

UNIVERSITY OF EDUCATION, WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

ASSESSING THE IMPACT OF COVID 19 ON FOOD SAFETY PRACTICES
AMONG FOOD HANDLERS IN KUMASI METROPOLIS



ANGELINA OPPONG MENSAH

MAY, 2021

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to the School of Graduate Studies, University of Education, Winneba, in Partial
fulfillment of the requirements for the award of Master of Technology
(Catering and Hospitality) degree**

MAY, 2021

DECLARATION

STUDENT'S DECLARATION

I, **ANGELINA OPPONG MENSAH**, declare that, except for reference to other peoples work which has been duly acknowledged, this project work consist of my own work produced from research undertaken under supervision and that no part has been presented for any degree in the university or any university elsewhere.

SIGNATURE:

DATE:



SUPERVISOR'S DECLARATION

I hereby certify that, the preparation and presentation of this project work was supervised in accordance with the guidelines on supervision of long essay laid down by the University of Education Winneba, Kumasi campus.

DR. (MRS.) ELLEN LOUISE OLU FAGBEMI

SIGNATURE:

DATE:

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DEDICATION

To my lovely four daughters: Rebecca Oppong Asenso, Faustina Oppong Asenso, Uzura Oppong Asenso and Awura Ama Afriyie Asenso.



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ABSTRACT

The world is facing an unprecedented food safety threat from the COVID-19 pandemic caused by the SARS-CoV-2 virus (referred to as the COVID-19 virus). The COVID-19 pandemic is a health and humanitarian crisis threatening the food security and nutrition of millions of people around the world. Food safety is a global concern that covers a variety of different areas of everyday life. These process of maintaining food safety has been altered by the advance of COVID 19 pandemic. This pandemic came with a protocol that must be observed to prevent it from spreading among people. The main objective of this study is to assess the impact of COVID 19 on food safety practices among food handlers. The researcher conducted this study using a descriptive research design. The population includes food handlers in the hotels, guest houses, restaurants, and traditional catering services (chop bars) in Kumasi Metropolis. The researcher made use of random sampling method and the sample size was based on the "rule of 5", in all 202 respondents were used for the study. Primary source of data that is questionnaire was used to collect data. All finished research instrument was gathered, marked, defined, and entered into the Social Science Statistics Suite (SPSS) for analysis. The study found that food handlers were following the laid down safety practice in an effort to control the spread of the virus and also it was revealed that the food handlers were exhibiting a good attitude and following the hygienic practices. It was revealed that these food handlers were facing challenges in the effort to help prevent the transmission of the virus. It is recommended that these companies should provide their employee with an electronic system at will regularly.

CHAPTER ONE

INTRODUCTION

1.0 Background of the Study

Food safety is used as a scientific discipline describing handling, preparation, and storage of food in ways that prevent food-borne illness. According to Wu et al. (2014), the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food is known as a food-borne disease outbreak. This includes several routines that should be followed to avoid potential health hazards. In this way, food safety often overlaps with food defence to prevent harm to consumers.

Food safety is a global concern that covers a variety of different areas of everyday life. The principles of food safety aim to prevent food from becoming contaminated and causing food poisoning. Van der Spiegel et al. (2013) indicated that regardless of why you are handling food, whether as part of your job or cooking at home, it is essential to always apply the proper food safety principles. Any number of potential food hazards exist in a food handling environment, many of which carry with them serious consequences.

The world is facing an unprecedented food safety threat from the COVID-19 pandemic caused by the SARS-CoV-2 virus (referred to as the COVID-19 virus). The COVID-19 pandemic is a health and humanitarian crisis threatening the food security and nutrition of millions of people around the world (Laborde et al., 2020). Hundreds of millions of people were already suffering from hunger and malnutrition before the virus hit and, unless immediate action is taken, we could see a global food emergency.

Governments of all countries worldwide are currently grappling with the COVID-19 pandemic. While some countries were very hard hit and others only mildly hit but all are still taking measures to mitigate the consequences.

In the longer term, the combined effects of COVID-19 itself, as well as corresponding mitigation measures and the emerging global recession could, without large-scale coordinated action, disrupt the functioning of food systems. Such disruption can result in consequences for health and nutrition of severity and scale unseen for more than half a century.

In Africa two common perceptions, rather unfounded, were that Africans were immune to whatever was happening in Wuhan, China and rest of Asia, Americas and Australia, Italy and the rest of Europe, secondly, SARS-CoV-2 could not survive the high temperatures in tropical African. According to Sharma et al (2020) during the COVID-19 pandemic, the food retail sector faces the greatest challenges in maintaining the highest standards of hygiene, protecting staff from the risk of infection, maintaining physical distancing when dealing with large numbers of customers, remaining open, and ensuring that adequate supplies of foods are available daily.

Food workers in retail premises are unlikely to contaminate food if they follow the standard, good personal hygiene practices that reduce the risk of transmission of most foodborne illnesses. Measures such as frequent hand washing, use of hand sanitizers, use of protective clothing, good respiratory hygiene, will reduce the risk of spreading the disease.

Employers should stress the importance of more frequent hand washing and maintaining good hygiene practices, and of more frequent cleaning and disinfecting surfaces that are touched regularly. According to Adams and Walls (2020), Food workers need to be aware of symptoms of COVID-19 and inform their employer and seek medical advice if they think they have symptoms of the disease. Maintaining physical distancing in retail food premises is critical for reducing the risk of transmission of the disease.

Although some consumers perceive there is a risk of COVID-19 infection resulting from open food displays, there is currently no scientific evidence suggesting that food is associated with the transmission of the COVID-19 virus. It is important to maintain good hygiene practices around open food displays, such as salad bars, fresh produce displays, and bakery products. Consumers should always be advised to wash fruit and vegetables with potable water before consumption. Both customers and staff should strictly observe good personal hygiene practices at all times around open food areas.

The food industry should have Food Safety Management Systems (FSMS) based on the Hazard Analysis and Critical Control Point (HACCP) principles in place to manage food safety risks and prevent food contamination. Food industry FSMS are underpinned by prerequisite programmes that include good hygiene practices, cleaning and sanitation, zoning of processing areas, supplier control, storage, distribution and transport, personnel hygiene and fitness to work all the basic conditions and activities necessary to maintain a hygienic food processing environment.

The Codex General Principles of Food Hygiene lay down a firm foundation for implementing key hygiene controls at each stage of the food processing, manufacture, and marketing chain for the prevention of food contamination during this pandemic. There is now an urgent requirement for the industry to ensure compliance with measures to protect food workers from contracting COVID-19, to prevent exposure to or transmission of the virus, and to strengthen food hygiene and sanitation practices. Therefore, the study assessing the impact of COVID 19 on food safety practices among food handlers.

1.1 Problem Statement

When food safety protocols are established, mistakes are reduced, foodborne illnesses are reduced or eliminated, profitability increases, employee morale increases, employee turnover is lower and the company's reputation remains secure. If food safety is neglected, the risks of foodborne illness outbreaks increase. This can critically damage a company's reputation, resulting in criminal negligence, expensive lawsuits and cause a company to go bankrupt.

These reasons have always made food safety an important element in the catering business. These businesses' survival is based on how their product is saved for consumption. This process of maintaining food safety has been altered by the advance of COVID-19 pandemic. This pandemic came with a protocol that must be observed to prevent it from spreading among people.

According to Zheng (2020), the COVID-19 pandemic is believed to have zoonotic origins and has close genetic similarity to bat coronaviruses, suggesting it emerged from a bat-borne virus. It is highly unlikely that people can contract COVID-19 from food or food packaging. COVID-19 is a respiratory illness and the primary transmission route is through person-to-person contact and through direct contact with respiratory droplets generated when an infected person coughs or sneezes.

At each step, there is a possibility of food handlers to touch the food surface or food directly and if food handler is not following appropriate precautionary measures e.g. hand hygiene, sanitization and disinfection, social distances, and is touching, then it can be a possible source of coronavirus spread.

