and perishable food (preferably below 5°C)

According to WHO, food handling personnel play an important role in ensuring food safety throughout the chain of food production, processing, storage and preparation. Mishandling and disregard of hygienic measures on the part of the food vendors may enable pathogens to come into contact with food and in some cases to survive and multiply in sufficient numbers to cause illness in the consumer. Some food handlers may introduce biological hazards by cross contamination after handling raw materials when

they suffer from specific diseases and physical hazards by careless food handling practices (Rane, 2011). Most of the vendors pack the food in polythene bags for their customers. When packing these foods, they blow air into the polythene bags to open them, in this process a number of pathogens can be passed on to the consumer.

A study in Santa Fe de Bogota, Colombia showed that over 30% of a group of food handlers examined were carriers of pathogenic microorganism including *Salmonella typhi*, *Staphylococcus aureus*, *Salmonella enteritidis*, and *Shigella* (Buchanan and Whiting, 1998). An important issue influencing food contamination and contributing to further increase in contamination is food storage temperature. The preparation of food long before its consumption, storage at ambient temperature, inadequate cooling and reheating, contaminated processed food, and undercooking are identified as the key factors that contribute to food poisoning outbreaks. Holding foods at high ambient temperatures for long periods of time have been reported to be a major contributor to the occurrence of food poisoning outbreaks (Rane, 2011). Foods are often held for several hours after cooking and this includes overnight holding at ambient temperatures, until sold, and thus can harbor high microbial populations. Besides, some of the foods are held in the pans in which they are cooked, until sold or reheated, which results in longer holding time, hence creating favorable conditions for the growth of food borne pathogens. In foods which are held under high ambient temperature, the counts of *Escherichia coli*, *Staphylococcus aureus*, *Bacillus cereus* and *Clostridium perfringens* are reported to be high (Rane, 2011).

### **2.2.5 Safe Temperature of Food**

As explained by McSwane *et al.* (2004), controlling temperature of food cook is vital in assuring that food service establishment complies with food safety regulations.

Food borne illness may be resulted from temperature abuse while preparing a dish. According to NRAEF (1999), time temperature abuse occurs when food has been allowed to stand for an extended period of time at temperatures favourable to bacterial growth. McSwane *et al.* (2004) further added that the abuse of temperature also may be caused by insufficient amount of cooking or reheating time and desired temperatures that should eliminate the existence of harmful microorganism. The usage of devices in measuring food temperature such as thermometers, thermocouples and infrared reading is essential in determining whether the food were in the danger zone or otherwise (McSwane *et al.*, 2004). Nott & Hall (1999) explained that the major purpose of cooking is to increase the palatability of food, the heating of many foods is essential to kill bacteria thereby increasing the foodstuff's safety and storage life. In practice, pasteurization and other sterilization processes require stringent assurance that all parts of the food product have been heated above a certain temperature for a defined period of time (Nott & Hall, 1999).

Several studies have reported that poor holding and cooking temperature control was a main factor contributing to food borne outbreaks (Todd, 1997). Improper holding temperature of food also can contribute to the growth of certain bacteria through its spores because not all of these spores will be destroyed with heating processes (McSwane *et al.*, 2004). Thus it is important for all food handlers to recognize their responsibilities in ensuring that all food prepared were monitored in every stages of its preparation.

#### **2.2.6 Food from Unsafe Sources**

In most countries of the South East Asian Region, laboratories with the capacity to detect common food borne hazards are rare, and where they do exist, the high cost of

testing is an obstacle (DeWaal & Robert, 2005). Walker and Jones (2002) explained that the traditional food safety control approaches have tended to focus on the general appearance, structure and cleanliness of food outlets. However, these methods have failed to successfully deal with the problem of food borne illness and have paid insufficient attention to the factors which actually cause illness (Walker & Jones, 2002). Miles *et al.* (2004) demonstrates the result where the participants were worried to some extent about all of the food safety issues with which they were presented, but there was a tendency for worry to be higher for those hazards related to the use of technology applied to food production (e.g. hormones, pesticides, antibiotics, genetic modification) in comparison to those hazards related to cost, diet, hygiene and other lifestyle issues (e.g. food poisoning, fat in the diet, food hygiene). Foods originating from an unapproved source or imported foods can influence the likelihood of an outbreak (Sato, 2007).

### **2.3 Food hygiene knowledge and practices**

Knowledge of the consequences of unsafe food hygiene practice can enhance adherence to food safety guidelines. The risk of food getting contaminated depends largely on the health status of the food handlers, their personal hygiene, knowledge and practice of food hygiene (Mead, 1999). Infections can also be acquired through contaminated unwashed fingers, insects, and circulation of bank notes and by wind during dry conditions (Isara, 2009). Food handlers i.e. any person who handles food, regardless whether he actually prepares or serves it, play an important role in the transmission and, ultimately, prevention of food borne disease (Isara, 2009). Information regarding food handlers' practices is key to addressing the trend of increasing food borne illnesses.



Generally, personal hygiene covers the aspect of hand hygiene, clean attire, personal health and personal habit or behavior. Food handlers with poor personal hygiene can be sources in spreading the food-borne diseases directly, or due to cross-contamination. These factors are influenced largely on the knowledge and practices of the food handlers (Mead *et al.*, 1999). Scientific research shows quite clearly that Icelandic seafood is wholesome and nutritious (IMF, 2001). Although seafood may be considered safe, wholesome and nutritious, microorganism may be present indicating the possible presence of pathogens whose presence in given numbers points to inadequate processing for safety (Mossel *et al.*, 1995). In general, indicator microorganisms are most often used to assess food sanitation (Jay, 1992). Thus, the presence of these organisms may not only indicate the hygienic condition under which the processing establishment operates but also the presence of potential microorganisms that may be harmful to the consumer. First, they are usually underestimates, because parasites are only detectable after signs of infection have developed. Incorrect practices among food handlers that led to cross contamination have also been emphasized, such as not using hair protection and long nails or wore nail polish, wore jewelry and skin infection (Campos *et al.*, 2009) and bad habits such as touching mouth with hands and wiping their hands on the face or clothes while working (Dag, 1996). Few studies suggested that lack of knowledge may result in poor hygiene practices among food handlers (Lambiri *et al.*, 1995; Cakiroglu and Ucar, 2008). Although the majority of consumers in studies conducted in the USA and Australia reported an awareness of some food-borne bacterial pathogens, such as Salmonella, they lacked awareness of other pathogens, such as Staphylococcus aureus, Listeria monocytogenes and Escherichia coli (Williamson *et al.*, 1992; Jay *et al.*, 1999a). Williamson *et al.*, (1992) also found in their study conducted in the USA that consumers under 35 years of age knew less about the causes of bacterial



food-borne disease than those over 35 years of age. Consumer awareness of the causes of bacterial food-borne disease had a positive effect on their self-reported adherence to food-borne disease prevention guidelines (Altekruse et al, 1996; Meer & Misner, 2000; Lin et al, 2004). Taylor et al. (2000) proved that the transfer of microorganisms to the hands was due to poor personal hygiene after visiting the toilet, while DeVita et al. (2007) found that contact surfaces that were more frequently contaminated were the hands as compared to food-contact surfaces. In studies conducted by the Canadian Food Inspection Agency (1998), Griffith and Redmond (2001) and Clayton et al (2003) a large number of merchants (47% to 85%) reported following bacterial food-borne disease prevention guidelines, such as washing their hands after handling raw food items. However, in other studies, conducted in Australia, the USA and the UK there were significant gaps in the self-reported adherence by consumers to some of the bacterial food-borne disease prevention guidelines (Jay et al, 1999a; Knabel, 1995). Only two published studies that investigated higher education students' awareness of bacterial food-borne disease (Unklesbayet al, 1998) and the adherence to guidelines that would prevent food-borne disease (Unklesbayet al, 1998; Sharp & Walker, 2003) could be obtained. The student respondent groups resided in the USA and the UK respectively. Studies in developing countries, such as South Africa and Ghana, show that street vendors do not always follow bacterial food-borne disease prevention guidelines. Despite this, the microbial levels of most of the street foods investigated in the studies conducted in Johannesburg, South Africa and Accra, Ghana, were within acceptable limits (Mosupye & Von Holy, 2000; Kubheka et al, 2001; Mensah et al, 2002). However, in a study conducted by the Department of Health in the Western Cape in 1995, food items obtained from street vendors in tourist areas carried high concentrations of Escherichia

Coli and Staphylococcus Aureus (Sidley, 1995). Studies on food hygiene have been done across the globe.

In Philippines, a survey on food safety knowledge and practice of street food vendors in a university campus in Quezon City was carried out by Azanza, Gatchalian, and Ortega (2000). Topics such as health and personal hygiene of vendors, food manufacturing procedures, food contamination and waste management as well as food legislations were assessed. The study found that among the 54 street food vendors surveyed, knowledge on food safety concepts was established particularly on topics that dealt with health and personal hygiene, food contamination and good manufacturing procedures; however, vendors were shown not to be knowledgeable in food legislation and waste management. A significant gap existed between knowledge and practice on these topics and this primarily attributed to the tendencies of street food vendors to compromise food safety for financial issue. The provision of continuous food hygiene education, some financial assistance through social service affiliation and basic water out waste management utilities were recommended to reduce the gap between knowledge and practices of safe vending on school campuses.

Burt *et al.* (2003), conducted study to assess the food handling practice of 10 processing mobile food vendors operating in Manhattan, New York City and found out that over half of all vendors (67%) contacted served food with bare hands. Also some vendors were observed vending with visibly dirty hands or gloves and no vendors once washed his or her hands or changed gloves in the 20 minutes observation period, more so, four (4) vendors were observed to contaminate served food with uncooked meat and poultry.

