

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

**ASSESSING HYGIENE PRACTICES OF STREET FOOD VENDORS IN BASIC  
SCHOOLS IN SISSALA EAST DISTRICT OF GHANA**



**GRACE ANNAGMENG MWINI**

**2014**

**UNIVERSITY OF EDUCATION, WINNEBA**  
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**Dissertation submitted to the Department Hospitality and Tourism Education of the  
College of Technology Education, University of Education, and Winneba- Kumasi  
in partial fulfillment of the requirements for award of Master of Technology  
(Catering and Hospitality) degree.**

**DECEMBER, 2014**

## DECLARATION

### Declaration by Candidate

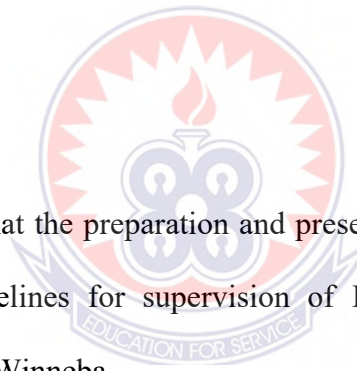
I, Grace Annagmeng Mwini, declare that this Dissertation, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and has not been submitted, either in part or whole, for another degree elsewhere

SIGNATURE:.....

DATE .....

### Supervisor's Declaration

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



NAME OF SUPERVISOR: **MR. MICHEAL TSORGALI**

SIGNATURE: .....

DATE.....

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## **DEDICATION**

This dissertation is dedicated to my parents, Mr. and Mrs. Mwini for their love, encouragement and support. Through their many sacrifices they made my education possible.



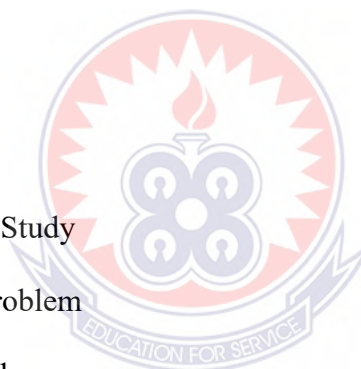
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## ABSTRACT

The major purpose of the study was to explore the food hygiene, personal hygiene and environmental hygiene practices of food vendors in basic schools in Sissala East District of Ghana. A descriptive survey design was used for the study. The population of the study comprised all street food vendors, environmental health officers and teachers in basic schools in the Sissala East District of Ghana. A sample size of eighty (80) was used. They were made up of thirty (30) street food vendors, twenty (20) environmental health officers and thirty (30) teachers. Purposive sampling and simple random sampling were used in selecting the sample. The data were gathered by administering interview guide, questionnaire and observation. Frequencies and percentages were used in analysing the data presented. From the responses of food vendors, environmental health officers and teachers, it was revealed that most food vendors observed food hygiene such as washing their hands before serving food, using separate equipment for serving cooked and raw, serving food with fork or spoon, serving food with cup or plate, keeping their equipment clean and having containers for washing bowls. It was also found that majority of the respondents did not observe some food hygiene practices. The major ones were that food vendors serve food with bare hands and do not provide drying racks for cleaned utensils. With respect to personal hygiene practices, food vendors and environmental officers indicated that food vendors do not wear clean clothes and do not wash their hands after receiving or counting money, sell when they have visible skin rashes, boils, cuts or wound and wear jewellery when selling food. The findings further showed that majority of food vendors failed to observe environmental hygiene relating to areas such as the provision of rubbish containers, drinkable water and clean towels for drying hands.

It was concluded that Food vendors on basic school premises do not observe food, personal and environmental hygiene practices to the optimum. Based on the findings, it was recommended that Environmental health workers and District Nutrition Officers should train food vendors on food hygiene practices relating to issues such as the provision of drying racks for cleaned utensils and clean towels for drying hands. It was also recommended that the training of food vendors should cover personal hygiene practices including hand washing practices and the use of clean clothes. Finally, it was recommended that food vendors should be provided training on environmental hygiene with respect to practices such as the provision of rubbish containers, drinkable water and clean towels for drying hands.



## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background to the Study

Street vended foods are interpreted by Von Holy and Makhoane (2006) as foods and beverages prepared and or sold by vendors in streets and other public places for immediate consumption or consumption at a later time without further processing or preparation. Street food businesses have become widespread in recent times, in responds to the changing lifestyle and food consumption of people. They offer convenience and ease of access of food to busy individuals who are unable to prepare their own meals regularly at home (Annor & Baiden, 2011).

Globally, street foods can be found in clusters around places of work, schools, hospitals, universities, railway stations, bus terminals and taxi ranks in the urban areas (Balkaran, 2014). Annor and Baiden (2011) asserted that the sale of foods on street is a common aspect of lifestyle in many countries. Street food vendors often have a variety of food for sale which includes snack, drinks and even full meals. A street food vendor is broadly defined as a person who offers food for sale to the public without a permanent built up structure but with a temporary static structure or mobile stall-head load, wheelbarrow or truck (Janie & Marie, 2010).

Street vended food plays important roles such as the following: they provide a source of inexpensive, convenient and often nutritious food for urban and rural poor. They are a source of attractive and varied food for tourists and the economically advantage, they are also a major source of income for a vast number of persons,

particularly women. Above all, they provide a chance for self-employment and the opportunity to develop business skills with low capital investment (Codex as cited in Nurudeen, Lawal & Ajayi, 2014).

Food and Agriculture Organisation (FAO, 2007) estimated that a total of 2.5 billion people all over the world eat street foods every day. Previous studies revealed that street food consumers come from all levels of society ranging from low income to high income groups. Even school children depend on street food (FAO as cited in Rhaman, Arif, Bakar, & Tambi, 2012).

Monday, Francis and Mohammad (2014) also stated that, there are many reasons why people eat away from home. These include among others absence from home while travelling, studying and at work. To others, the need for a change in terms of food type or location urged them to resort to buying street vended food which may be inappropriately processed.

In contrast to the potential benefits, it is also observed that street food vendors are often poor and uneducated and lack appreciation for safe food handling (Nurudeen et al, 2014). Consequently, street foods are perceived to be a major public health risk worldwide (Monday *et al*, 2014). World Health Organisation (WHO, as cited in Nurudeen *et al*) added that if a community is to have the full benefits of street vended foods, with minimal risk of food borne disease, government's intervention is required to ensure that the standard of safety for such food is attainable in the context of the prevailing local situation.

To achieve food safety globally, the Codex Alimentarius Commission in June 1997 adopted revised basic texts on food hygiene and recommended their wide use and

understanding by authorities, food industries, all food handlers and consumers to ensure that food is safe and suitable for human consumption (Codex, 1999). The general hygiene requirements and practice to be followed by the vendors was also recommend for translation by the relevant authorities into codes of practice and this was recognised as cost effective tools for the control of street foods by fully taking into account local conditions including specific risk factors that are relevant to each operation (Codex, 1999). WHO further recommended that authority undertaken Hazard Analysis and Critical Control Point (HCCP) studies to identify and integrate critical control measures into strategies for improving the safety of street foods. According to Musa and Akande (as cited in Monday *et al*, 2014), the initiative resulted to the transfer of food sanitary measures and proper food handling from individuals, families to the food vendors who rarely enforce such practices.

FAO (2007) asserted that street foods raise concern with respect to their potential for serious food poisoning outbreaks and associated health problems like flu-like illness, cholera, diarrhoea, stomach upset, vomiting, nerve breakdown, abortion and in fact death as result of unhygienic handling of foods and improper sanitary practices. The World Bank also estimated that food-borne illness cases are 350 times more than is reported worldwide. This means that most people do not report for treatment at health facilities when they experience food-borne illness which may increase morbidity and mortality rate in the country. In 2007, a research conducted by National Research Institute (NRI) in one of the regions in Ghana, revealed that most vendors and consumers do not associated unsafe food with food-borne illnesses. This calls for a great awakening on the part of all

as they could be serious consequences of patronising the sale of unsafe foods (Ababio, n.d.).

Street food vendors are classified as informal food vendors because the foods are prepared in informal settings. These informal settings pre-dispose the food to climate and temperature, unsafe water, suppliers, sanitations and pests. Most of the foods are often prepared under unsanitary conditions and in appropriate storage systems are used to store these foods for long periods before selling. It is known that poor personal and environmental hygiene contribute significantly to food contamination and the resultant on food-borne diseases (McSwane, Rue, Linton & Williams, 2004). Therefore, street foods are perceived to be a major contributory factor of morbidity and mortality due to food borne illnesses as in most instances street foods largely do not meet proper hygienic practices. For instance, food prepared in unsanitary conditions by people not trained in proper food handling techniques (Akonnor and Akonnor, 2013). Food-borne disease outbreaks are common in Ghana but are rarely reported. Despite the health-related risk potential of street foods, there have been tremendous increases of street food vending on the premises of basic schools in the urban and rural communities in Ghana.

## **1.2 Statement of the Problem**

Street food vending is associated with food-borne illnesses due to inappropriate hygienic practices. Yet majority of students depend on these street foods on the school premises for their nutrition in the Sissala East District. A casual observation and conversation with some vendors revealed that many of them assume that no matter how raw food looks or the environment from which it was purchased, once the food is cooked, it is safe for

consumption. It is, therefore, very necessary that an assessment be conducted to assess what information basic school street food vendors have in relation to food safety. Such an assessment may help to identify areas that need attention in the training programme with regard to ensuring the safety of street foods in schools, especially for vulnerable groups such as children. Additionally, legislative changes that may be necessary in light of such an assessment could be suggested for the registration of food vendors in the basic school system to help promote good health in schools through healthy nutrition. But very little research has been conducted on the hygienic practices of street food vendors in basic schools in the Sissala East District in the Upper West Region of Ghana. It appears that appropriate hygienic practices are not being observed or adhered to by street food vendors operating in basic schools in the district. There is the need for data on the hygienic practises of street food vendors in order to put in place measures to protect health of students and staff in basic schools. It was against this background that the researcher sought to assess the hygienic practices of street food vendors in basic schools in the Sissala East District in the Upper West Region of Ghana.

### **1.3 Purpose of the Study**

The purpose of the study was to assess the food hygiene, personal hygiene and environmental hygiene practices of street food vendors in basic schools in the Sissala East District of Ghana.



#### **1.4 Objectives of the Study**

The objectives of the study were to:

1. explore the food hygiene practices of street food vendors in basic schools;
2. identify the personal and environment hygiene practices of street food vendors in basic schools;
3. Recommend strategies to improve the food, personal and environmental hygiene practices of food vendors.

#### **1.5 Research Questions**

The following research questions guided the study:

1. What are the food hygiene practices of street food vendors in basic schools?
2. What are the challenges of personal hygiene practices of street food vendors in basic schools?
3. What strategies can be employed to improve the hygiene practices of street food vendors in basic schools?