To ensure food safety and limit the spread of coronavirus at food services and retail sector has become a challenge where delicate and fresh food items are served and delivered to the customers, which have passed through a series of operational steps from

order taking, food receiving, preparation of food, packing, delivery to customers. Therefore, the study seeks to examine the impact of COVID 19 has had food safety practices.

1.2 Main Objective

The main aim of the study is to assess the impact of COVID 19 on food safety practices among food handlers.

1.2.1 Specific Objectives

But specifically, the study will seek to

1. To examine the safety practices among food handlers towards the prevention of COVID-19.
2. To evaluate the attitude and hygienic practice among food handlers during COVID 19.
3. To examine challenges facing food handlers in practices Food Safety during COVID 19.



1.3 Research Questions

1. What are the safety practices among food handlers towards the prevention of COVID-19?
2. What are the attitudes and hygienic practice among food handlers during COVID 19?
3. What are the challenges facing food handlers in practicing Food Safety during COVID 19?

1.4 Significance of the Study

There is the scarceness of published works on food safety practices amongst food handlers during the COVID 19 pandemic in Ghana. Research within this area is consequently very significant as it would expose the areas where challenges are being faced. This study is necessary because the practice and knowledge of food safety practices have the propensity of preventing food-borne illness.

This study will provide a local framework of food safety practice during the pandemic that could be incorporated locally into the design and implementation of food safety programs in communities in Ghana and other places.

Finally, the research will encourage further studies into exclusive breastfeeding by providing areas for future study.

1.5 Scope of the Study

The research will seek the views of food handlers within the Kumasi Metropolis. The study is committed to adhering to the best practices of food safety practises among food handlers during this pandemic period.

1.6 Limitation of the Study

Observation of the COVID 19 protocol was a challenge as it brought forth extra cost because the researcher needed to acquire Personal Protective Equipment (PPE) for the study. Many respondents were foreseen to conceal certain important details from the researcher only because they feared their vulnerabilities were revealed.

Despite this, most respondents declined to give interviews and answer the interview questions, but they eventually gave in through persuasion and determination.

1.7 Organisation to the Study

The project will be divided into five sections for the accurate presentation of the work. The first chapter will present the context of the study, the problem statement, the study goals, research concerns and the value of the analysis, and the study's limitations. Chapter two will discuss the literature on the subject and split it into suitable sub-topics. Chapter 3 will discuss the methodology used by the researcher. The interpretation and presentation of the results of the research are covered under Chapter 4. The findings of the data will be presented and explained by the use of table and figures. Lastly, Chapter 5 will deal with the summary, conclusions, recommendations and suggestions of the study.



CHAPTER TWO

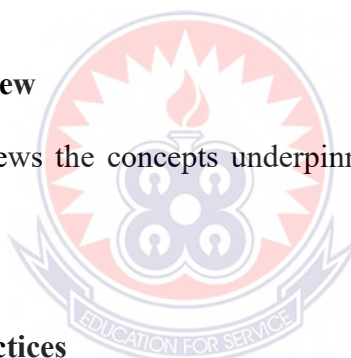
LITERATURE REVIEW

2.0 Introduction

The literature review offers an overview and evaluation of what distinguished scientists and academics have written on specific subjects or areas of study. Literature reviews are envisioned to provide a summary of the sources reviewed when studying a specific topic and to show a person who reads how the work fits into the broader field of study. In this segment, the study takes a gaze at the Conceptual Review, Theoretical Review, and conceptual framework. The literature review is done with the objectives of the research in mind.

2.1 Conceptual Review

This section reviews the concepts underpinning the study. The discussion is done with subtitles.



2.1.1 Food Safety Practices

Food safety is complex as it involves a combination of multifaceted interdisciplinary processes. Food safety includes producing, harvesting, processing, handling, packaging, storing (freezing), transporting and distributing or selling food in an acceptable manner (by standards) that will prevent the food from changing its biological/microbiological, chemical and physical form beyond acceptable limits until it reaches the last consumer for consumption.

According to Wu et al. (2017), Food safety refers to routines in the preparation, handling and storage of food meant to prevent foodborne illness and injury. From farm to factory to fork, food products may encounter any number of health hazards during their journey through the supply chain. Safe food handling practices and procedures are

thus implemented at every stage of the food production life cycle to curb these risks and prevent harm to consumers.

The diseases caused by food, or the foodborne diseases, are described as the illnesses with which people are infected by the foods they eat (Henao et al 2015). These diseases are a widespread public health issue and are expensive to treat. Foodborne diseases result from the consumption of contaminated foods and products. Contamination of the food at any stage, from production to consumption, produces bacteria, viruses, parasites, chemical agents and toxins, which eventually cause foodborne diseases.

These diseases are seen as a pervasive, permanent problem that can lead to morbidity and, occasionally, to mortality. Foodborne diseases are increasing worldwide, particularly in developing countries, due to neglect of personal hygiene and food hygiene (Rao et al., 2007).

Bolton et al. (2008) argue that food safety and food hygiene are important as they ensure that the food you handle and produce is safe for consumption. If food safety and hygiene are not maintained, consumers could become seriously ill with food poisoning and foodborne illnesses. Therefore, food safety and food hygiene are of the utmost importance to protect the health of consumers.

According to Abankwah (2018), food poisoning occurs when food becomes contaminated by bacteria, viruses and other germs, making those who consume the contaminated food very ill. Typically, food poisoning can be treated at home within a week, but sometimes food poisoning can be serious and require urgent medical attention. Therefore, knowing how to protect consumers from food poisoning is essential.

A safe and hygienic workplace helps to create a productive workforce, therefore creating a food safety and hygiene policy will ensure all employees know how to contribute to appropriate work practices.

It is therefore required to ensure that the area which you are working in is clean and hygienic. This involves thoroughly cleaning and sanitising the workspace, utensils and equipment before cooking, in-between cooking tasks and after cooking.

Cooking utensils and equipment, such as chopping boards, knives and mixers, must be thoroughly cleaned between dealing with foods. For example, either a separate chopping board must be used or it must be thoroughly cleaned between chopping raw chicken and vegetables (Ravishankar et al., 2010). If this is not done, the bacteria from the raw chicken will transfer onto the vegetables and cross-contamination of foods will occur. Ensure there are no ways that pests or insects could enter the workplace, through keeping the area clean, using pest control sprays, and covering food appropriately.

Hobbs (2020) in times of self-isolation and quarantine we all rely more than ever on a safe and efficient food supply chain to ensure that food is readily available in every home. As food shopping in stores and markets becomes more difficult for consumers because of the measures to reduce contact and avoid the person-to-person spread of coronavirus, governments are doing all they can to keep food available on the shelves.

To ensure this, the food itself and the people working hard to provide it needs to be kept safe. Food hygiene is key to that. Though current evidence indicates that for COVID-19 the main transmission is between humans and not through food, good food hygiene is as important as ever as it does not only protect from the new virus but also from those other viruses that do easily transmit through food (e.g. norovirus and hepatitis A) and from harmful bacteria.

As part of the preventive measures worldwide for the COVID-19, people are being encouraged to wash their hands with soap and clean water. Where there is no water, people are advised to use alcohol-based hand sanitizer to kill the virus on the hands to prevent it from entering the nose, mouth and eyes.

How important foodservice providers were in maintaining the movement of food along the food chain, there's a huge role here to be played by the food industry and each link in the chain. Food safety management systems and all the current programs that underpin those systems built around standards already in place still apply. Those include measures based on Hazard analysis and critical control points (HACCP) principles and grounded in the Codex General Principles of Food Hygiene.

However, the threat of COVID-19 calls on the need for additional hygiene and sanitation measures to be introduced to ensure protection for workers in the food environment.