Chukuezi (2010) on the other hand, conducted a study on food safety and hygienic practices at street food vendors in Owerri, Ngira. Data collection was done with

help of structured interviews, semi structured questionnaires as well as through observations. A descriptive survey design was used. Results shows that 23.81% of the vendors prepared food in on hygienic conditions, 42.86% did not use aprons, 47.62% handled food with bare hands and 52.38% wore no hair coverings while 61-90% handled money while serving food. In all, 19.05% wore jewelry while serving foods and 28.57% blew air into polythene bag before use. Some (9.52%) of the vendors, stored food for serving openly in the stalls while 23.81% stored then in the wheel barrows. A good number (42.86%) of food vendors had left over's for serving the next day with poor storage facilities. In all, 47.62% of the vendors washed their utensils with dirty water which is recycled and used severally in 28.57% despite the fact that only 9.52% of them complained of water shortages. The researcher recommends that there is need for health education of those vendors in order to ensure food safety for the consumers.

Muinde (2005) had a study on hygiene and sanitary practices of vendors of street foods in Nairobi, Kenya. The accessible population was all street food vendors from Dandora and Kayole estates. Data collection was done by using in depth interview schedule and observational checklist. Data was analyzed using both descriptive and inferential statistics. Results show that 35% of vendors belong to 20-25 years, 60% were males while 40% were females. Slightly over half of vendors (57.5%) were married. In all, 62% of vendors had primary education and below, 36.3% had secondary education while only 1.3% had college education. Most vendors 61% vendors acquired cooking principles by observation, 33.3% were taught by parents while 6.3% gained by trial and error. Based on observation about 85% of vendors prepared their foods in unhygienic conditions given that garbage and dirty waste were consciously close to the stalls, about 92.5% did not have garbage receptacles, hence they dispose their waste just near the stalls. In all, 92% of vendors threw waste water just beside the stalls making the

environment surrounding the eaters quite filthy. Hence there is a significant P value  $> 0.5$  indicating that there was no relation between education and state of environment.

Benny-Oliviera (2007) conducted a study on "Hygienic practices by vendors of the street food-doubles and public perception of vending practices in Trinidad". A structured questionnaire was administered to 120 street vendors and 115 public members in Trinidad, West Indies. Most vendors are male (61.7%), had been vending for 5 years (81.7%) and received primary level of education (72.5%). Preparation of doubles was mainly by family (84.2%) in the morning of vending (81.7%). Vendors were appropriately dressed (99.2%), used forks/spoons (100%) and tongs (81.7%) for serving. At vending sites, containers with faucets supplied water (85.7%) and toilets were not close (97.5%). Most respondents (86.1%) consumed doubles. Some (30.6%) felt ill from eating doubles, but only 2.7% reported to a medical doctor/health authority. Significant associations were found for vending practices and sanitation of vending environment.

Furthermore, a study conducted in Latin America by Arambulo, Almeida, Gueller and Belotto (1994) on street food vending showed that there was a rapid rise of food vending. It was also found out that the generally unregulated and quasi- clandestine street food industry tended to observe poor hygiene practices which pose significant public health problems. Latin America rice cholera epidemics in this context have drawn increasing attention to street food potential for disease transmission and have created growing support for attempts to resolve these problems. To them this could be achieved through legal reorganization directed at structurally developing the street for food vending and permitting application of measures especially provision and use of safe food. Programmes that would provide appropriate training for inspectors as well as health education for both vendors and consumers of street food, the promotion and adaptation of improved methods for preparing and selling such food were advocated for.

This they said may not provide immediate panacea for the street food vending problem in Latin America but can immensely improve the situation that existed at the time. Some studies have been done globally on contamination of street food, to assess microbiological contamination of street food.

Begue *et al.* (1997) studied the dietary risk factors, associated with the transmission of *Helicobacter Pylori* in Lima, Peru, in trying to establish the facts influencing the risk of acquisition of *Helicobacter pylori* infection. They sampled one hundred and four children within the age range of 0-17 years requiring an endoscopy for the evaluation of gastrointestinal systems. These children had their demographic and dietary data collected and biopsy specimens of the gastric antrum stained for the identification of *Helicobacter pylori*. They discovered that 52 representing 50% infected subjects were significantly older than the uninfected ones with no difference in gender, crowding, source of drinking water, or exposure to domestic animals, increased consumption of fish, chicken, beef, beans, vegetables, rice cheese, milk and unboiled water. They concluded that their findings supported the role of food prepared under unhygienic conditions as a probable mechanism of transmission of *Helicobacter pylori* in developing countries.

Also a study carried out by Volland *et al.* (2004) to assess the risk factors for transmission of food borne illness in restaurants and street vendors in Jakarta, Indonesia sought to explain a previous study in Jakarta which showed that eating from restaurant was not associated with disease. To explain this 128 street food vendors with the food handlers from restaurant were engaged in a cross sectional study. Poor hand washing hygiene and direct hand contact with food, male sex and educational level were independent characteristics of street vendors in logistic regression analysis. Faecal contamination of drinking water in 65% of samples, dish water in 91% and ice cubes in

(100%) was frequent. Transmittable pathogens including *S. Typhi* and non-typhoid salmonella were isolated in faecal sample in 13 (7%) vendors. It was established that there is poor food hygiene among food vendors as compared to restaurant vendors. The study recommended that, health intervention to reduce the transmission of food borne illness should include hand washing with soap, adequate food-hygiene and frequent and renewal of dish water in street food truck.

Musa & Akande (2003) carried out a research on food hygiene practices of food vendors in Ilorin Secondary School in Nigeria. The study reveals that among 185 respondents, premedical practice was high 141 (76%) but periodic medical examination was low 30 (16%). More than 61 (33%) and 72 (39%) respondents prepared food in advance and reheated food before sale respectively. The major unhygienic practices observed among the food vendors were poor care of utensils, 100 (57%) use of previously used water for washing and cleaning, lack of covering apron among food vendors 128 (69%) and lack of hand washing basin for immediate cleaning, lack of soap and water to clean their utensils, while the rest 100 (57%) used unhygienic methods to clean their utensils. Some of the food contaminating risk factors including unclamped finger nails, skin lesions and poor protection from flies. According to the study, the need exist for food vendors and other handlers to be trained in basic principle of safe food handling.

Muinde and Kuria (2005) conducted a study in Kenya to determine the hygienic and sanitary practices of vendors in Nairobi using a descriptive survey design. A sample size of 80 street food vendors selling commonly consumed food was selected. Most of the food vendors neither underwent any form of formal training in food preparation nor did they attempt to seek it. Moreover, water for washing utensils and hygiene was compromised. Also stalls were poorly constructed. They would not give proper

protection of the street food from the dust and smoke from vehicles. Furthermore, vendors observed minimal personal hygiene. It was found out that 81.3% of the vendors did not use apron, 60% handled food with their hair uncovered. All the vendors handled money while serving food and only 10% of them wore jewelry of their hand. Also, utensils were washed using water in buckets which were rinsed only once and the water used repeatedly before it was replaced. The water for washing and rinsing the utensils was observed to be dirty. More so, proper methods of storing leftover food were not used, hence this could have promoted the sale of stale food. Out of the food vendors interviewed, 32.1% reported consuming them and rest saved for the following day's sale. Vendors stored leftover food in open places (21%) refrigerator (21%) and plastic containers (21%) while 16% kept them either in polythene bags or in cupboards for sale the next day. Findings also showed that vendors prepared the food either at home or at the stalls, which were located by the road side. These places were highly unhygienic as food vendors deposited their food and waste water beside stalls which rendered the environment dirty and attracted houseflies. Their presence compromised sanitation.

Similarly, Okojie *et al.* (2005) carried out a study to assess the knowledge and practice of food hygiene by food handlers in a Nigerian University. A descriptive, cross sectional study was carried out on randomly selected for handlers operating on the campus. A total of 102 respondents were interviewed and inspected using a structured questionnaire administered by researchers. The study showed that 90 (88.21%) of the respondents were females and these had a predominantly poor level of food hygiene knowledge. The practice of steering and reheating left over was a very low and was practiced by 15 (30.41%) of the respondents, which was a very low frequency of hand washing. Inspection of food handlers showed a low level of personal hygiene. Only 31



(30.41%) had pre-employment medical examination and 49 (48%) had received any form of health education.

Moreover, Barro *et al.* (2002) conducted a study on microbial quality assessment of some street food widely consumed in Ouagadougou, Burkina Faso. The first part of their research showed that 75% of food vendors were women. The vendors sat close to water drainage system and solid waste. Sometimes food was not as in areas infested by flies and other insect it was also found that water used to wash food materials was of poor quality. The second part of the study showed some foods which were not preheated such as milk product; fruit juice vegetable and fruit failed the microbial quality assessment.

In Ghana, Mensah *et al.* (2002) carried out a study entitled, Street food in Accra, Ghana how safe are they? The study investigated the microbial quality of food sold on street of Accra and factors predisposing food to contamination. They found out the 177 street vendors 79 (66.7%) were educated and these vendors exhibited good hygiene behavior. The surroundings of the vending sites were clean but some sites (3.4%) were classified as very dirty. The cooking of food well in advance of consumption, exposure of food to flies and preparing food on the ground were likely risk factors for contamination. Examinations made from 511 menu items classified as breakfast/snack food, main dishes, soups and cold dishes showed the presence of *Mesophilic bacteria* in 356 foods (69.7%), 28 contained *Enterobacteriaceae* (33.7%). The microbial quality of most of the food was within the acceptable limits but samples of salads, macaroni, fufu, rice balls and red pepper had unacceptable level of contaminating. To them, street foods can be a source of pathogens.

Tjoa *et al.* (1997) were quoted to have confirmed the role played by unwholesome meat in the causation of disease. They recommended that food vendors



should receive education on food hygiene and moreover special attention be given to the causes of diarrhea, transmission of diarrhea pathogens, the handling equipment's and cooked food, hand washing practices and environmental hygiene.

