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ASSESSING FOOD HYGIENE AND HYGIENE PRACTICES OF FOOD HANDLERS IN TRADITIONAL RESTAURANTS (CHOP BARS) A CASE STUDY OF WA MUNICIPALITY

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DECLARATION

STUDENT'S DECLARATION

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

SIGNATURE: ……

DATE: ……

SUPERVISOR'S DECLARATION

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

NAME OF SUPERVISOR: DR. PATRICIA FORIWAA ABABIO

SIGNATURE ……

DATE ……

DEDICATION

This work is dedicated to my husband Mr. Joseph Gbaara, my children Maaluu Mikel, Mwinnomo Michelle, and Mwinsomo Melissa Gbaara, my mother Comfort Basing, and all my siblings for their patience, support, and prayers and all who strive fervently to ensure that the right things are done at all times especially as it concerns hygiene because health is more precious than wealth.

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ABSTRACT

Food hygiene is a subject of great concern to anyone who cares about eating healthy and staying alive because the import of food borne illness can occasionally be grave. This research study was carried out among food handlers in the Wa Municipality; it sought to assess the sanitary conditions under which food is cooked and served in 'chop bars', assess the food hygiene practices employed by food handlers in 'chop bars' and assess the personal hygiene practices of food handlers in 'chop bars'. The study was a survey that used both open ended and close ended structured questionnaires to illicit data from local restaurant (chop bar) operators/handlers, customers and regulatory bodies. In all 82 questionnaires were issued, 40 to operators/ handlers, 40 to customers and 2 to regulatory bodies. Out of the 80 questionnaires issued, 74 were retrieved. Forty (40) from operators/handlers, 32 from customers, and 2 from the regulatory bodies, representing (92.5%) response rate. Using the statistical package for social sciences (SPSS) version 20.0, the results revealed 80% of managers of chop bars and food handlers had no formal education. Kitchen hygiene, personal hygiene and food hygiene were poorly practiced in many chop bars. Food handlers had knowledge in hygiene but did not put into practice for instance hand washing was improperly and irregularly practiced, hair was improperly covered during operation, and both solid and liquid wastes were poorly disposed. Most chop bars lacked proper storage systems; hence both cooked and raw food items were poorly stored. The results also showed that chop bars did not have rules and regulations guiding their operations and three quarters (75%) of them had no training in food hygiene and safety. It was recommended that regular monitoring and inspection should be carried out, clear rules and regulations concerning choice of site for restaurant, the requirements of the structure, and standard of hygiene practice should be set up.

CHAPTER ONE

INTRODUCTION

1.0 Background to the study

Majority of urban dwellers purchase and eat food outside (Okojie & Isah, 2014) because they cannot have meals at home due to their heavy schedules at work or school. Food business keeps increasing in order to satisfy busy individuals who cannot have meals at home (Annor & Baiden, 2011). People who eat food outside expect that the food should be safe for consumption and not harmful. The role of food handlers is therefore very essential since they may contaminate food during production, processing, preparation and presentation (Angelio, Viggiania, Rizzo & Bianco, 2000).

In developing countries such as Ghana, poor food handling practices still prevail particularly among food handlers who have little or no formal education (Okojie & Insah, 2014; Ababio, Adi & Commey, 2012; Ackah *et al.,* 2011). Food borne disease outbreaks occur as a result of poor food handling practices such as cleanliness of food premises and equipment, poor temperature control(slow cooling and inadequate refrigeration of food), cross contamination of raw and cooked food products, poor food handler hygiene practices including hand hygiene.

Globally food safety is of great concern, much so if the environment in which the food is handled is seriously contaminated. A report of WHO (2014) indicates that unsafe food containing harmful bacteria, viruses, parasites or chemical substances cause more than 200 diseases ranging from diarrhoea to cancers and kill 2 million people annually. In most developed countries, the percentage of the population suffering or likely to suffer from food borne diseases in a year is estimated to be around 30%. According to WHO, the USA is likely to record around 76 million cases of food borne diseases with

up to 325,000 hospitalisations and 5,000 deaths estimated to occur every year (WHO, 2000).

Most often food borne diseases are not reported due to their sporadic nature (FAO, 2005). On the other hand, global incidences show that food borne diseases outbreak may take on a massive proportion. For instance in 2015 a multistate outbreak of *Salmonella* infection linked to frozen raw tuna occurred in the USA, affecting an estimated 65 persons in 11 states (CDC, 2015). Another outbreak of *Norovirus* associated with sold food from a restaurant in California occurred in 2015 and almost 100 persons were infected (Safe Food International, 2015). Similarly, in 2014, an outbreak of *Hepatitis A,* resulting from the consumption of packed bread contaminated by an ill worker affected 1000 individuals in Japan (Safe Food International, 2014).

The situation in Africa is not different, several African countries have experienced food borne diseases such as *Salmonellosis, Cholera, Hepatitis A, Entero-haemorrhagic Escherichia coli (EHEC*), and acute *Aflatoxicois,* which are linked to consumption of unsafe food and water (FAO, 2005). In 2014, an outbreak of Salmonellosis connected with contaminated food or water sickened 42 people at Mokopan Lodge, Limpopo in South Africa. Summaries of cholera outbreaks in various African countries from 11th February, 2014 to 21st June, 2015 alone as indicated by Safe Food International (2015) are shown in table 1.1.

Table 1.1: Cholera Outbreaks in Various African Countries

Country	Number of Cases	Number of Deaths	Date
Nigeria	600	25	4th Feb, 2014
Namibia	453	23	28th Jan, 2014
Tanzania	204	5	11th Feb, 2014
Ghana	4,271	57	2014
Ghana	636	6	21st June, 2015
Mozambique	2,400	28	16th Feb, 2015

Source: Safe Food International, 2015.

In Ghana, an estimate in 2007 indicates that one in every 40 Ghanaians suffer from serious food borne diseases annually (MOFA& World Bank, 2007). Records also show that in 2008 alone 90,692 deaths related to food and personal hygiene with 297,104cases reported at outpatient department of various hospitals and clinics (Food and Drugs Authority, 2008). According to Yeboah (2010), the total number of outpatients who report with food borne diseases in Ghana is about 420,000 per year, with an annual death rate estimated at 65,000 and total cost to the economy at US $69 million(Graphic Business, 2010). Poor food, personal hygiene and environmental sanitation of food handlers in both formal and traditional catering industries have been implicated as causes of food borne disease outbreaks (CDC, 2015).

Traditional catering industry consists of food establishments where ready-to- eat staple dishes are cooked and served to paying guest. Chop bars, street food and beverage vendors, fast food joints are examples of such establishments in Ghana (Owusu-Mintah, 2015). Dishes served in these establishments are banku, kenkey, fufu, tuo-zaafi, konkonte, and so on.

"Chop bars'' are traditional restaurants in Ghana where traditional Ghanaian dishes are served. The word 'chop bar' is a local term used in Ghanaian vernacular English, which means 'eat and drink'. It means both eating and drinking goes on in the same premises. Chop bars are patronized by both tourist and residence in Ghana because they serve tasty traditional dishes which are convenient, easily accessible and at affordable prices as compared to restaurants (Afele, 2006).

There have been growing concerns about outbreaks of food borne diseases due to poor food hygiene and other related practices of food handlers over the pastyears (Ababio & Lovatt, 2014; Muhonja & Kimathi, 2014; Ababio & Adi, 2012; Mensah, Yeboah-Manu, Owusu-Darko & Adblordey, 2002). Restaurants, delicatessens and other retail food establishments have been identified as major contributors to this problem. (Angulo & Jones, 2006; Addo *et al*, 2007). Records in the United States of America prove that between 1998-2008, sick food handlers caused specifically 53% of the food borne *Norovirus*outbreaks. (CDC, 2013). According to the Centre for Disease Control and Prevention (2013), over 80% of food borne disease outbreaks are caused by eating food prepared in commercial settings, such as restaurants, delis or catering businesses.

There have equally been cases of food borne disease outbreaks that are linked to retail food establishments in Ghana, for instance in 2007 a case of food poisoning was recorded at Obuasi in the Ashanti Region, where 30 people were poisoned and hospitalized after eating fried rice from a fast food joint(Daily guide, 2007). In a related story, 40 persons suffered food poisoning at a salad joint at Koforidua in the Eastern Region (Anon, 2010). Ghana has recently become a cholera endemic country, for example 4,271 cases with 57 deaths occurred in 2014. In 2015 accumulative 636 cases with six deaths, a case fatality rate (CFR) of 0.9% was reported as of 21stJune 2015(Ghana Web, 2015).

In Wa, the capital of the Upper West region, the conditions under which chop bars are operated are often undesirable for both the preparation and the selling of food. Operators face many challenges. For example, buildings or structures used as chop bars are usually very old and small and situated in very congested areas like the central market, close to open gutters and filthy areas. Majority of these building sites lack basic infrastructure and services such as portable running water and waste disposal facilities, hand washing and dishwashing water is usually insufficient and often reused, sometimes without soap, waste water and garbage is discarded in the vicinity of the building (Musupye &Von Holy, 2000; Kubheka *et al,* 2003). Only in exceptional cases do these chop bars have adequate refrigeration and freezing facilities. The lack of storage facilities therefore, pose a health risk especially during the warmer season when food is displayed for long periods of time(Walker *et al.,* 2003).The municipal assembly and authorities find it difficult controlling the activities of these chop bars because most of them operate in the night.

1.1 Statement of the Problem

Recently, eating habits have changed remarkably in Ghana with many people eating outside the home though the food usually prepared and sold at various retail food outlets are mostly unhygienic (Newman, 2005). Data all over the world points to the fact that majority of food diseases occur because of improper handling of food in food service establishments. For instance, Centres for Disease Control and Prevention (CDC) U.S.A. suggested that improper food handling practices contributed to approximately 80% of food borne illnesses in food service establishment (CDC, 2013) an indication that improper food handling practices still exist in food service establishments. According to Ghana Food and Drugs Authority's report (2013), 77% of all traceable

food borne diseases result from improper food handling in food service establishments. Several research works have been carried out in the capital city and other cities of Ghana (Ababio & Lovatt 2014; Ababio & Adi, 2012; Ababio, Adi & Commy, 2012; Ackah et al, 2011 & Mensah *et al.,* 2002) on food safety and hygiene related issues in food service establishments. However, much work has not been done in the other regional capitals, meanwhile these areas are also affected. Ababio and Lovatt in their research report on a review on food safety and hygiene studies in Ghana, in 2014 suggested that research could be carried out on food safety and hygiene in the regional capitals. Traditional restaurant (chop bar) operators are no exception. This resulted in the researcher's interest to assess the food hygiene and hygiene practices of food handlers in traditional restaurants (chop bars) in the Wa municipality.

1.2 Purpose of the study

The Study was to create awareness of food service operators, consumers and the public towards food hygiene and hygiene practices. It also seeks to protect public health and reduce the number of food borne disease outbreaks.

1.3 Objective of the Study.

The study assessed the food hygiene and hygiene practices of food handlers in Traditional Restaurants (Chop Bars) in Wa Municipality in the Upper West Region.

1.4 Specific Objectives

The specific objectives of the study were to asses;

1. the environmental hygiene conditions under which food is cooked and served in 'chop bars'

2. food hygiene practices employed by food handlers in 'chop bars'
3. the personal hygiene practices of food handlers in 'chop bars'.

1.5 Research questions

1. What are the environmental conditions under which food is cooked and served in 'chop bars'?
2. To what extend do food handlers practice food hygiene?
3. How do food handlers in 'chop bars' practice personal hygiene?

1.6 Significance of the study

The study is expected to inform a spectrum of people both in and outside the hospitality industry about the relevance of hygiene practices in food services establishments. The document will also be useful in providing in-service training to food service operators' on environmental contaminants and proper food handling practices based on adherence to Standard Operating Procedures (SOPS) and Good Hygiene Practices (GHPS).

CHAPTER TWO

LITERATURE REVIEW

2.0 Definition of food

Ceserani and Fosket (2007), define food as anything liquid or solid that when eaten and digested repair worn-out tissues, provides heat and energy, promotes growth, fight against diseases and infections and regulates body processes.

Cameron and Collymore (1979) view food as any substance composed of carbohydrates, fats and oil, protein and water, which can be eaten or drunk by animals, including humans for nutrition or pleasure. According to them items considered food may be sourced from plants, animals or other categories such as fungus. In his view, Alcock (1985) sees food as material consisting essentially of protein, carbohydrates, and fats used in the body by an organism to sustain growth, repair worn out tissues, vitalise processes and furnish the body with energy. From the foregoing definitions, food could be defined as anything liquid or solid which when eaten provides the body with the nutrients necessary for growth, repair of worn out tissues, provide heat and energy and regulates the body's processes. In the wake of strange diseases and the use of chemicals in food production, care must be taken in the selection of food to satisfy one's hunger or need.

2.1 Food poisoning

Food poisoning is an illness caused by eating food or drinking water containing microbial toxins (bacteria and bacterial toxins) or chemical poisons (residue of insecticides on fruits and vegetables or lead and mercury) (Marriot & Gravani, 2006). Signs and symptoms from most common types of food poisoning start within 2-6 hours (the incubation period) of eating the food. Food poisoning is an illness that is

characterized by abdominal cramps or pain, diarrhoea (may be bloody), fever occasionally, headache, nausea and sometimes vomiting (Fosket, 2007). High standard of cleanliness and physical fitness is necessary for every food handler. Persons who are ill or not clean themselves should not handle food, because they may contaminate the food causing consumers to be ill (Paulson, 1997).

Food can be contaminated by chemicals, which enter food during the growing, preparation or cooking of the food accidentally. Toxins (poison) produced in the food by certain bacteria and harmful bacteria that enter the food from humans, animals or other sources can cause food poisoning. Food contaminated by bacteria is for the most common cause of food poisoning and bacteria found in food cause diseases such as tuberculosis, typhoid, cholera, dysentery and scarlet fever. The various bacteria that cause food poisoning are *Staphylococcus Aureus*, the *Salmonella* group, the *Clostridium* group, *E. coli* among others ((Robert, 2003).

2.2 The concept of food borne illness/diseases

Globally Food borne illness continues to be important and preventable cause of illness, diseases and death. Though difficult to estimate, it has been reported that in 2005 alone 1.8 million people died from diarrhoea diseases (Saidatul *et al.,* 2013). A great proportion of these cases can be attributed to contaminated food and drinking water. Due to food safety problems in many developing countries, diarrhoea diseases are on the ascendancy. According to Mead (1999), food borne illness refers to illness that are caused by food contaminants with harmful levels of pathogenic microorganisms (pathogens) or chemical substances, which are subsequently consumed and result in disease. In a majority of cases, the microorganisms responsible for the illness are not known because of the difficulty in identifying the causative agent. However, bacteria

such as *Campylobacter SPP., E. coli 0157:01+7, Salmonella SSP., Shigella SPP.,* and viruses such as *Hepatitis A, and Norwalk viruses (Norovirus*) have been identified and commonly implicated as causing food borne illness (FDA, 2002). *Norovirus,* commonly spread by unhygienic workers, accounts for over 80% of all food borne illness (CDC, 2013). The centre for diseases control (CDC) also observed that, due to the intrinsic nature of Pathogens to food items (such as salmonella in poultry) they are introduced to the food item during processing. These pathogens are often introduced to food through soiled food equipment, illness or poor sanitation, or by food workers with face-contaminated hands due to illness or poor hygienic practices, open infected cuts or wounds, or with respiratory ailments involving the discharge of mucus.