2.1.2 Food Safety Management System (FSMS)

Food and beverage processors can easily become overwhelmed as they work to meet challenging customer requirements and government regulations, such as the Food Safety Modernization Act while continuing to minimize costs and maximize profitability.

To meet these demands, processors must develop and execute written food safety plans. They must have systems in place that enable them to rapidly identify and track every ingredient for each of their products through all processing steps: from receipt through processing, packaging, and shipping, to the exact customer location.

In the case of an investigation or recall, a processor must be able to quickly show documentation of each step performed for a particular product or ingredient, not

only within its organization but also at least one step back and one step forward in its supply chain. There's never been a greater need for a comprehensive food safety management system (FSMS).

2.1.3 Key Elements of FSMS

A complete FSMS enables the processor to meet all of its customer and government demands with minimal business disruption, for a manageable cost. An effective FSMS includes four components:

2.1.3.1 Hazard Analysis & Critical Control Points (HACCP) Plan

HACCP is defined by Panghal et al. (2018) as “a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product.

Processors must have documented HACCP plans and corrective actions/preventative actions (CAPAs) and be able to provide such documentation to the Food and Drug Administration (FDA) upon request. They must also maintain all of these records for a minimum of two years.

To efficiently and effectively comply with these mandates, leading processors use FSMSs that enable electronic document controls and electronic signatures. Such systems include workflow management functions, checklists/ standard operating procedures (SOPs) and critical control point alarms. They also allow for statistical process controls (SPC) charting and the easy collection of quality data.

Not only do effective FSMSs enable compliance in these areas, but because they automate data management processes that would otherwise require manual intervention, they save costs and improve productivity.

2.1.3.2 Manufacturing operations management (MOM)

Control of plant floor activities is key to a processor's overall efficiency. More and more processors use FSMSs that provide production tracking and scheduling, scaling and rejection tracking. Such systems also provide overall equipment effectiveness (OEE) reporting and analyses that help processors avoid costly breakdowns, develop a knowledge base of technical experience, respond quickly to maintenance problems and maximize productivity.

Best-in-class FSMSs also include human-machine interface (HMI) and machine/equipment integration (SCADA) functionality. They assist in managing inventory by enabling processors to easily track consumed ingredients and intermediate inventory in real-time.

2.1.3.3 Traceability and Recall Management

With the number of audits and recalls on the rise, processors' FSMSs must track every ingredient from receipt through finished product delivery, at least one-up and one-back in the supply chain. This capability is often referred to as e-pedigree or product genealogy usage.

With best-in-class FSMSs, control processes are in place to immediately address any quality issues. If a quality problem is suspected or identified, here's a typical scenario:

The distributor or customer logs into its FSMS and creates a problem report, noting the unique identification number, batch number or barcode scan that identifies the problem ingredient by its lot or batch. The problem ticket triggers an alert inside the system. Quality automatically receives the ticket, along with a complete traceability tree for the problem product, including all ingredients.

The FSMS performs root-cause analysis and identifies the problem. All ingredients within the identified batch are quarantined inside the software. Then the software quarantines the inventory not yet consumed and all finished goods still in stock, and identifies any shipped products that need to be recalled. Notifications are immediately sent to all distributors and customers.

This speedy response meets mandated turnaround times and notification requirements. It also enables processors to isolate any problem ingredients early, reducing the scope of any audits or recalls.

2.1.3.4 Enterprise Resource Planning (ERP) for Processors

The fourth, and final, component of an effective FSMS is enterprise resource planning (ERP). ERP systems have traditionally included only finance and accounting. Today's ERP solutions also include advanced costing, customer resource management (CRM), human resources, maintenance and purchasing (Marshall et al., 2016).

While, by definition, an ERP system covers all facets of a business, not every solution that calls itself "ERP" actually supports all functions effectively or within a single system. Also, because ERP systems have their origin in the more industrial manufacturing industries, many are not well-suited for the food and beverage processing environment.

2.1.4 Food Safety Hazards

A Food safety hazard refers to any agent with the potential to cause adverse health consequences for consumers (Yeung & Morris, 2001). Food safety hazards occur when food is exposed to hazardous agents which result in contamination of that food. Food hazards may be biological, chemical, physical, allergenic, nutritional and/or biotechnology-related.

Hazards may be introduced into the food supply any time during harvesting, formulation and processing, packaging and labelling, transportation, storage, preparation, and serving. According to Saba (2020) in food safety, three types of hazards may be encountered.

2.1.4.1 Physical Hazards

Physical hazards include any potentially harmful extraneous matter not normally found in food. When a consumer mistakenly eats the foreign material or object, it is likely to cause choking, injury or other adverse health effects. Sekheta et al. (2008) denote that Physical hazards are the most commonly reported consumer complaints because the injury occurs immediately or soon after eating, and the source of the hazard is often easy to identify.

Physical Hazards which deal with the presence of a physical object such as hair, glasses, papers, bones, rubbers, nails, pieces of face masks, etc. in the food which may be harmful to consumers.

2.1.4.2 Chemical Hazards

Chemical hazards which deal with the presence of chemical agents such as formalin, DDT, disinfectants etc., or the higher proportion of recommended chemical above the recommended daily dose in food.

According to Marshall et al (2016) the Chemical contamination can happen at any stage in food production and processing. Chemicals can be helpful and are purposefully used with some foods, such as pesticides on fruits and vegetables. Chemicals are not hazardous if properly used or controlled. Potential risks to consumers increase when chemicals are not controlled or the recommended treatment rates are exceeded.

The presence of a chemical may not always represent a hazard. The amount of the chemical may determine whether it is a hazard or not. Some may require exposure over prolonged periods to have a toxic effect.

2.1.4.3 Biological Hazards

Foods can contain biological hazards. These hazards can come from raw materials or from food-processing steps used to make the final product (Marshall et al., 2016).

Biological hazards which deal with the presence of microorganisms (bacteria, viruses, fungi, and protozoa) and their toxins and other biological agents in food that may be hazardous for human consumption. Examples of the microorganisms are *Escherichia coli*, *Salmonella* spp., *Campylobacter* spp., Coronaviruses, Rotaviruses, Noroviruses, Hepatitis A, *Aspergillus* spp. *Cryptosporidium* spp. etc.

2.1.2 The COVID -19 Pandemic

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the strain of coronavirus that causes coronavirus disease 2019 (COVID-19), the respiratory illness responsible for the COVID-19 pandemic. Acter et al. (2020) defined COVID-19 as a disease caused by a new strain of coronavirus. 'CO' stands for corona, 'VI' for the virus, and 'D' for the disease. Formerly, this disease was referred to as '2019 novel coronavirus' or '2019-nCoV.' COVID-19 can be characterized as a pandemic. This is due to the rapid increase in the number of cases outside China over the past 2 weeks that has affected a growing number of countries.

When COVID-19 outbreak began, the transmission routes of the SARS-CoV-2 were not well understood. The known transmission routes are the eyes, nose and mouth. It was not until February and March of 2020 that scientists published first articles about

the presence of the genetic materials of the SARS-CoV-2 being identified in the faeces of patients in China (Xiao et al., 2020; Zhang et al. 2020), where the disease started.

This raises a concern about the possible transmission of the SARS-CoV-2 through the faecal-oral route which has implications on food, water, hygiene, sanitation, and the environment. On the 7th of April, 2020, the Food and Agriculture Organization (FAO) and World Health Organization (FAO and WHO, 2020) published a document on "COVID-19 and food safety: guidance for food businesses" even though it stated that it is highly unlikely that people can contract COVID-19 through food or food packaging.

Transmission through faeces and food can be considered as the game-changer in food safety. Another important finding was that the genetic material of the virus could be stable for several hours to days in aerosols and on surfaces (van Doremalen et al., 2020), but the live virus was not detected. Such stable genetic material contaminates the environment even in absence of the live virus, which could have far-reaching implications on genetic modifications.