Also, Paa Nii (2005) in collaboration with some institutions in Ghana had the concerns that livelihood of vendors and health of consumers may be at risk if concerns over food safety are not addressed. A survey of 180 vendors in five different markets in Accra was conducted and the result showed that most vendors worked under poor sanitary conditions. They also found out from a micro biological survey (45 samples) that some streets foods were intrinsically safer than others. It was found out that kenkey and waakye were safe products while fufu was contaminated. The study also showed that most food vendors (197) sampled had no concern regarding heavy metal (lead metal).

Finally, in a study by Okai and Dordi (2002), a non-experimental design was used to determine the knowledge, attitude and practices on food hygiene by food vendors of University of Ghana campus. The study highlighted on two types of vendors. Those who brought already prepared food from home and those who cooked on site. It was showed that food vendors' educational background and the relation of the selling had further established that the food vendors had high knowledge with regard to purchasing, transporting, storing, preparing and handling food as well as personal cleanliness. The study also showed that food vendors practiced poor food hygiene as evidenced by the poor state of cooking and selling environment as well as improper handling and washing of drinking cups, napkins and lack of proper water storage facilities.

Food safety experts have identified the most common food handling mistakes made by consumers as well as food vendors. The mistakes include serving contaminated raw food, cooking or heating food inadequately, obtaining food from unsafe sources and cooling food inadequately. Consumers need to appreciate the seriousness of food borne-

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

In order to keep prices down, some vendors purchase cheap or adulterated ingredients containing unpermitted chemical additives from unauthorized suppliers which may further increase the risks associated with the food so prepared. Raw meat, poultry and vegetables are commonly contaminated with large numbers of bacteria, including potential foodborne pathogens such as *B. cereus*, *C. perfringens*, *C. jejuni*, *E. coli*, *L. monocytogenes*, *Salmonella* and *S. aureus*. Spices are known to harbor a large number of microorganisms which include members of the genus *Bacillus*, anaerobic sporeformers, enterococci, members of *Enterobacteriaceae*, a variety of yeast and mould and pathogens like coagulase positive staphylococci (International Commission on Microbiological Specifications for Foods [ICMSF], 1996). Contamination of foods by spices which act as spore carriers has been reported to lead to food spoilage and can even lead to food poisoning. Sporeformers in spices may lead to food spoilage, when they survive the cooking process and multiply under favorable conditions (Powers, Latt and Brown, 1976).

In a study done in Calcutta, samples that were suspected of adulteration were analysed and in 30 of the 50 samples, unauthorized food additives were detected. Similarly, pathogens like *B. cereus*, *S. aureus*, *C. perfringens*, *V. metschnikovii* and *E. coli* were reported in raw chicken, salad and gravy raw materials (Mosupye and Von Holy, 1999). These organisms were probably present in these foods either prior to

purchase by vendors or may have been introduced by cross contamination during food handling or during preparation.

The literature reviewed internationally and locally shows the peril a person's health is exposed to through the consumption of unhygienic street foods. It indicates that poor personal and environmental hygiene, lack of food hygiene knowledge on the part of food vendors can go a long way to affect the health of the patrons of street foods. Reasons for contamination could be the location of the stall (surroundings), poor personal hygiene, and poor food hygiene practices during cooking, storing and serving, poor source of drinking water, poor storage system, uncovered food container, improper practices of taking out water from the pitcher, long hours of storage of food among others.

#### **2.4 Improving Hygienic Knowledge and Practices of Food Vendors**

The production of safe food is based on the implementation and application of general preventative measures such as General Preventive Management (GPM) (Reij *et al.* 2003). GPM is the overall management (organizing, implementing and adhering) of procedures, processes, control and other precautions that exclude, prevent, minimize, and inhibit product failures, and consistently yield safe, suitable foods of uniform quality, according to their intended use. General Preventive Hygiene (GPH) is part of General Preventive Management (GPM) concerned with general hygiene, microbial safety and product spoilage (Heggum, 2001). While it is not possible to achieve zero risk under GPM, the development and use of other approaches, to ensuring safe food, cannot be omitted, there should be a systematic approach to identification, assessment and control of hazard during production, processing, manufacturing, preparation and use of food, water or other substances (Jay, 1992). Thus, good hygiene, cleaning and sanitation are

necessary to secure low levels of microorganism on the final product and this should be the direct responsibility of hygiene authorities. Strict hygiene during manufacture of food products may therefore decrease the risk from some pathogens and increase the risk from others (Huss, 1997). Never the less, the quality of food at every point of production is and should be paramount to inspectors. Thus, in no case is the application of good hygiene sufficient to secure safety and a second line of defense (prevention of growth) must be established (Huss, 1997).

Making certain that the food served to customers is safe for consumption is a priority for retail foodservice operations such as restaurants, hospitals, schools, and catering. Operations risk reputation loss, financial difficulties, legal actions, and even closure if employees' unsafe food handling practices result in a foodborne illness outbreak. The National Restaurant Association reports that 12.7 million employees are employed in the restaurant industry (NRA, 2010), and the majority of those employees have not received food safety training. The role of managers and supervisors, to encourage and motivate employees to follow proper practices, is critical. The manager plays a key role in the food safety culture by establishing policies and standards, expecting accountability, serving as a role model, controlling rewards and punishment, providing training, and providing needed resources to follow food safety practices. Manager oversight has been found to be of paramount importance to get foodservice employees to follow safe food handling behaviors such as handwashing, cleaning and sanitizing, and taking food temperatures (Arendt & Sneed, 2008).

Arendt and Sneed (2008) proposed a model for employees' motivations to follow food safety practices. The sample used for their model development included primarily employees in the under 26 year old age category. The motivators for this group included all external motivators as controlled by the manager or leaders of the foodservice

operations. In addition, this work found the manager sets the tone for practice of safe food handling behaviors, or the food safety culture. Researchers have advocated the important role the organization plays in influencing employees' safe food handling practices. It has been suggested that undesirable food handling practices are often deeply rooted in the work environment and are not easily changed (Sheppard et al., 1990).

Studies have found that training helps to improve overall employee knowledge of food safety (Roberts *et al.*, 2008) although others have found that training is not consistently associated with improved knowledge (Pilling *et al.*, 2008). Chapman *et al.* (2010) observed the influence of a food safety information sheet on practices within the foodservice environment. Results showed that the information had a positive impact on food handler behaviors.

The major element which will ensure a lasting and growing benefit throughout the hospitality industry, is without a doubt the requirement for its workforce to receive food hygiene awareness training (Smith, 1994) because human error is one of the largest driving forces behind food borne illness outbreaks. This recognition of the important role food handlers have in food borne illness outbreaks has led to a realization. The key to preventing food borne disease is to educate and train food handlers (Clayton & Griffith, 2008). Training and certification programs have been introduced to educate restaurant managers in sanitary food handling practices; due to the cost of training programs, an evaluation of their efficacy is crucial (Cotterchio *et al.* 1998). Less than 20% of managers in the foodservice industry have been trained in the supervisory role of food safety; therefore the lack of training is damaging and restricts their ability to assess food safety risks and convey proper hygiene training to their staff (Egan *et al.*, 2006). More shockingly, a study that uncovered food handlers and managers' perceptions of hygiene training, found the majority (80% of individuals interviewed) of untrained food handlers

indicated their managers had not discussed nor provided food hygiene training during their early stages of employment (Seaman & Eves, 2009). Reasons for the lack of training are costs of training programs, a lack of course availability particularly free food safety courses, and a time for when the food handlers would be trained. Even high employee turnover can mean a loss of food safety practice as soon as the food handler is trained (Hume, 2005). When food handlers are provided formal food safety training during their employment, the concern then becomes the fact that food safety knowledge does not always transfer into practice (Clayton & Griffith, 2004). The implied theoretical framework behind most training programs is an increased knowledge about sources of contamination and appropriate responses will result in improved food safety behavior (Mitchell *et al.*, 2007). Training has been used as the primary means of promoting food safety and according to Mitchell *et al.* (2007).

Knowledge of food contamination risks does not always result in safe food handling behavior. Knowledge evolves and so should training education to convey and imprint the most recent information in food handlers. Implementing knowledge gained from training requires a change in behavior and communicating food safety basics must be continual (Hume, 2005). As an example, a study in Wales concluded that 95% of its respondents had received food safety training however only 63% admitted they did not carry out safe food handling practices in the instances they knew would be appropriate (Clayton *et al.*, 2002). Unfortunately, the review of the effectiveness of food safety training is predominately through self-report and survey methods; observational studies would prove a more powerful research design to validate effectiveness of food safety training (Mitchell *et al.*, 2007).

Tjoa *et al.* (1997) were quoted to have confirmed the role played by unwholesome meat in the causation of disease. They recommended that food vendors

should receive education on food hygiene and moreover special attention be given to the causes of diarrhea, transmission of diarrhea pathogens, the handling equipment's and cooked food, hand washing practices and environmental hygiene.



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter describes the methods used in the research study and this includes research design, study area, population, sampling and sampling technique, data collection instrument, data collection procedure, plan for data analysis, and ethical considerations.

#### **3.2 Research Design**

A descriptive cross-sectional study was used to evaluate the hygienic knowledge and practices between urban and rural food vendors at lorry parks. As a widely accepted method in educational research, the descriptive cross-sectional method of research is a fact-finding study that involves adequate and accurate interpretation of findings.