The impact of food borne illness on individual can vary greatly. For most healthy individuals, it can results in only mild, gastrointestinal illness, usually involving diarrhoea, vomiting, nausea, or fever, etc. For young children and elderly with weak immune system, food borne illness can result in loss of life or long-term disability. In 1999, Mead *et-al* estimated that the contamination of food with diseases causing agents results in 76 million illnesses, 325,000 hospitalisation and 5,000 deaths each year. Hospitalizations and loss of productivity from these illness cost individuals and businesses an estimated $ 23 to $ 43 billion dollars a year (FDA & Food Safety and Inspection Service, 2002). According to Jonas & Angulo (2006), majority of food borne diseases outbreaks results from inappropriate food handling practices. Food handlers play an important role in food safety and in the occurrence of food poisoning because they may introduce pathogens into food during production, processing, distribution and or preparation (Green et al., 2005). Taylor *et al* (2002) indicate that microorganisms are transferred to the hands in the process of handling food and through poor personal hygiene after visiting the lavatory, resulting in the hand being heavily contaminated

with enteric pathogens such as *E. coli* and *S. aureus*. *E. coli* and *S. aureus* are amongst the most common pathogens found on hands (Shojoei *et al.,* 2006). *Saphylococci* food poisoning is ranked second or third causative agent often associated with the majority of repeated food borne outbreaks in many countries (Atanassonva *et al.,* 2001).

Food and Drugs Administration (2002) indicates the following as the factors associated with repeated food borne outbreaks; Providing food from unsafe sources, Holding foods at improper temperatures and times, Inadequate cooking, Poor personal hygiene and Inadequate cleaning of equipment. According to the FDA these form the majority of factors.

2.3 Prevention of food borne illness

One of the most effective ways to prevent food-borne poisoning is by following hygiene/ sanitation rules and regulations. Sanitation or hygiene is the prevention of illness through cleanliness. Keeping oneself clean helps get rid of some microorganisms. It also helps keep the ones that remain from multiplying and from getting into food. Clayton (2005) asserts that, one of the things we learn very early in life is to wash our hands before eating. However, this very simple act is also often ignored as one grows older leading to the spread of deadly infections, which threaten our very lives.

Hand washing with soap under running water greatly reduces the chances of spreading or getting germs. The mechanical action of scrubbing loosen up the dirt and germs on our hands and soap picks them up and binds to them so that the water can wash them away (GNA, 2008). Washing of hands according to Larson (2002) should be done before beginning to prepare food and after handling raw food, between handling

different kinds of food and after touching the nose, mouth, hair or other parts of the body while handling food.

2.4 Food Safety

Food safety is a responsibility of every person who is involved in food service operation. According to Stretch (1991), Food safety is a scientific discipline describing handling, preparation, and storage of food in ways that prevent food borne illness. This includes a number of routines that should be followed to avoid potential health hazards. Food can transmit disease from person to person as well as serve as a growth medium for bacteria that can cause food poisoning. According to Food Australia (2001) ‘‘food is not safe if it is likely to cause physical harm to persons who might later consume it’’. The safety of food is paramount to the consuming public and therefore must be taken seriously to prevent illness and subsequently death.

2.5 Food safety knowledge

It is said that following rules and regulations plays an important role in the prevention of food poisoning. However, this knowledge can only be attained through education. Knowledge is associated with current practices, which in turn affects willingness to change current practices if it is learned that previous practices are unsafe (McIntosh, *et al.,* 1994). The importance of food safety education for improving food-handling behaviours has been increasingly recognised during the past 10-20 years (Griffith and Redmond, 2006). According to Howe et al. (1996), cited in Gathered *et al* (2013), food handler’s malpractices contributed to 97% of food –borne illness in food service establishments. As a result, such mistakes place consumers at considerable risk of contracting food borne illness, leading to increased individual and social costs due to

pain and suffering, loss of economic productivity and pressures on primary and public health resources (Kennedy *et al.,* 2005)

It is incumbent on every food service business, to provide its food handlers skills and knowledge of food safety and hygiene to ensure that, food prepared is safe to be consumed by the public. However, actual food handling practices are known to differ from self-reported practices (Jay, *et al.,* 1999). This is important as studies by Evans, et al. (1998) have shown that the main factor responsible for the outbreaks of food poisoning in England and Wales during 1992-1994 and 1995-1996, respectively, were inappropriate storage, inadequate cooking or reheating and cross-contamination. Particular attention should be given to the importance of time and temperature control, personal hygiene, cross contamination, sources of contamination and the factor determining the survival and growth of pathogenic organisms in food (WHO, 1988). These factors can double the effect of an outbreak.

A study by Zain & Naing (2002) and Maning & Snider (1993) showed that employees at food stall and for that matter food handlers lacked attitudes, knowledge and practices in areas of cooling or reheating, temperature control and cross contamination. This they observed was due to the low level of education of food handlers.

Sockett (1995) points out that many people do not know the basic rules of food hygiene. In contrast, surveys conducted in 1986 and 1995/1996 illustrated that respondents did know which foods were at high risk from food poisoning, but knowledge about how food could be made safe to eat was limited (Raab & Woodburn, 1997). Many program planners believe that by enhancing knowledge or altering attitudes, they can induce behavioural change (McKenzie-Mohr & Smith, 1999).

2.6 Hygienic Practices

Hygiene promotion is necessary particularly for all food handlers because it will help people to understand and adopt good hygiene practices, develop positive attitudes towards cleanliness, to prevent diseases. Hygiene is used to describe the application of sanitary rules or laws for the preservation of health (Marriot and Gravani, 2006). Good hygiene practices describes ‘‘all practices regarding the conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain’’, which is an important process as it eventually leads to the safety of food in food establishments (FAO, 2012).

Hygiene practices covers proper storage of food items, maintenance of clean environment during food preparation and assurance of all dishes served clean and free from bacteria that can potentially cause food borne illness (Lee *et al,* 2012). Many studies have confirmed that the main causes of microbial contamination typically occurring in foodservice establishment are contaminated suppliers, dirty food contact surfaces, poor personal hygiene practices, inappropriate storage temperatures and insufficient cooking (FDA, 2006; Potter *et al,* 1995). Ansari-Lari *et al,* (2010) & Mc Envoy et al., (2004) also observed this.

2.6.1 Food Hygiene

Food hygiene is increasingly important public health issue. Governments all over the world are intensifying their efforts to improve food safety. These efforts are in response to an increasing number of food safety problems and rising consumer concerns. Food hygiene refers to the measures food handlers employ to ensure the safety of food during preparation, cooling, storage and service (Adzovy and Honyenua, 2014). In order to improve food hygiene, according to Morrison *et al.,* (1998), the driving forces for

change in a commercial world must be the customer who must see hygiene accreditation as a pre-requisite to doing business. It is important that customers are educated, as well as providers. When hygiene is highly demanded, market forces will prevail and hygiene will be supplied. In other words, customer awareness of food hygiene will drive a better hygiene food service business.

Hygienic preparation, cooking and storage of food are of prime importance if food poisoning is to be prevented. High standard of hygiene minimise food spoilage, spread of food borne diseases, so we must ensure that food eaten is wholesome and free from pathogenic bacteria, harmful viruses and moulds. In other to ensure a much better understanding of foods, Neal, (1995) has put food items in to two groups: view of this food items can be grouped into two: High risk and low food commodities.

- The high risk food commodities: These are foods with high content of moisture and have lower PH such as meat, milk, fish, egg, fruits and some vegetables
- The low risk food commodities: These are foods with lower moisture content and can stay for a little longer if handled properly. However, food must be stored well at the appropriate temperature in other to discourage the growth of bacteria.

Food hygiene is all about keeping food clean, at appropriate storage temperature and away from microorganisms so that the food will be safe for consumption

Food hygiene includes all practices, precautions and procedures involved in:

Protecting food from the risk of biological, chemical or physical contamination.

- Preventing an organisms multiplying to an extent that would expose consumers to risk or result in premature decomposition of food.
- Destroying any harmful bacteria in food by thorough cooking or processing.

The five key principles of food hygiene according to WHO (2007) are;

- Prevent contaminating food with pathogen spreading from people pets and pets.
- Separate raw and cooked foods to prevent contaminating the cooked foods
- Cook foods for the appropriate length of time and at the appropriate temperature to kill pathogens.
- Store food at the proper temperature.
- Use safe water and raw materials.

2.6.2 Safe Temperature of Food

A factor that could results in food borne illness is time and temperature abuse in food preparation. McSwane *et al.* (2004), attest to the fact that effective temperature control of cooked food could be one of the vital ways of assuring compliance with food safety regulations by food service establishments.

Several studies have reported that poor holding and cooking temperature control was a main factor contributing to food borne outbreaks (Ababio & Adi, 2012; Todd, 1997). According to National Restaurant Association Educational Foundation, NRAEF (1999), time and temperature abuse happens when food have been allowed to stay for a longer period at temperatures favourable to growth of harmful bacteria. McSwane *et al.* (2004) further explains that the abuse of temperature may also be caused by insufficient amount of cooking or reheating time and desired temperatures that should eliminate the existence of harmful microorganisms. The use of devices such as thermocouples, thermometers and infrared in measuring food temperatures is essential in determining whether the food was in the danger zone or otherwise (McSwane *et al.,* 2014). Essentially heating is to kill bacteria thereby increasing the foodstuffs safety and storage life. According to Nott &Hall (1999), the major purpose of cooking is to increase the palatability of the food. In practice, pasteurisation and other sterilisation

processes require stringent assurance that all parts of the food product have been heated above a certain temperature for a defined period of time (Nott & Hall, 1999).

Improper holding temperature of food also contributes to the growth of certain bacteria through their spores because not all of these spores will be destroyed using the heating processes (McSwane *et al.,* 2004). Thus, it is important for all food handlers to recognise their responsibilities of monitoring the temperature of food in every stages of its preparation.

2.6.3 Personal Hygiene

One potential source of bacteria and physical contamination of food is food handlers and so personal hygiene is a key element ensuring that food is prepared safely (Paulson, 1997). Good personal hygiene is a legislative requirement, ensuring safe food. It requires every person working in a food service area to maintain a high degree of personal cleanliness preventing the spread of food poisoning bacteria (Miles, 2004). Poor personal hygiene practices as well as improper hand washing have been identified as common causes of food borne illness. (Guzewich & Ross, 1999)

Statistics indicate that improper hand washing alone accounts for 38% of food contamination (Marriot & Gravani, 2006) and more than 25% of all food borne illness (Weinstein, 1991). Contaminated hands of workers, due to inadequate hand washing allows pathogenic microorganisms which commonly exist on the food worker and in the kitchen environment to be picked up and manually transferred to foods (Paulson, 1997). Hand washing should always be done thoroughly after using the restroom, touching raw foods, touching the hair, nose face or body, sneezing, coughing or using a tissue, smoking, eating or chewing gum or tobacco, handling chemicals. Handling trash or touching anything else that may contaminate hands (National Restaurant Association Educational Foundation (NRAEF), 2004). To prevent such contamination, food workers

must conduct thorough hand washing at critical times during the workday. Guzewich and Ross (1999) identify several different protocols for effective hand washing that have been recommended by authorities, involving the use of different cleaning agents (soap, antibacterial soap, waterless gels) washing times (10-20 seconds) and means for drying (paper, towel, hair dryers). In instances where food workers hand may be highly contaminated, hand washing may need to be combined with the use of food gloves to effectively protect the food (FDA, 2002)

The above notwithstanding, Kramer and Scott (2004) noted that safe food handling in ready-to-eat food establishment is a basic element in the reduction of food borne disease and it can give a better food assurance for their consumers. Bare hand contact with ready to eat food has been associated with the transmission of pathogens such as Salmonella, Hepatitis A and Norovirus (Guzewickz & Ross, 1999). In a survey of restaurant that had been implicated in recent outbreak of food borne illness, it was found that 35% of the time, bare hand contact with ready-to-eat foods was a contributing factor (FDA, 2002). Pathogens may be intrinsic to the food item (such as Salmonella in poultry) and or they may be introduced to the food items during processing, which is typically the case with Norovirus. During processing, pathogens are often introduced to foods by soiled food equipment due to poor sanitation, or by food workers with faeces-contaminated hands due to illness or poor hygienic practices, open infected cuts or wounds, or with respiratory ailments involving the discharge of mucus.

The impact of food borne illness on individuals can vary greatly. For most healthy individuals, food borne illness results in only mild, gastrointestinal illness, usually involving diarrhoea, vomiting, nausea, or fever. It may also result in a loss of work or activity for a few days. Food gloves have been recognised as an affective barrier to the

contamination of ready-to-eat food (Paulson, 1996). Food safety regulations commonly require that food workers were close-fitting vinyl or latex gloves or use utensils or other method to minimised bare hand contact. Paulson (1997) recommends that gloves are changed frequently and that hands are washed whenever gloves are changed.

Improper hygiene allows workers to increase the likelihood of food contamination through risky behaviours. Examples include engaging in food preparation with infected cuts or sores on hands, coughing and sneezing on hands or in foods , and eating, drinking or smoking in food preparation areas, wearing of jewellery during cooking, not covering of hair, not wearing suitable clean protective clothing (including appropriate footwear and hats) and so on (Food and Drugs Association, 2002). These behaviours are usually controlled through training and management supervision to ensure they do not happen, or are limited to certain areas of establishment. In the case of open cuts or wounds, appropriate action requires that they are immediately cleaned, bandaged, and covered prior to food handling (Food and Drugs Association, 2002).

The awareness of food workers to the importance of hand washing technique; care of open cuts and good hygiene in food safety is a factor. To improve this, managers must find adequate time in the workday to educate and evaluate food workers on these issues to ensure workers understand their importance (Walczak, 1997).

2.6.4 Kitchen Hygiene

Maintaining an effective and proper cleanliness in the kitchen and its surrounding is very important. Kitchen tidiness, how things are arranged in an orderly fashion, prevents accidents. This must be given serious attention since poor hygiene leads to diseases or contamination (Ceserani, 2007). Kitchen hygiene involves the cleanliness of work areas, all equipments and tools, the entire kitchen including walls and floors

It is important that the kitchen is free from pests. Pets are known to carry a number of pathogenic organisms that can be transmitted to humans through contaminated food. Even a small quantity of food enables pests to survive and multiply. Regular and thorough cleaning of spillages is therefore imperative. Environmental control must be introduced (Denial of food, warmth or shelter) it will prevent the survival of pests (Meal, 1975). According to Paulson (1996) adequate provision must be made for the removal and storage of food waste and other refuse stores must be designed and managed in such a way so as to enable them to be kept clean, prevent access by pests, and protect against contamination of food, drinking water, equipment or premises.