Surprisingly, the SARS-CoV-2 genetic material has also been detected in faeces of humans just three days after infections, unlike the nasopharyngeal samples that take 5 days or more to manifest in patients (Peng et al., 2020). This finding may be very important in most parts of Africa since open defecation is widely practised due to lack of sanitary facilities.

Based on the current literature, people may spread the virus through faeces to the environment as a result of open defecation, several days before the symptomatic infection starts. Thus, there is a risk of the SARS-CoV-2 being transmitted through people's faeces, but no evidence of such transmission exists currently.

The stability of SARS-CoV-2 in the environment, as reported by van Doremalen et al. (2020), is another problem. This calls for very effective disinfectants to defeat the virus in the environment. Africa, which is already the “playing ground” for fake drugs (Antignac et al., 2017; Laing et al., 2019), may also have to battle with the influx of counterfeit disinfectants that lack the necessary activity. The use of such products may give a false sense of security to the users and lead to further spread of the disease if stringent regulatory frameworks are not put in place.

In a research work done by Saba et al. (2020) on the efficacy of alcohol-based sanitizers, 54% of sanitizers in Ghana were not effective against laboratory and ATCC strains of bacteria. Per the research, the number of unregistered alcohol-based hand sanitizers outnumbered the registered ones as at the time of purchasing samples in four major cities in Ghana. Most of the unregistered hand sanitizers were allegedly made in China with made in China labels.

The high demand for such products gave leeway for unscrupulous individuals to flood the market with counterfeit or diluted disinfectants. In one instance, a producer of fake hand sanitizer was arrested by the police in Techiman, the Bono East Regional for using water and some unprescribed ingredients to produce and sell substance to the public (Nyabor, 2020). Such practices may produce fake disinfectants which are not effective and contribute to the wider spread of the virus, coupled with the widespread unsanitary conditions.

2.1.2.1 Food Processing/Cooking in COVID 19 Era

In the case of the SARS-CoV-2, there are no known toxins to be released into food. However, the live virus could find its way into food when there are gaps in processing and cooking practices. A typical example to expatiate this point is when infected sewage or untreated water is used to irrigate a leafy vegetable such as lettuce,

for example, that is harvested for immediate sale on the market, without further basic processing on a farm to eliminate potential pathogens.

Lettuce may continue to harbour the virus until it is consumed and if the appropriate receptor of the virus is found, proliferate and may result in COVID-19 (Saba, 2020). This applies to other vegetables and fruits from the farm that are not processed well before consumption. The processor or cook may also be a source of the infection and may transmit the virus into the food during cooking without following good hygienic practices.

2.1.2.2 Food Packaging and COVID 19

SARS-CoV-2 could live up to four hours on copper, up to 24 hours on cardboard and up to two to three days on plastic and stainless steel (van Doremalen, 2020). The local packaging materials are sometimes made of leaves of certain trees, old newspapers, in some cases old cement packaging bags, etc. and the conventional packaging materials such as the polythene bags, paper bags, plastic containers etc. Considering the local and conventional packaging materials and environmental temperature and conditions, the survival of the virus may vary.

According to Saba (2020) apart from the materials that are cardboard-like (e.g., old newspapers, leaves of exercise books or textbooks, old cement packaging bags, paper bags) and plastic-like (polyethene bags and, plastic containers) of which the survival of the SARS-CoV-2 may be predicted or extrapolated, the survival on the leaves of trees is not known. Generally, the virus is likely to die faster on local packaging materials than the conventional ones. Unfortunately, the viability of the virus in different food products is not documented yet.

Two factors are noteworthy in food packaging:

- The ability of the packaging personnel to introduce the virus directly from him or herself into the food or on the packaging material through sneezing, coughing or with a contaminated hand and
- The ability of the personnel to introduce the virus from a contaminated contact surface either into the food directly or indirectly when touching or cleaning the material to package the food.

After sterilization of packaged product is done, the outer part of the packaging material is still vulnerable to microbial contamination. The sterilization of the outer packaging materials may not be done for most local packaging materials. Cardboard-like materials have been reported to harbour the virus for just a few minutes to hours while the stainless or cans may harbour them for up to 3 days based on PCR analysis (van Doremalen, 2020). Those involved in packaging food must be mindful of the good packaging practices and take precautions to avert any possible spread of the virus through the food packaging materials of the food itself.

2.1.3 Food Retailing

Small scale retailing of freshly cooked food is present everywhere on the African continent. This is an informal activity, commonly practised by women in Ghana. The sanitation and hygiene levels of these retailers are generally low, due to lack of training. Some food items such as oranges, yam, watermelon, cabbage etc. are generally sold from the ground, which may also harbour pathogens, possibly including the SARS-CoV-2. According to Humphrey et al (2007), some may argue that there is no problem with products that will be cooked before consumption, but cross-contamination of other food products or contact surfaces may occur and put the consumer at risk of infection.

Another behaviour of concern is that many people are allowed to touch directly these retail foods to check for their quality before purchase.

Flies that might have landed on infected faeces may also land on such products on the market and therefore, increase the risk of acquiring the disease. Newman & Cullen (2002) indicated that small-scale retailers buy their stock in a well-packaged form, but open the package to further retail in smaller quantity to make them affordable. This practice also predisposes the retail products to contamination. Awareness creation on these practices is needed to reduce the possible spread of COVID-19.

During the COVID-19 pandemic, the food retail sector faces the greatest challenges in maintaining the highest standards of hygiene, protecting staff from the risk of infection, maintaining physical distancing when dealing with large numbers of customers, remaining open, and ensuring that adequate supplies of foods are available daily.

Food workers in retail premises are unlikely to contaminate food if they follow the standard, good personal hygiene practices that reduce the risk of transmission of most foodborne illnesses (World Health Organization, 2020). Measures such as frequent hand washing, use of hand sanitizers, use of protective clothing, good respiratory hygiene, will reduce the risk of spreading the disease.

Employers should stress the importance of more frequent hand washing and maintaining good hygiene practices, and of more frequent cleaning and disinfecting surfaces that are touched regularly. Food workers need to be aware of symptoms of COVID-19 and inform their employer and seek medical advice if they think they have symptoms of the disease.

2.1.4 Street Food Safety

Street food is a prepared or cooked food sold by vendors in a street or other public location for immediate consumption (World Health Organization, 1996). Street foods in Africa are generally ready-to-eat foods sold in stationary stalls, opened, semi-closed or closed tables or by hawkers who roam about with the foods to find customers. Hawkers are commonly found in schools, at bus stations, government workplaces or offices, markets, social events, at places where major construction works are going on, by the windows of vehicles in heavy traffic and from door to door.

These foods are normally prepared by vendors without training and certificates. Those that are well-organized and stationary have some supervision by the local authorities intermittently because they are charged taxes. They are generally not well regulated and operate unhygienically. There has been a report in Accra, Capital of Ghana often street vendors at the Achimota Government Hospital who tested COVID-19 positive in routine surveillance (Wemakor, 2020).

According to More (2020) another street vendor, who sold peeled oranges to the public was confirmed dead of COVID-19 in the Tamale Metropolis on the 11th of May. These pose risk to consumers of their products and any other persons who came into contact with them. Where there are enough testing centres and kits, it is recommended to test all those involved in the food production chain, especially chefs at hotels and restaurants, street food vendors, waiters, etc. This will lead to early detection and treatment to prevent the further spread of the disease.

2.1.5 The Role of Food Safety Authorities and Stakeholders

The role of food safety authorities is very crucial in the enforcement of stringent guidelines to mitigate the spread of the disease through food (van Egmond et al., 2007). Even though the enforcement of the law is generally relaxed during ordinary times,

more efforts must be put in during crisis period even if it demands employing more people.

The effects of the pandemic might be more than the financial commitment to employ more hands to help educate and enforce the law effectively to prevent the spread of the disease. This calls for the authorities to redouble their efforts and if possible fast track some of the processes to respond to the demands of the pandemic.