#### **3.3 Study Area**

Volta Region is one of Ghana's ten administrative regions, with Ho designated as its capital. It is located west of Republic of Togo and to the east of Lake Volta. It contains twenty five administrative districts with several ethnic groups, such as, the Ewe people who speak the Ewe Language, the Guan peoples, and the Akan folks. The Guan peoples include the Lolobi, Likpe, Akpafu, Buem, and Nkonya people etc.; they are however believed to be the foremost Neolithic groups to have settled in the area including the outlying regions. The main towns in this region are Ho (The capital, largest and busiest city), Hohoe and Kpando. Ho is a town and the capital of Ho Municipal District and the Volta Region of Ghana. Ho lies between Mount Adaklu and Mount



Galenukui (Togo Atakora Range), and is home to a museum,, a cathedral and a large prison. Ho has a settlement population of 96,213 people. It was the capital of British Togoland. Sogakope is a small town and is the capital of South Tongu District, a district in the Volta Region of Ghana. Sogakope (Sogakope) is a populated place (class P - Populated Place) in Volta Region, with the region font code of Africa/Middle East. It is located at an elevation of 49 meters above sea level and its population amounts to 104,194. Sogakope is also known as Sogakofe, Sogakope, Sogakorpe, Sogankope.



**Figure 3. 1: Map of Volta Region, Ghana**

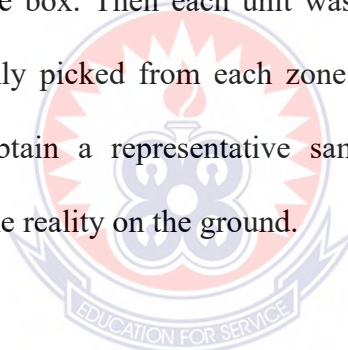
### 3.4 Population

The study population included all the food vendors at Ho market (Urban) and Sogakope (Rural) in the Volta Region. The food handlers consist of female and male adults who work in the identified lorry parks.

### **3.5 Sampling Technique and Sample Size**

A census was conducted to obtain the list of food vendors at the various lorry parks at Ho market and Sogakope in the Volta Region. The lorry parks were zoned into two (2) namely; zone A and zone B each based on the population density of food vendors. A proportional sample size was determined for each zone and the food vendors were randomly selected from each zone using random table. Two hundred and sixty (260) food vendors were randomly selected for the study, comprising one hundred and thirty (130) food vendors at Ho market (Urban) and one hundred and thirty (130) food vendors at Sogakope (Rural) lorry parks in the Volta Region.

This was done by assigning numbers to the food vendors at the lorry parks and all the numbers were put in the box. Then each unit was picked randomly from the box. Food vendors were randomly picked from each zone. The purpose of using a simple random method was to obtain a representative sample and get the representative information which will be the reality on the ground.



### **3.6 Data Collection Instrument**

A self- designed structured questionnaire was used to collect data from 260 food vendors. A pre-tested, structured questionnaire was used for data collection. The questionnaire was initially prepared in English and translated into Twi and Ewe for data collection. The knowledge questionnaire contained items on the source and knowledge of food handling.

### **3.7 Data Collection Procedures**

Prior to commencement of the survey, advocacy visits were made to the selected street vendors to solicit for their support and cooperation. This study was conducted

through in-depth interview, administration of questionnaires and observational checklists. Two investigators consisting of one interviewer and an assistant in each location administered a pre-test structured questionnaire to each street food vendor to elicit basic socio-demographic details, food handling practices, personal hygiene practices, types of vending, storage of food before selling and serving of food, handling and storage of leftovers, water supply and sanitary practices.

### **3.8 Data Analysis**

Data collected through various methods were inputted, processed and analysed by using IBM SPSS-20.0 Statistics. Appropriate descriptive and quantitative methods were adopted to generate results that are of research interest such as frequencies, percentage, proportion and tables

### **3.9 Ethics in Data Collection**

All professions are guided by ethics and so is research. Research has code of ethics which govern the way research is conducted. Consent should be based on an appreciation of the practical limits of anonymity and confidentiality (Miller, 2009). The following elaborate on the codes of ethics considered for the data collected.

#### **3.9.1 Anonymity**

The stricter standard is the principle of anonymity which essentially means that the participant will remain anonymous throughout the study - even to the researcher themselves. However, the researcher ensured the standard of anonymity of respondents in all documents resulting from this study by not providing options on the questionnaires for information such as name and the residential address of the selected food vendor.

### **3.9.2 Confidentiality**

Confidentiality is concerned with who has the right of access to the data provided by the respondents. In view of this, identities and data collected were kept confidential whether or not an explicit pledge has been given. In order to ensure the confidentiality of the respondents, the researcher clearly indicated a preamble on the questionnaire which assured appropriate precautions to protect the confidentiality of respondents' data and was adhered to. This triggered the respondents to willingly provide information and discuss sensitive issues concerning their hygienic knowledge and practices.

### **3.9.3 No Compulsion**

This requires that respondents are not coerced into participating in research. For that matter, the researcher fully informed the prospective respondents about the procedures and risks involved in research. Thus, the questionnaires were administered to the respondents after each gave his or her consent to participate in the research. Hence, the researcher conducted the research in an ethical way without compulsion which aided the accuracy of responses, rate of response and timeliness of data collection.

## CHAPTER FOUR

### RESULTS AND DISCUSSION

#### 4.1 Introduction

The chapter presents the results and discusses the findings of the study. It focuses on the response of urban and rural food vendors at lorry parks in Volta Region, Ghana. The results specifically relates to the hygienic knowledge level of food vendors at the lorry parks, level of hygienic practices among food vendors at the lorry parks and the ways of improving the hygienic knowledge and practices of food vendors at the lorry parks.

#### 4.2 Socio-Demographic Characteristics of Respondents

Issues covered under the background of respondents include the age, gender, marital status and education level of respondents. The background of respondents were very necessary to enable the researcher describe the peculiar characteristics of the respondents as well as providing the basis for later discussions of the findings.

##### 4.2.1 Age of Respondents

The responses with regard to the age category of the respondents are presented in Table 4.1.

**Table 4. 1: Age of respondents**

| Age                | Urban     |              | Rural     |              |
|--------------------|-----------|--------------|-----------|--------------|
|                    | <i>N</i>  | %            | <i>N</i>  | %            |
| 15-19 years        | 18        | 22.8         | 4         | 8.2          |
| 20-24 years        | 22        | 27.8         | 13        | 26.5         |
| 25-34 years        | 23        | 29.1         | 18        | 36.7         |
| 35-39 years        | 13        | 16.5         | 9         | 18.4         |
| 40 years and Above | 3         | 3.8          | 5         | 10.2         |
| <b>Total</b>       | <b>79</b> | <b>100.0</b> | <b>49</b> | <b>100.0</b> |

Table 4.1 clearly shows that the respondents were fairly distributed among the age brackets set out on the questionnaire. With regards to age of urban food vendors, the statistics indicates 22.8% of the respondents were between 15-19years; 27.8% were between the age category of 20-24years. On the hand, 29.1% of the respondents were between 25-34years, 16.5% of the respondents were between the ages of 35-39years, 3.8% of the respondents were in the age category of 40years and above.

Concerning the rural age category, 8.2% were between the ages of 15-19years, while, 26.5% were in the age category of 20-24years. In addition, 36.7% of the participants were between the ages of 25-34years, 18.4% of the respondents were between 35-39years. The remaining 10.2% of the respondents were in the age category of 40years and above. Comparing the age category of the urban and rural food vendors, it appeared that the average age of the food vendors were between the ages of 25-34years, majority of the food vendors in the urban are at their youth age between 15-19years as compared to that of the rural food vendors. Age wise, the distribution obtained for both study areas corroborates that of earlier studies (Lues, et al., 2006; Subratty, 2004; Rosnani, et al., 2014) in various countries which allude to massive involvement of food vendors between the ages of 18 and 35 years in the food vending business.

#### 4.2.2 Gender of Respondents

The responses with regard to the gender of the respondents are presented in Table 4.2.

**Table 4. 2: Gender of Respondents**

| Gender       | Urban     |            | Rural     |              |
|--------------|-----------|------------|-----------|--------------|
|              | <i>N</i>  | %          | <i>N</i>  | %            |
| Male         | 14        | 17.7       | 6         | 12.2         |
| Female       | 65        | 82.3       | 43        | 87.8         |
| <b>Total</b> | <b>79</b> | <b>100</b> | <b>49</b> | <b>100.0</b> |

On the gender of urban food vendors, the study revealed that 82.3% of the selected respondents were females with the remaining 17.7% were males. From the gender of rural food vendors, 87.8% representing were female whilst 12.2% were males. Generally, the vendors in both study areas (urban and rural) were predominantly females and constituted 80.0% of respondents. The gender distribution of street food vendors in this study is in utter contrast with those reported by Muinde and Kuria (2005) in Kenya; Chander et al. (2013) in India; and Rosnani et al. (2014) in Malaysia, where street food vendors were found to be rather dominated by males. It is however consistent with previous studies in Ghana (Mensah et al., 2002; Apanga, 2014); Ethiopia (Tessema, 2014); Nigeria (Chukuezi, 2010; Musa & Akande, 2003); Cameroun (Edima, 2014) and South Africa (Lues, 2006). Thus, the assertion that street food vending business in developing countries is a trade predominated by women may not be entirely true; rather it is dependent on the geographical region in question.

#### 4.2.3 Educational Level of Respondents

The current study investigated no formal educational background of the respondents to ascertain their knowledge levels as well as application of basic scientific in their trade. The frequencies and percentages are outlined in Table 4.3.

**Table 4. 3: Educational Level of Respondents**

| Educational level   | Urban    |      | Rural    |      |
|---------------------|----------|------|----------|------|
|                     | <i>N</i> | %    | <i>N</i> | %    |
| No formal education | 6        | 7.6  | 11       | 22.4 |
| Basic level         | 36       | 45.6 | 13       | 26.5 |
| Apprenticeship      | 19       | 24.1 | 8        | 16.3 |
| Drop Out            | 18       | 22.8 | 17       | 34.7 |
| Total               | 79       | 100  | 49       | 100  |

In terms of the highest level of education attained by food vendors, the results pointed out that Junior High School education (45.6%) was the commonest among food vendors in urban area, while school drop-out (34.7%) was common among food vendors in rural areas. On the other hand, no formal education (7.6%) and apprenticeship (16.3%) generally constituted the least proportion of urban and rural food vendors respectively. The pattern of highest educational levels attained by food vendors in both areas under study is in line with that of Apanga et al. (2014) which found a predominant proportion of food vendors with Junior High School education but is in contrast with the findings of Edima et al. (2014).