2.6.5. Cross Contamination

The possible spread of bacteria from one contaminated source (raw chicken, meat, fish, eggs and contaminated utensils and equipment, etc.) to another food or surface is cross-contamination. It occurs mainly in the kitchen because of contact between, contaminated hands and equipment. Approximately 10 to 20% of food-borne disease outbreaks are due to contamination by the food handler (Zain & Naing, 2002). Various studies have demonstrated that the main source of cross contamination during processing come from food contact surface, equipment and employees (Ansari-Lari *et al*, 2010).

The common cause of cross contamination in the kitchen is the use of contaminated hands and equipments to prepare cooked and raw food at the same time. Cross contamination can also occur when uncovered raw foods are stored directly adjacent to or above ready-to-eat foods in a refrigerator or other holding equipments. In a recent review Annor & Baiden (2011) said cross-contamination was identified as an important contributory factor in 30% out breaks of food-borne disease. It is generally accepted that improved personal hygiene and scrupulous hand washing would lead to the basic

control of face-to-hand-to-mouth spread of potentially pathogenic transient microorganisms (Allwood, *et al.,* 2004).

The food preparers' hands have been cited as the main factor or a contributory factor in up to 39% of domestic food poisoning outbreaks (Ryan, *et al.,* 1996). Scott and Bloomfield (1990) identified the ability of the test organism *S. aureus* to cause cross contamination for up to 24 hours via the fingertips. The draining board and the counter-top showed the greatest frequency of contamination by target microorganisms (Scott & Bloomfield, 1990).

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

At the end of the food supply chain, the restaurant industry often finds itself responsible for ensuring not only that the foods they serve are safe from contamination introduced at the restaurant, but also contamination introduced anywhere else in the supply chain (Enz, 2003). For this reason, proper food handling procedures from receiving to serve in these establishments are critical to the prevention of food borne illness.

To avoid cross-contamination it is important that the same equipment is not used for handling raw meat and milk products without being disinfected. To prevent the

inadvertent use of equipment, it is recommended that, where possible, different colours and shapes are used to identify products (Kinton *et al.,* 1996).

2.7 Food Control Systems

A systematic set of activities carried out by food producers, processors, retailers and national or local authorities in an effort to protect consumers against food poisoning and unscrupulous food traders is referred to as food control (Stretch *et al,* 1991). Food control ensures that all foods produced within or imported into a country conform to national/global food safety requirements. The food control system therefore consists of a food inspection department, food legislation, food analysis facilities (Laboratories), and information dissemination and management. The production, processing, distribution, retail, packaging and labelling of foodstuffs are governed by a mass of laws, regulation, code of practices and guidance.

As foods provided to the public continued to be a significant source of food-borne illnesses and deaths, the U.S. Public Health Service, saw it a mandatory duty of assisting the state and local governments with the improvement of public health to institute the Restaurant Sanitation Regulations in 1934 (FDA, 2013). These were the first national guidelines for the control and prevention of food borne diseases caused by restaurants in the United States and the precursor to FDA's modern day Food Code. Since that time, the quality of food and food handling practices in the restaurant industry has substantially improved due to the regulatory efforts of local, state, and federal governments and improved technology, such as pasteurisation and refrigeration. This, in turn, has resulted in significant improvement in the overall health and well-being of the public (CDC, 1999).

The food hygiene regulation of 1970 has been brought into force in order to protect public health and reduce the number of outbreaks of food poisoning. It must be put into practice by anyone 'handling' food in a food business (Worsfold *et al.,* 2003).

The importance of food legislation is to; protect public health, protect consumers with relevant and accurate information so that they can make inform choices. Also protect consumers from products that are spoilt and fraudulent, or otherwise unfit for consumption again, it facilitates fair trade by ensuring a consistent standard among competing businesses, ensuring that all stake holders of the food chain that is both suppliers and customers fulfil their roles. It also increases the confidence of consumers in the food supply therefore providing guidance on matters related to food safety. All laws made on food in various countries have common focus:

- To ensure safety of the consumers
- To be able to meet the demand of quality and safety of both internal and external market
- To make profit.

When food is exported to another country, the food must meet standards stipulated. The Food Standard Agency (FSA) is the government department set up to protect public health and consumer interests in relation to food, in United Kingdom (UK). In UK, general food requirements are laid down in Food Hygiene Regulation (EC) 852/2004, which provides rules for food businesses handling or processing foods through the food chain. It requires food business operators to put in place and maintain food safety management procedures based on the Hazard Analysis and Critical Control Point (HACCP). HACCP principles supervise, instruct and or maintain food handlers on food hygiene and provide training on HACCP procedures.

In Ghana, the Food and Drugs Authority (FDA) is the body responsible for the enforcement of food laws. It enforces the Public Health Act, 2012 Act 851 that stipulates standards for safe manufacture production and service of food and contains penalties for breach of the Act.

2.8 Hazards Analysis Critical Control Point (HACCP)

An important effort made by public health authorities to address food safety in restaurants has been the development of programmes based on Hazards Analysis Critical Control point (HACCP) principles. The Food and Drugs Administration (2002) defines HACCP as ‘‘a systematic approach in identifying, evaluating, and controlling food safety hazards’’. Yeung and Morris (2001) describe that the analysis of risk relating to food safety can begin with the identification of food hazards. Furthermore, a hazard is defined as ‘an event or occurrence associated with an activity or process, which can result in negative consequences and thereby provide a source of risk to a receiving environment or population. There are three basic types of hazards that can cause food borne illness namely,

Physical hazards exist when food products may contain particles of glass, metal, plastic, wood, hair, jewellery or dirt etc.

Chemical hazards associated with the use of chemical additives, processes and controls in the agricultural and food industries such as pesticides, toxic metals or toxic cleaning products.

Microbiological hazards caused by microorganisms like bacteria.

The food worker is often the last handler of food before it is delivered to the public. As such the hygienic practices of the individual worker may greatly determine whether the food delivered is safe for consumption or not. The specific employee

health and hygiene risk factors that have been associated with outbreaks are both direct and indirect in nature. The direct risk facts include reporting to work sick, lack of proper hand washing with ready-to-eat foods (National Restaurant Association Education Foundation, NREF, 2004). Indirect risk factors include the lack of management commitment, knowledge and training (WHO, 1989).

The HACCP approach focuses on the control of food hazards by systematically addressing the risk factors known to contribute to food borne illness at each step of the production to ensure, that the final food item is safe to eat (Bryan, 1990). These risk factors include those related to contamination introduced by poor employee hygiene.

To ensure the production of safe food, the HACCP system requires food establishments to evaluate each item they produce. A prevention/control programme has been developed consisting of seven basic elements including 1) hazard analysis, 2) identification of critical points of control, and the establishment of 3) critical limits, 4) monitoring procedures, 5) corrective actions, 6) record keeping procedures, and 7) verification procedures (FDA, 2002).

During hazard analysis, biological, chemical and physical hazards to the food items are identified through a review of each step in the production and the intrinsic and extrinsic factors that may contribute to contamination. Intrinsic factors include ingredients of the food item, chemical characteristics such as pH, and the biological characteristics such as the foods suitability for growth of pathogens. Extrinsic factors include facility/equipment design, packaging, sanitation, and the health and hygiene of food workers (Knechtges, 2012; Bryan et al, 1992). Once the hazards are identified, the risks they present to the food item are assessed and the critical points of control in the production where an identified hazard can be completely

eliminated or controlled. Next, critical limits are set for each CCP to define the range in which the hazard of concern can be considered controlled or eliminated. Critical limits are usually science-based and frequently include measurements of time, temperature or pH .The HACCP approach is considered superior to traditional inspections based on food code guidelines and food safety educational efforts (Bryan, 1990).

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the methodology for the study and covers the population, the sample and sampling technique, the research instruments, the administration of the instruments and analysis of data.

3.1 The study area

The study area is the Wa Municipality in the Upper West Region.

Wa is the capital of the Upper West Region. It is located south of the upper West Region (10'4N 2'30W) with a population estimate of 66,644 persons in 2000 and 80,589 (provisional figure) in the recent 2010 population and housing census (Ghana Statistical Service, 2011) of which 59% of the population depend on subsistence food cropping as the predominant occupation (Kunbour,2003 & Upper West Regional Coordinating Council, 2010). The township of Wa is occupied by civil servants and some private individual business people who are mainly shop owners engaged in petty trade. Figure 3.1 shows the map of the study areas.

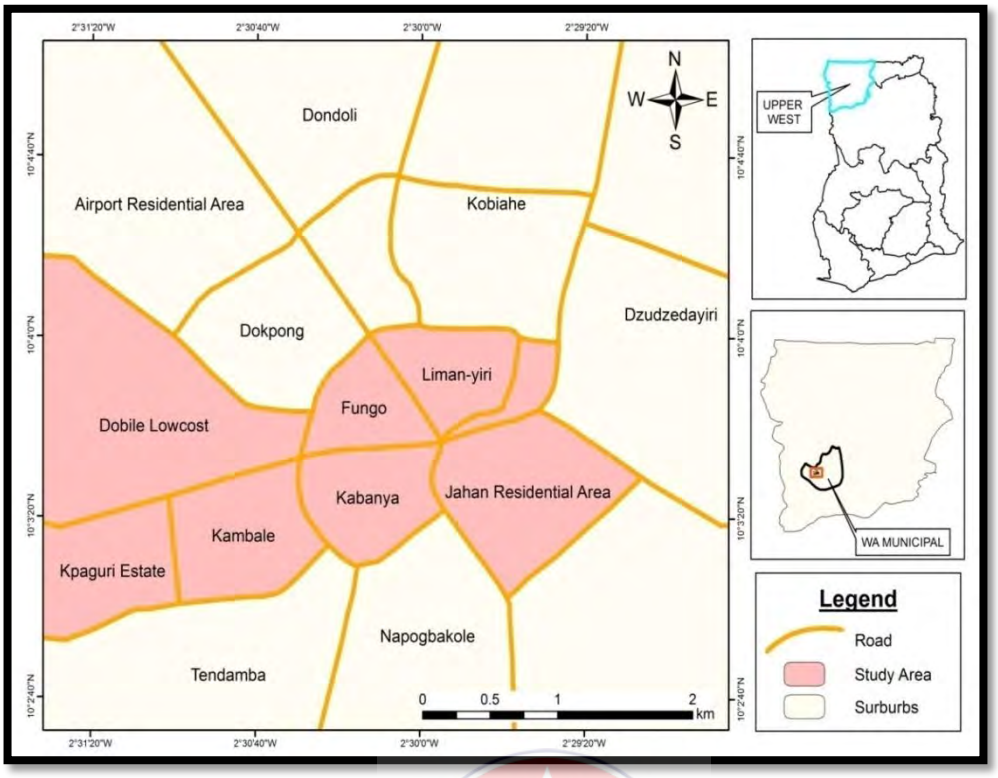

Figure 3.1: Map of study area

Source: Cartographic unit, U.C.C.

3.2 Study design

The study was observational and the design was a cross sectional survey to assess the hygiene practices of local restaurants (chop bars) in the Wa municipality. The study used both qualitative and quantitative techniques. The field work took place from August 2015 to January 2016.

3.4 Study Population

A total number of eighty thousand, five hundred and eighty-nine (80,589) population has been obtained from Ghana Statistical Service (GSS) for the Wa Municipality. This represents the sample frame of the interview schedule survey.

The study specifically targeted eighty-two individuals. They include forty (40) chop bar operators/food handlers, forty (40) food consumers and two personnel from the

Environmental Health Department and Food and Drugs Authority in the Wa Municipality. According to Ghana Tourist Authority, Wa, there are 22 registered and duly certified chop bar operators in the Wa Municipality.

3.5 Study Sample

Operators of 'chop bars', employees, consumers and sanitary inspectors formed the sample of the study. Three sampling techniques were used to select the respondents for the study. Cluster sampling was used to select 'chop bar' operators and employees. Simple random sampling was also used to select food consumers whiles purposive sampling was used for sanitary inspectors.

Under the cluster base sampling, the study area was divided into five, namely kanbale cluster, wapaani cluster, konta cluster, bamahu cluster, and kpaguri cluster. Two chop bars were then selected from each cluster through balloting.

In employing the random sampling technique to select food consumers, all the selected chop bars were visited during their peak hours between 10:00 am and 2:00 pm. With a sampling interval of 3, questionnaires were distributed to three respondents at random after every third customer to the bar until the entire twenty (20) respondents target was reached.

The purposive sampling technique is straight forward because the target is the sanitary inspectors.

3.6 Study Instruments

Secondary data was obtained from books, articles, newspapers and internet sources to review literature. These are analysed in chapter two.

Questionnaires, face-to-face interview guide and preliminary observation checklist was used to collect the necessary primary data for the study.

The preliminary observation involved scouting through the study area to assess the following.

1. Number of 'chop bars' (local restaurants) in the Municipality
2. The size of these 'chop bars'.
3. The rate of patronage
4. The layout of the environment: cooking and sitting arrangement
5. The location of the chop bars: nearness to open dumping site and/or filthy gutters.
6. Type and state of gutters.
7. Place of convenience: toilets, washrooms and bathrooms.
8. Storage facilities: store rooms, shelves and deep freezers.
9. Personal hygiene: type of clothes worn by staff, their foot wear, how their hair are kept, skin infections and exposed cuts while cooking, and hand washing practices employed by staff.
10. Food hygiene: food storage, cleaning of utensils, drinking cups, serving dishes, water jugs, napkins, etc
11. The availability of sanitary facilities for staff and costumers. Pictures were taken and included in the analysis of the data gathered from the field. This process will guide the formulation of the interview schedule. Questionnaire, face-to-face interview and personal observation were used in the collection of data from the four groups of respondents.

3.7 Pre-test of Study Instrument

Data collection tools such as the questionnaire and checklist were pretested at dondoli in the study area. This area was chosen due to its similarity with the rest of the study area in terms of socio cultural characteristics. This was done to ensure the validity and reliability of the instruments. The format or presentation of questionnaire was revised and modified according to reactions of respondents.

3.8 Ethical consideration

Ethics approval was sought and obtained from the Association of Chop bars in the municipality, the Municipal Environmental Health Office and the Municipal Tourist Board through a written permission to carry out the survey. Verbal consent was also sought from respondents for voluntary participation

3.9 Data Collection Procedure

Data was collected through personal visit to selected food outlets in the Wa Municipality. Permission was sought from respondents before administering questionnaire and interview guide to collect both quantitative and qualitative data. The aim and objectives of the study was made clear to respondents. Respondents were assured, relevant and sensitive issues will be treated with at most confidentiality.