The major problem of food regulation in Ghana is the centralization of activities in the headquarters in the capital, Accra. Very simple procedures and analyses that could be done by regional offices are still sent to Accra, which is very far away from some of the regions. It takes about 600 km to 800 km to get to the headquarters in Accra from some regions.

Food authorities must make conscious efforts and make it a priority to decentralize their activities to serve the population better. They must locate subsidiary laboratories in the regions and build their capacity to be able to perform very simple but important tests to ensure basic safety.

Since samples from almost the whole of Ghana must be analysed in the central laboratory in Accra, there are unnecessary delays of test results. This can be avoided by using the tertiary institutions with laboratory facilities in the various regions. Central authorities must be ready to provide simple equipment and training to staff in those subsidiary laboratories to meet the required standards.

COVID-19 has been present globally for the past eleven months and its impact is been felt throughout the world. The impact is expected to be more pronounced in developing countries, which are still struggling with the necessities of life. Until a vaccine or a cure is found for the disease, the direct health effects and their related issues will continue to raise concerns.

2.1.6 Food Handlers and Food Safety

Legesse et al. (2017) defined a food handler as anyone who works in a food business and who either handles food or surfaces that are likely to be in contact with food such as cutlery, plates and bowls. A food handler may do many different things for a food business. Food handlers can also be involved in manufacturing, producing, collecting, extracting, processing, transporting, delivering, thawing or preserving food.

Food handlers must tell their work supervisor if they have any of the following symptoms while they are at work - vomiting, diarrhoea, a fever or a sore throat with a fever. The only exception to this is if the food handler knows that he/she has these symptoms for a different reason. For example, a food handler may be vomiting at work because of pregnancy.

Food handlers must also tell their supervisor if they have been diagnosed as having or carrying a food-borne illness. As well as reporting the food-borne illness, the food handler must not handle any food where there is a chance, they might make the food unsafe or unsuitable because of their illness. Also, if a food handler stays on at work to do other work, he or she must do everything reasonable to make sure that they do not contaminate any food.

Abdul-Mutalib et al (2012) Food handlers' hygiene practices and cleanliness must minimise the risk of food contamination. The hands of food handlers can be the vector to spread harmful microorganism through cross-contamination. This can occur if they ignore the importance of washing hand during food preparation. Some of the bacteria that can be found on the hands of food handlers are *Escherichia coli* and *Staphylococcus aureus*.

Food handlers should have excellent hygiene practice to ensure cross-contamination can be reduced, thus protecting the consumers from foodborne diseases.

To ensure food handlers practise the correct way of handling food, knowledge and training are essential as part of their job (Abdul-Mutalib et al., 2012).

2.1.7 Food Handlers' Hygiene

The food industry should not overlook the importance of food handlers in managing the transmission of viruses. Historically, scientists have discovered that insufficient hand washing among food handlers is responsible for many foodborne disease outbreaks. An example given by Todd (2013) was Typhoid Mary (Mary Mallon) who was attributed with infecting over 50 individuals during her work as a cook while asymptotically shedding *Salmonella Typhi* – the most remarkable example of poor personal hygiene.

Personal protective equipment (PPE) such as masks and gloves can be effective in reducing the spread of viruses and disease within the food industry, but only if used properly. Additionally, the food industry is strongly advised to introduce physical distancing and stringent hygiene and sanitation measures and promote frequent and effective hand washing, in compliance with government-enforced Standard Operation Procedures (SOPs). SOPs are crucial at every step, from food preparation to serving (Paster, 2007).

Food handlers experiencing clinical gastrointestinal or respiratory disease symptoms should not participate in food processing or preparation. Ultimately, food safety practices in food premises should continue to be delivered to the highest hygiene standards following established food safety assurance systems

2.2 Theoretical Review

The purpose of Theoretical Review is to concretely examine the corpus of theory that has accumulated regarding an issue, concept, theory, phenomena. The unit of analysis can focus on a theoretical concept or a whole theory or framework.

2.2.1 Theory of Planned Behavior

According to Montaño & Kasprzyk (2015), the Theory of Planned Behavior (TPB) started as the Theory of Reasoned Action in 1980 to predict an individual's intention to engage in a behaviour at a specific time and place. The theory was intended to explain all behaviours over which people can exert self-control (Parker et al., 1992).

The key component to this model is behavioural intent; behavioural intentions are influenced by the attitude about the likelihood that the behaviour will have the expected outcome and the subjective evaluation of the risks and benefits of that outcome.

The TPB has been used successfully to predict and explain a wide range of health behaviours and intentions including smoking, drinking, health services utilization, breastfeeding, and substance use, among others. The TPB states that behavioural achievement depends on both motivation (intention) and ability (behavioural control). It distinguishes between three types of beliefs - behavioural, normative, and control. According to Kaiser and Scheuthle (2003), the TPB is comprised of six constructs that collectively represent a person's actual control over the behaviour.

Attitudes - This refers to the degree to which a person has a favourable or unfavourable evaluation of the behaviour of interest. It entails a consideration of the outcomes of performing the behaviour.

Behavioural Intention - This refers to the motivational factors that influence a given behaviour where the stronger the intention to perform the behaviour, the more likely the behaviour will be performed.

Subjective Norms - This refers to the belief about whether most people approve or disapprove of the behaviour. It relates to a person's beliefs about whether peers and people of importance to the person think he or she should engage in the behaviour.

Social Norms - This refers to the customary codes of behaviour in a group of people or larger cultural context. Social norms are considered normative, or standard, in a group of people.

Perceived Power - This refers to the perceived presence of factors that may facilitate or impede the performance of a behaviour. Perceived power contributes to a person's perceived behavioural control over each of those factors.

Perceived behavioural control - This refers to a person's perception of the ease or difficulty of performing the behaviour of interest. Perceived behavioural control varies across situations and actions, which results in a person having varying perceptions of behavioural control depending on the situation. This construct of the theory was added later and created the shift from the Theory of Reasoned Action to the Theory of Planned Behavior.

Mullan et al. (2013) found that the Theory of Planned Behavior (TPB) with the addition of risk perception could predict safe food handling in a sample of adolescents from the UK and Australia over and above the explanatory power of knowledge. The results provide further support for the utility of the TPB in predicting safe food handling.

Several authors provide support for the use of the Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB) in the prediction of a wide range of

behaviours, including food handling (Clayton et al., 2002), and hand hygiene, (Jenner et al., 2002). The TRA assumes that behaviour is preceded by intention to perform a behaviour, which in turn is preceded by attitudes and beliefs about the behaviour. The TRA, however, appears to be a poor predictor of behaviours that are not under volitional control.

Clayton et al., (2002) suggested that effective design of training for food handlers requires an understanding of the factors underlying food hygiene behaviour in the workplace. This paper explores the influences on food handlers' intention to perform safe food handling behaviours, including physical and psychological barriers.

2.3 Conceptual Framework

According to Camp (2001), a conceptual framework is a structure which the researcher believes can best explain the natural progression of the phenomenon to be studied. It is linked with the concepts, empirical research and important theories used in promoting and systemizing the knowledge espoused by the researcher.