#### 4.2.4 Period of Selling Food

The responses with regard to the period food vendors have been selling food at the lorry parks are presented in Table 4.4.

**Table 4. 4: Period of selling food**

| Experience       | Urban    |      | Rural    |      |
|------------------|----------|------|----------|------|
|                  | <i>N</i> | %    | <i>N</i> | %    |
| Below 1year      | 5        | 6.3  | 28       | 57.1 |
| 1-3years         | 11       | 13.9 | 12       | 24.5 |
| 4-6years         | 25       | 31.6 | 6        | 12.2 |
| 7years and above | 38       | 48.1 | 3        | 6.1  |
| Total            | 79       | 100  | 49       | 100  |

The distribution of work experience in both study areas depicts that, 6.3% of urban food vendors and 57.1% of rural food vendors have been selling for a period between below 1year. Again, 13.9% and 24.5% of the urban and rural food vendors respectively have been selling for about 1-3years, while 31.6% of the urban and 12.2% of the rural food vendors have been selling for 4-6years. Meanwhile 48.1% of the urban food vendors and 6.1% of the rural food vendors have been selling for 7years and above.

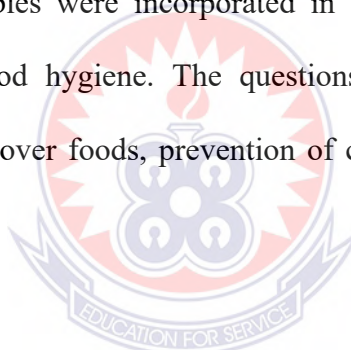


This indicates a soaring interest in the urban food vending business than the rural food vending business over the past decade.

A good proportion of urban (48.1%) food vendors had been selling food for 7 years and above, while the majority of the rural (57.1%) have been selling food for less than 1 year (Table 4.4). This trend of urban food vendors is similar to that reported by Abdalla *et al.* (2008) and confirms the assertions in available literature (Musa, & Akande, 2003; Lues, et al., 2006) that the food vending business in developing countries is rapidly expanding and serves as a form of employment for urban residents.

### 4.3 Hygienic knowledge level of food vendors at the lorry parks

A number of variables were incorporated in the questionnaire to assess food vendor's knowledge of food hygiene. The questions were to assess food vendor's knowledge on handling leftover foods, prevention of cross contamination and personal hygiene.



#### 4.3.1 Handling Leftover Foods

In order to determine the food vendors knowledge about how to handle leftover food, two questions were asked, namely; How do you store your leftover food to avoid food poisoning and at what temperature do you preserve it?

**Table 4. 5: Storage of leftover food**

| Responses                                  | Urban    |      | Rural    |      |
|--|----------|------|----------|------|
|  | <i>N</i> | %    | <i>N</i> | %    |
| Place saucepan in refrigerator             | 3        | 3.8  | 1        | 2.0  |
| Store remaining in a plastic container     | 57       | 72.0 | 16       | 32.6 |
| Leave the rest on the stove in the kitchen | 19       | 24.1 | 32       | 65.4 |
| Total                                      | 79       | 100  | 49       | 100  |

Finding indicates 3.8% and 2.0% of urban and rural food vendors, respectively refrigerate their leftover food in the saucepan in which the food was cooked, while 72.0% and 32.6% of urban and rural food vendors respectively transfer the remaining food in a plastic container before placing in the refrigerator. On the other hand, the remaining 24.1% and 65.4% of the urban and rural food vendors respectively leave the cooked food in the saucepan on the stove in the kitchen

The discussion from Table 4.5 shows that majority of urban (72.0%) food vendors have knowledge on how to store leftover food to avoid food poisoning as compared to the rural (32.6%) food vendors. It is however worrying that more than 67.4% of the rural food vendors have no knowledge about how to correctly preserve leftover food.

**Table 4. 6: Temperature for storage of leftover to avoid food poisoning**

| Responses                             | Urban    |      | Rural    |      |
|---------------------------------------|----------|------|----------|------|
|                                       | <i>N</i> | %    | <i>N</i> | %    |
| Below 5 <sup>0</sup> c                | 43       | 54.4 | 2        | 2.0  |
| 5 <sup>0</sup> c - 10 <sup>0</sup> c  | 21       | 26.6 | 16       | 32.7 |
| 10 <sup>0</sup> c - 15 <sup>0</sup> c | 12       | 15.2 | 26       | 53.1 |
| Above 15 <sup>0</sup> c               | 3        | 3.8  | 5        | 10.2 |
| Total                                 | 79       | 100  | 49       | 100  |

Determining food vendor's knowledge about the correct temperature of storing leftover food revealed mixed responses. As depicted in Table 4.6, 54.4% of the urban food vendors and 2.0% of the rural food vendors indicate below 5<sup>0</sup>C, 26.6% of the urban food vendors and 32.7% of the rural food vendors indicated between 5<sup>0</sup>C-10<sup>0</sup>C. In addition, 15.2% of the urban food vendors and 53.1% of the rural food vendors indicated

10<sup>0</sup>C-15<sup>0</sup>C and the remaining 3.8% of the urban food vendors, and 10.2% of the rural food vendors indicated above 15<sup>0</sup>C.

This shows that more than half (54.4%) of the urban food vendors know the temperature at which left-over food should be stored to prevent food spoilage which upon consumption results in food poisoning, whereas only 2.0% of the rural food vendors know the correct storage of leftover food to prevent food poisoning. It can be affirmed that the majority (96.0%) of the rural food vendors have no knowledge about the temperature at which leftover must be preserved. More often than not, this has always at the end resulted in accusing fingers for the spread of food-borne diseases, particularly cholera outbreaks.

#### 4.3.2 Cross Contamination

To determine vendors knowledge about cross contamination, the following questions were asked. What would you do if you found crumble canned/rusted tomato, cracked egg among eggs purchased and Suppose you have raw meat and salad to store in a container or the refrigerator, how will you position both ?. Table 4.7 and Table 4.8 show the knowledge level of the respondents on the prevention of cross contamination.

**Table 4. 7: Handling of dented/rusted canned tomato and purchase cracked egg**

| Responses                          | Urban    |      | Rural    |      |
|------------------------------------|----------|------|----------|------|
|                                    | <i>N</i> | %    | <i>N</i> | %    |
| I used it                          | 15       | 19.0 | 36       | 73.5 |
| I throw it away                    | 59       | 74.7 | 3        | 6.1  |
| I put in the cool dry place/fridge | 5        | 6.3  | 10       | 20.4 |
| Total                              | 79       | 100  | 49       | 100  |

As depicted in Table 4.7, 19.0% of the urban food vendors and 73.5% of the rural food vendors indicated they use the dented/rusted canned tomato and also had no difficulty in purchasing cracked eggs for suppliers. On other hand, 74.7% of the urban food vendors and 6.1% of the rural food vendors affirmed that they will throw it away, whereas 6.3% of the urban food vendors and 20.4% of the rural food vendors revealed that they will put it in a cool dry place/refrigerator. This implies that majority (74.7%) of urban food vendors have knowledge about how to prevent cross contamination by throwing such crumble/rusted tomato and cracked eggs away as compare to that of rural (6.1%) food vendors. According to Tang & Fong, (2004) all food vendors have knowledge on dealing with spoilt foods. Tang & Fong, (2004) attributed this to lack of food hygiene training and inadequate food hygiene knowledge or practice food hygiene.

**Table 4. 8: Positioning of food items in a shelf**

| Responses                 | Urban    |      | Rural    |      |
|---------------------------|----------|------|----------|------|
|                           | <i>N</i> | %    | <i>N</i> | %    |
| Both on the same shelf    | 29       | 36.7 | 25       | 51.0 |
| Meat on shelf above salad | 12       | 15.2 | 8        | 16.3 |
| Salad on shelf above meat | 38       | 48.1 | 16       | 32.7 |
| Total                     | 79       | 100  | 49       | 100  |

In response to the question, “Suppose you have raw meat and salad to store in a container or the refrigerator, how will you position both”, 48.1% and 51.0% of the urban and rural food vendor respectively indicated that they will place both raw meat and salad on the same shelf. Moreover, 15.2% and 16.3% of the urban and rural food vendors respectively affirmed that they will place meat above salad whiles 36.7% of the urban food vendors and 32.7% of the rural food vendors mentioned that they will place salad on a shelf above the raw meat. The response indicates that, majority of the urban (48.1%)

food vendors answered correctly and therefore had knowledge about how to prevent cross contamination as compared to the rural (32.7%) food vendors. From the discussion it can be inferred that the knowledge level of both study areas (urban and rural) are low.

### 4.3.3 Personal Hygiene

To determine whether food vendors had knowledge about personal hygiene, two questions were asked namely; “what do you do when you want to sneeze or cough whiles selling food? and what do you do immediately after sneezing / coughing whiles selling?”

**Table 4. 9: Attitude exhibited during coughing / sneezing whiles selling**

| Responses   | Urban     |            | Rural     |            |
|---|-----------|------------|-----------|------------|
|   | <i>N</i>  | %          | <i>N</i>  | %          |
| Cough/sneeze in my handkerchief/<br>disposable tissue | 19        | 24.0       | 5         | 10.2       |
| Turn face away(open air) and<br>Cough/sneeze          | 33        | 41.8       | 8         | 16.2       |
| Cough/sneeze with my hand                             | 27        | 34.2       | 36        | 73.5       |
| <b>Total</b>  | <b>79</b> | <b>100</b> | <b>49</b> | <b>100</b> |

The current study revealed that, 24.0% of the urban food vendors and 10.2% of the rural food vendors sneeze in their handkerchief/ disposable tissue, 41.8% and 16.2% of the urban and rural food vendors respectively turn their face away from food and sneeze/ cough without covering their mouth whiles 34.2% of the urban food vendors and 73.5% of rural food vendors cough/sneeze with their hands covering the mouth. The discussion affirmed that both the urban and rural food vendors had little knowledge of handling coughing / sneezing whiles selling. On the other hand, majority (24.0%) of the urban food vendors had knowledge on how to sneeze/cough hygienically whiles selling to prevent food contamination than the rural (10.2%) food vendors.