Qualitative and quantitative methods were used to classify, describe and quantify the variables.

Structured questionnaires were administered to chop bar operators and consumers. This was used to obtain data relating to demography (age, occupation, education etc.), kitchen hygiene and personal hygiene; the questionnaire also assessed the frequency of

personal health check and practices employed by operators. Check list was used to review the hygiene practices of operators/ handlers.

3.10 Data analysis

Administered questionnaires were examined to check completeness, accuracy and consistency of responses in order to detect and eliminate errors. Data collected each day, both qualitative and quantitative, were handed over to principal investigator who entered the various responses onto a computer and preliminary analysis started right away. Copies of data were also sent to the principal investigator's email to serve as a backup in case of any data loss.

The Statistical Package for Social Sciences (SPSS version 20.0) was used to process the quantitative data. The data is processed into statistical tables and charts for interpretation and discussion in chapters four (4) and five (5). Processed data was analysed both quantitatively and qualitatively.

3.11 Limitations of the study

The study sought to assess the food hygiene and hygiene practices of food handlers in Traditional Restaurants (Chop Bars) in Wa Municipality in the Upper West Region. Some of the respondents (operators) did not consistently attend to issues in the restaurant hence their inability to respond to the questions. Costumers were not patient to go through the interview process and those who did, did not want to be seen as critics. These coupled with time constraints could not permit a large sample size to be.

CHAPTER FOUR

ANALYSIS /PRESENTATION OF RESULTS

4.0 Introduction

This chapter looks at data presentation, analysis and discussion of results. The presentation of this chapter is going to take the following form:

1. Response rate
2. Demographics of respondents
3. Operator's perception of kitchen hygiene, food hygiene and personal hygiene
4. Customers' perception of kitchen hygiene, food and personal hygiene
5. Food safety practices and cross contamination
6. Food safety principles
7. Training of food operators.

4.1 Response Rate

Out of the 80 questionnaires that were administered 72 of them were returned. This comprises of 40 for operators/food handlers and 32 for customers. Two state institutions (Wa Municipal Sanitation Department and the Food and Drugs Authority) who are responsible for regulation and education were also interviewed.

4.2 Demographics of Respondents

Table 4.1: Demographic information of operators/ handlers

Food operators and handlers (n= 40)

Variable	category	frequency	percent
Gender	Male	-	-
	Female	40	100.00
Age (yrs.)	20 & below	-	-
	21-30	10	25.00
	31-40	14	35.00
	41 & above	16	40.00
Work experience (yrs.)	below 1	2	5.00
	1-5	2	5.00
	6-10	2	5.00
	11& above	34	85.00
Educational level	Tertiary	-	-
	HND	-	-
	NVTI	2	5.00
	Intermediate	2	5.00
	Secondary	-	-
	MSC	2	5.00
	None	32	80.00
Catering background	Yes	6	15.00
	No	34	85.00

Source: Fieldwork, 2016

From Table 4.1, the 40 year age group & above had the highest number of food handlers (16 out of 40) whereas the 21-30 age group recorded the least (i.e. 10 out of 40). All the respondents were, female. Also 80% of the food handlers were illiterates. With 10% of them being middle school graduates, and 10% being NVTI and Intermediate certificate holders. Majority of the respondents 34 representing 85% have been in the local restaurant business for more than 10 years and 15% of them less than a year, 1- 5, and 6-10 equally distributed. Out of the 40 respondents, only 6 had catering background.

4.3 Chop Bar Operators/ Handlers Perception about Food, Kitchen and Personal Hygiene Practices

4.3.1. Frequency of medical screening

With regards to the frequency of medical screening of operators and food handlers, 85% of operators went for medical screening every year, whiles 15% of operators indicated they went for screening every six months.

4.3.2. Kitchen Hygiene

Food operators understanding and practices of kitchen hygiene

Most of the handlers had good knowledge of kitchen hygiene (85%) whiles 15% of them demonstrated poor knowledge in kitchen hygiene as shown in figure 4.1.

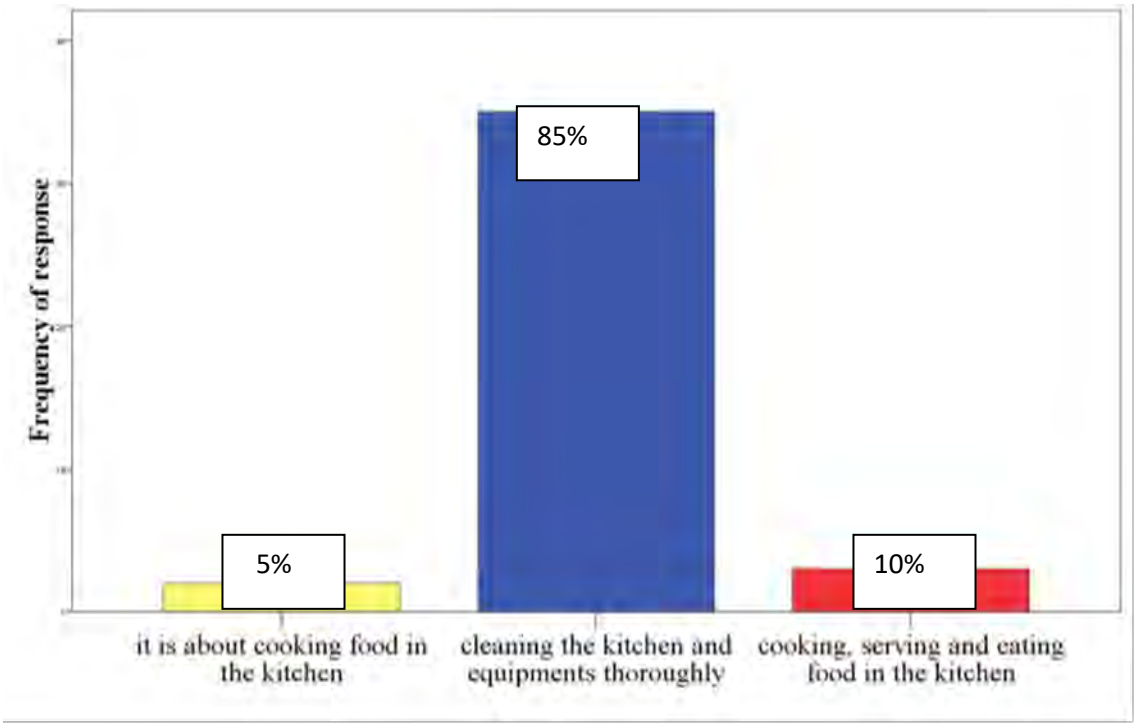

Figure 4.1: Operators / handlers knowledge of kitchen hygiene

Source: Field work 2016

4.3.2. Practice of kitchen hygiene

Food operators practice of kitchen hygiene was tested on how often the food preparation and service area are cleaned, how waste is disposed off in the kitchen, and weather the food production area is fumigated and how often.

Table 4.2: How often kitchen is cleaned

Days/ weeks	frequency	percent
After day's work	8	20.00
Weekly	12	30.00
Before and after the day's work	20	50.00
Total	40	100.00

Source: Fieldwork, 2016

As shown in Table 4.2, 20 respondents representing 50% indicated they clean the kitchen and work area daily before and after work. 12 respondents do this weekly

representing 30% whiles 8 of them representing 20% clean their food and service area after the day's work.

Table 4.3: Disposal of refuse in the kitchen

Method of disposal	Frequency	Percent
Wrap in a polythene bag and place in a corner	4	10.00
Gather in a corner and collect later	2	5.00
Dump in a refuse bin outside the kitchen	34	85.00
Total	40	100.00

Source: Fieldwork, 2016

From Table 4.3, 85% of operators dump refuse in a bin outside the kitchen, 10% wrap their refuse in polythene bags and keep in the kitchen to be disposed later, whiles 5% gather refuse in a corner and collect later.

Table 4.4: Fumigation of kitchen

How often	Frequency	Percent
Monthly	6	15.00
Every six month	16	40.00
Yearly	4	10.00
Total	40	100.00

Source: Fieldwork, 2016

Out of the 26 respondents who fumigate their production area, 40% of them fumigate their production area every six months, 15% monthly and 10% every year whiles 35% of the respondents do not fumigate their production area as indicated in Table 5.

Table 4.5: Disposal of liquid waste

Method of disposal	Frequency	Percent
Poured into a gutter	24	60.00
Through a drainage system in the kitchen	2	5.00
Poured on the floor outside the kitchen	10	25.00
Kept in a container and disposed later	4	10.00
Total	40	100.00

Source: Fieldwork, 2016

As indicated in Table 4.5, 60% of food operators dispose their liquid waste in exposed gutters within the premises, 25% dispose the liquid waste outside the kitchen floor, 10% store the waste in a container in the kitchen and dispose them later, whiles 5% dispose their liquid waste through a drain in the kitchen.

4.3.4. Personal Hygiene

Operator's knowledge of personal hygiene

Personal hygiene forms a major part of food safety and therefore requires strict compliance. Respondents exhibited convincing knowledge of personal hygiene as 95% of them practiced personal hygiene.

Operator's practice of personal hygiene

Respondents were interviewed on personal hygiene under the following headings:

Under what condition do you wash your hands?

After handling raw food products how do you wash your hands?

How often do you cut your finger nails?

Do you cover your hair when working?

How often do you clean your clothes? And

How do you treat fresh cuts?

Table 4.6: Cleaning of hands during food preparation

Variable/ category	Frequency	Percent
After using the toilet	24	60.00
Before every activity	6	15.00
After the toilet and before every activity	10	25.00
Total	40	100.00

Source: Fieldwork, 2016

From Table 4.6, 36 respondents representing 90% of respondents have and use hand washing equipment whereas 4 respondents representing 10% do not. Twenty-four of them representing 60% wash their hands after using the toilet, 6 of them wash their hands before and after every activity representing 15% whiles 10 of them representing 25% wash their hands after using the toilet and before and after every activity.

Table 4.7: Handling of raw food products

Method of cleaning	frequency	percent
Wash hands with soap and warm water	20	50.00
Wipe with napkin	18	45.00
Wash with cold water and soap	2	5.00
Total	40	100.00

Source: Fieldwork, 2016

As indicated in Table 4.7, Respondents when asked how they wash their hands after handling raw food products, indicated they wash their hands using warm water and soap (50%). 5% wash their hands with cold water and soap whiles 45% of respondents wipe their hands with a napkin after handling raw food products.

Table 4.8: Treatment of fresh cuts and wounds on hands by handlers

Treatment	frequency	percent
Applied mentholated spirit and water prove plaster	2	5.00
Leave it as it is	6	15.00
Apply ash and other methods	32	80.00
Total	40	100.00

Source: Fieldwork, 2016

From Table 4.8, 80% of respondents use other means such as ash etc to treat fresh cuts, 5% applied mentholated spirit and water prove plaster, whiles 15% of food handlers leave fresh cuts to heal on their own either than using mentholated spirit and plaster.

4.3.5. Food Hygiene

All food operators/ handlers had good knowledge of food hygiene and there was none with poor knowledge. But when it came to whether they practice this knowledge in food hygiene, it was obvious that was not the case.

1. **Where raw food stuff is obtained and stored**

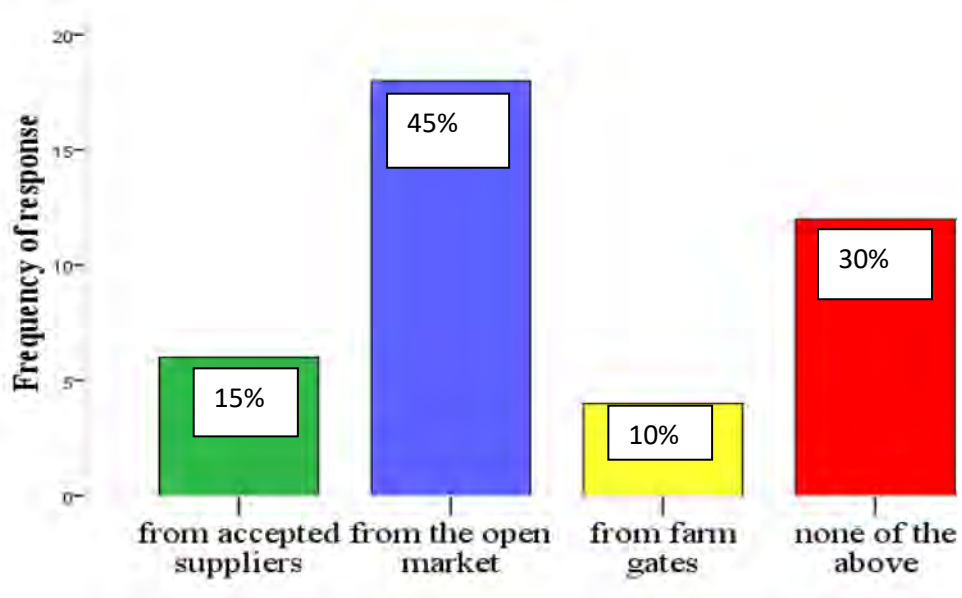

Figure 4.2: Source of raw foods

Source: Field work 2016

In Figure 4.2, 45% of respondents obtain their food products from the open market, 15% from acceptable suppliers, whiles10% obtain their food products from the farm gate. 12 respondents representing 30% get their food products from and other sources such as their farms etc.

Storage of fresh and dry food stuffs

Table 4.9: Storage of fresh food products

Storage option	Frequency	percent
Spread it on the floor	14	35.00
Store it in a basket	4	10.00
Store in a refrigerator	10	25.00
On trays	10	25.00
Do not store	2	5.00
Total	40	100.00

Source: Fieldwork, 2016

From Table 4.9, 14 operators/ handlers representing 35% spread fresh food product on the floor, 10% of them store theirs on trays, whiles 10% store theirs in a refrigerator. 2 of them representing 5% did not store fresh food products.

Table 4.10: Storage of dry food products

Storage option	Frequency	Percent
In plastic containers	4	10.00
In a well ventilated area	18	45.00
In a store room	2	5.00
In a basket	16	40.00
	40	100.00

Source: Fieldwork, 2016

When it came to storing dry food products, 45% of operators/ handler stored them in well ventilated areas, 40% stored them in a basket, whiles 10% stored them in plastic containers as shown in Table 4.10.

3. Keeping food hot until service time

Table 4.11: Keeping food hot until service time

Storage option	frequency	percent
Leave on fire	30	75.00
Dish it in food warmers	2	5.00
Dish it in aluminium bowls and cover	4	10.00
Do not do anything	4	10.00
	40	100.00

Source: Fieldwork, 2016

Cooked food was kept hot by food operators / handlers on fire until it was time to service. As indicated in Table 4.11, 75% of them used this method, whiles 5% of them used food warmers. Meanwhile 10% of them did nothing until it was time to serve the cooked food.