#### **1.6 Significance of the Study**

- The research findings would highlight the poor hygiene practices to enable the environmental health officers to develop appropriate programmes to train food vendors on good hygiene practices and ensure compliance through regular inspections.
- Data on the unsatisfactory hygiene practices would be useful to the district community nutrition officer and the health directorate in

developing educative programmes on food safety practices in order to minimize food borne illnesses among pupils and the community.

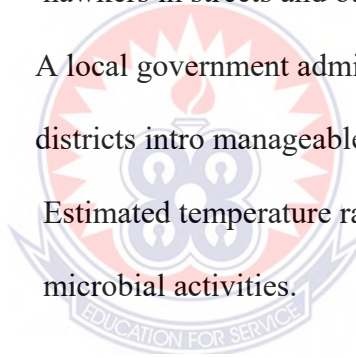
- The results on the basic school food vendors' hygiene practices would be utilized by the district school health officials to educate and monitor street food vendors on the need to maintain good hygiene practices on basic school premises.
- School Authorities such as Head-teachers and Health-teachers would become aware of poor hygiene practices which would help them to provide guidelines to enforce good hygiene practices.
- Teachers and Students would become aware of the poor food hygiene practices of food vendors and this would make them demand for appropriate hygiene practices to be observed by street food vendors on the school premises.
- Street Food Vendors would become aware of the results of the study and the recommendations for improving hygiene. This would help them adopt appropriate hygiene practices during food production and sales.
- Future researchers would have access to the results of the study which would serve as related literature for such persons in conducting similar studies.

## **1.7 Scope of the Study**

The scope of the study involved conceptual literature in relation to the concept of food hygiene, types of food contamination, street food vending in Ghana, causes of food borne-illnesses. It covered empirical literature such as relationship of knowledge, attitude and practice of hygiene among food vendors, food, personal and environmental hygiene practices among street food vendors. The study assessed the hygiene practices of Basic Schools Street Food Vendors in relation to hygiene practices during food sale on the school premises. The food hygiene practices covered food handling practices such mode of serving food, hand washing practice and care of vending equipment. The study also explored the personal hygiene practices such as care of garment worn food sales and of finger nails, covering of hair, use of jewellery and hand washing practices. Issues of environmental hygiene considered were provision of potable water for drinking and provision of equipment for hand washing, clean hand towels for drying hands, soap, and bins for washing dishes, brooms for cleaning the floor, rubbish containers and the protection of food from flies.

## 1.8 Definition of Terms

- Formal Food Vendors:* Persons involved in food preparation, distribution or selling thereof in mainstream sector e.g. restaurant, hospital, catering establishments, food factories etc.
- Informal Food Vendors:* Persons involved in food preparation, distribution or selling thereof in the ‘non-mainstream’ sectors such as street food, vendors or hawkers.
- Street Food:* Ready-to-eat foods prepared and/or sold by vendors and hawkers in streets and other similar public places.
- Area Council:* A local government administrative demarcation of districts into manageable politically affiliated units.
- Holding temperature:* Estimated temperature range of keeping food safe from microbial activities.



## CHAPTER TWO

### 2.0 REVIEW OF RELATED LITERATURE

#### 2.1 Introduction

A review of the literature would explore the studies that have looked at food safety and hygiene practices among street food vendors. The literature was reviewed under the following sub-headings;

- **Conceptual Literature**
  - The Concept of Food Hygiene
  - Types of Food Contamination
  - Street Food Vending in Ghana
  - Causes of Food Borne-illnesses
- **Empirical Literature**
  - Relationship of Knowledge, Attitude and Practice of Hygiene among food vendors
  - Food Hygiene Practice among Street Food Vendors
  - Personal Hygiene Practice among Street Food Vendors
  - Environmental Hygiene Practice among Street Food Vendors
- **Summary of Literature**

#### 2.2 The Concept of Hygiene

The conceptual issues of hygiene are reviewed under three major component namely food and personal hygiene as well as environmental hygiene practices.

### **2.2.1 Food and Personal hygiene practices**

Food and personal hygiene practices are set of principles aimed at preventing the spread of food poisoning bacteria from the body or clothing to food. It is the responsibility of the individual and all food handlers to have an elementary knowledge and understanding of the importance personal hygiene in prevent food borne diseases. The scope of personal hygiene is outlined as follows by (Codex, 1995).

### **2.2.2 Proper Hand Washing**

To avoid many illnesses, it is requested that proper hand washing procedures be adopted to ensure the use of clean hands before, during and after food preparation, before eating and after using the bathroom, blowing your nose, or touching your hair, after handling animals or their waste, or when hands are dirty (Sizer & Whitney, 2011). Washing hands more frequently before handling food in the kitchen is said to be very important since bacteria will be prevent on the surface of the skin. According to Gaman and Sherrington (n.d), hand washing usually removes most Gram negative bacteria, but Gram positive bacteria such as *Staphylococcus aureus* may remain, as they arise to the surface of the skin from the pores. This implies that cooked, high risk foods should not be touched with the bare hands.

Also, washing hands after using the toilet and before leaving the washroom helps to reduce the risk of the transfer of bacteria, such as salmonella and clostridium perfringens, from faeces and door handles to food. It is also suggested that the between food handling operations and after coughing, sneezing and after using a handkerchief

helps to reduce risk of transfer of staphylococcus aureus to food and also prevent cross contamination (Gaman & Sherrington n.d; Sizer & Whitney, 2011).

Proper hand washing should be done with plenty of warm water and soap and the nails scrubbed with a brush. They should then be rinsed under running water and dried. Hot air driers or paper towels are more hygienic than cloth towels which allow transfer of bacteria from person to person. Also the testing of food with the fingers and biting nails should be avoided in food preparation areas as these habits can spread bacteria such staphylococcus aureus from the mouth to the hands.

### **2.2.3 Coughing, Sneezing and Smoking**

Coughing and sneezing may be responsible for the spread of staphylococci on to food or working surfaces and should therefore be avoided whenever open food is handled. Handkerchiefs or tissues should be used at all times. The codex alimentarius 1995, hygiene principle also suggested that disposable paper tissues are preferable since they can be discarded. In addition, the hands should be washed after using a tissue or handkerchief (Brown, 2008). The safety standard law is against smoking in a food-preparation area. Smoking involves contact between the hands and mouth which can be responsible for the spread of staphylococcus aureus. The smoking also encourages coughing (Gaman & Sherrington, n.d.).

### **2.3.4 Outdoor Clothing and Protective Clothing**

Outdoor clothing should be placed in lockers outside food rooms since they are frequently contaminated by bacteria such as staphylococcus and streptococcus. This

contamination is particularly in congested areas, especially where people make frequent use of public transport. Food safety standard demands that protective clothing should be worn by all food handlers. This should be clean and it should cover all parts of the body liable to contaminate food. The clothing must be laundered regularly.

Otherwise, if it is worn continuously it may harbour harmful bacteria. Protective head gear should be designed so as to retain the hair in position, since hair and dandruff are a potential source of contamination by bacteria, particularly staphylococcus aureus. A food handler whose hair is long, it should be tied back. Hair should not be touched or combed in the vicinity of food. The main danger is the transfer of bacteria from the hair to the hands and then to food.

### **2.2.5 Cuts, Grazes, Boils and Septic Spots**

The personal hygiene rules outline that cuts, grazes, boils and septic lesions frequently harbour staphylococci and therefore should be covered with clean water proof dressing whereby food is handled. These dressings should be brightly coloured so that they will be readily seen if they fall into food. The recommended dressings used in food premises are normally blue. A well-equipped first aid box containing these dressings and other equipment, such as bandages and cotton wool, should be kept on the premises.

### **2.2.6 Nails, Jewellery and Health**

Long, dirty nails harbour dirt and bacteria. Therefore food handler's fingernails must be kept clean and short. Nail varnish should not be worn by food handlers since if it becomes chipped, it may provide services which can harbour bacteria. In addition, chips



of nails vanish may enter food and this neither hygienic nor aesthetically pleasing. Food handler jewellery may harbour bacteria or may fall into food and therefore, jewellery, other than wedding rings, should not be worn by food handlers.

Current food safety regulations demand that any food handler who is suffering from diarrhoea, vomiting, septic cuts, boils or other skin infection should notify his/her employee and should not handle food. This is because any of these conditions indicates that the food handler is a potential source of food poisoning organisms (Brown, 2008; Sizer & Whitney, 2011).

### **2.2.7 Environmental Hygiene**

The environmental hygiene practices cover issues related to the layout, care and maintenance food handling premise and equipment. According to Codex (1995), the food premises should be designed so that they are easy to clean. In older buildings alteration should be made to facilitate cleaning. Large equipment such as refrigeration units should be placed where they can be cleaned all around or else malleable or built into a continuous surface. The hygiene standard states that a common layout in the kitchen is to have preparation equipment, round the edges and island cooking equipment in the centre with extractor fans above for ventilation. The preparation areas for raw and cooked foods should be well separated to prevent cross-contamination and there should be a “flow” of food from delivery to storage, to preparation, to cooking, to final preparation, to service with no back tracking (Food Safety Regulation, 2005).

Equipment should be designed and positioned so that it can be easily cleaned. It should be kept in good repair and made of material that is non-absorbent and non-reactive to foods or cleaning chemicals. Stainless steel is ideal for both equipment and work surfaces. Plastics are suitable for some purposes. Wood is not suitable in food areas as it is absorbent and is difficult to clean and disinfect. It is recommended that chopping should be made of hard plastic for example Polypropylene (Gaman & Sherrington, n.d). They should be colour-coded for use with separate foods for instance red for raw meat, blue for fish, green for vegetables, brown for cooked meat. This would help avoid the risk of cross-contamination when raw and cooked foods are prepared in the same area.

Further, cloths should be used with discretion in the kitchen as they too can be a cause of cross-contamination. For example, a napkin used to mop up drip from a defrosting chicken and then used to wipe a surface to be used for cooking food. The kitchen clothes should either be colour coded for different uses or ideally single use disposable wipes should be used.

### **2.3 Types of Food Contamination**

Microorganisms can cause food borne illness either by infection or by intoxication. Infectious agents such as salmonella bacteria or various that causes forms of river disease hepatitis infect the tissues of the human body and multiply there. Other microorganisms in foods produce enterotoxins or neurotoxins, poisonous chemicals released as the bacteria multiply; once absorbed into tissues the poisons cause various kinds of harm, ranging from milk stomach pain and headache to paralysis and death (Sizer & Whitney, 2011). The toxins may arise in food during improper preparation or

storage or within the digestive tract after a person eats contaminated food. Although ten most common cause of food intoxication is the staphylococcus aureus bacterium, the most infamous is undoubtedly clostridium botulinum, an organism that produce a toxin as a single grain of salt can kill several people within an hour.