**Table 4. 10: Hand washing with soap after sneezing/ coughing**

| Responses                   | Urban    |      | Rural    |      |
|-----------------------------|----------|------|----------|------|
|                             | <i>N</i> | %    | <i>N</i> | %    |
| Wash hands with soap        | 9        | 11.4 | 1        | 2.0  |
| Wash hands but without soap | 16       | 20.3 | 11       | 22.5 |
| Do not wash hands at all    | 54       | 68.3 | 37       | 75.5 |
| Total                       | 79       | 100  | 49       | 100  |

In determining whether food vendors wash their hands after sneezing/coughing as a way of preventing food contamination, 11.4% of the urban food vendors and 2.0% of the rural food vendors wash hands with soap after sneezing/coughing, meanwhile, 20.3% of the urban food vendors and 22.5% of the rural food vendors wash hands but without soap. Again, 68.3% and 75.5% of the urban and rural food vendors respectively do not wash their hands at all after sneezing/ coughing. Table 4.10 shows that more than half of the urban (68.3%) and rural (75.5%) do not wash their hands at all after sneezing and coughing. This implies that food vendors had little knowledge on how to wash their hands after sneezing/coughing to prevent food contamination than the rural (10.2%) food vendors.

Generally, the urban food vendors knowledge levels were high as compared to the rural food vendors. They demonstrated good knowledge in the areas of hand handling leftover foods and prevention of cross contamination and personal hygiene. All respondents indicated that hands should be washed before food preparation and serving to customers. The findings confirms with the study by Nurudeen et al (2014), in central state of Nigeria. The result of this study showed only 60% of urban street vendors had knowledge about how to preserve leftover food properly. Fifty-three percent (53%) of them have knowledge about how to prevent cross contamination and forty-nine percent (49%) of the street vendors have knowledge about personal hygiene. Knowledge on food

hygiene is crucial because poor practices had been shown to be significant contributory factors to food borne illnesses in various food retailers (Taylor et al, 2000).

#### 4.4 Hygienic practices among food vendors at the lorry parks

With regards to hygienic practices, hand hygiene and food hygiene practices are the two most critical factors in ensuring food safety.

**Table 4. 11: Washing of hands after visiting the washroom**

| Response | Urban    |      | Rural    |       |
|----------|----------|------|----------|-------|
|          | <i>N</i> | %    | <i>N</i> | %     |
| Yes      | 73       | 92.4 | 36       | 73.5  |
| No       | 6        | 7.6  | 13       | 26.5  |
| Total    | 79       | 100  | 49       | 100.0 |

Respondents were pulled to response whether they wash their hands after visiting the washroom, 92.4% of the urban food vendors and 73.5% of the rural food vendors indicated that they wash their hands after visiting the washroom (Table 4.11). In responding to why they wash their hands, it appeared that they wash their hands to avoid germ from spreading, reduce the risk of things like flu, food poisoning and to prevent contamination of food by handling. On the other hand, 7.6% of the urban food vendors and 26.5% of the rural food vendors do not wash their hands after visiting the wash room. In response to why the food vendors fail to wash their hands after visiting washroom, it was revealed that there is no clear water supply available to them and this is in agreement with findings of Bryan et al. (2008) and Abdalla et al. (2008) who pinpoint that there is no availability of water supply to the street food vendors. It appeared that both urban and rural food vendors exercise good hand hygienic practices by washing their hands after visiting the washroom, but majority (92.4%) of the urban

food vendors exercise better hand hygienic practices as compared to the rural food vendors.

**Table 4. 12: How vendors wash their hands after visiting the washroom**

| Responses                                    | Urban    |       | Rural    |       |
|--|----------|-------|----------|-------|
|  | <i>N</i> | %     | <i>N</i> | %     |
| Washing with water only                      | 16       | 20.3  | 43       | 87.8  |
| washing with soap and bowl filled with water | 45       | 57.0  | 1        | 2.0   |
| washing with soap and running water          | 18       | 22.8  | 5        | 10.2  |
| Total  | 76       | 100.0 | 49       | 100.0 |

In response to how the food vendors wash their hands after visiting the washroom, 20.3% of the urban food vendors and 87.8% of the rural food vendors mentioned that they wash their hands with water only after visiting the washroom. Moreover, 57.0% and 2.0% of the urban and rural food vendors respectively asserted that they wash their hands with soap and bowl filled with water after visiting the washroom, while 22.8% of the urban food vendors and 10.2% of the rural food vendors affirmed that they wash their hands with soap and running water after visiting the washroom. As indicated in Table 4.12, majority of urban (22.8%) food vendors ensure proper hand hygienic practice as compared to rural (10.2%) food vendors. As discussed, it is however worrying that both urban and rural food vendors do not ensure proper hygienic practices as they wash their hands with water only and also wash with soap and bowl filled with water after visiting the washroom.



**Table 4. 13: Used of hand gloves while selling**

| Responses | Urban    |       | Rural    |       |
|-----------|----------|-------|----------|-------|
|           | <i>N</i> | %     | <i>N</i> | %     |
| Yes       | 10       | 12.7  | 3        | 6.1   |
| No        | 69       | 87.3  | 46       | 93.9  |
| Total     | 79       | 100.0 | 49       | 100.0 |

As depicted in Table 4.13, 12.7% of the urban food vendors and 6.1% of the rural food vendors use hand gloves while selling. The respondents further mentioned that they wash use hand gloves to keep hands odor and stain free and protect the food from being contaminated. On the other hand, 87.3% and 93.9% of the urban and rural food vendors respectively affirmed that they do not use hand glove while selling. This implies that majority of urban (87.3%) and rural (93.9%) food vendors of the food vendors do not use gloves to serve food. The findings concurs with the study by Burt *et al.* (2003) who conducted study to assess the food handling practice of 10 processing mobile food vendors operating in Manhattan, New York City and found out that over half of all vendors (67%) contacted served food with bare hands. Also some vendors were observed vending with visibly dirty hands or gloves and no vendors once washed his or her hands or changed gloves in the 20 minutes observation period.

**Table 4. 14: Covering of hair while selling**

| Responses | Urban    |       | Rural    |       |
|-----------|----------|-------|----------|-------|
|           | <i>N</i> | %     | <i>N</i> | %     |
| Yes       | 43       | 54.4  | 13       | 26.5  |
| No        | 69       | 45.6  | 36       | 73.5  |
| Total     | 79       | 100.0 | 49       | 100.0 |

From Table 4.14, the food vendors were asked whether they cover their hair while selling. It appeared from the study that 54.4% of urban food vendors and 26.5% of rural food vendors covered their hair when selling food. In response to why the vendors cover their hair, it appeared that the vendors cover their hair to protect the food from being contaminated, to be smart when selling and as a sign of personal hygiene, while 45.5% of the urban food vendors and 73.5% of the rural food vendors do not cover their hair while selling. In comparison more than half (54.4%) of the urban food vendors cover their hair while selling than the rural (26.5%) food vendors. The practices of the rural food vendors go contrary to the recommendation in the Food and Drugs Act Cap 303 where it is a requirement for all food vendors to be covering their hair. The reason for not covering their hair was that these food vendors do not know the essence of covering their hair before they can sell.

**Table 4. 15: Washing utensils with hot water**

| Responses | Urban    |       | Rural    |       |
|-----------|----------|-------|----------|-------|
|           | <i>N</i> | %     | <i>N</i> | %     |
| Yes       | 12       | 15.2  | 2        | 4.1   |
| No        | 67       | 84.8  | 47       | 95.9  |
| Total     | 79       | 100.0 | 49       | 100.0 |

With regards to washing utensils in hot water, 15.2% of urban food vendors and 4.1% of rural food vendors indicated that they washed their utensils in hot water while 84.8% of urban food vendors and 95.9% of rural food vendors indicated that they did not wash their utensils in hot water (Table 4.15). The finding reveals that majority of the food vendors do not ensure proper food hygienic practices. From the study, majority (15.2%) of the urban food vendors had knowledge on washing their utensils with hot water as compared to that of the rural (4.1%) food vendors. The response of of the

vendors contradicts with the Food and Drugs Act Cap 303, that utensils are suppose to be washed in hot water.

#### 4.5 Improving the hygienic knowledge and practices of food vendors

The third research question sought to find the ways of improving the hygienic knowledge and practices of food vendors. Table 4.16 shows the frequencies and percentages of each variable.

**Table 4. 16: Response on ways of improving hygienic knowledge and practices**

| S/N | Responses   | Urban =79 |      | Rural = 49 |      |
|-----|---|-----------|------|------------|------|
|     |   | N         | %    | N          | %    |
| 1.  | More education on hygienic practices                            | 37        | 46.8 | 21         | 42.9 |
| 2.  | Improvement through structured food safety and hygiene training | 21        | 26.6 | 1          | 2.0  |
| 3.  | Tiring the road to reduce dust                                  | 4         | 5.1  | 12         | 24.5 |
| 4.  | Construction of closed gutters                                  | 2         | 2.5  | 3          | 6.1  |
| 5.  | Keeping gutters clean   | 7         | 8.9  | 5          | 10.2 |
| 6.  | Regular hygiene inspection                                      | 8         | 10.1 | 7          | 14.3 |

Table 4.16 shows a tabular representation of the ideas of food vendors to improve food hygiene knowledge and practices. Statistically, 46.8% of urban and 42.9% of rural food vendors was the highest among each group of the food vendors suggesting more education for vendors on hygienic practices. The view of the respondents buttress with the study by Tjoa *et al.* (1997) who recommended that food vendors should receive education on food hygiene and moreover special attention be given to the causes of diarrhea, transmission of diarrhea pathogens, the handling equipment's and cooked food, hand washing practices and environmental hygiene.