4.3.3. Food Safety Practices and Cross Contamination

How frozen meat / fish is handled

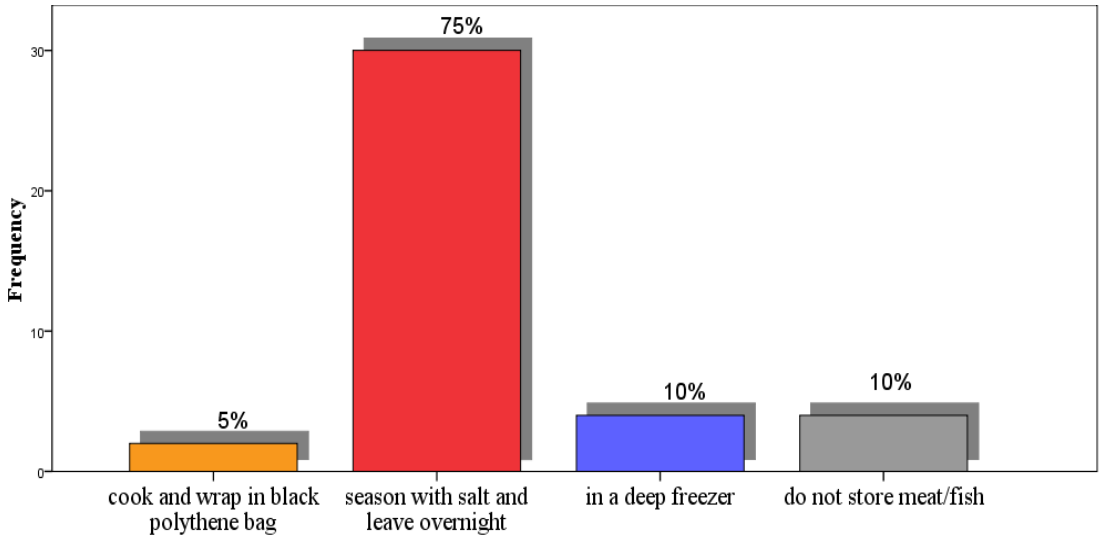

Figure 4.3: How fresh meat/ fish is kept overnight

Source: Fieldwork, 2016

From figure 4.3, 75% of respondents season their meat or fish with salt, steam and leave overnight, 10.0% of them keep theirs in a deep freezer, 5.0% cook their meat or fish and wrap in black polythene bags and keep overnight, whiles 10.0% of them purchase enough for the day and for that matter do not store meat or fish overnight.

How frozen meat/ fish is thawed

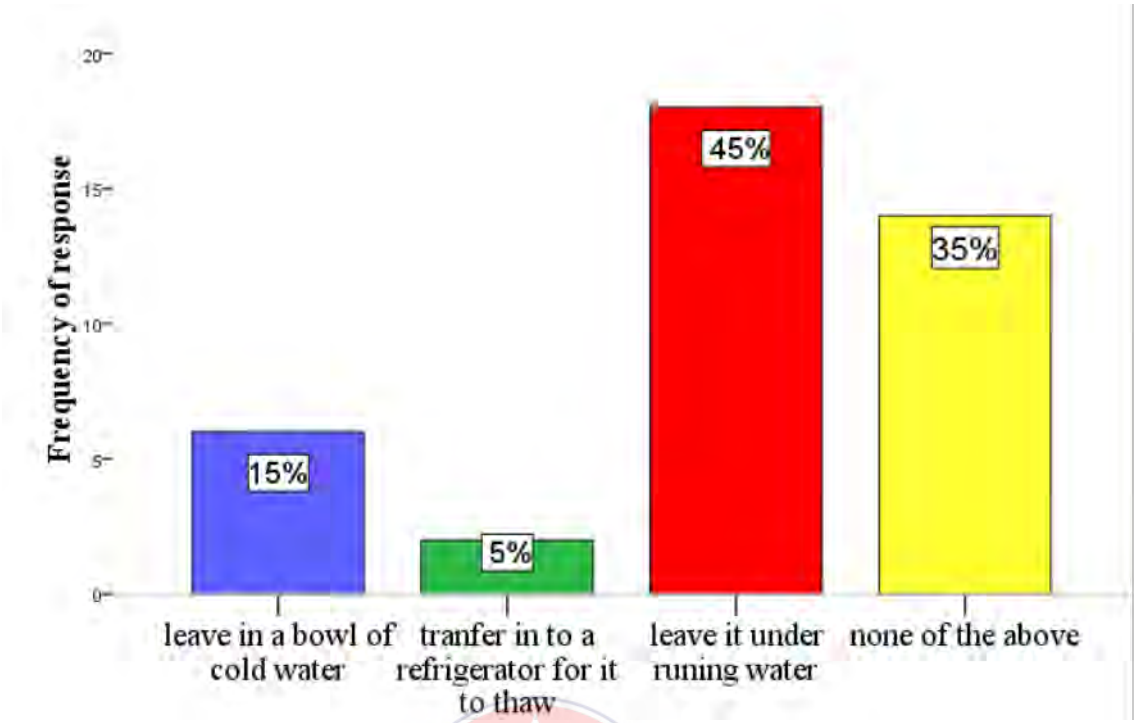

Figure 4.4: How frozen meat/ fish are thawed.

Source: Fieldwork, 2016

Shown in figure 4.4, when asked how frozen meat or fish is thawed after it was kept in the freezer overnight, 45 % of the respondents indicated it was left under running water, 15% leave it in a bowl of water, 5% transfer in a refrigerator to thaw, and 35% leave in the open to thaw.

Handling of cooked food by operators

With reference to how cooked food is handled, 95% of food handlers use their bare hands to serve customers, whiles 5% cover their hands with polythene bags.

Do operators have separate knives for cutting raw and cooked food?

As to whether operators had separate knives for cutting raw and cooked food, 90% of food handlers use the same knife to cut raw meat or fish, vegetables and cook food, whiles 10% had separate knives for raw meat or fish, vegetables and cooked food.

4.3.7. Food Safety Principles

After a careful observation and response from respondents, the researcher wanted to know if operators work with rules and regulations concerning the handling of food and whether the regulating body(s) pays them visits and how regular that is done. It was to also to find out if respondents have had any training programme(s) and who did the training.

Availability of Rules and Regulations Concerning Handling of Food

When respondents were interviewed about whether they have rules and regulations concerning the handling of food, 30 of them representing 75% said yes whiles 10 respondents (25%) did not have any rules or regulations governing the way they handle food.

Inspection, monitoring and training of food operators/handlers

Findings revealed that 40 respondents had inspectors from the Environmental Health Department and the Food and Drugs Board visiting them. Visits were done weekly and monthly. 36 of the respondents (90%) had their premises visited monthly, whiles 4 of them representing 10% got weekly visits.

Areas of visit by inspectors

With regards to areas of visit, 60% of respondents indicated the food service area was checked when the inspectors visited, whiles 40% of them had their production area, utensils, surfaces and service area checked

Have you had any training recently?

.

Training is an essential part of ensuring food safety. 10 respondents (25%) had training in the area of good hygiene practices and prevention of food poisoning, whiles a greater number of respondents 30 (75%) had no training at all. These trainings took the form of talks, seminars and conferences.

4.4. Customers Perception about Food, Kitchen and Personal Hygiene.

Table 4.12: Demographic information of customers

Customers(n=32)

Variable	category	frequency	percent
Gender	Male	12	32.50
	Female	20	67.50
Age (yrs.)	20 & below	6	18.80
	21-30	20	62.50
	31-40	3	9.40
	41 & above	3	9.40
Educational level	Tertiary	3	9.40
	HND	11	34.40
	NVTI	-	-
	Intermediate	-	-
	Secondary	15	46.90
	MSC	-	-
	Non	3	9.40
Employment	Civil Servant	12	37.50
	Self employed	11	34.40
	Unemployed	9	28.10

Source: Fieldwork, 2016

As indicated in Table 4.12, 32.5% of customers were males and 67.5% females. On the age category, 18.8% were 20 years and below, and 62.5% were in the 21-30 year group. Nine point four percent (9.4%) had tertiary education, 34.4% HND holders, 46.9% secondary school leavers and 9.4% had no formal education. As indicated in the Table 2, 37.5% were civil servants, 34.4% were self employed, and 28.1% were unemployed.

Frequency, choice and reasons in patronage of food from chop bars

Costumers were asked how often they buy food from chop bars; they indicated it was done daily 62%, and weekly 38%.

Choice of food from chop bars

From figure 4.5, costumers' preference for food ranges from fufu and soup, rice balls, banku and soup, plain rice and stew, and T. Z. Forty-two point five percent (42.5%) of costumers patronize fufu and soup, 27.5% go for T.Z., 10.0% of them prefer plain rice, 10.0% banku and soup, whiles 10.0% also prefer rice balls.

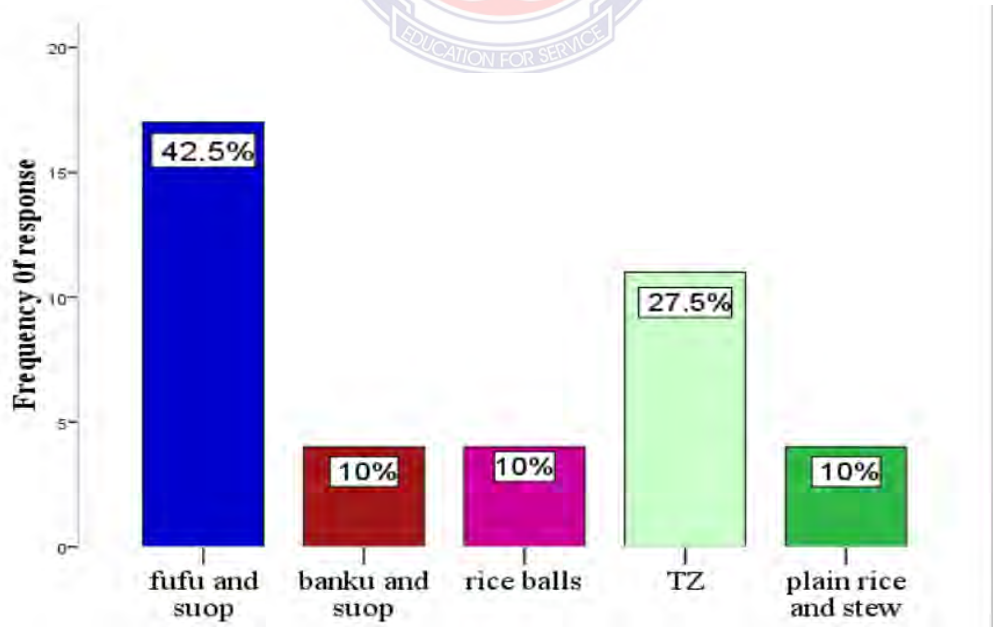

Figure 4.5: Choice of food

Source: Field work

Reasons for buying food from a chop bar

Customers bought food from chop bars. 56.2% of costumers bought food from chop bars because they do not have enough time to cook at home, 34.4% bought food from chop bars in other to save time, whiles 9.4% bought food from chop bars because the food is delicious.

Table 4.13: Reasons for buying food from a chop bar

Reasons	Frequency	Percent
To save time	11	34.40
Do not have enough time	18	56.20
The food is delicious	3	9.40
Total	32	100.00

Source: Fieldwork, 2016

4.4.1 Knowledge of Kitchen Hygiene and Operators Practice of Kitchen Hygiene

Table 4.14: Understanding of kitchen hygiene

Understanding	Frequency	Percent
Cooking food in the kitchen	3	9.40
Cleaning the kitchen and equipment thoroughly	15	46.90
Sweeping the kitchen	14	43.80
Total	32	100.00

Source: Fieldwork, 2016

As indicated in Table 4.14, costumers unlike operators have fair to average knowledge of what kitchen hygiene is all about. Out of the 32 respondents, 46.9% perceive kitchen hygiene to mean cleaning the kitchen and equipment thoroughly, 43.8% see as sweeping the kitchen, while 9.4% think it is about cooking food in the kitchen.

Operators practice of kitchen hygiene

Costumers' perception of kitchen hygiene informed their response to operators' practice of kitchen hygiene. 6 costumers representing 18.8% think that operators practice good kitchen hygiene, whiles 26 costumers representing 82.2% thinks either wise.

Reasons for operator' practice of kitchen hygiene

Reasons costumers gave for concluding that operators practice hygiene were, cooking and serving equipment are well cleaned (46.8%) and no waste was found on the premises (53.2%).

Reasons why costumers think that operators do not practice kitchen hygiene

Table 4.15: Reasons for operators' not practicing kitchen hygiene

Reasons	Frequency	Percent
Cooking and serving equipment are very dirty	12	46.10
Equipment and items are poorly arranged	2	7.80
Waste found on premises	12	46.10
Total	26	100.00

Source: Fieldwork, 2016

From Table 4.15, out of the 32 respondents, 26 of them representing 82.2 indicated that operators do not practices kitchen hygiene citing cooking and serving equipment are very dirty (46.1%), waste was found on premises (46.1%) and that equipment and items are poorly arrange (7.8%).

Availability of netted door to the food area

Six respondents indicated that the door to the food area is netted, whiles 81.2% indicated there was no net on the door to the food area.

How costumers rate food service area of chop bars

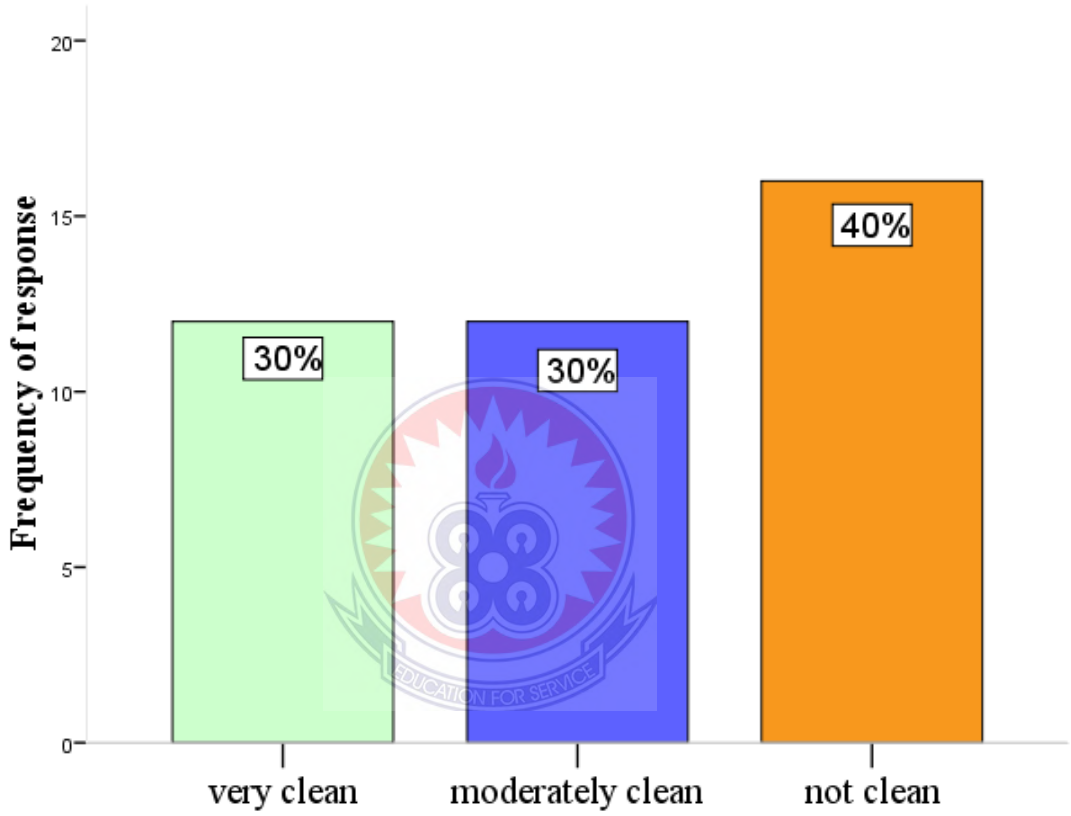

Figure 4.6: Rating of food service area

Source: Field work, 2016

Based on costumers' knowledge and perception of operator's practice of kitchen hygiene, costumers rated the food service area as indicated in figure 4.6, as very clean 30%, moderately clean 30% and 40% as not clean.