To reproduce and release the toxin, clostridium botulinum requires anaerobic conditions such as those found in improperly canned food, home fermented foods such as corn dough and homemade garlic or herb-flavoured oils stored at room temperature (centres for disease control 2006) Botulism quickly paralyzes muscles, making seeing, speaking, swallowing and breathing difficult because death can occur as soon as 24 hours later, botulism demand immediate medical attention. Even then, survivors may suffer the effect for months or years (Sizer & Whitney, 2011).

Pathogenic bacteria and virus largely enter the food supply during food production, processing, transportation, storage or preparation. (Mead *et al* as cited in Brown, 2008). They are transferred to humans in food through many different routes, A major one being the contamination of food with animal faeces, the lower intestines of many healthy farm animals are colonized by bacteria that maybe harmful to humans. These bacteria contaminate food when unsanitary practices are used to prepare and process meats, and when vegetables and fruits are fertilized with animal manure.

They can also be transferred to foods by humans who have colonies of harmful bacteria in their gastrointestinal tracts through the use of human sewage on crops and food handling by people carrying the bacteria on their hands. Also, humans transfer certain harmful microorganisms to food when fluids from infected injuries or body

secretions contact food (Brown 2008; Sizer & Whitney 2011). These types of food borne illnesses are mainly caused by bacteria that are “on” rather than “in” food (Brown, 2008).

Although less common, bacteria can be present on the inside of foods, they can enter vegetables and fruits, for example, if the protective skin coatings are broken, allowing an entrance for bacteria. Salmonella bacteria can infect the ovaries of hens and cause them to lay normal-looking but infected eggs. Shellfish can concentrate microorganisms present in surrounding water, and although the bacteria may be harmless to the shellfish they can provide large dose of harmful bacteria and virus to human (Brown, 2008).

### **2.3.1 Practices that Cause Food Contamination**

Food can provide ideal conditions for bacteria to multiply and to produce toxins. Disease-causing bacteria require the three conditions to thrive: nutrients, moisture and warmth (40<sup>0</sup>F to 140<sup>0</sup>F; 4<sup>0</sup>C to 60<sup>0</sup>C) (U.S Food and Drug Administration, 2007). To defeat bacteria, one must prevent them from contaminating food or deprive them of these conditions. Four core practices help to achieve these purposes: keeping the hands clean and surfaces clean; keep raw foods separated; keep hot food hot; and keep cold food cold. Any food with an “off” appearance or odour should be thrown away (Sizer & Whitney, 2011).

### 2.3.2 Cross-contamination of Foods

The source of many cases of food borne illness is food that has come into contact with contaminated food. This situation, referred to as “cross-contamination; increases the reach of food-borne illnesses. Microorganisms including bacteria, viruses, toxins and other harmful substance can contaminate safe foods during processing, transportation, preparation, or storage. Opportunities for cross-contamination of foods during processing, for example, an omelette in a restaurant may contain the eggs of hundreds of different chickens, and a bad breed chicken may have bathed within hundreds of others when they were all washed in same bowl of water at the processing factory. Cross-contamination also occurs on cutting boards. The handlers’ failure to routinely wash cutting boards in between the preparation of different raw foods is a major route to the spread of food-borne illness (Mead *et al* cited in Brown, 2008).

Food handlers are people who are involved in any activities that involve food or surfaces likely to come in contact with foods. It cover staff whose work involves manufacturing processing preparing (such as, chopping cooking thawing), delivery, transporting or packaging your food and staff that clean the premises and equipment (Food safety standard, 2002). It is therefore possible for these food handlers to carry diseasing causing bacteria such as staphylococcus aureus, salmonella and clostridium perfringens to food during the production.

The food process environment thus the kitchen, selling ground equipment and the source of water may provide favourable condition for the spores of clostridium perfringens and Bacillus cereus that may be found in dust around food- preparation area. Also it has been found that most types of food-poisoning bacteria may be spread by cross-contamination in the kitchen by pest (Gaman, & Sherington n.d).

One of the major sources of food poisoning bacteria is the food itself. It is apparent that food brought into the kitchen may contain bacteria or the bacteria may enter the food due to faulty handling during the preparation. Considering the multi dimension of food poisoning it is therefore very important to adopt effective measures to prevent food poisoning. These measures can be divided into three broad categories. There are personal hygiene, hygiene in the kitchen and hygienic food handling.

#### **2.4 Street Food Vending in Ghana**

The rapid growth of urban population has been accompanied with growth in poverty. The informal food trades first emerged as likelihood strategy and source of inexpensive food for many poor households. Street foods are also considered essential for maintaining the nutritional status of the population (Maxwell, 2000). In a longitudinal study conducted in Ghana, street foods accounted for 19-27% of food expenses and provide 134-417 kcal per day per person (Bendeck, 2000).

Street food vending assures food security for low-income urban populations and provides a livelihood for a large number of workers who would otherwise be unable to establish a business. The benefits of this trade extend through the local economy as often, vendors buy their ingredients locally (Winamo & Allain, 1991). Street foods are a heterogeneous food category, encompassing meals, drinks and snacks. They are mass consumer foods that are normally eaten without further processing or cooking. Street foods show variation in terms of ingredients, methods of processing and consumption (Ekanem, 1998).

Street food vending has and is becoming globally a convenient and an essential service. Lifestyle changes and socio-economic factors create very little space for consumers to look at other alternatives one of which would be to prepare one's own meal. Street foods therefore become an easy and economic means to acquire prepared food (Balkaran, 2014). In Ghana, there is growing need for already prepared meals and the importance of this growth market cannot be underestimated especially with the urban, peri-urban and folk who cannot afford the luxury of cooking a three 'square meal' at home on a daily basis.

The culture of taking friends and family out to have quick meals has also come to stay. Also meals are prepared for or sold in schools and hospital to provide meals for children and inmates respectively. The changing life-style of people has created the need for already prepared meals for the public. (Ababio, n.d). In Ghana, street foods can be found in clusters around place of work, schools, hospitals, universities, railway stations, bus terminals and taxi ranks in the urban and peri-urban areas.

A number of studies have examined the characteristics of street food vendors and the results indicated that the street food vendors are heterogeneous group. They differ in various socio-economic area demographic criteria. Vendors have been classified as stationary and ambulatory (Campbell, 1990). Food vendors may contaminate food by poor personal hygiene, cross-contaminating raw and processed food, as well as inadequate cooking and improper storage of food. Maintaining high food safety levels in school food services is very important because incidence can affect a high number of students (Osaili, Jamous Obédait, Bawadi, Tayyem & Subith, 2013).

## 2.5 Causes of Food-Borne Illness

Worldwide, food-borne diseases are most especially diarrhoeal disease, which is an important cause of morbidity and mortality. Food-borne diseases are the illness contracted from eating contaminated food or beverages. The illnesses include food-borne intoxication and infections which are often incorrectly referred to as food poisoning (McSwane, Rue, Linton & Williams, 2004). There are more than 250 different food-borne diseases. They are caused by viruses, bacteria, parasites, toxins, metals and prions. The spectrum of food-borne illnesses, range from mild gastroenteritis to life-threatening neurologic hepatic and renal syndrome (Occupational Food Safety and Health Administration, 2010).

Contaminated food and water have been implicated to be a major source of illness. Food-borne illnesses are a growing public health concern worldwide because they result from food contaminated by pathogenic micro-organisms, mycotoxins or chemical hazards. This concern is elevated by the fact that, worldwide, there seems to be a change in life-style and food consumption patterns as frequency of "eating out" is increasing and commitment to food preparation at home is decreasing (Initiative to Estimate the Global Burden of Food, 2013).

Most food-borne diseases are caused by microbial pathogens such as viruses, bacteria and parasites although few might cause by physical and chemical contamination. There is a wide range of food and water borne infections such as cholera, campylobacteriosis, cryptosporidiosis, E Coli infections, salmonellosis, shigellosis, enteric fevers, brucellosis, hepatitis, amoebiasis and nematode infections (Cartwright, 2003).



These dangerous microorganisms are widely found in soil, water, animal, and people. These micro-organisms may be carried on hands, wiping cloths, utensils, cutting boards. It is therefore very important to take note of their health implication in schools (Esená & Owusu, 2013). Several food-borne disease outbreaks have been reported to be associated with poor personal hygiene of food stuff handlers.

Food-borne diseases are increasing in both developed and developing countries. Diarrhoeal diseases, mostly caused by food borne microbial pathogens, are the leading causes of illness and deaths in the developing countries, killing an estimated 1.9 million persons annually at the global level (Schundt, Toyofuku, Janse, & Herbst, 2004). It has been noted that risk factors such as compromised nutritional status, immune status, debilitation disease, stress factors and physiological state of the stomach and upper small intestine at the time of exposure to the agent determines the nature of infections (Health protection agency, 2009). Food-borne diseases are a major contributor to illness, compromised nutritional status, less resistance to disease and loss of productivity (World Health Organization, 2007).

The globalization of food supply system has presented new challenges for food safety and has contributed to the international public health problem of food-borne disease. This attributed to the growing industrialization and trade of food produce, rapid urbanization associated with increased food preparation and consumption outside the home and the emergence of new or antibiotic-resistant pathogens and food vehicles (WHO, 2007).

To initiate and sustain efforts aimed at preventing food borne diseases at national and international levels, the magnitude of the problem needs to be determined. The number of reported outbreaks of food-borne illnesses has been high, both in developed as well as developing countries (Osaili, Jamous, Obeidat, Bawadi, Tayyem, & Subili, 2013). However, the problem is aggravated in developing countries due to economic reasons, poverty, the lack of adequate health care facilities, and the limited data regarding food-borne diseases. This greatly compromises the achievement of millennium development goals (particular MDG 1, 4, 5 and 6) (FAO of the United Nations, WHO, 2013).

Food contamination in developing countries is caused by many factors including traditional food processing methods, inappropriate holding temperatures, and poor personal hygiene practices of food handlers (Feglo & Sakyi, 2012). The prevalence of food-borne illness in developing countries is intertwined with other economic and developmental issues, namely, legislation, infrastructure and enforcement mechanisms. Specific examples include inadequacy of food safety laws, laxity in regulatory enforcements and the lack of education for food handlers ( DeWaal & Rober, 2013).

The incidence of food and water-borne diseases is estimated at 3.3 – 4.1 episodes per child per year in Africa. Further, food and water-borne diarrhoeal diseases are estimated to cause between 450,000 and 700,000 deaths in Africa annually. Meanwhile, many of the sporadic cases are not recorded (Santos, Nogueira, Patarata & Mayan, 2008). Feglo & Sakyi (2013); Dewaal et al 2013) added that most of the food and water-borne cases pathogens such as *Escherichia coli*, *Bacillus cereus*, *Salmonella*, *Hepatitis*, *Shigella*, *Brucella*, *Staphylococcus aureus*, *campylobacter*, *rotavirus* and enteric bacteria are identified.