In addition, 26.6% of urban food vendors and 2.0% of rural food vendors were of the view of improvement through structured food safety and hygiene training. The view of the respondents confirms with Hume (2005) that training improves the knowledge and hygienic practices of food vendors. According to Hume knowledge evolves and so should training education to convey and imprint the most recent information in food vendors. As an example, a study in Wales concluded that 95% of its respondents who had received food safety training admitted they carry out safe food handling practices in the instances they knew would be appropriate (Clayton *et al.*, 2002).

As depicted in Table 4.16, 5.1% of the urban food vendors and 24.5% of the rural food vendors think tiring the road to reduce dust would ensure proper hygienic practices. Meanwhile 2.5% of the urban food vendors and 6.1% of the rural food vendors suggested that gutters should be constructed closed. In comparison, it appeared that the rural food vendors require tiring of road to reduce dust and construction of closed gutters as a way of ensuring good hygienic practices more than the urban food vendors. Keeping gutters clean took a stand with 8.9% of the urban food vendors and 10.2% of the rural food vendors. The results implies that rural food vendors required keeping gutters clean as a way of ensuring proper hygienic practices as compared to the urban food vendors. According to Reij *et al.* (2003), production of safe food is based on the implementation and application of general preventative measures such as keeping gutters clean, construction of gutters and cleaning the environment. In Africa poverty is the underlying cause of consumption of unsafe food. Poor road network causing dust, choked gutters, unclosed gutters poor government structural arrangement, and other inconvenient environmental conditions are notable reasons are an indications of poor food hygiene practices in the African region (DeWaal & Robert, 2005).

A fraction 10.1% of urban food vendors and 14.3% of rural food vendors thought regular hygienic inspection would improve hygienic practices. According to Jay (1992), the involvement of hygiene official in ensuring hygiene practices is paramount to improving hygiene. Even upon implementation of policies, there is still a likelihood of vendors not observing these policies and therefore 100% safety of food before and after production cannot be assured. This is clearly in conformity to studies done by (Jay 1992), where he stated, it is not possible to achieve zero risk, the development and use of other approaches, to ensuring safe food, cannot be omitted. It is clear that it is for this reason inspectors should go on weekly hygiene education as they agreed.

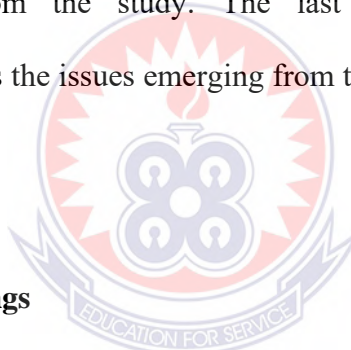


## CHAPTER FIVE

### SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

The chapter focuses on the findings of the study, conclusions drawn from the main findings and finally proffers recommendations. The chapter is constituted into three main sections. The first section which deals with the summary looks at summary of the main findings emanating from the data collected from the field as well as the contribution this study makes to knowledge on the phenomenon under studied. The second section concentrates on conclusions of the study with specific reference to the main findings drawn from the study. The last section has to do with the recommendations to address the issues emerging from the study and recommendation for further study.



#### 5.2 Summary of Findings

A number of findings were made after a discussion of the responses. They are summarized as below;

- The study found that urban food vendors have knowledge on how to store leftover food to avoid food poisoning as compared to the rural food vendors. The study further confirmed that the urban and rural food vendors' knowledge level about how to prevent cross contamination are low. It further appeared that both the urban and rural food vendors had little knowledge of handling coughing / sneezing whiles selling.
- The study revealed that both urban and rural food vendors exercise good hand hygienic practices by washing their hands after visiting the washroom, but

majority of the urban food vendors exercise better hand hygienic practices as compared to the rural food vendors.

- The study found that both urban and rural food vendors do not ensure proper hygienic practices as they wash their hands with water only and also wash with soap and bowl filled with water after visiting the washroom. It further appeared that the urban and rural food vendors of the food vendors do not use gloves to serve food.
- The study revealed that both urban and rural food vendors suggest more education for vendors on hygienic practices and construction of closed gutters as a way of ensuring good hygienic practices more than the urban food vendors

### **5.3 Conclusions**

The study generally observed that urban food vendors' knowledge levels were high as compared to the rural food vendors. They demonstrated good knowledge in the areas of hand handling leftover foods and prevention of cross contamination and personal hygiene. It was concluded that the level of hand hygiene practices among food vendors are high among all the food vendors at Ho market (Urban) and Sogakope (Rural) in the Volta Region at the identified lorry parks. The policy should be implemented in relation to more education for vendors on hygienic practices and improvement through structured food safety and hygiene training in order to ensure proper food hygienic knowledge and practices. Documentation and licensing of food vendors would enable authorities to identify persons employed in such enterprises and the types of food sold. This effort is likely to enable an opportunity to give food vendors advice and training in food safety.

#### **5.4 Recommendations**

The following recommendations are made to address the findings:

- Safety and hygienic inspectors in the Ho municipality should educate the vendors on the importance and use of hot water for utensils and hand-washing at the lorry stations.
- Food vendors should be educated and advice on washing their hands immediately after using the toilet, coughing, sneezing, and using a handkerchief.
- Health inspectors should advice vendors on sanitary protective clothing, hair covering, and removing objects (i.e. watches, jewelry) before serving food to prevent food contamination.
- It is also recommended that regular inspections should be carried out in order to improve the knowledge level and hygienic practices of the food vendors at the lorry stations.
- The inspector directorate of ministry of health should sought funding on Environmental Health activities to improve the hygienic practices of the food vendors at the lorry station.

#### **5.5 Suggestion for Further Studies**

Notwithstanding the limitation, this study draws attention to critical issues on food hygiene knowledge and practices amongst urban and rural food vendors in Volta Region. In a case study such as this, recommendations for future research would address the issues generated from this study. Based on these findings, future research may start from a relatively higher level of knowledge.



First, a replication of this study would be helpful in re-examining the validity of its findings for which the researcher was not able to investigate. Further empirical studies using larger sample sizes and greater geographical diversity would be helpful in validating specific parts of the theoretical models proposed in this study.

Second, subsequent research needs to be engaged in the development of more valid and reliable operational definitions for the proposed constructs, overcoming the limitations posed by the data source used in this study, also, more structured interviews should be conducted in different area in Ghana.



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**APPENDICES**

**APPENDIX A**

**UNIVERSITY OF EDUCATION, WINNEBA  
COLLEGE OF TECHNOLOGY EDUCATION, KUMASI  
DEPARTMENT OF HOSPITALITY AND TOURISM**

**THE EVALUATION OF THE HYGIENIC KNOWLEDGE, PRACTICES BETWEEN  
URBAN AND RURAL FOOD VENDORS AT LORRY PARKS**

**QUESTIONNAIRE FOR RURAL FOOD VENDORS**

DEAR SIR/MADAM.....

This study is being conducted to assess the evaluation of the hygienic knowledge, practices between urban and rural food vendors at Lorry Parks. I would appreciate very much if you could take some time off your tight schedule to complete this questionnaire. The questionnaire is for academic purposes only and the responses will be treated with the utmost confidentiality. Please carefully analyse each question and answer appropriately by ticking (✓) to indicate your choice

1. Name (Optional):.....

2. Age

a. 15years – 20 years [ ]

b. 20 years – 25 years [ ]

c. 25years- 35years [ ]

d. 35years- 40years [ ]

e. 40years and above [ ]

Specify.....

.....

3. Gender: Male [ ] Female [ ]

4. Marital Status: Single [ ] Married [ ] Divorced [ ]

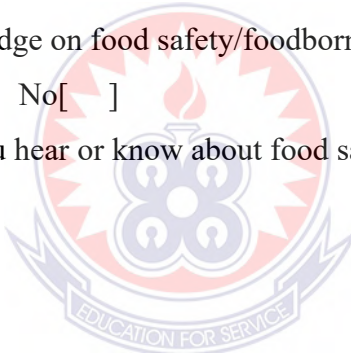


5. Number of children
- a. None [ ]
  - b. One [ ]
  - c. Two [ ]
  - d. Three [ ]
  - e. Four and more [ ]

6. Educational level:
- Not educated [ ]
  - Basic level [ ]
  - Technical/Vocational [ ]
  - Tertiary [ ]

**SECTION B**

7. Do you have knowledge on food safety/foodborne disease?
- Yes [ ] No [ ]
- If “Yes” how did you hear or know about food safety/foodborne disease
- Print media [ ]
  - Friends [ ]
  - School [ ]
  - Workshop [ ]
- If other specify.....



8. Where do you stay?
- Lorry station [ ]
  - House [ ]
  - Slums [ ]
  - Front of shops [ ]
- If other specify.....

9. What type of packed food do you sell at the station?
- a. Plain rice and stew [ ]
  - b. Fried rice with kitchen [ ]
  - c. Bread and salad [ ]

d. Kenkey and fried fish [ ]

If other (Specify).....

10. Where are these meals prepared from?

a. Personal kitchen [ ]

b. Open sheltered kitchen [ ]

c. Chop bar kitchens [ ]

d. Hotels and restaurants kitchen [ ]

If other (Specify).....

11. How many times do you bath in a day?

Once [ ]

Twice [ ]

Thrice [ ]

More [ ]

12. What type of toilet facility do you often use?

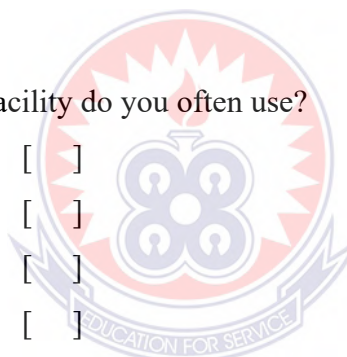
b. Toilet with sinks [ ]

c. Open gutters [ ]

d. Public toilets [ ]

e. Free range [ ]

If other (Specify).....