Food Hygiene and Cross- Contamination

With regards to what costumers look out for in their decision to buy food, costumers indicated in figure 4.7, food that is covered 52.5% is the main determinant, 27.5% also indicated food that is neatly / nicely presented informed their choice, and 20% settled for food that is hot.

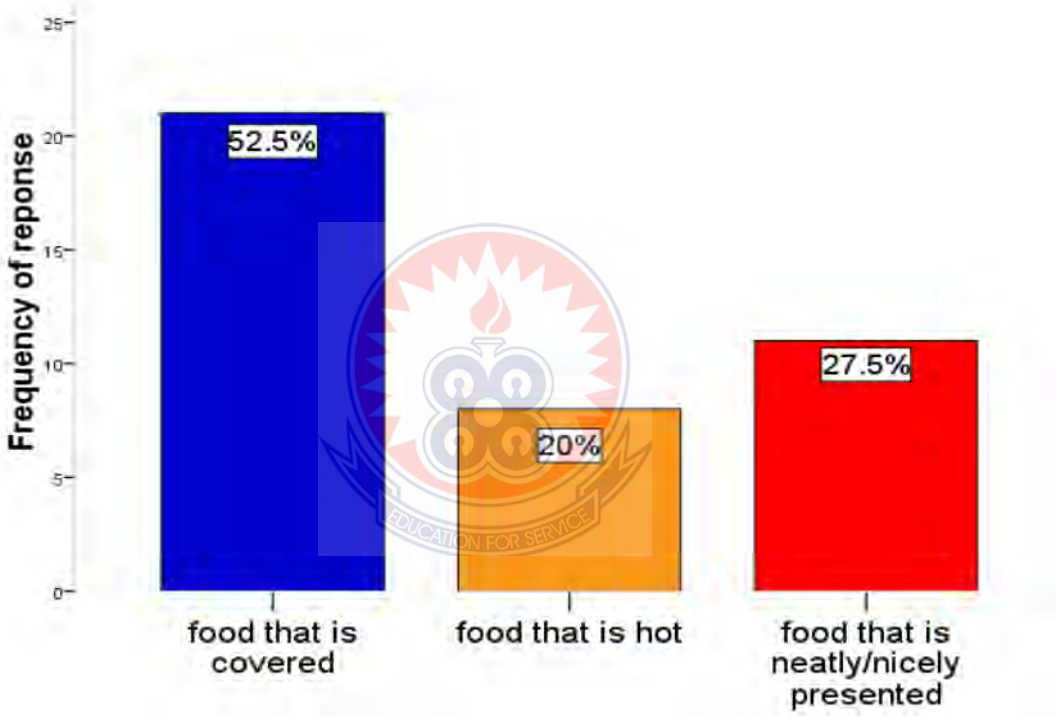

Figure 4.7: Hygiene check before buying food

Source: Field work, 2016

Experience of food borne illness and foreign material found in food

Table 4.16: Complains of food borne illness and foreign material in food

	Complains of illness		foreign material	
Rating	**Frequency**	**Percent**	**Frequency**	**Percent**
Yes	12	37.50	6	18.80
No	20	62.50	26	81.20
Total	32	100.0	32	100.00

Source: Fieldwork, 2016

As to whether costumers experienced some food borne illness, 37.5% indicated they did, and 62.5% never experienced any food borne illness. About 18.8% costumers also indicated they found foreign material in their food, whiles 81.2% had no such experience as shown in Table 4.16

Customers also indicated that vomiting, headaches, diarrhoea, and stomach pains are some of the symptoms of food borne illness they suffered after eating from a chop bar. Respondents indicated 33.3.% of them vomited, 33.3% had headaches, 15.6% experienced diarrhoea, and 15.6% also experienced stomach pains as shown in figure 4.8.

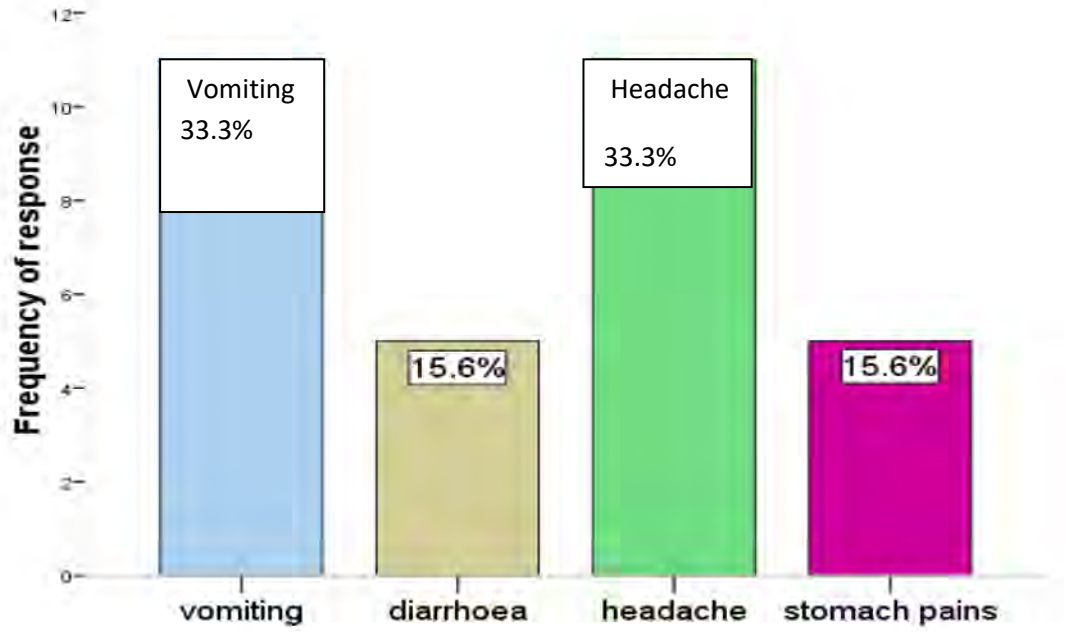

Figure 4.8: Symptoms of food borne illness suffered by customers.

Source: Field work, 2016

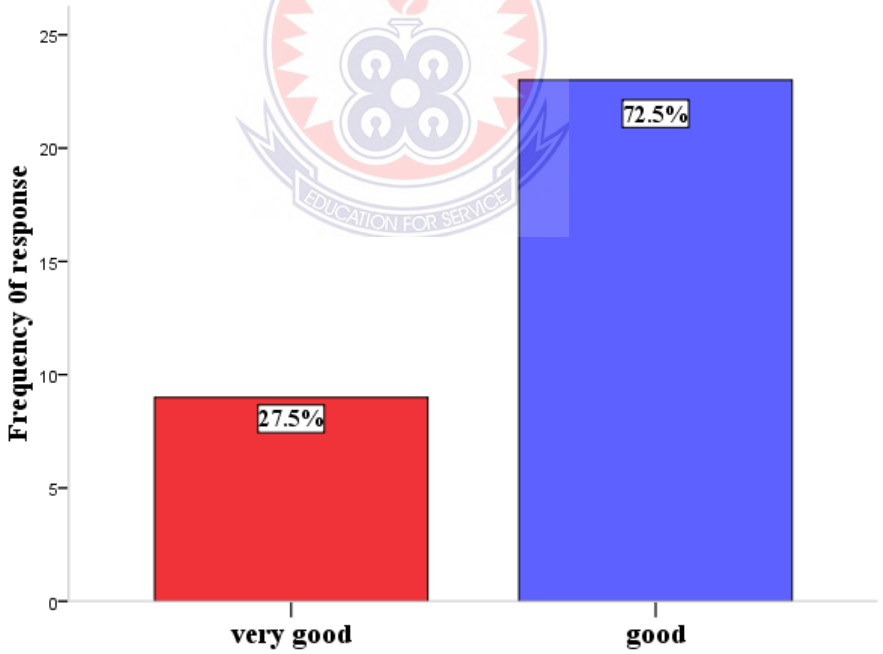

Figure 4.9: Rating of quality of food sold

Source: Field work, 2016

How costumers rate quality of food in chop bars

Costumers indicated as shown in Figure 4.9 that, the quality of food in chop bars are very good (27.5% of them), and 72.5% think it is good.

4.4.3. Costumers Perception of Personal Hygiene and Operators Practice of Personal Hygiene

Knowledge of personal hygiene

In ascertaining customers' knowledge of personal hygiene, costumers were asked to select the following that best represents personal hygiene; eating hygienic food, taking good care of the body, and covering the body with cloths. Table 4.17 indicates that, almost an average (46.9%) of respondents understood personal hygiene to mean taking good care of the body, 43.8% of respondents indicated that covering the body with cloths best represents personal hygiene, whiles 3 out the 32 respondents representing 9.4% understood personal hygiene to be eating hygienic food.

Table 4.17: Understanding of personal hygiene

Understanding	Frequency	Percent
Eating hygienic food	3	9.40
Taking good care of the body	15	46.90
Covering the body with cloth	14	43.80
Total	32	100.00

Source: Fieldwork, 2016

Waiters/ servers covering of hair

As to whether waiters/server covered their hair during service, customers indicated that only 25% of them covered their hair, whereas 24 costumers out of the 32 respondents' revealed waiters/ servers do not cover their hair.

Operating with open cuts/ bruises

Also, customers indicated that 9.4% of operators operate with cuts/ bruises, whiles 90.4% do not operate with cuts.

Figure 4.10: How cooked food is handled and served by handlers

Source: Field work, 2016

As indicated in figure 4.10, 93.8% of food handlers use their bare hands to handle and serve cooked food, 3.1% of respondents use tongs and 3.1% also use gloves when handling cooked food.

Use of towel/ napkin for cleaning hands

With reference to the use of a common towel/ napkin, 96.9% of respondents indicated a common towel/ napkin was used at chop bars.

Use of common cup to drink

Also, 75% of respondents indicated a common cup was being used in chop bars.

Table 4.18: Rating of operators/ handlers personal hygienic practice

Rating	Frequency	Percent
Very good	5	15.60
Good	24	75
Bad	3	9.40
	32	100.00

Source: Fieldwork, 2016

Customer's perspective of operator's hygiene practice as shown in Table 4.18 indicates that, operator's practice of personal hygiene was good. 75%, 15.6% showed very good practice of personal hygiene, whiles 94% exhibited bad personal hygiene practice.

CHAPTER FIVE

5.0. DISCUSSION OF RESULTS

From the Socio-demographic characteristics indicated in Table 4.1, it can be observed that there were food handlers in all the age groups except in the 20 and below age group with the older age group (41 and above) having the highest number of handlers. The age group 21-30 had the least number of food handlers signifying that food handling is essentially a business run by the middle aged women. Significantly no male was involved in food handling from the study which conforms largely to the well acclaimed general trend, that in Africa, cooking is a feminine business. The largest proportions of food handlers were those who had no formal education. This could mean that food handling is reserved for illiterate in the study area. This finding also illustrates the fact that most of the food handlers have been in this business for more than 11 years (85%). This situation demands that vigorous education as well as regular inspection and monitoring is effected to avert a potential deadly food borne disease.

5.1. Food handlers practice of kitchen hygiene

The research revealed that 60% of food operators in Wa Municipality dispose their liquid waste in exposed gutters within the premises, 25% dispose the liquid waste outside the kitchen floor which invite flies and other insects.

Kitchen hygiene is very important to avoid bacterial contaminations and unhealthy tendencies in the kitchen. Failure to maintain equipment and utensils hygienically may cause food poisoning (Ceserani, 2007).

The study reveals that, despite the high knowledge of operators in kitchen hygiene, it is fairly translated in practice. Kitchen hygiene extends beyond cleaning of work areas, equipments and tools to the entire kitchen including floors and walls (Cerani, 2007).

Pets are known to carry pathogenic organisms that can be transmitted to humans through contaminated food therefore regular fumigation and serious attention should be geared towards general cleanliness of the kitchen.

5.2. Personal hygiene of food handlers

Respondents showed fair to good compliance when it came to personal hygiene. Eighty percent (80%) of respondents use other means such as ash etc to treat fresh cuts rather than using mentholated spirit and plaster. This was found to be dangerous.

This finding goes to confirm the assertion that knowledge in personal hygiene does not translate in compliance or practice. The findings revealed that only 15% of operators / food handlers went for medical screening every six months, whiles 85% did so every year which is not acceptable per the law. The law requires that every food operator or handler goes for medical screening every six months to ensure that they are fit to handle food. High standard of cleanliness and physical fitness is very necessary for every food handler. Persons who are ill or not clean themselves should not handle food, because they may contaminate the food causing consumers to be ill (Paulson, 1997).

It is expected that everyone working in the food industry maintain a high degree of personal hygiene because, personal hygiene is a legislative requirement. *Noro virus* accounts for about 66% of all food borne illness and it is commonly spread by unhygienic food handlers (CDC, 2003). Handling Statistics indicate that improper hand washing alone accounts for 38% of food contamination (Marriot and Gravani, 2006) and more than 25% of all food borne illness (Weinstein, 1991). Contaminated hands of workers, due to inadequate hand washing allows pathogenic micro-organisms which commonly exist on the food worker and in the kitchen environment to be picked up and manually transferred to foods (Paulson, 1997). Hand washing should always be done

thoroughly with soap and warm or cold water after using the restroom, touching raw foods, touching the hair, nose face or body, sneezing, co-rash or touching anything else that may contaminate hands (National Restaurant Association Educational Foundation (NRAEF), 2004). Food operators/ handlers are a potential source of bacterial and physical contamination of food, and so personal hygiene is a key element ensuring that food is prepared safely (Alcock, 1985).