### **2.5.1 The Incidence of Food-borne Diseases in Ghana**

Ghana like many other African countries, there is an abundance of national legislation but limited resources to control street food safety (Dawaal et al, 2013). Institutions such as the Ghana Standards Authority and Food and Drugs Board are committed to the work of regulating food standards and training the general populace on food safety issues. However, improvement in food safety systems has not been fully realised. This is observed in recent reports of food-borne illnesses and contamination of street food with enteric the bacteria in various parts of the country (Toddi as cited in Monney, Agyei & Owusu, 2013).

A number of outbreaks have recently been reported in Ghana. For instance, four persons died in Sheho in the Upper East Region of Ghana after eating contaminated meat (Ghana New Agency (19 April, 2013). Also, a cholera outbreak in Atebubu in the Brong Ahafo Region claimed nine lives (Ghanaweb, 22/May, 2013). Another outbreak resulted in the death of one person in Obuasi in the Ashanti Region and the hospitalization of over 50 people (Joy News, 22/5/2013). It has been estimated that about 500 children under five years age die from diarrhoea each year in Ghana (Graphic Online, 22/5/2013) Despite these alarming statistics, only few surveys have been done to understand and correlate the cause of food-borne illness in Ghana.

### **2.6 Relationship of Knowledge, Attitudes and Practices (KAP) of hygiene**

Simelane's (2005), KAP model would be used to discuss the relationship among knowledge, attitudes and behaviour. Knowledge accumulates through learning processes and these may be formal or informal instruction, personal experience and experiential

sharing (Glanz & Lewis, 2002). It has been traditionally assumed that knowledge is automatically translated into behaviour (Glanz & Lewis). However, behaviour change theories and experiences in the HIV fields have indicated that knowledge alone does not translate into appropriate behaviour modification (USAID, 2004). Knowledge, however, is not insignificant and it is found to be vital in cognitive processing of information in the attitude and behaviour relationship (Simelane, 2005).

Attitude, on the other hand, involves evaluative concepts associated with the way people think, feel and behave. Psychologists define attitudes as a learned tendency to evaluate things in a certain way. This can include evaluation of people, issues, objects or events. Such evaluations are often positive or negative but they can also be uncertain at times. For example, you might have mixed feelings about a particular person or issue (Cheery, nd; Keller, 1998).

Researchers also suggest that there are several different components that make up attitudes namely; an emotional component: How the object, person, issue or events makes one feel; a Cognitive Component: One's thoughts and beliefs about the subject and a Behavioural Component: How the attitude influences one's behaviour (about.com psychology, 2013)

Attitude can also be explicit and implicit. Explicit attitudes are those that we are consciously aware and that clearly influence our behaviour and beliefs. Implicit attitudes are unconscious but still have an effect on our beliefs and behaviour (Cherry, nd). It has also been postulated that attitude may influence one's intention to perform a given behaviour or practice (Rutter & Quine, 2003). This implies that the knowledge and

attitude correlate with behaviour. For instance, if a person has a positive attitude towards appropriate hand washing, he or she is more likely to wash the hands (Simelane, 2005).

However, some social scientists have argued that KAP surveys are not necessarily adequate to provide information especially for programmatic planning. It argued that critical elements relating to variable may not be captured in the use of questionnaire at that in-depth information gathering using qualitative methods may be additionally beneficial in eliciting information as surveys fail to explain the logic behind the behaviour (Launiala, 2009).

### **2.6.1 The Effect of Knowledge, Attitudes and Practices (KAP) on Food Safety and Food-Borne Diseases**

Results of a study to assess knowledge, attitudes and behaviour concerning food-borne diseases and food safety issues amongst formal food handlers conducted in Italy found that the majority of the food handlers who have been trained in food hygiene and safety course had knowledge and positive attitude towards food-borne diseases, control and preventive measures (Angellilo, Veggiani, Rizzo & Biaric, 2000). In contrast, a study conducted in Mauritius on street food vendors it was reported that despite the efforts of health inspectors in preventing the risk of poor hygiene practice and creating an awareness of hygienic conditions, the majority of the food vendors were not putting their knowledge into practice as they perceived their products to be of low risk (Subratty, Beeharry & Chansun, 2004).

## 2.7 Food Hygiene among Street Food Vendors

A study conducted by Monney *et al* (2013) in educational institutions in Konongo in the Ashanti Region of Ghana; revealed that food vendors in educational institutions generally adhered to good food hygiene practices, namely, regular medical examination (93%) use of personal protective clothing (52%) protection of food from flies and dust (55%), preserving of food (100%) and good hand washing practices (63%). This finding was attributed to food hygiene training instead of the level of education. The finding agrees with the finding of a related study conducted by Rahmam *et al* at Sarawak in Northern Kuching city, which also revealed that food safety training correlates with good food hygiene, practices among streets food vendors. Rahman, *et al* recommended that food safety training is essential for street food vendors to enhance their hygiene practices.

Information from a study conducted by Muinde and Kria (2005) in Nairobi of which the data were collected through in-depth interview and observation checklist revealed that the food vendors lack training on food preparation. The study outlined that 62% obtained food preparation skills through observation while 33% were taught by their parents in non-formal setting. Also, the finding indicates that preparation surfaces used for the preparation of raw foods were not washed regularly. Cooked foods were stored at ambient temperature in cupboards, plastic bowls, jug and buckets were just left in the open. Vendors had garbage and waste bins beside the stalls.

Balkaran (2014) added that food vendors prepared foods were display with no covers in very humid weather.

In a study done by Nicolas, Razack, Yoland and Aly (2007), it was observed that cooked and uncooked foods at warm temperatures for 6 hours or longer without any appropriate holding temperature are a major critical point of street vending control operation surveyed. In addition, cooked food were subjected to cross-contamination and contamination from various sources such as utensils, knives, raw foodstuff, flies that sporadically land on the foods, by vendors' bare hand serving and occasional food handling by consumers. Most of the studies reviewed agreed that street food vendors neglect food safety practices, providing population unsafe foods.

## **2.8 Personal Hygiene Practices among Street Food Vendors**

A descriptive survey of hygienic and sanitary practices of vendors of street foods in Nairobi with a sample of street food vendors revealed that hygiene was not observed as the vendors never covered their heads, handled money and food at the same time and they did not wear overcoats aprons and handled food with bare hands. The findings were attributed to the fact that the vendors were not aware of hygienic and sanitary practices (Muinde & Kuria, 2005).

A similar study conducted by Nurudeen *et al* (2014) added that vendors used their mouths to blow air into polythene bags to open, before using it to package foods for customers. Balkaran (2014) also added that majority of food handlers studied in South Africa did not wear gloves, hair nets or apron.

A study conducted by Mensah, Yeboah-Manu, Owusu, Dark and Ablordey (2002) found that the use of fork and spoon to serve food reduced the level of contamination, while the use of bare hands resulted in increase. They also reported about 36% of the

vendors served food with their bare hands. The vendors were also found to be carriers of variety of bacteria enteropathogens, including salmonella tyrobi (Mensah *et al* as cited in Mensah *et al*, 2002).

A study on foods sold in Nigerian schools also showed unacceptable levels of bacteria. Okukoya *et al* (as cited in Mensah *et al* 2002). In addition, E. coli and S. perferinges were isolated from some samples. Vendors appeared to be selling low standard food to school children because of their low purchasing power and their lack of knowledge on food safety. A lack of knowledge was identified as the risk factor because the study found that none of the vendors associated dirty hands with the transmission of diarrhoea pathogens. This explained why people commonly used their hands to serve cooked food.

## **2.9 Environmental Hygiene Practices among Street Food Vendors**

Gordon Davis (2011) interprets hygiene as the preservation of health and it involves all measures that ensure that safety and quality of food during its handling. Gordon-Davis (2011) identifies these measures as correct storage of both raw and cooked foods as well as correct preparation and cooking methods. Unhygienic preparation of food provides plenty of opportunity for transfer of bacteria as well as growth or survival of bacteria and other pathogens.

The hygiene and sanitation aspect is the most significant aspect that could possibly have a negative impact on food quality (Gordon-Davis, 2011). Mensah *et al* (2002) found that in most countries street food stands are simple structures where running water, toilets and washing facilities are seldom available. The washing of hands, utensil and dishes are



often done in bowls or pots of water. Mensah *et al* (2002) have also mentioned in their findings that disinfection is seldom carried out and pest may be attracted to vending sites if there is inadequate sewage disposal. Foods prepared at these sites pose health risks as they are ineffectively refrigerated and hygiene principles are not applied properly.

Abdalla *et al* (2009) found that food handling personnel play a significant role in maintaining the safety of food throughout the food production and storage stages. Bad hygienic practices by the vendors may allow bacteria to come into contact with food and cause food poisoning. Failure to maintain equipment and utensils hygienically and good repair may cause food poisoning.

Gordon-Davis (2011) identified the most common food poisoning bacteria as salmonella, staphylococcus aureus, clostridium perfringens, bacillus cereus, Escherichia coli (E. coli) and clostridium botulinum, with salmonella being the most common. Abadalla *et al* (2009) identified that in food processing food borne microbes can be released from infected humans who handle the food, or by cross-contamination from some other raw agricultural product and the in-plant environment. Abadalla *et al* (2009) stated that the hands are the most significant source of transfer of micro-organisms from faeces, skin, or other sites to vendors.

A survey of street food vendors at vending site in the city of Durban South Africa showed that a total of 29 vendors were observed all of whom said they prepared all their meals at the site and began preparation at 5am every day. Washing of utensils was carried out in bowls or pots which were also used for cooking and water was not being changed, as it was not easily accessible. This method of washing meant that water was becoming dirtier and dirtier with repeated use. Dirty pots and other dishes were left in heaps close

to serving areas and already prepared food (Kok & Balkaran, 2014). The activities cause a great number of flies in the area. The study also reported that garbage was left open. Prepared foods were displayed with no covers in very humid weather. This encourages the proliferation of insects and rodents linked to disease.

Mensah *et al* (2002) also stated that environmental hygiene and the vendors' appearance did not show any significant relationship with the levels of contamination implying that no risk if direct contact could not be made with food. The study noted that the handling of food at ground level increased the risk of contamination because dust could easily be blown on to food handled. Pathogens can be passed mechanically by flies (Levine *et al* as cited in Mensah *et al*, 2002). This study confirmed that there is consequently a risk of contamination associated with the exposure of food to flies.

## **2.10 Summary of Literature**

The conceptual review indicated the practice of street food vending assures food security for low-income urban populations and provides a livelihood for a large number of workers who would otherwise be unable to establish a business. The benefits of this trade extend through the local economy as often, vendors buy their ingredients locally. Street foods are a heterogeneous food category, encompassing meals, drinks and snacks. They are mass consumer foods that are normally eaten without further processing or cooking. The changing life-style of people has created the need for already prepared meals for the public.

Food vendors may contaminate food by poor food hygiene, personal hygiene and environmental hygiene which often lead to cross-contamination of raw and processed food. Also inadequate cooking and improper storage of food promote microbial invasion of food. Maintaining high food safety levels in school food services is very important because food contamination can affect a high number of students.