13. Where is it located?

Specify:.....

14. Do you visit washroom during vending?

Yes [ ] No [ ]

15. How often do you visit the washroom while vending

*Tick as many as possible*

Once [ ] Twice [ ] Thrice [ ] Frequently [ ] Rarely [ ]

16. Do you wash your hands after visiting the washroom?

Yes [ ] No [ ]

If “Yes” why

To avoid germ from spreading [ ]

To be confident with strangers [ ]

To reduce the risk of things like flu, food poisoning [ ]

Preventing contamination of food by handling [ ]

All the above [ ]

17. How do you wash your hands?

Washing with water only [ ]

Washing with soap and warm running water [ ]

Washing with liquid detergent under running water [ ]

Using sanitizers only [ ]

18. Do you use hand gloves while selling

Yes [ ] No [ ]

If “Yes” why

For keeping hands odor and stain free [ ]

Protecting the food from being contaminated [ ]

Protecting manicure [ ]

As a sign of good hygiene [ ]

All the above [ ]

19. While selling food do you cover hair?

Yes [ ] No [ ]

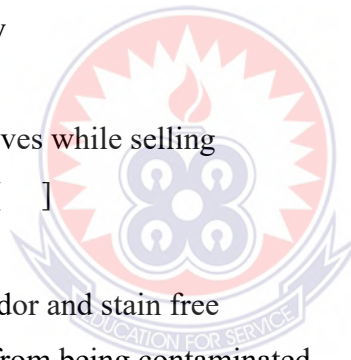
If “Yes” why

To protect the food from being contaminated [ ]

To be smart when selling [ ]

As a sign of personal hygiene [ ]

All the above [ ]



20. Do you wear aprons while selling?  
Yes [ ] No [ ]  
If “Yes” why  
Protect the inner clothing while selling [ ]  
For storing items like money [ ]  
Eliminate the need for washing clothes too often [ ]  
As a sign of practicing hygiene [ ]  
All the above [ ]
21. How often do you wash aprons?  
Daily [ ]  
Every other day [ ]  
Only when dirty [ ]  
Weekly [ ]  
If other (Specify).....
22. Who are your customers?  
Passengers/travelers [ ]  
Drivers [ ]  
Passers-by [ ]
23. Which of these customers patronize your food most?  
Women [ ]  
Children [ ]  
Men [ ]  
Aged [ ]  
All the above [ ]
24. Do your customers always complain about the hygienic condition at the station?  
Yes [ ] No [ ] Sometimes [ ]
25. At what condition is food served?  
Hot [ ] Warm [ ] Cold [ ]

26. How is food transported to customers?

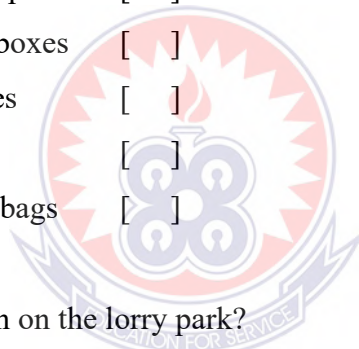
- On the head [ ]
- On a tray [ ]
- Packaged in sack bags [ ]
- Carry with bare hands [ ]

27. How do you treat leftover foods after the day's work.

- Dispose off [ ]
- Re-heat [ ]
- Cook fresh and mix with old [ ]
- Give out to the needy [ ]

28. How is food packed?

- Served in disposable plates [ ]
- Served in takeaway boxes [ ]
- Served in fresh leaves [ ]
- Served in papper [ ]
- Served in polythene bags [ ]



29. What is the condition on the lorry park?

- Tarred [ ]
- Dusty [ ]
- Graveled [ ]
- Muddy [ ]

30. How is food protected from the direct sunrays?

.....

.....

.....

31. How do you sell food during rainy seasons?

.....

.....

32. How long do you intend to sell at the lorry station?

- a. 1year – 3 years [ ]

- b. 3years – 5 years      [   ]
- c. 5 years – 10 years    [   ]
- d. 10years and above    [   ]

33. What motivated you to sell at the lorry stations?

.....

.....

.....

34. Are there any improvements you will want in your area of work?

.....

.....

.....





**APPENDIX B**

**UNIVERSITY OF EDUCATION, WINNEBA**

**COLLEGE OF TECHNOLOGY EDUCATION, KUMASI**

**DEPARTMENT OF HOSPITALITY AND TOURISM**

THE EVALUATION OF THE HYGIENIC KNOWLEDGE, PRACTICES BETWEEN  
URBAN AND RURAL FOOD VENDORS AT LORRY PARKS

**QUESTIONNAIRE FOR URBAN FOOD VENDORS**

DEAR SIR/MADAM.....

This study is being conducted to assess the evaluation of the hygienic knowledge, practices between urban and rural food vendors at Lorry Parks. I would appreciate very much if you could take some time off your tight schedule to complete this questionnaire. The questionnaire is for academic purposes only and the responses will be treated with the utmost confidentiality. Please carefully analyse each question and answer appropriately by ticking (✓) to indicate your choice

1. Name (Optional).....
2. Age
  - 15years – 20 years [ ]
  - 20 years – 25 years [ ]
  - 25years- 35years [ ]
  - 35years- 40years [ ]
  - 40years and above [ ]
3. Gender : Male [ ] Female [ ]



4. Marital status    Single [    ]            Married [    ]            Divorced [    ]

5. Number of children

None            [    ]

One            [    ]

Two            [    ]

Three            [    ]

Four and more [    ]

6. Educational level:

Not educated            [    ]

Basic level            [    ]

Apprenticeship            [    ]

Drop Out            [    ]

7. Where do you stay?

Lorry station [    ]

House [    ]

Slums [    ]

Specify.....



8. What type of food do you sell at the station?

Fufu and goat light soup            [    ]

Boiled ampesi and kontomire            [    ]

Waakye and fish            [    ]

Roasted yam/plantain            [    ]

Specify.....

9. Where are these meals prepared from?

a. Personal kitchen            [    ]

b. Palm branch hut kitchen [    ]

c. Mud kitchens            [    ]

d. Wooden kitchen            [    ]

If other (Specify).....

10. How many times do you bath a day?
- Once [ ]
- Twice [ ]
- Thrice [ ]
- More [ ]
11. What type of washroom do you have?
- Public latrine [ ]
- Bushes nearby [ ]
- Chamber pots [ ]
- Buckets & Pale [ ]
- Specify.....
12. Do you visit the washrooms during vending?
- Yes [ ] No [ ]
13. How often do you visit the washroom while vending
- Tick as many as possible*
- Once [ ] Twice [ ] Thrice [ ] Frequently [ ] Rarely [ ]
14. Do you wash your hands after visiting the washroom?
- Yes [ ] No [ ]
- “If Yes” Why
- To avoid germ from spreading [ ]
- To be confident with strangers [ ]
- To reduce the risk of things like flu, food poisoning [ ]
- Preventing contamination of food by handling [ ]
- All the above [ ]
15. How do you wash your hands?
- Washing with water only [ ]
- Washing with soap and water [ ]

Washing with soap and running water [ ]

Specify.....

.....

.....

16. Do you use hand gloves while selling?

Yes [ ] No [ ]

If "Yes" why?

For keeping hands odor and stain free [ ]

Protecting the food from being contaminated [ ]

Protecting manicure [ ]

As a sign of good hygiene [ ]

All the above [ ]

17. While selling food do you cover hair?

Yes [ ] No [ ]

If "Yes" why

To protect the food from being contaminated [ ]

To be smart when selling [ ]

As a sign of personal hygiene [ ]

All the above [ ]

18. Do you wear aprons while selling?

Yes [ ] No [ ]

If "Yes" why

Protect the inner clothing while selling [ ]

For storing items like money [ ]

Eliminate the need for washing clothes too often [ ]

As a sign of practicing hygiene [ ]

All the above [ ]

19. How often do you wash aprons?

Daily [ ]

Every other day [ ]

Only when dirty [ ]

Weekly [ ]

Specify.....

20. Who are your customers?

Passengers/travelers [ ]

Drivers [ ]

Passers-by [ ]

21. Which of these customers patronize your food most?

Women [ ]

Children [ ]

Men [ ]

Aged [ ]

All the above [ ]

22. What condition is food served?

Hot [ ] Warm [ ] Cold [ ]

23. How is food transported to customers?

On the head [ ]

On a tray [ ]

Packaged in polythene bags [ ]

Carry with bare hands [ ]

24. How do you treat leftover foods after the day's work?

Dispose off [ ]

Re-heat [ ]

Cook fresh and mix with old [ ]

Give out to the needy [ ]

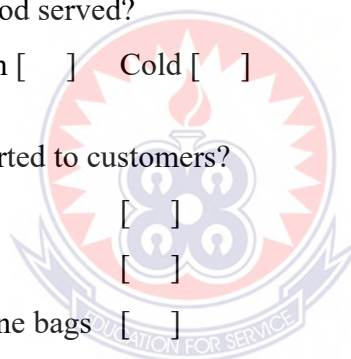
25. How is food packed?

Served in paper [ ]

Served in fresh leaves [ ]

Served in dry leaves [ ]

Served in polythene bags [ ]



26. What is the condition of the lorry park?

Tarred [ ] Dusty [ ] Muddy [ ]

27. How is food protected from the direct sunrays?

.....  
.....

28. How do you sell food during rainy seasons?

.....  
.....

29. How long do you intend to sell at the lorry station?

1year – 3 years [ ]

3years – 5 years [ ]

5 years – 10 years [ ]

10years and above [ ]

30. What motivated you to sell at the lorry station?

.....  
.....