As the present literature reveals, several factors have impacted food safety practices among food handlers as the results of COVID 19. This is shown in figure 2.1 below:

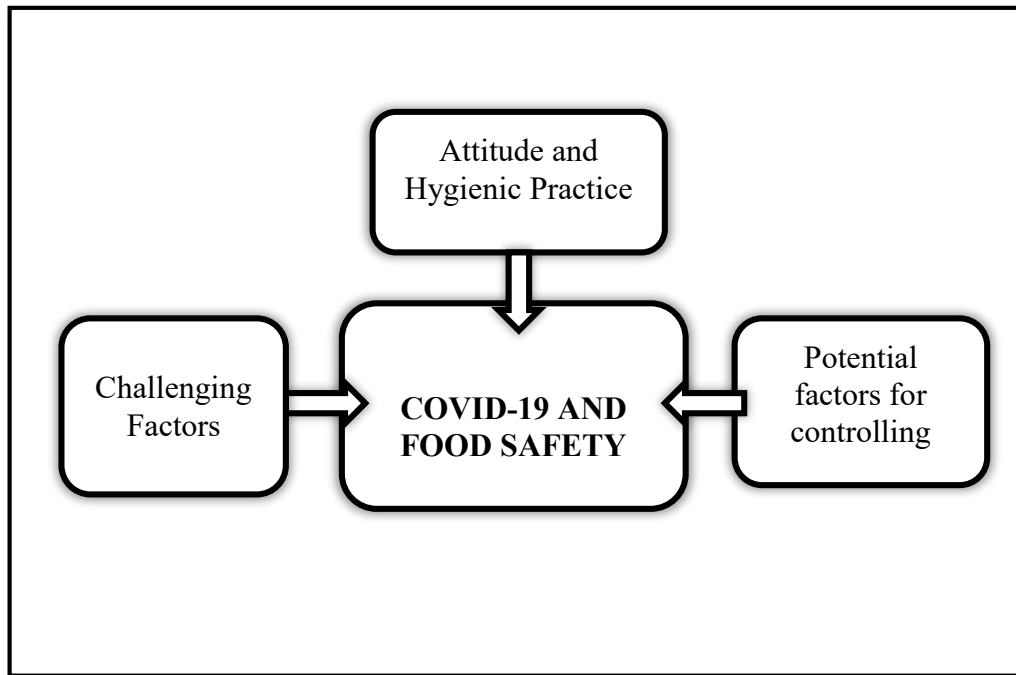


Figure 2.1: Conceptual Framework

Source: Author's Construction, 2020.

As presented in Figure 2.1 (with boldface arrows), Attitude & Hygienic Practice, Potential factors for controlling and challenges facing food handlers in practicing food safety during this COVID 19 era were under study.

The food safety practices and COVID 19 protocol must be observed to prevent the spread of the viruses. This research, therefore, seeks to survey the effects of the above-mentioned factors on the practicing of food safety during this COVID 19 period.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The methodology is a formal, analytical review of the processes employed in research. It consists of a systematic study of the body of approaches and concepts identified with the information section. Typically, it encompasses concepts such as paradigm, theoretical model, phase, and quantitative or qualitative techniques.

3.1 Research Design

A research design is the means and processes used to capture and analyse the variable in a problem analysis (Yilmaz, 2013). The design helps researchers to analyse and establish effective methods of study that are suitable for the subject. A study design defines the type and subtype of the study, research problem, theories, independent and dependent variables, experimental design, and, where applicable, the methodology for collecting data and a methodological framework for analysis.

The researcher conducted this study using a descriptive research design to help in collecting data from a wide section of the study respondents. It is research where the researcher is interested only in explaining the situation or event.

3.2 Population of the Study

The population is defined as a number of persons who share a (Yilmaz, 2013). The 'population' in research does not necessarily have to be human. It can be any data parameter with a specific characteristic. This characteristic allows participants to be considered as members of the community. The population, in general, is characteristically simplistic in that it includes participants whose inclusion in the sample is contradictory to the research purpose, conclusions, and/or contexts.

The total population is characteristic raw in that sometimes some individuals will breach the analysis goal, conclusions, and/or the meaning if included in the sample. In the Kumasi Metropolis, there are several food services around. The population includes food handlers in the hotels, guest houses, restaurants, and traditional catering services (chop bars). According to the Ghana Statistical Service (2014), collectively these activities employ 56,169 and are the third-largest employer in the Metropolis. The population size includes these 56,169 individuals.

3.3 Sampling Technique

The sampling technique is the method or process of selecting respondents for a study. In this study, the sampling technique used is the probability technique called the sample random sampling method. Sample random sampling is a part of the sampling technique in which each sample has an equal probability of being chosen. A sample chosen randomly is meant to be an unbiased representation of the total population.

According to Yilmaz (2013), random sampling is one of the simplest forms of collecting data from the total population. Under random sampling, each member of the subset carries an equal opportunity of being chosen as a part of the sampling process. Each member of the workforce has an equal opportunity of being chosen because all the employees who were chosen to be part of the survey were selected randomly. But there was a possibility that the group or the sample does not represent the population as a whole, in that case, any random variation is termed as a sampling error.

3.4 Sample Size

A sample size is a group of people or objects the researcher uses to generalize the findings of the study. By sample size, we recognize the group of subjects selected from the general population and are considered to be representative of the actual population for that specific study.

The sample size of this study is based on the "rule of 5" (Hair et al, 2011). This rule is a common rule of thumb in estimating the sample size required for a study. The total number of questions on the questionnaire was 34, per the rule of 5, the minimum sample of this study should be not below 170 ($34 \times 5 = 170$). In this study, the researcher has distributed 220 questionnaires for data collection in order to get a necessarily required sample size.

3.5 Data Collection Instruments

Research Instruments are the tools for data gathering. It helps the researchers to obtain relevant information or to acquire knowledge from others from which they learn to enrich the study. Various methods and instruments of data collection must be employed in this respect. In order to obtain the correct information to answer research questions, it is important to determine which tool or tool is better suitable for the purpose of the study (Dikko, 2016).

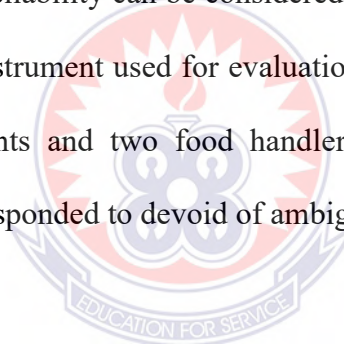
Questionnaires were used to collect data for this research. A questionnaire consists of a series of questions and other suggestions for collecting facts from respondents. The questionnaire was standardized because the questions were similar to all respondents. Semi-structured questions were used to capture the opinions the respondents expressed about the questions they were asked. They were all closed-ended questions. Closed-ended questions were used so the response choices can clarify question meaning for respondents.

3.6 Validity and Reliability of the Research Instrument

In the production and testing of any instrument, validity and reliability are two important factors for use in a study (Cook and Beckman, 2006). The development of a valid and reliable instrument usually involves several pilot and test iterations, which can be intensive in terms of resources.

Dikko (2016) denoted that Validity means the degree to which an instrument tests what it wishes to measure truly. Simply put, validity refers to the extent to which an instrument measures what it is intended to evaluate.

Reliability refers to the extent to which an instrument is producing consistent results. Popular reliability indicators include the reliability of internal integrity, test-retest, and inter-rater. Reliability can be considered in many ways; the approach may depend on the type of instrument used for evaluation. The questionnaires were tested on two colleague students and two food handlers to consider if the question is understood and can be responded to devoid of ambiguity.



3.7 Data Analysis

Data analysis is (characterized as) a process for cleaning, transforming, and modelling data to discover useful decision-making knowledge. The aim of Data Analysis is to collect useful data information and decide on the basis of data analysis. Data analysis tools make it easier for users to process and manipulate data, analyse the relationships and correlations between data sets, and also help identify interpretation patterns and trends.

All finished research instrument was gathered, marked, defined, and entered into the computer for analysis. The Social Science Statistics Suite (SPSS) was used. Descriptive statistics used included mean, standard deviations, frequencies, and

percentages. Frequency distributions were also used to evaluate the demographic information of the respondent to display their distribution.

3.8 Ethical Consideration

Research ethics includes the code of conduct governing the conduct of the researcher's activities. The researcher took several steps to ensure that acceptable ethical behavior is observed in the report. The researcher understood the causes and traditions of research ethics before beginning the research work. The researcher, therefore, sought to follow the practices and procedures that led to the protection of human and non-human subjects.