Contaminated food and water have been found to be a major source of illness. Food-borne illnesses are a growing public health concern worldwide because they result from food contaminated by pathogenic micro-organisms, mycotoxins or chemical hazards. This concern is elevated by the fact that, worldwide, there seems to be a change in life-style and food consumption patterns as frequency of "eating out" is increasing and commitment to food preparation at home is decreasing.

There is a wide range of food and water borne infections such as cholera, campylobacteriosis, cryptosporidiosis, E Coli infections, salmonellosis, shigellosis, enteric fevers, brucellosis, hepatitis, amoebiasis and nematode infections. The source of many cases of food borne illness is food that has come into contact with contaminated food. This situation, referred to as "cross-contamination which increases the risk of food-borne illnesses.

To defeat bacteria, one must prevent them from contaminating food or deprive them of these conditions. Four core practices help to achieve these purposes: keeping the hands clean and surfaces clean; keep raw foods separated; keep hot food hot; and keep cold food cold. Any food with an "off" appearance or odour should be thrown away.

The empirical review indicated that knowledge and attitude correlate with behavior in street food vendors' hygiene practices. For instance, if a person has a positive

attitude towards appropriate hand washing, he or she is more likely to wash the hands before handling food (Simelane, 2005).

The literature also revealed that cooked food were subjected to cross-contamination and contamination from various sources such as utensils, knives, raw foodstuff, flies that sporadically land on the foods, by vendors' bare hand serving and occasional food handling by consumers. Most of the studies reviewed agreed that street food vendors neglect food safety practices, providing population unsafe foods.

Some studies found that the use of fork and spoon to serve food reduced the level of contamination, while the use of bare hands resulted in increase of microbes in cook food. There also report that vendors served food with their bare hands. Vendors were also found to be carriers of variety of bacteria enteropathogens, including salmonella.

Some findings also indicated failure to maintain equipment and utensils hygienically and good repair; garbage left open as well as prepared foods displayed with no covers in very humid weather cause food poisoning. Other studies confirmed that there is consequently a risk of contamination associated with the exposure of food to flies.

The researcher therefore sought to explore the food hygiene, personal hygiene and environmental hygiene practices of street food vendors in basic schools in the Sissala East District in the Upper West Region of Ghana.

## **CHAPTER THREE**

### **3.0 METHODOLOGY**

#### **3.1 Introductions**

This chapter describes the research methodology utilized. It comprised the research design, population, sampling, research instruments, the data collection procedure, and data analysis techniques.

#### **3.2 Research Design**

A descriptive survey design was used for the study. This is because the current study sought to describe the existing food, personal and environmental hygiene practices of street food vendors. It also facilitated easy collection of data from a large group which is relatively inexpensive and can be used in a short space of time (Campbell, 2011).

#### **3.3 Study Area**

The study was conducted in the Sissala East District. The Sissala East District is located in the north-eastern part of the Upper West Region of Ghana. The district has a total land mass of 4,744 sq km and current estimated population of 54,752. It shares boundary on the north with Burkina Faso, on the east with Kassena Nankana and Builsa South Districts, to the south east with West Mamprusi District, South West with Wa East and Nadowli Districts and to the west by Sissala West Districts. For administrative purposes, the district is divided into five town/area councils namely; Tumu Town Council; Bujan Area Council; Wellembele Area Council; Sakai Area Council and Nabulo Area Council (Sissala East District Assembly, 2012).

### **3.4 Population**

The population of the study consisted of all street food vendors in basic schools, environmental health officers and teachers in the Sissala East District in the Upper West Region of Ghana.

### **3.5 Sampling Techniques and Sample Size**

Two sampling techniques were used namely purposive and simple random sampling. The purposive sampling was used to select all vendors who prepare and sell complete meals in basic schools and all the district environmental health officers while simple random sampling was used to select teachers in basic schools for the study.

The sample size was eighty (80). This was made up of thirty (30) street food vendors, twenty (20) environmental health officers and thirty (30) teachers. This was based on the recommendation made by Krejcie and Morgan (1970). There are fifty-nine (59) basic schools in the Sissala East District. The basic schools used for the study were; TUCE Demonstration Basic, Tumu Junior High, Egala Basic, Falahiya Basic, T.I Ahamadia Basic, St Gabriel's Basic and Tumu United Basic.

### **3.6 Data Collection Techniques**

Three instruments were used to collect data. These were interview, questionnaire and observation.

### **3.7 Data Collection Procedure**

#### **3.7.1 Interview**

The interview was used to collect data from food vendors on their food and personal hygiene practices. The interview guide comprised questions to obtain information on demographical data such as age, level of education and types of food sold. Information on food hygiene, personal hygiene and environmental hygiene were also covered. The questions were dichotomous making room for yes/no responses. The items on the food hygiene practice covered how food vendors handle foods to prevent cross-contamination such as hand washing, keeping food warm, and care of equipment. Also, the items on personal hygiene covered issues relating to use of clean garment, hand washing and hair covering.

#### **3.7.2 Questionnaire**

Questionnaires were administered to the environmental health officers and teachers to collect data on the food, personal and environmental hygiene practices of food vendors in basic schools. The instruments were adapted from Simpson (2005), Martins (2006), Abdalla, suliman and Bakhiet (2009) and Campbell (2011) who conducted similar studies on street food hygiene and safety. The questionnaire comprised questions to obtain information on demographical data such as age, level of education and types of food sold. Information on food hygiene, personal hygiene and environmental hygiene were also covered. The questionnaire was dichotomous making room for yes/no responses. The items on the food hygiene practice covered how food vendors handle foods to prevent cross-contamination such as hand washing, keeping food warm, and care

of equipment. Also, the items on personal hygiene covered issues relating use of clean garment, hand washing and hair covering. Finally, the environmental hygiene items covered cleanliness of working area, provision of drinkable water and hand washing equipment.

### **3.7.3 Observation**

The observation was also conducted to collect data on the environmental hygiene practices of food vendors during food sale on basic school premises. The environmental hygiene items covered cleanliness of working area, provision of drinkable water and hand washing equipment.





## **CHAPTER FOUR**

### **4.0 RESULTS AND DISCUSSION**

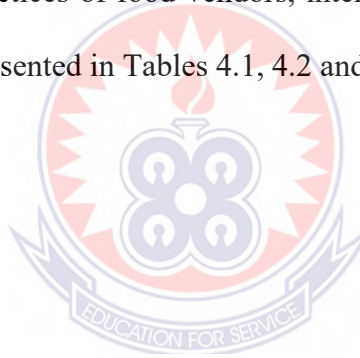
#### **4.1 Introduction**

This chapter presents the results and discussions from interview, questionnaire and observation.

#### **4.2. Results and Discussion of Interview from Vendors**

##### **4.2.1 Results of Interview from Vendors**

To assess the hygiene practices of food vendors, interview was granted to food vendors and their responses are presented in Tables 4.1, 4.2 and 4.3.



**Table 4.1: Socio-Demographic Data of Street Food Vendors**

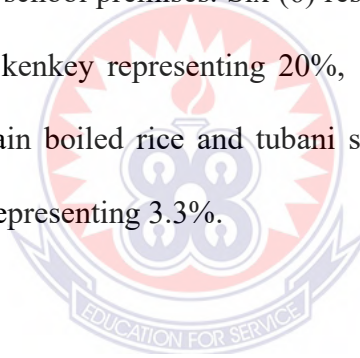
Variable	Frequency	Percentage (%)
<b>Sex</b>		
Male	-	-
Female	30	100
<b>Age</b>		
Less than 20	-	-
21-30	5	16.7
31-40	18	60.0
41-50	4	13.3
above 50	3	10.0
<b>Educational Status</b>		
No formal education	10	33.3
Primary	1	3.3
J.H.S	7	23.3
S.H.S	11	36.7
Technical/Vocational	1	3.3
Tertiary	-	-
<b>Types of food sold on</b>		
basic school premises	5	16.7
Porridge	2	6.7
Plain boiled rice	3	10.0
Kenkey	8	26.7
Banku	2	6.7
Tubani	1	3.3
Ampesi	6	20.0
Fried yam	3	10.0

The data in Table 4.1 showed that all of the respondents 30 representing 100% were females. This means that food vendors in schools at Sissala East District are females. Also 18 respondents representing 60% were in the 31-40 year range, 5 representing

16.7% were in the 21-30 year range, 4 representing 13.3% were in the 41-50 year range and 3 representing 10% were above 50 years.

Also the data indicated that, 10 of the respondents representing 33.3% had no formal education, 1 representing 3.3% had primary education, 7 representing 23.3% had JHS education, 11 representing 36.7% had SHS education and 1 respondent representing 3.3% having technical/vocational education. This shows that majority of the respondents have their education up to the SHS level. It can further be seen that none of the respondents had tertiary education.

Additionally, 8 respondents sold banku representing 26.7% which was the highest type of food sold on basic school premises. Six (6) respondents sold fried yam, another 5 sold porridge and 3 sold kenkey representing 20%, 16.7% and 10% respectively. The least sold food were plain boiled rice and tubani sold by 2 respondents representing 6.7%, respectively and 1 representing 3.3%.



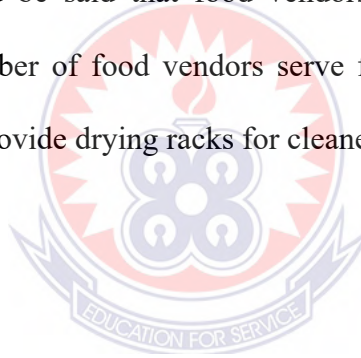
**Table 4.2: Food Hygiene Practices of Vendors**

<b>PRACTICES</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Hand washing	17	56.7
No hand washing	13	43.3
Separate equipment for serving cooked and raw food	28	93.3
No separate equipment for serving cooked and raw food	2	6.7
Keep food warm	14	46.7
Keep no food warm	16	53.3
Serve food with fork/spoon	20	66.7
Serve food with no fork/spoon	10	33.3
Serve food with bare hands	26	86.7
Serve food with no bare hands	4	13.3
Serve food with cup/plate	26	86.7
Serve food with no cup/plate	3	10.3
Keep equipment clean	23	76
Keep no equipment clean	7	23.3
Container for washing utensils	24	80
No container for washing utensils	6	20
Drying rack for cleaned utensils	7	23.3
No drying rack for cleaned utensils	23	76.7

The results in Table 4.2 indicated that 17 of the respondents representing 56.7% stated that they wash their hands before serving food, whereas 13 representing 43.3% said they do not wash their hands. The table also shows that 28 respondents representing 93.3% said they use separate equipment for serving cooked and raw food but 2 representing 6.7% said they do not. Also, 14 respondents representing 46.7% indicated that they keep food warm during sales while 16 representing 53.3% said they do not. It can also be seen that 20 respondents representing 66.7% said they serve food with fork or spoon, but 10 representing 33.3% said they do not.