5.3. Food hygiene

This finding is in tandem with a study carried out by Osagbemi and colleagues about knowledge, attitude and practice concerning food poisoning in Okene metropolis of Kogi State where they discovered that the knowledge of food poisoning amongst food handlers was very high (100%). World Health Assembly declared that prevention and control of food borne diseases was a public health priority in 2000. Food handlers play a very important role in curbing food borne disease outbreaks. For this reason, assessing the knowledge of food hygiene and its correct application amongst food handlers is very essential in a bid to preventing food borne diseases.

5.4. Food safety practices and cross- contamination

Respondents were quizzed to find out how they handle raw meat, how meat or fish is thawed when taken out of the fridge or deep freezer, how cooked food is handled and served, and whether cutting knives and boards are separate for raw and cooked foods. With regards handling of cooked food, 95% of food handlers use their bare hands to serve customers, 90% of food handlers also used the same knife to cut raw meat or fish, vegetables and cook food.

According to Ansari-Lari *et al.,*(2010) the main source of cross contamination occur during processing when food come into contact with surface, equipment and employees. The common cause of cross contamination in the kitchen is the use of contaminated hands and equipments to prepare cooked and raw food at the same time. Cross contamination can also occur when uncovered raw foods are stored directly adjacent to or above ready-to-eat foods in a refrigerator or other holding equipments.

The finding is in sink with a survey that was conducted by Annorand Baiden (2011) which identified cross-contamination as an important contributory factor in 30% out breaks of food-borne disease. This was mainly attributed to the use of kitchen equipment to handle raw and ready to eat food.

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

At the end of the food supply chain, the restaurant industry often finds itself responsible for ensuring not only that the foods they serve are safe from contamination introduced at the restaurant, but also contamination introduced anywhere else in the supply chain (Enz, 2003). For this reason, proper food handling procedures from receiving to serve in these establishments are critical to the prevention of food borne illness.

To avoid cross-contamination it is important that the same equipment is not used for handling raw meat and food products without being disinfected. To prevent the

inadvertent use of equipment, it is recommended that, where possible, different colours and shapes are used to identify products (Kinton *et al*., 1996).

5.5. Availability of Rules and Regulations Concerning Handling of Food

As to whether food operators had rules and regulations regarding handling of food, 75% of operators had rules and regulations governing their operations, whiles 25% did not have any rules nor regulations governing their operations.

This finding reveals a general compliance by operators to have rules and regulations governing the handling of food, but a reasonable percentage of them (25%) do not have any idea about food handling rules and regulations. This finding supports the point made by Sockett (1995) when he points out that many people do not have the basics when it comes to rules of food hygiene. Besides education and training in food, regulation plays an important role in achieving food safety assurance in the food business.

It is imperative therefore that, the food hygiene regulations of 1970 be strictly observed in order to protect public health and reduce if not eliminate the number of food poisoning outbreaks.

5.6. Inspection, monitoring and training of food operators/handlers

All 40 Respondents indicated they had inspectors from the Environmental Health Department and the Food and Drugs Board visit them. These visits were done weekly and monthly. 36 of the respondents (90%) had their premises visited monthly, whiles 4 of them representing 10% got weekly visits. 60% of respondents indicated the food service area was checked when the inspectors visited, whiles 40% of them had their production area, utensils, surfaces and service area checked.

Training is an essential part of ensuring food safety. 10 respondents (25%) had training in the area of good hygiene practices and prevention of food poisoning, whiles a greater number of respondents 30 (75%) had no training at all, as indicated. These trainings took the form of talks, seminars and conferences.

As shown in Figure 8, inspections are mostly conducted monthly (90%), with much time spent at the food service area, which is not enough to ensure food safety because cross-contamination mostly occur in the kitchen and production area. According to Ceserani, (2007) failure to maintain equipment and utensils hygienically may cause food poisoning. Risk will always exist in food service business and inspectors must be thorough in their monitoring to help operators and handlers identify preventive measures at each level on their premises in order to reduce if not eliminate such risk to an acceptable level (Norton, 2002).

As the findings suggest, though 25% of operators/ handlers had some form of training, a greater number of them (75%) had no training at all.

This finding agrees with Wilson et al when they observed that many managers in the hospitality industry endorse the concept of training but only a few of them practice it.

Food service operators and handlers should have a better knowledge about food safety and hygiene since customers expects that their resource spend on food service do not result in illness. Despite better knowledge, a clear understanding of how and why consumers perceive food safety, risk cannot be neglected since the uncertainty of achieving food safety goals may lead to some possible consequent losses for customers (Yeung & Morris, 2001).

5.7. Costumers Perception about Food, Kitchen and Personal Hygiene

From the findings indicated in Table 4.13, many people patronize chop bar food for its convenience either than safety. This goes to buttress the point made by Mensah *et-al.* (2002) when they said, consumers who depend on such food are more interested in its convenience than in question of its safety, quality and hygiene. Especially for most people in the Wa Municipality who patronize chop bars daily, its due to its contribution towards meeting the nutritional requirements of the poor in society. Tuo-zaafi, which is the staple food of the Upper West Region is eaten during dinner and therefore residents will prefer something different for lunch. As indicated in Figure 10, majority of the customers (43.8%) choose fufu and light soup, followed by T.Z. (28.1%). The choice of a chop bar or eat out should not only be based on convenience or its perceived nutritional value but safety and hygiene.

According to Walker & Jones (2002) traditional food safety control approaches have tended to focus on the general appearance, structure and cleanliness of food outlets. However, these methods have failed to successfully deal with the problem of food borne illness. This confirms the findings in this study. As indicated in Figure 13, customers considered food that is covered (53.1%), food that is hot (18.8%) and food that is neatly/ nicely presented (28.1%) before purchasing food from chop bars. This does not eliminate risk of food borne illness. This is evident in the number of complains of food borne illness by customers (12 respondents representing 37.5%). According to the World Health Organisation report 2002, food borne diseases caused by microbiological hazards is a large growing public health problem in Europe and worldwide. Delivering safe and clean food to customers is the responsibility of operators at all levels. But customers also have a responsibility for their own safety and for that matter, should ensure that food purchased is safe.

Customers' perspective of operators' hygiene practice as shown in Table 29 indicates that, operators' practice of personal hygiene was good 37.5%, 37.5% showed moderate practice of personal hygiene, 15.6% showed very good practice of personal hygiene, whiles 94% exhibited poor personal hygiene practice.

Personal hygiene is a legislative requirement of every food operator to ensuring food safety. Therefore food handlers are to avoid operating with open cuts or bruises, keep both body and cloths clean all the time, cover hair to avoid them dropping in to food, ensure there are enough towels or napkins and drinking cups available to customers, and must avoid skin contact with cooked food. As indicated in Table 25, 75% of operators and handlers leave their hair uncovered. Customers are exposed to all kinds of risk due to the use of common towel or napkins (96.9%) and cups (75%) as shown in Tables 27 and 28 respectively. It is a serious health risk when cooked food comes into contact with the skin or bare hand. As much as 93.8% of operators and food handlers are said to handle food with their bare hands. This phenomenon as indicated in Figure 16 should be discouraged and discontinued at all cost.

Data on food borne diseases indicate that the majority of outbreaks results from inappropriate food handling (Jonas & Angulo, 2006). According to Guzewick & Ross (1999), bare hand contact with ready to eat food has been associated with the transmission of pathogens such as *Salmonella, Hepatitis A and Norovirus.* It is estimated that in the USA improper food handling practices contributed to about 97% of food borne illness in the food service industries and homes (Howes *et al.,* 1996). That notwithstanding, education and training are the surest ways of ensuring that food handlers are proficient in the knowledge of food safety, and sanitation principle (Jacob, 1989).

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This chapter summary's the main findings of the study, draw conclusions to the findings. Recommendations are also made to help both authorities and operators as well as customers to improve hygiene practices in local restaurants (chop bars) in the Wa Municipality.

6.1 Summary

The study was to ascertain the hygiene practice of traditional restaurants (chop bars) in the Wa Municipality. The purpose of the study was also to create awareness among both food operators and customers towards food safety and food hygiene practices. The objectives of the study were to;

I. Assess the environmental hygiene conditions under which food is cooked and served in 'chop bars'
II. Assess the food hygiene practices employed by food handlers in 'chop bars'
III. Assess the personal hygiene practices of food handlers in 'chop bars'.

The study which took the form of a survey used open and closed ended structured questionnaire to elicit data from chop bar operators and customers in the Wa Municipality. Out of 80 questionnaires administered, 74 were retrieved. Forty from operators/ handlers, 32 from customers and 2 from regulatory bodies representing 92.5%response rate.

Following the analysis of the data and the findings thereafter, the following are the summary of the findings;

1. Majority of operators (80%) do not have formal education or training in food management.
2. Local restaurants (chop bars) are inexpensive and therefore see great patronage from all category of people in the society. They are easily accessed, time saving, and complement the nutritional value of many in the Municipality.
3. A greater majority of operators (82.2%) do not practice kitchen hygiene. A situation observed to be due to dirty cooking and serving equipment, improper or equipment not well arranged, and waste found on the premises of chop bars. Kitchen hygiene accounts for a greater proportion of cross- contamination and food borne illness. It is therefore crucial that food operators who are potential sources of bacterial and physical contamination of food ensure that food is prepared safely.
4. The findings also revealed that operators exhibited poor personal hygiene practices. Operators handling of food with bare hands, leaving hair uncovered, improper hand washing and operating with open cuts increases the likelihood of food contamination.
5. The level of knowledge of food hygiene amongst the food handlers was high giving the fact that 80% of the food handlers had never had any formal training on food safety. That notwithstanding, the level of food hygiene practice among the food handlers was however not encouraging with majority of them only having fair practice. A few of them still had hygiene practices that could be considered poor.
6. Majority of customers (53%) before buying food consider food that is covered to be hygienic. Though this is good, it does not guarantee food safety.
7. Majority of food handlers (75%) have not received any training on their operations. Knowledge is key in the food industry to prevent food borne illness and rightly so that food handlers should be equipped with all the relevant information to operate.

6.2 Conclusions

The goal of hygiene promotion is to help understanding and develop good hygiene practices to prevent food borne illness and promote cleanliness amongst both operators and customers. The knowledge of food hygiene amongst the food handlers was good. However, the practice of food hygiene was only fair.

About three quarters of operators had no training in food hygiene and safety.

Food safety and hygiene education strategies must be adopted to reduce if not eliminate the incidence of food borne illness. Legislation must be introduced and enforced to encourage both operators and customers use safe and hygienic practice in handling food.

6.3 Recommendations

Based on the findings from this study, the following recommendations are proffered:

1. Any prospective food handler seeking to operate a chop bar should be compelled to take pre-employment examination to assess his/her level of knowledge of food safety and hygiene by the sanitary health officer(s) of the Environmental Health Unit in conjunction with the medical officer(s) of the Municipal Health Department. This would enable the Health Department screen out those who might pose some threat to the public as far as food safety is concerned.

2. Regular monitoring and inspection should be carried out by the Municipal Sanitary Health Department to ensure food handlers undergo periodic medical examination.

3. Periodic food safety and hygiene training sessions should be organized by the authority for the managers or operators of chop bars so that they will intend train their food handlers in order to bring them abreast with global best practices and current trend in the food handling business.

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APPENDIX A

UNIVERSITY OF EDUCATION WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION-KUMASI CAMPUS

DEPARTMENT OF HOSPITALITY AND TOURISM EDUCATION

Questionnaire for food handlers (operators and cooks)

This questionnaire forms part of a research work to be carried out for the award of a Master of Technology degree in Catering and Hospitality by the above university. The questionnaire is designed solely to solicit information on food hygiene and the hygiene practices of food handlers in traditional restaurants (chop bars) in the Wa Municipality. Your honest response, views, opinions and suggesting on the various questions asked will help complete the study successfully.

Your responses will be treated as confidential and used solely for academic purpose. Thank you.

Please tick (√) against the appropriate answer in the box.

PERSONAL DATA

1. Gender: male [ ] Female [ ]
2. Age
   a. Under 20 years [ ]
   b. 21-25 [ ]
   c. 26-30 [ ]
   d. 31-40 [ ]
   e. 41 and above [ ]
3. How long have you been working as a chop bar operator or cook?
   a. Below 1 year [ ]
   b. 1-5 years [ ]

c. 6-10 years [ ]

d. 11 years and above [ ]

4. Do you have any catering educational background?

a. Yes [ ] b. No [ ]

5. If yes to what level?

a. B. Tech. hospitality [ ]

b. HND hospitality [ ]

c. Advance cookery [ ]

d. Intermediate cookery

e. N. V. T. I [ ]

f. Middle school certificate [ ]

g. None of the above [ ]

6. Do you have a health certificate?

a. Yes [ ] b. No [ ]

7. How often do you go for medical screening?

a. Once a year [ ]

b. every six months [ ]

c. Every two years

d. Not at all [ ]

KITCHEN HYGIENE

1. How do you understand kitchen hygiene?

a. It is about cooking food in the kitchen [ ]

b. Cleaning the kitchen and equipments thoroughly [ ]

c. Sweeping the kitchen [ ]

d. Cooking, serving and eating food in the kitchen [ ]

2. How often do you clean your food preparation and service area?

   a. Before and after the day's work [ ] b. Weekly [ ] c. Daily [ ]

   b. d. Monthly [ ]

3. Do you clean your working surfaces/tops?

   a. Yes [ ] b. No [ ]

4. If yes how often?

   a. Daily [ ] b. weekly [ ] c. Monthly [ ] d. Not at all [ ]

5. How do you dispose off refuse in your kitchen/ food preparation area?

   a. Wrap in a polythene bag and keep in the kitchen [ ]

   b. Dump into a gutter [ ]

   c. Dump in a bin outside the kitchen [ ]

   d. Gather in a corner and collect it later [ ]

6. How do you dispose off your solid waste?

   a. Burn it [ ] b. Burry it [ ] c. Dump on a refuse collection site [ ] d. Use waste conductor [ ]

7. Do you fumigate your food production area?

   a. Yes [ ] b. No [ ]

8. If yes how often?

   a. Monthly [ ] b. Every three Months [ ] c. Every six Months [ ] d. Yearly [ ] e. not at all [ ].