Firstly, the researcher ensured that consent and voluntary engagement were notified. The food services concerned and the respondents who provided the correct information were sought confirmation. A letter was forwarded to ask for a research authorization

Secondly, the researcher ensured that respondents were respectful of their privacy, confidentiality, and anonymity. All respondents have been told that the information they have received is kept private and used for academic reasons only. The findings of the study have been secretly reported and thus no researcher or foodservice can be found in this report. At the end of the day, the researcher tried as much as possible to remain honest, respectful, and sympathetic towards all participants.

CHAPTER FOUR

RESULT AND DISCUSSIONS

4.0 Introduction

In this section, the data obtained from the research are presented and analyzed and the findings and outcomes are discussed. This chapter has been divided into various subheadings.

In this study, results refer to the outcome of the various statistical procedures used in analyzing the data collated and coded. The results served as the foundation for interpretation, discussion, and concluding the purpose of achieving the research objectives.

Because of the COVID 19 pandemic, most of the respondents were not at the post when the questionnaire was sent, hence to observe social distancing, most of some copies of the questionnaire were delivered electronically. The researcher made use of WhatsApp, Email Address and Google forms to distribute and receive them.

4.1 Demographic Information

In order to understand the background characteristics of the respondents their Demographic Information was inquired. Four variables about them were investigated viz. (things were asked that is there) gender, age, educational level, and sector of work. Data on these were presented as follows.

4.1.1 Gender of Respondent

As shown in figure 4.1, 114 respondents representing 56% were female, 88 representing 44% were male. By implication the majority of the respondents were female. In the Ghanaian social situation, gender is a significant variable that is influenced by any social or economic phenomenon and globalization is no exception.

Integrating sex and gender is an important determinant of knowledge usage, testifying the effectiveness of implementation interventions and recommendations.

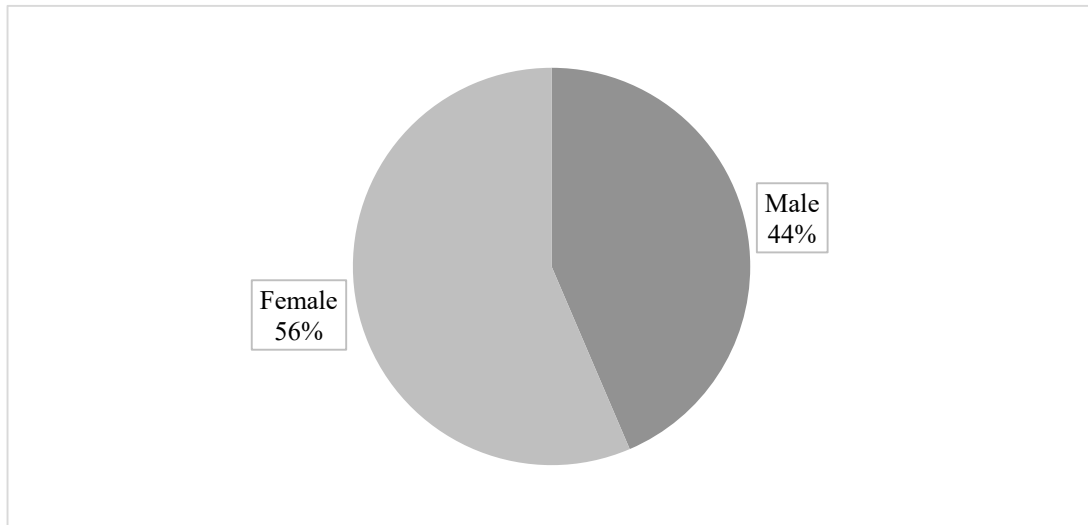


Figure 4.1: Gender of Respondent

Source: Field Work, 2020.

4.1.2 Age of Respondent

The respondents' age is one of the most significant features in interpreting their views on the specific issues; by and large, age suggests the maturity level of individuals. In that sense age is a function of the quality of responses.

In figure 4.2, the majority of the respondents were between the ages of 18 – 28 years. They numbered 107 representing 53%. Those between the ages of 40 and above recorded 40 representing 20%, while other respondents who were between the ages of 29 – 39 years were 55 representing 27%.

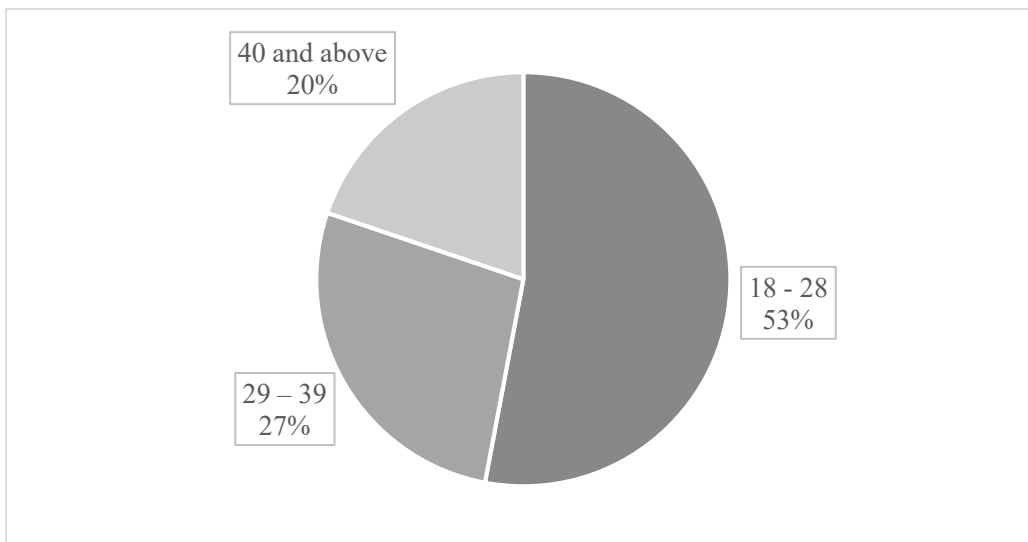


Figure 4.2: Age of Respondent

Source: Field Work, 2020.

4.1.3 Education level

The education level of the respondents was also inquired. Education level is one of the most important demographics that could affect the attitudes of a person and the way any particular social phenomenon can be seen and understood by that person.

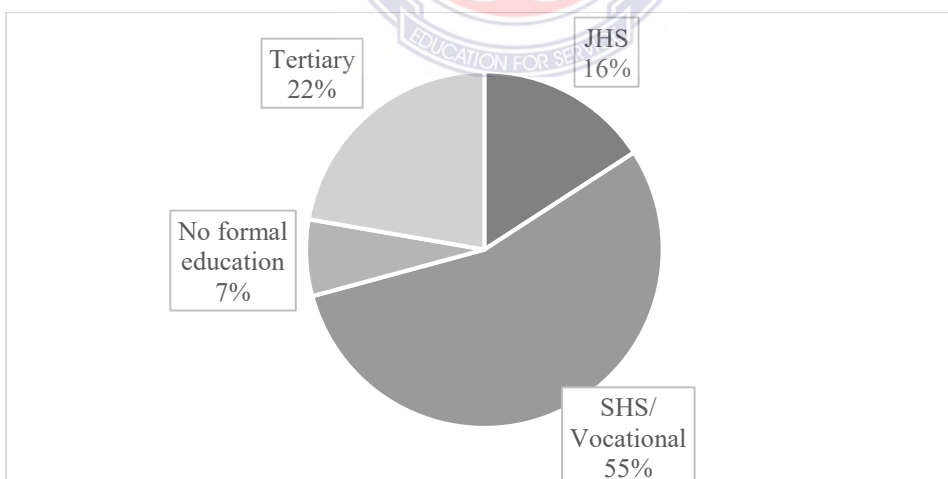


Figure 4.3: Educational Level

Source: Field Work, 2020.