The table also indicates that 26 of the respondents representing 86.7% stated that they serve food with bare hands whereas 4 representing 13.3% said they do not. It was also observed from the table that 26 respondents representing 86.7% said they serve food with cup or plate whereas 3 representing 10.3% said they do not. Moreover, 23 respondents representing 76.7% said they keep their equipment clean while 7 representing 23.3% said they do not. Again, it was observed that 24 respondents representing 80% have containers for washing utensils while 6 (representing 20%) said they do not. Lastly, 7 respondents (representing 23.3%) said they provide drying racks for cleaned utensils whereas 23 representing 76.7% said they do not.

In nutshell, it could be said that food vendors observe food hygiene practices. However, a sizeable number of food vendors serve food with bare hands representing 86.7% and some do not provide drying racks for cleaned utensils representing 76.7%.



**Table 4.3: Personal Hygiene Practices of Vendors**

Practices	Frequency	Percentage (%)
Wear clean clothes	22	73.3
Wear no clean clothes	8	26.7
Keep nails short and clean	24	80.0
Leave nails longer and dirty	6	20.0
Sell food with visible skin rash, boil, cut or wound	16	53.3
Sell food with no visible skin rash, boil, cut or wound	14	46.7
Wear jewellery when selling food	22	73.3
Wear no jewellery when selling food	8	26.7
Cover hair when selling food	27	90.0
Cover no hair when selling food	3	10.0
Wash your hands after counting/receiving money	4	13.3
Wash no hands after counting/receiving money	26	86.7

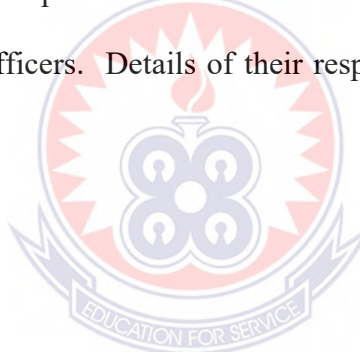
The results in Table 4.3 revealed that 22 respondents representing 73.3% stated that they wear cleaned clothes, whereas 8 representing 26.7% said they do not. Also 24 respondents representing 80% said that they keep their nail short and cleans while 6 representing 20% said they do not. Again, 16 respondents representing 53.3% said they do sell food when they have visible skin rashes, boil, and cut or wound whereas 14 representing 46.7% said they do not. In addition, 22 respondents representing 73.3% said they wear jewellery when selling food whereas 8 representing 26.7% said they do not. Also, 27 respondents representing 90% stated that they cover their hair when selling food while 3 representing 10% respondents said they do not. Lastly, 4 respondents representing 13.3% said that they wash their hands after counting or receiving money while 26 respondents representing 86.7% indicated that they do not.

To summarize, food vendors observe personal hygiene practices to some extent. However, they failed to observe some other important personal hygiene practices. For example, 53.3% of the respondents said they sell when they have visible skin rashes, boils, cuts or wound. Other respondents representing 73% indicated that they wear jewellery when selling food and 86.7% said they do not wash their hands after counting or receiving money.

### **4.3 Results and Discussion of Questionnaires**

#### **4.3.1 Results and Discussion of Questionnaire from Environmental Health Officer**

To assess the hygiene practices of food vendors, questionnaires were administered to environmental health officers. Details of their responses are presented in Tables 4.4, 4.5, 4.6 and 4.7.



**Table 4.4: Socio-Demographic Data of Environmental Health Officers**

<b>Variables</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Sex</b>		
Male	10	50.0
Female	10	50.0
<b>Age</b>		
less than 20	2	10.0
21-30	12	60.0
31-40	6	30.0
41-50	-	-
Above 50	-	-
<b>Educational Status</b>		
No formal Education	-	-
Primary	2	10.0
JHS	1	5.0
SHS	3	15.0
Technical/Vocational	1	5.0
Tertiary	13	65.0
<b>Types of food sold on basic school premises</b>		
Porridge	1	5.0
Plain boiled rice	4	20.0
Kenkey	3	15.0
Banku	9	45.0
Tubani	1	5.0
Fried yam	2	10.0

As shown in Table 4.4, respondents were made up of 10 representing 50% males and 10 representing 50% females. Two (2) respondents representing 10% were less than 20 years, 12 representing 60% were in the 21-30 year range and 6 representing 30% in the 31-40 year range. None of the respondents were in the 41-50 year range and above 50 years.

Also, from the data 2 of the respondents representing 10% had their education up to the primary and 1 representing 5% respondent attended JHS, 3 representing 15% had SHS education, and 1 representing 5% respondent had technical/vocational education



while 13 representing 65% of the respondents had tertiary education. Thus, all the respondents had formal education.

Furthermore, 8 respondents representing 45% indicated banku was the highest type of food sold on basic school premises, 4 representing 20% said plain boiled rice was sold and 3 representing 15% indicated kenkey while others said tubani 1 representing 5% and porridge 1 representing 5% which were the least sold.

**Table 4.5: Environmental Health Officers on Street Food Vendors' Food Hygiene Practices**

Practices	Frequency	Percentage (%)
Hand washing	16	80.0
No hand washing	4	20.0
Use separate equipment	17	85.0
Use no separate equipment	3	15.0
Keep food warm	7	35.0
Keep no food warm	13	65.0
Serve food with fork/spoon	4	20.0
Serve food without fork/spoon	15	75.0
Serve food with bare hands	15	75.0
Serve food without bare hands	5	25.0
Serve food with cup/plate	9	47.4
Serve food without cup/plate	10	52.6
Keep equipment clean and free from visible dirt and filth	8	40.0
Keep no equipment clean and free from visible dirt and filth	12	60.0
Containers for washing utensils	19	95.0
No containers for washing utensils	1	5.0
Provide drying racks for cleaned utensils	2	10.0
Provide no drying racks for cleaned utensils	18	90.0

Table 4.5 revealed that 16 of the respondents representing 80% stated that food vendors wash their hands before serving food while 4 representing 20% said they do not wash their hands. Also 17 respondents representing 85% said food vendors use separate equipment for serving cooked and raw food but 3 representing 15% said they do not. Furthermore, 7 respondents representing 35% indicated that food vendors keep food warm during sales while 13 respondents representing 65% said they do not. Besides, 4 respondents representing 20% said food vendors serve food with fork or spoon and 15 representing 75% said they do not.

Table 4.5 further shows that 15 of the respondents representing 75% stated that food vendors serve food with bare hands whereas 5 representing 25% said they do not. It was also observed from the table that 9 respondents representing 47.4% said food vendors serve food with cup or plate whereas 10 representing 52.6% said they do not. Moreover, 8 respondents representing 40% said food vendors keep their equipment clean while 12 representing 60% said they do not. Again, it was observed that 19 representing 95% said food vendors have containers for washing utensils while 1 representing 5% said food vendor do not. Lastly, 2 respondents representing 10% said food vendors provide drying racks for cleaned utensils whereas 18 representing 90% said they do not provide drying rack for cleaned utensils.

It can be said that street food vendors observe food hygiene practices. However, a sizeable number of the respondents representing 65% and representing 52.6% indicated food vendors do not keep food warm during sales and do not serve food with cup or plate respectively.

**Table 4.6: Environmental Health Officers on Street Food Vendors' Personal Hygiene Practices**

Practices	Frequency	Percentage (%)
Wear clean clothes	8	40
Wear clean clothes	12	60
Keep nail short and clean	10	50
Keep nail longer and dirty	10	50
Observe visible skin rash, boil, cut or wound	6	30
Observe no visible skin rash, boil, cut or wound	14	70
Wear jewellery when selling food	18	90
Wear no jewellery when selling food	2	10
Cover hair when selling food	14	70
Cover no hair when selling food	6	30
Wash hands after counting/receiving money	3	15
Wash no hands after counting/receiving money	17	85.0

From the results in Table 4.6, 8 respondents representing 40% stated that food vendors wear clean clothes, whereas 12 respondents representing 60% said they do not. 10 respondents representing 50% said that food vendors keep their nail short and clean while 10 respondents representing 50% said food vendors do not. Again, 6 respondents representing 30% said food vendors do not have visible skin rashes, boil, and cut or wound whereas 14 respondents representing 70% said they do not. In addition, 18 respondents representing 90% said food vendors wear jewellery when selling food whereas 2 respondents representing 10% said they do not. Also, 14 representing 70%

stated that food vendors cover their hair when selling food while 6 respondents representing 30% said they do not. Finally, 3 respondents representing 15% noted that food vendors wash their hands after counting or receiving money while 17 respondents representing 85% indicated that they do not wash their hands after counting money when selling food.

From the analysis, it can be said that street food vendors do not observe personal hygiene. This because 90% of the respondents indicated that food vendors wear jewellery when selling food and 85% of the respondents also said food vendors do not wash their hands after counting or receiving money during food sales.

**Table 4.7: Environmental Health Officers on Street Food Vendors' Environmental Hygiene Practices**

Practices	Frequency	Percentage (%)
Provide drinkable water	6	30.0
Provide no drinkable water	14	70.0
Provide bowls or buckets	11	55.0
Provide no bowls or buckets	9	45.0
Provide clean towels	4	20.0
Provide no clean towels	16	80.0
Provide soap for washing hands	5	25.0
Provide no soap for washing hands	15	75.0
Provide bowls or buckets for washing dishes	14	70.0
Provide no bowls or buckets for washing dishes	6	30.0
Provide brooms for keeping grounds clean	11	55.0
Provide no brooms for keeping grounds clean	9	45.0
Provide rubbish containers	-	-
Provide no rubbish containers	20	20
Protect food from flies	14	70
Leave food to flies	6	30

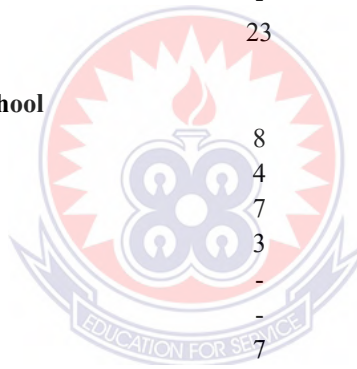
The results in Table 4.7 indicated 6 respondents representing 30% stated that food vendors provide drinkable water but 14 respondents representing 70% said they do not. Also, 11 respondents representing 55% said that food vendors provide bowls or buckets for washing hands while 9 respondents representing 45% said they do not provide. Moreover, 4 respondents representing 20% said food vendors provide clean towels for drying hands whereas, 16 respondents representing 80% said food vendors do not. In addition, 5 respondents representing 25% indicate that food vendors provide soap for hand washing but 15 respondents representing 75% said do not. Again, 14 respondents presenting 70% stated that food vendors had bowls or buckets for washing dishes while 6 respondents representing 30% said food vendors do not. Eleven respondents representing 55% stated that food vendors have brooms to clean grounds whereas 9 respondents representing 45% said they do not. Again, 20 respondents representing 100% said that food vendors do not provide rubbish containers. Fourteen respondents representing 70% said food vendors protect food from flies and 6 respondents representing 30% of them do not protect food from flies. To sum up, food vendors do not keep environmental hygiene practices. Particularly, food vendors representing 100% do not provide rubbish containers.