9. Do you have a trap door?

   a. Yes [ ] b. No [ ]

10. How do you dispose off your liquid waste?
    a. Through a drainage system [ ]
    b. Poured in to gutter [ ]
    c. Poured outside the kitchen [ ]
    d. Store in a container and poured away later [ ]
    e. None of the above [ ]

PERSONAL HYGIENE

1. Have you heard of the term personal hygiene?
    a. Yes [ ] b. No [ ]
2. If yes which of these phrases best explains personal hygiene?
    a. Eating hygiene food personally [ ]
    b. Taking good care of the body [ ]
    c. Covering the body with cloth [ ]
3. Do you have a basin or tap for hand washing?
    a. Yes [ ] b. No [ ]
4. If yes, under which of these conditions do you wash your hands while working?
    a. After using the toilet [ ]
    b. After blowing my nose [ ]
    c. Wash as you work [ ]
    d. Before/Start of cooking [ ]
    e. None at all [ ]
    f. Whenever I like [ ]
5. How do you clean your hands after handling raw products?
    a. Wipe on napkin [ ]
    b. Wash with hot water and soap [ ]

c. Not at all [ ]

6. How often do you trim your fingernails?

   a. Twice a week [ ]

   b. Every week [ ]

   c. Once a month [ ]

   d. Others (specify)--------

7. Do you cover your hair while preparing food?

   a. Yes [ ] b. No [ ]

8. If yes, what do you use to cover your hair?

   a. Head scarf [ ]

   b. Hair net [ ]

   c. Others (specify)---------

9. How often do you wash your clothes you wear when preparing food?

   a. Everyday [ ]

   b. Every week [ ]

   c. Twice a week [ ]

   d. Every month [ ]

   e. Others (specify)----------

10. How do you treat fresh cut and wounds on your hands?

    a. Apply mentholated spirit and cover with water proof plaster [ ]

    b. Chew cassava and apply on it [ ]

    c. Put the hand into mouth and then tie it with a rag [ ]

    d. Leave it just like that [ ]

11. Have you ever suffered from any of the following recently.

    a. Diarrhoea [ ] b. Cough [ ] c. Cold [ ] d. Skin rashes [ ]

12. Were you able to cook that day?

    a. Yes [ ] b. No [ ]

13. Has anyone ever complained of food poisoning after eating your food?

    a. Yes [ ] b. No [ ]

14. If yes was it fatal?

    a. Yes [ ] b. No [ ]

15. Has anyone ever complained of finding any foreign material in your food?

    a. Yes [ ] b. No [ ]

16. If yes what foreign material was found? …….....

    ……..

    FOOD HYGIENE

1. Where do you obtain your raw materials.

    a. From accepted suppliers [ ]

    b. From the open market [ ]

    c. From farm gates [ ]

    d. None of the above [ ]

2. What do you look out for when purchasing your raw materials?

    a. Check the hygienic condition of the raw product [ ]

    b. Check the quality of the raw product [ ]

    c. Check the expiry date of the product [ ]

    d. All of the above [ ]

    e. None of the above [ ]

3. What measures do you put in place to ensure food safety in your operation?

    a. Cover food when cooking

    a. Cook food on time [ ]

b. Cook and serve food at the right temperature [ ]

c. All the above [ ]

d. None of the above [ ]

4. What is your major source of water for your operations?

a. Pipe borne water [ ]

b. Boreholes [ ]

c. Well [ ]

d. Ground water [ ]

5. What is your major source of water for drinking?

a. Pipe borne water [ ]

b. Boreholes [ ]

c. Well [ ]

d. Ground water [ ]

e. Sachet water [ ]

6. How do you store your fresh stores?

a. Spread it on the floor [ ]

b. Store it in a basket [ ]

c. Store it in a refrigerator [ ]

d. On shelves [ ]

e. On trays [ ]

6. Where do you store your dry foods?

a. In plastic containers [ ]

b. In a well ventilated place [ ]

c. On shelves [ ]

d. In a basket [ ]

7. How do you keep food hot until service time?
    a. Leave it on fire [ ]
    b. Dish into food warmers [ ]
    c. Dish into aluminium bowls and cover [ ]
    d. Do not do anything to it [ ]

FOOD SAFETY PRACTICES AND CROSS CONTAMINATION

1. How do you store your raw meat?
    a. In freezers without any covering [ ]
    b. Place in a sack and leave in a freezer [ ]
    c. Cook and wrap in black polythene bag [ ]
    d. Season with salt and leave overnight [ ]
    e. In a deep freezer [ ]
    f. In a refrigerator [ ]
    g. In a meat safe [ ]
2. How do you thaw your frozen meat/fish?
    a. Open freezer door for several hours for meat to thaw [ ]
    b. Leave in a bowl of cold water [ ]
    c. Transfer in to a refrigerator for it to thaw [ ]
    d. Leave it on the floor overnight [ ]
    e. Leave under running water [ ]
3. Do you have separate storage freezers for fish and meat?
    a. Yes [ ] b. No [ ]
4. What do you use in tasting food during cooking?
    a. Hand [ ]
    b. Ladle [ ]

c. Teaspoon [ ]

5. How do you store leftover cooked food?

   a. Cover and leave them in the kitchen [ ]

   b. Reheat and keep in a store room [ ]

   c. Bag into smaller quantities and store in a fridge [ ]

   d. Discard [ ]

6. What do you do to leftover foods?

   a. Add it to the next day's food [ ]

   b. Reheat and serve [ ]

   c. Throw it away [ ]

   d. Consume it yourself [ ]

   e. None of the above [ ]

7. How do you handle cooked foods?

   a. With bare hands [ ]

   b. With food tongs [ ]

   c. Wear hand cloves before handling [ ]

   d. Cover hands with polythene bag [ ]

8. On what do you cut your fish/meat

   a. On a table [ ]

   b. On a piece of log [ ]

   c. On a chopping board [ ]

9. Do you have separate cutting boards for raw and cooked foods?

   a. Yes [ ] b. No [ ]

10. If yes how do you differentiate them?

    a. Colour coding [ ]

b. Old and new [ ]

c. Wood and plastic [ ]

d. All the same [ ]

11. How do you clean your boards?

a. Use rag to wipe after use [ ]

b. Wash with soap and hot water [ ]

c. Rinse under cold water [ ]

12. Do you have separate knives for cutting meat/fish and vegetables?

a. Yes [ ] b. No [ ]

FOOD SAFETY PRINCIPLES

1. Do you have any rules or regulations concerning the handling of food?

a. Yes [ ] b. No [ ]

2. If yes which one of these do you apply when cooking?

a. Food safety act [ ]

b. Food hygiene regulations [ ]

3. Do inspectors visit your kitchen?

a. Yes [ ] b. No [ ]

4. What do they look out for when they do come?

a. Visit the production area, check utensils, working surfaces and others [ ]

b. Check service area [ ]

c. Inspect cooked food items [ ]

d. Asks for mode of preparation of food [ ]

e. Sit and converse with you [ ]

5. Where do these inspectors normally come from?

a. Environmental health office [ ]

b. Food and Drugs office [ ]

c. Community health office [ ]

6. How often is this inspection done?

a. Every week [ ] b. Monthly [ ] c. quarterly [ ] d. Not at all [ ]

7. Have you ever attended any training programme?

a. Yes [ ] b. No [ ]

8. What was it about?

a. Good hygiene practices [ ]

b. Proper ways cooking food [ ]

c. Prevention of food poisoning [ ]

d. Cross contamination issues [ ]

9. Who was the trainer?

a. Food control officers [ ]

b. Catering experts [ ]

c. Quality assurance experts [ ]

10. What form does the training take?

a. Conference [ ]

b. Talk [ ]

c. Teaching and exams [ ]

d. Seminar [ ]

APPENDIX B

UNIVERSITY OF EDUCATION WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION-KUMASI CAMPUS

DEPARTMENT OF HOSPITALITY AND TOURISM EDUCATION

Questionnaire for customers of chop bars

The questionnaire forms part of a research work to be carried out for the award of M. Tech catering and Hospitality by the above University. The questionnaire is designed solely to solicit information on the topic: the hygienic practices of chop bar operators in the WA municipality.

Your views or options on the various questions asked will help complete the research work successfully.

Please respond to the following questions. You are assured that your responses will be treated as confidential and used solely for academic purposes.

Pease tick [√] against the appropriate answer in the box

PERSONAL DATA

1. Gender: a. Male [ ] b. Female [ ]
2. Age: a. Below 20 years [ ] b. 21-30 years [ ] c. 31-40 years [ ] d. 41 and above
3. Educational level
    a. Masters degree [ ] b. Bachelors degree [ ] c. HND [ ] e. Diploma [ ] f. Certificate [ ] g. secondary [ ]
4. Mode of employment
    a. Self employed [ ]
    b. Civil servant
    c. Unemployed [ ]

5. Do you have any catering educational background?

   a. Yes [ ] b. No [ ]

6. How often do you buy food from chop bar operators?

   a. Daily [ ]

   b. Weekly [ ]

   c. Monthly [ ]

   d. First timer [ ]

7. What type of food do you normally buy?

   a. Fufu and soup [ ]

   b. Banku and soup [ ]

   c. Banku and pepper [ ]

   d. Rice balls (omotuo) and soap [ ]

   e. Plain rice and stew [ ]

   f. Konkonte and soap [ ]

   g. Tuo-zaafi and soup [ ]

KITCHEN HYGIENE

1. How do you understand kitchen hygiene?

   a. Cooking food in the kitchen [ ]

   b. Cleaning the kitchen equipment thoroughly [ ]

   c. Sweeping the kitchen [ ]

   d. Cooking serving and eating food in the kitchen [ ]

2. In your opinion, do you think this operator practice kitchen hygiene?

   a. Yes [ ] b. No [ ]

3. If yes which of these is your reason?

   a. Cooking and serving equipments are well cleaned [ ]

b. Equipments and items are well arrange [ ]

c. No waste found on the premises [ ]

d. No pest found on premises [ ]

4. If no which of this is your reason?

a. Cooking serving equipments are very dirty [ ]

b. Equipments and items are poorly arranged [ ]

c. Waste found on premises [ ]

d. Pests/insects found on premises [ ]

5. Is the door to the food service area well netted?

a. Yes [ ] b. No [ ]

6. How would you rate the food service area?

a. Very clean [ ]

b. Moderately clean [ ]

c. Averagely clean [ ]

d. Very dirty [ ]

e. Moderately dirty [ ]

FOOD HYGIENE AND CROSS CONTAMINATION

1. What do you look out for to ensure that the food you buy is hygienic before you buy?

a. Food that is covered [ ]

b. Food that is hot [ ]

c. Food that is neatly/nicely presented [ ]

d. Food that is cooked and served on time [ ]

e. All of the above [ ]

2. Have you ever found any foreign material in the food you buy?

   a. Yes [ ] b. No [ ]

3. If yes, what was it?

   ……

   ……

4. Have you ever suffered from any food borne illness before?

   a. Yes [ ] b. No [ ]

5. Which of the symptoms did you experience?

   a. Vomiting [ ]

   b. Diarrhoea [ ]

   c. Headache [ ]

   d. Stomach pains [ ]

6. How would you rate the quality of food sold here to you?

   a. Very good [ ]

   b. Good [ ]

   c. Moderate [ ]

   d. Poor [ ]

   e. Very poor [ ]

7. Why do you normally buy food from chop bar operators?

   a. To save time to be used for cooking [ ]

   b. Do not have enough time for cooking at home [ ]

   c. The food is delicious [ ]

   d. Do not know how to prepare this type of food [ ]

PERSONAL HYGIENE

1. How do you understand personal hygiene?
   a. Eating hygienic food [ ]
   b. Taking good care of one's body [ ]
   c. Covering the body with cloth [ ]
2. Do the waiters/servers keep their hair covered when handling food?
   a. Yes [ ] b. No [ ]
3. Have you ever found the food handlers operating with any open cuts/bruises?
   a. Yes [ ] b. No [ ]
4. How do the food handlers handle cooked food?
   a. With bare hands [ ]
   b. With food tongs [ ]
   c. Wear gloves before handling cooked food [ ]
   d. Covers hand with polythene bag [ ]
5. Do you use a general towel/napkin for cleaning your hands?
   a. Yes [ ] b. No [ ]
6. Do you drink from a common cup?
   a. Yes[]b. No [ ]
7. How would you rate the personal hygienic practices of this operator?
   a. Very good [ ]
   b. Good [ ]
   c. Moderate [ ]
   d. Bad [ ]
   e. Very bad [ ]

APPENDIX C

UNIVERSITY OF EDUCATION WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION-KUMASI CAMPUS

DEPARTMENT HOSPITALITY AND TOURISM EDUCATION

Face to face, interview for Environmental Health Department of WaMunicipal Assembly and Food, and Drugs Authority of Wa.

This interview forms part of a research work to be carried out for the award of M. Tech catering and Hospitality by the above University. The aim of the interview is solely to solicit information on the topic: the hygienic practices of chop bar operators in the WA municipality. Your views or opinions on the various questions asked will help complete the research work successfully.

Please respond to the following questions. You are assured that your responses will be treated as confidential and used solely for academic purposes.

Pease tick [√] against the appropriate answer in the box

1. Position……

   ……

2. What in your view is safe food?

   ……

   ……

   ……

   ……

3. What role do you play in making foods soled in chop bars safe for consumption?

   ……

   ……

……

……

……

……

4. How do you ensure that operators achieve this?

……

……

……

……

5. How often do you go for inspection?

   a. Monthly [ ] b. Once every 3 months [ ] c. Every 6 months [ ] d. Annually [ ] e. as and when it is required [ ]

6. What do you look out for when you do go for inspection?

……

……

7. What happens when an operator fails to meet the requirements prescribed by law?

……

……

……

……

……

……

8. Have you ever had the experience of having to deal with a food poisoning case related to the sale of food from chop bars?

a. Yes [ ] b. No [ ]

9. How did you handle the situation

……

……

10. What challenges do you face as far as maintaining safe and hygienic foods for consumers are concerned?

.....

……

……

……

……

.....

APPENDIX D

OBSERVATIONAL CHECKLIST FOR FOOD HYGIENE PRACTICES AMONG FOOD HANDLERS IN THE WA MUNICIPALITY OF THE UPPER WEST REGION

Name of chop bar……

No of food handlers in the establishment:……

The size of the chop bar…….

The rate of patronage…….

The layout of the environment: cooking and sitting arrangement…….

The location of the chop bars: nearness to open dumping site and/or filthy gutters

……

Type and state of gutters……..

Availability of covered bins for waste disposal……...

Availability of places of convenience: toilets, wash rooms and bathrooms

…….

Availability of storage facilities: store rooms, shelves, fridges and deep freezers

……..

Personal hygiene of staff: cleanliness of their clothes and footwear, how their hair are kept, skin infections and exposed cuts while cooking……..

Availability of facilities for regular hand washing and hand drying of staff and food consumers…….

Food hygiene: food storage, cleanliness of utensils, serving dishes, cups, water jugs, napkins etc……...

Are there adequate food preparation surfaces which are clean and in good repair? Are the eating rooms & storage rooms free from pests (rats, mice, insects etc.)?

Is the premises free from potential pest entry points e.g. gaps and hole

Are the cooking area(s) and eating spaces well clean?.....

Is the chop bar well ventilated and spacious?.....

Do door-ways and windows have insect screens?.....