#### **4.3.2 Results and Discussion of Questionnaire from Teachers**

To assess the hygiene practices of food vendors, questionnaire was administered to teachers. Details of their responses are presented in Tables 4.8, 4.9, 4.10 and 4.11.

**Table 4.8: Socio-Demographic Data of Teachers**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Sex</b>		
Male	9	30.0
Female	21	70.0
<b>Age</b>		
less than 20	1	3.3
21-30	21	70.0
31-40	5	16.7
41-50	2	6.7
above 50	1	3.3
<b>Educational Status</b>		
No formal education	1	3.3
Primary	-	-
Junior High Sch. (JHS)	4	13.3
Senior High Sch. (SHS)	2	6.7
Technical/Vocational	-	-
Tertiary	23	76.7
<b>Types of food sold on basic school premises</b>		
Porridge	8	26.7
Plain boiled rice	4	13.3
Kenkey	7	23.3
Banku	3	10.0
Tubani	-	-
Ampesi	-	-
Fried yam	7	23.3
Other foods	1	3.3



The data in Table 4.8 showed that respondents were made up of 9 males representing 30% and 21 females representing 70%. Also, 1 respondent representing 3.3% was less than 20 years, 27 respondents representing 70% were in the 21-30 year range, 5 representing 16.7% were in the 31-40 year range, 2 representing 6.7% were in the 41-50 year range and 1 representing 3.3% was above 50 years. Besides, 23 respondents representing 76.7% had tertiary education, 4 representing 13.3% had JHS education, 2 representing 6.7% attended SHS, and 1 respondent representing 3.3% had no formal education.

In addition, 8 respondents representing 26.7% indicated porridge was the highest type of food sold on basic school premises. Seven (7) respondents indicated fried yam, another 7 indicated kenkey representing 23.3% respectively while 4 indicated plain boiled rice and 3 indicated banku representing 13.3% and 10% respectively. None of the respondents indicated the sale of tubani and ampesi on the basic school premises.

**Table 4.9: Teachers on Street Food Vendors' Food Hygiene Practices**

Practices	Frequency	Percentage (%)
Wash hands before serving food	16	52.2
Wash no hands before serving food	13	44.8
Use separate equipment for serving cooked and raw food	17	56.7
Use same equipment for serving cooked and raw food	13	43.3
Keep food warm during sales	18	60.0
Keep food cold during sales	12	40.0
Serve food with fork/spoon	11	36.7
Serve food without fork/spoon	19	63.3
Serve food with bare hands	26	86.7
Serve food without using bare hands	4	13.3
Serve food with cup/plate	23	76.7
Serve food without cup/plate	7	23.3
Keep equipment clean and free from visible dirt and filth	17	56.7
Keep equipment unclean and open to visible dirt and filth	13	43.3
Provide drying racks for cleaned utensils	17	56.7
Provide no drying racks for cleaned utensils	13	43.3
Have containers for washing utensils	29	96.7
Have no containers for washing utensils	1	3.3

Results in Table 4.9 indicated 16 respondents representing 52.2% stated that food vendors wash their hands before serving food while 13 respondents representing 44.8% said they do not wash their hands. Seven (7) respondents representing 56.7% also said food vendors use separate equipment for serving cooked and raw food while 13 respondents representing 43.3% said they do not. 18 respondents representing 60% indicated that food vendors keep food warm during sales while 12 respondents representing 40% said they do not. Also 11 respondents representing 36.7% said food vendors serve food with fork or spoon whereas 19 respondents representing 63.3% said they do not.

Table 10 further showed that 26 respondents representing 86.7% stated that food vendors serve food with bare hands whereas 4 respondents representing 13.3% said they do not. It was also observed from the table that 23 respondents representing 76.7% indicated food vendors serve food with cup or plate whereas 7 respondents representing 23.3% said they do not. Moreover, 17 respondents representing 56.7% said food vendors keep their equipment clean while 3 respondents representing 43.3% said they do not. Again, it was observed that 29 respondents representing 96.7% indicated that food vendors have containers for washing utensils while 1 respondent representing 3.3% said food vendors do not. Finally, 3 respondents representing 10% said food vendors provide drying racks for cleaned utensils whereas 27 respondents (representing 90%) said they do not.

In the nutshell, street food vendors practice food hygiene to a great extent. However, a sizeable number of them (86%) indicated that food vendors serve food with bare hands and 90% said food vendors do not provide drying racks for cleaned utensils.



**Table 4.10: Teachers on Street Food Vendors' Personal Hygiene Practices**

Practices	Frequency	Percentage (%)
Wear clean clothes	19	63.3
Wear no clean clothes	11	36.7
Keep their nail short and clean	16	53.3
Keep their nail long and dirty	13	43.3
Observe visible skin rash, boil, cut or wound	5	16.7
Observe no visible skin rash, boil, cut or wound	25	83.3
Wear jewellery when selling food	17	56.7
Wear no jewellery when selling food	13	43.3
Cover hair when selling food	20	66.7
Cover no hair when selling food	10	33.3
Wash no hands after counting/receiving money	6	20.0
Wash hands after counting/receiving money	24	80.0

The results in Table 4.10 indicated 19 respondents representing 63.3% stated that food vendors wear clean clothes, whereas 11 respondents representing 36.7% said they do not. Sixteen respondents representing 53.3% said that food vendors keep their nail short and clean while 13 respondents representing 43.3% said food vendors do not. Again, 5 respondents representing 16.7% said food vendors have visible skin rashes, boil, and cut or wound whereas 25 respondents representing 83.3% said they do not. In addition, 17 respondents representing 56.7% said food vendors wear jewellery when selling food whereas 13 respondents representing 43.3% said they do not. Also, 20 respondents representing 66.7% stated that food vendors cover their hair when selling food while 10 respondents representing 33.3% said they do not. Lastly, 6 respondents

representing 20% indicated that food vendors wash their hands after counting or receiving money while 24 respondents representing 80% indicated that they do not.

In brief the results revealed that, street food vendors observe personal hygiene practices. However, a sizeable number 56% of the respondents reported stated food vendors wear jewellery when selling food. Also, 80% of the respondents do not wash their hands after counting or receiving money (80%).

**Table 4.11: Teachers on Street Food Vendors' Environmental Hygiene Practices**

Items	Frequency	Percentage (%)
Provide drinkable water	18	60
Provide no drinkable water	12	40
Provide bowls or buckets	20	66.7
Provide no bowls or buckets	10	33.3
Provide clean towels for drying hands	3	10.0
Provide no clean towels for drying hands	27	90.0
Provide soap for hand washing	13	43.3
Provide no soap for hand washing	17	56.7
Have bowls or buckets for washing dishes	27	90.0
Have no bowls or buckets for washing dishes	3	10.0
Have brooms for keeping selling grounds clean	18	60.0
Have no brooms for keeping selling grounds clean	12	40.0
Provide rubbish containers	6	20.0
Provide no rubbish containers	24	80.0
Protect food from flies	19	63.3
Expose food to flies	11	36.7

Results in Table 4.11, indicated 18 respondents representing 60% respondents stated that food vendors provide drinkable water but 12 respondents representing 40% said they do not. Also, 20 respondents representing 66.7% said that food vendors provide bowls or buckets for washing hands while 10 respondents representing 33.3% said they do not provide. Moreover, 3 respondents representing 10% provide clean towels for drying hands whereas 27 respondents representing 90% said food vendors do not. In addition, 13 respondents representing 43.3% said food vendors provide soap for hand washing but 17 representing (representing 56.7%) said do not. Again, 27 respondents representing 90% stated that food vendors have bowls or buckets for washing dishes while 3 respondents representing 10% said food vendors do not.

Furthermore, 18 respondents representing 60% respondents said food vendors have brooms for keeping selling grounds clean but 12 respondents representing 40% indicated that food vendors do not have brooms. Again, 6 respondents representing 20% stated that food vendors provide rubbish containers and 24 respondents representing 80% food vendors do not provide rubbish containers. Lastly, 19 respondents representing 63.3% said food vendors protect food from flies and 11 respondents representing 36.7% do not protect food from flies.

From the analysis, it could be said that street food vendors observe environmental hygiene practices. However, a sizeable number (90%) of respondent said that food vendors do not provide clean towels for drying hands. Also, it was found that 80% reported that food vendors do not provide rubbish containers.

#### 4.4 Results and Discussion from Observation

##### 4.4.1 Observation of Food Vending Environment

The environmental hygiene practices of food vendors were observed during food sales on the basic school premise. Details of the results are presented in Table 4.12.

**Table 4.12: Environmental Hygiene Practices**

Practices	Frequency	Percentage (%)
Provide drinkable water	20	66.7
Provide no drinkable water	10	33.3
Provide bowls or buckets	5	16.7
Provide no bowls or buckets	25	83.3
Provide clean towels	4	13.3
Provide no clean towels	26	86.7
Provide soap for washing hands	25	83.3
Provide no soap for washing hands	4	13.3
Provide bowls or buckets for washing dishes	28	93.3
Provide no bowls or buckets for washing dishes	2	6.7
Provide brooms for keeping grounds clean	13	43.3
Provide no brooms for keeping grounds clean	17	56.7
Provide rubbish containers	3	10.0
Provide no rubbish containers	27	90.0
Protect food from flies	15	50.0
Expose food to flies	15	50.0

The observation results in Table 4.12 indicated that 20 respondents representing 66.7% provide drinkable water but 10 representing 33.3% do not. Also, 5 of the respondents representing 16.7% provide bowls or buckets for washing hands while 25

respondents representing 83.3% do not. Moreover, 4 respondents representing 13.3% provide clean towels for drying hands, whereas 26 respondents representing 86.7% do not. In addition, 25 respondents representing 83.3% provide soap for hand washing but 4 representing 13.3% do not. Again, 28 respondents representing 93.3% had bowls or buckets for washing dishes while 2 respondents representing 6.7% do not. Thirteen respondents representing 43.3% have brooms for keeping selling grounds clean but 17 respondents representing 56.7% do not. Again, 3 of the respondents representing 10% provide rubbish containers and 27 respondents representing 90% do not. Finally, 15 of the respondents representing 50% protect food from flies and 15 respondents representing 50% do not protect food from flies.

From the analysis, it can be said that food vendors do not observe environmental hygiene practices to a great extent. This is because 83.3% of the respondents do not provide bowls or buckets for washing hands, 86.7% do not provide clean towels for drying hands and 90% do not have brooms for keeping selling ground clean.

From the analysis of results of food vendors, environmental health officers and teachers showed that indeed, food vendors observe food hygiene practices. This finding supports the study conducted by Monney *et al* (2013) in educational institutions in Konongo in the Ashanti Region of Ghana which revealed that food vendors in educational institutions generally adhered to good food hygiene practices, namely, regular medical examination (93%) use of personal protective clothing (52%) protection of food from flies and dust (55%), preserving of food (100%) and good hand washing practices (63%).

Moreover, the results of the current study support the study conducted by Mensah, Yeboah-Manu, Owusu Dark and Ablovdey (2002) who found that the use of fork and spoon to serve food reduced the level of contamination, while the use of bare hands resulted in increase. However, the results from the study revealed that sizeable number of food vendors serve food with bare hands which is line with Abadalla *et al* (2009) who stated that the hands are the most significant source of transfer of micro-organisms from faeces, skin, or other sites to vendors.

Also the results of food vendors and environmental health officers revealed that food vendors do not observe personal hygiene practices because they sell when they have visible skin rashes, boil, cut or wound. They also wear jewellery and do not wash their hands after counting or receiving money. This supported a descriptive survey of hygienic and sanitary practices of vendors of street foods in Nairobi conducted by Muinde and Kuria (2005) which revealed that personal hygiene was not observed and that the vendors never covered their heads, handled money and food at the same time and they did not wear overcoats aprons and handled food with bare hands.

Balkaran (2014) also added that majority of food handlers studied in South Africa did not wear gloves, hair nets or apron. However, the results from teachers revealed that food vendors practice personal hygiene. This could be as a result of the fact that most of the teachers sent students to buy food for them from school vendors hence they pay little attention to the personal hygiene practices of vendors in their schools.

Results of the study from the analysis of food vendors and environmental health officers revealed that food vendors do not observe environmental hygiene practices to a great extent. This is because they do not provide bowls or buckets for washing hands,

they do not provide clean towels for drying hands and majority of them do not have brooms for keeping selling grounds clean. This current study supports the survey of street food vendors at vending site in the city of Durban South Africa conducted by Kok and Balkaran (2014), which showed that a total of 29 vendors observed, it was found that washing of utensils was carried out in bowls or pots which were also used for cooking and water was not being changed, as it was not easily accessible. Dirty pots and other dishes were left in heaps close to serving areas and already prepared food.

Similarly, the results of the current study supports the study of Mensah et al (2002) who discovered that the handling of food at ground level increased the risk of contamination because dust could easily be blown on to food handled. Pathogens can be passed mechanically by flies. They further found that there is consequently a risk of contamination associated with the exposure of food to flies. However, results from school staff in this study revealed that food vendors practice environmental hygiene. This could also be as a result of the teachers not paying keen interest in the activities of school vendors hence they only assumed that they practice environmental hygiene.

## CHAPTER FIVE

### 5.0 SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

This chapter discusses the summary of findings, conclusion and recommendation of the study.

#### 5.2 Summary of Findings:

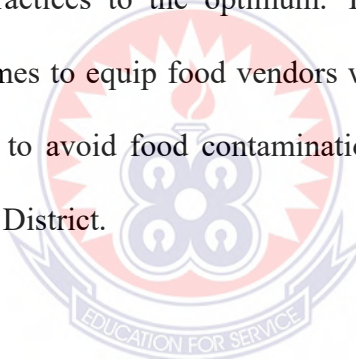
- It was found that street food vendors observed food hygiene practices to some extent. The study revealed that majority of the respondents reported food vendors observe food hygiene practices such as using separate equipment for serving cooked and raw food, serve food with fork or spoon, serve food with cup or plate, and keep their equipment clean as well as have containers for washing. However, some do not observe other relevant food hygiene practice as majority of respondents indicated that food vendors do not keep food warm, serve food with bare hands and do not provide drying racks for cleaned utensils.
- It was also revealed that street food vendors practised personal hygiene. It was found that, majority of the respondents stated that food vendors wear cleaned clothes, keep their nail short and cleans. Again, the study indicated that most of the respondents cover their hair when selling food. It was further revealed that more than half of respondents do not observe some important personal hygiene practices since they sell when they have visible skin rashes, boils, cuts or wound, they wear jewellery when selling food and they do not wash their hands after counting or receiving money.



- From the study, it was found that food vendors do not observe environmental hygiene practices to a large extent. Particularly, food vendors do not provide rubbish containers, do not provide drinkable water, do not provide clean towels for drying hands and do not provide soap for hand washing. It was however, found that majority of the respondents indicated food vendors protect food from flies.

### **5.3 Conclusion**

Food vendors on basic school premises do not observe food, personal and environmental hygiene practices to the optimum. There is need to develop relevant hygiene training programmes to equip food vendors with the requisite skills of ensuring healthy hygiene practices to avoid food contamination and food-borne illness in basic schools in the Sissala East District.



### **5.4 Recommendations**

- Environmental health workers and District Nutrition Officers should develop appropriate programmes to train food vendors on food, personal and environmental hygiene practices to enable them provide drying racks for cleaned utensils, wash their hands before serving food, provide clean towels for drying hands and to avoid serving food with bare hands, improve their hand washing practices and the use of clean clothes, avoid selling when they have visible skin rashes, boils, cuts or wound and stop wearing jewellery during food sales, provide rubbish containers, drinkable water, clean towels for drying hands and soap.

- Regular supervision of street food vendors should be made by the School Health coordinators to ensure that good hygiene practices are observed on basic school premises.
- Head teachers and their staff should monitor food vendors who sell on their school premises with the view to ensuring that they observe good hygiene practices to safeguard the health of pupils.



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**APPENDIX A****INTERVIEW GUIDE FOR BASIC SCHOOL STREET FOOD VENDORS**

This interview guide seeks information on the practices of basic school street food vendors with respect to their food and personal hygiene practices during food sales on school premises. The information provided will be used for academic purposes only. Confidentiality is therefore assured.

**Direction:** Please fill in the blank spaces by ticking [√] the appropriate response.

**SOCIO-DEMOGRAPHIC CHARACTERISTICS**

## 1. Age:

1.	Less than 20	
2.	21 – 30	
3.	31 – 40	
4.	41 – 50	
5.	Above 50	

## 2. Sex:

1.	Male	
2.	Female	

## 3. Educational Status:

1.	No formal education	
2.	Primary	
3.	Junior High School	
4.	Senior High School	
5.	Technical/Vocational	
6.	Tertiary	



4. Types of Food sold on Basic School premises:

1.	Porridge	
2.	Plain boiled rice	
3.	Kenkey	
4.	Banku	
5.	Tubani	
6.	Ampesi	
7.	Fried yam	

**Food Hygiene Practices**

No	Items	Please tick [√] one	
		Yes	No
5	Do you wash your hands before serving food?		
6	Do you use separate equipment for serving cooked and raw food?		
7	Do you keep food warm during sales?		
8	Do you serve food with fork/spoon?		
9	Do you serve food with bare hands?		
10	Do you serve food with cup/plate?		
11	Do you keep your equipment clean and free from visible dirt and filth?		
12	Do you have a container for washing utensils?		
13	Do you provide a drying rack for cleaned utensils?		

**Personal Hygiene Practices**

No	Items	Please tick [√] one	
		Yes	No
14	Do you wear clean clothes when selling food?		
15	Do you keep your nails short and clean always?		
16	Do you sell food when you have any kind of visible skin rash, boil, cut or wound?		
17	Do you wear any type of jewellery when selling food?		
18	Do you cover your hair when selling food?		
19	Do you wash your hands after counting/ receiving money?		



**APPENDIX B****QUESTIONNAIRE FOR ENVIRONMENTAL HEALTH OFFICERS AND  
TEACHERS**

This questionnaire seeks information on the practices of basic school street food vendors with respect to their food, personal and environmental hygiene practices during food sales on school premises. The information provided will be used for academic purposes only. Confidentiality is therefore assured.

**Direction:** Please fill in the blank spaces by ticking [] the appropriate response.

**SOCIO-DEMOGRAPHIC CHARACTERISTICS**

6. Age:

5.	Less than 20	
7.	21 – 30	
8.	31 – 40	
9.	41 – 50	
10.	Above 50	

6. Sex:

1.	Male	
2.	Female	

7. Educational Status:

1.	No formal education	
2.	Primary	
3.	Junior High School	
4.	Senior High School	
5.	Technical/Vocational	
6.	Tertiary	

## 8. Types of Food sold on Basic School premises

1.	Porridge	
2.	Plain boiled rice	
3.	Kenkey	
4.	Banku	
5.	Tubani	
6.	Ampesi	
7.	Fried yam	

**Street Food Vendor's Food Hygiene Practices**

No	Items	Please tick [✓] one	
		Yes	No
5	Do food vendors wash their hands before serving food?		
6	Do food vendors use separate equipment for serving cooked and raw food?		
7	Do food vendors keep food warm during sales?		
8	Do food vendors serve food with fork/spoon?		
9	Do food vendors serve food with bare hands?		
10	Do food vendors serve food with cup/plate?		
11	Do food vendors keep their equipment clean and free from visible dirt and filth?		
12	Do food vendors have containers for washing utensils?		
13	Do the food vendors provide drying racks for cleaned utensils?		

**Street Food Vendor's Personal Hygiene Practices**

No	Items	Please tick [√] one	
		Yes	No
14	Do all food vendors wear clean clothes?		
15	Do food vendors keep their nail short and clean?		
16	Do you observe any kind of visible skin rash, boil, cut or wound on food vendors' body?		
17	Do food vendors wear any type of jewellery when selling food?		
18	Do food vendors cover their hair when selling food?		
19	Do food vendors wash their hands after counting/receiving money?		

**Street Food Vendor's Environmental Hygiene Practices**

No	Items	Please tick [√] one	
		Yes	No
20	Do all food vendors provide drinkable water?		
21	Do food vendors provide bowls or buckets for washing hands?		
22	Do food vendors provide clean towels for drying hands?		
23	Do food vendors provide soap for hand washing?		
24	Do all food vendors have bowls or buckets for washing dishes?		
25	Do all food vendors have brooms for keeping selling grounds clean?		
26	Do all food vendors provide rubbish containers?		
27	Do the food vendors protect food from flies?		

**APPENDIX C****OBSERVATION GUIDE**

The observation guide is designed to seek information on the environmental hygiene practices of food vendors at vending premises.

**Direction:** Please fill in the blank spaces by ticking [√] the appropriate response.

No	Environmental hygiene practices	Please tick[√] one	
		Yes	No
1	Does he/she provide drinkable water?		
2	Does he/she provide a bowl or a bucket for washing hands?		
3	Does he/she provide clean towels for drying hands?		
4	Does he/she provide soap for hand washing?		
5	Does he/she have bowls or buckets for washing dishes?		
6	Does he/she have a broom for cleaning selling area?		
7	Does he/she provide a rubbish container?		
8	Does he/she keep cooked food covered and protected from flies?		