As shown in figure 4.3, More than half of the respondents which is 111 representing 55% were SHS/Vocational certificate holders, those who are JHS levers and tertiary level were 42 and 35 representing 22 % and 16% respectively. Respondents

without formal education were 14 which also represents 7%. By implication, most of the respondents have attained some level of education.

4.1.4 Sector of Work

The last demographic information inquired about the respondents was the sector of the respondents works in. The data obtained were presented in figure 4.4. It showed that 75 respondents representing 37% were working in Fast Food joint, those working with chop bars were 53 which is also 26%. Those working in Hotels and Restaurants were 45 and 29 representing 22% and 15% respectively.

This means most of the respondents are employed in the fast-food sector which is common foodservice in the metropolis.

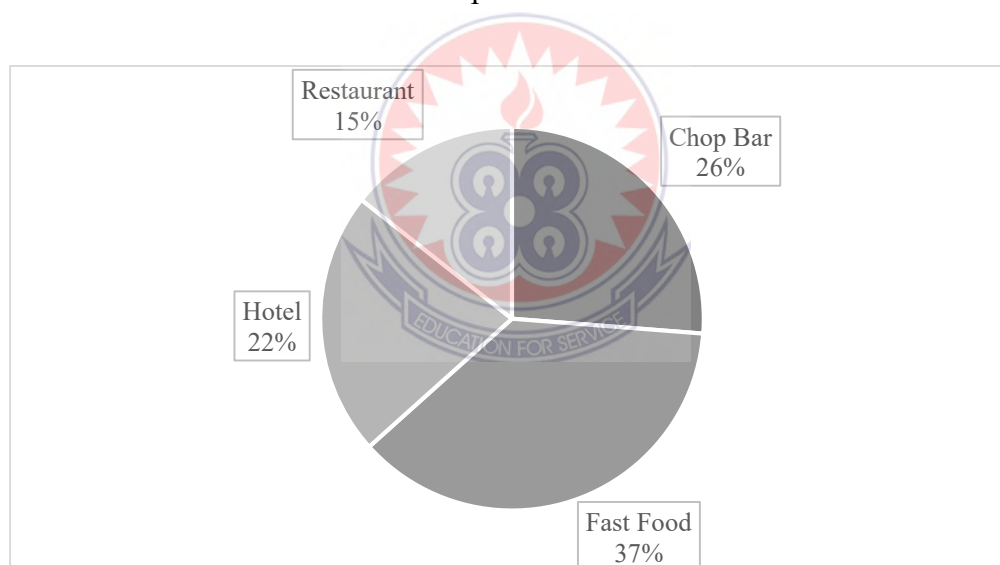


Figure 4.4: Sector of Work

Source: Field Work, 2020.

4.2 The Safety Practices towards the Prevention of COVID-19

To find an answer to the research question in respect of the safety practices among food handlers towards the prevention of COVID-19, about 10 statements were considered and the outcomes of the study are presented in Table 4.1. The statements were placed in order of the degree of their mean and standard deviation.

Table 4.1: Descriptive Statistics of Safety Practices

Rank	Statement	N	Mean	SD
1	Use of Personal protective equipment (PPE) (disposable gloves, face masks, sleeves, clean apron)	202	3.78	0.92
2	Checking the temperature for the employees and other COVID19 symptoms.	202	3.66	0.91
3	Use spray disinfectants, hand sanitizers, surface sanitizers	202	3.55	0.90
4	Adhere to physical distancing at least (2-m) among the workers.	202	3.53	0.90
5	Make a barrier between the employees and any gust at the receiving area.	202	3.51	0.95
6	Reduce and regulate the numbers of employees in working areas to prevent overcrowding.	202	3.49	0.93
7	Make working teams to reduce the interaction between the employees.	202	3.39	0.88
8	Use signs for wearing gloves and mask and use floor signs for physical distance.	202	3.37	0.9
9	Identify the most uses equipment and utensils (hand doors, scales, trolleys) and confirm their cleaning and disinfectants	202	3.34	0.97
10	Use electronic reminders to warn the employees to keep physical distancing and clean and sanitize their hands	202	2.22	1.22

Source: Field Work, 2020.

The use of Personal Protective Equipment (PPE) like disposable gloves, face masks, sleeves, and clean apron among the food handlers was ranked first with a mean of 3.78 and a standard deviation of 0.92. According to Laborde et al (2020), Personal protective equipment (PPE) such as masks and gloves can be effective in reducing the spread of viruses and disease within the food industry, but only if used properly. This

means the various food handlers have taken the recognizes that using of PPEs was essential in the fight against COVID 19.

Followed up on second and third were the checking the temperature for the employees and other COVID19 symptoms (Mean =3.66, SD = 0.91) and spray disinfectants, hand sanitizers, and surface sanitizers (Mean= 3.55, SD=0.90). The respondents also agreed that they adhere to a physical distancing of at least (2-m) among the workers (Mean= 3.53, SD= 0.90), and the making of a barrier between the employees and any gust at the receiving area was also done by the food handlers (Mean= 3.51, SD= 0.95). The World Health Organization (2020) did indicate that measures such as frequent hand washing, use of hand sanitizers, use of protective clothing, good respiratory hygiene, will reduce the risk of spreading the disease.

The respondents also agreed that they reduce and regulate the numbers of employees in working areas to prevent overcrowding and also, they make working teams to reduce the interaction between the employees recording means of 3.49 and 3.3 with a standard deviation of 0.93 and 0.88 respectively.

Using of signs for a worker to wear their gloves and mask and using of floor signs for physical distance was also agreed by the respondents with a mean of 3.37 and standard deviation of 0.90 and the Identification of most uses' equipment and utensils (hand doors, scales, trolleys) and confirm their cleaning and disinfectants also recorded a mean of 3.34 and standard deviation of 0.97.

Recording the highest standard deviation of 1.06 was the use of electronic reminders to warn the employees to keep physical distancing and clean and sanitize their hands with a mean of 2.22. Per the results, nine of the statements were agreed upon by the respondent and one was rejected.

4.3 Attitude and Hygienic Practice during COVID 19

The second objective is to evaluate the attitude and hygienic practice among food handlers during COVID 19. All ten statements were presented to the respondent placed on five Likert scales. The outcome is presented in Table 4.2.

Table 4.2: Descriptive Statistics of Attitude and Hygienic Practice

Rank	Statement	N	Mean	S.D.
1	Using mouth mask during processing time	202	3.92	0.87
2	Washing hands with water and soap before preparing food	202	3.87	0.91
3	Washing and sanitizing your hands before food preparation	202	3.76	0.92
4	Deep washing of vegetables and fruits	202	3.55	0.85
5	Sanitizing vegetables and fruits before slicing them	202	3.40	0.82
6	Covering the lesions on hands during preparing a food product	202	3.33	1.02
7	Cleaning food contact surfaces before and after preparing food.	202	3.33	1.12
8	Checking of temperature for food and refrigerator periodically	202	3.27	1.02
9	The separation of finished from raw food	202	3.26	0.81
10	Washing fresh vegetables and fruits in tap water before eating	202	3.06	0.88

Source: Field Work, 2020.

Most of the respondents indicated that they often used mouth mask during processing time with a mean of 3.92 and standard deviation of 0.87. Washing of hands with water and soap before preparing food and also washing and sanitizing their hands before food preparation was also found to be common among the respondents recording a means of 3.87 and 3.76 with standard deviation 0.91 and 0.92 respectively. These attitudes and hygienic practices are seen as the best way to prevent and control COVID

19 as indicated by Adams and Walls (2020). They found that measures such as frequent hand washing, use of hand sanitizers, use of protective clothing, good respiratory hygiene, will reduce the risk of spreading the disease.

Also, it was revealed that deep washing of vegetables and fruits was also common (Mean =3.55 and SD=0.85) and also the sanitizing of vegetables and fruits before slicing them as well common (Mean = 3.40 and SD=0.82). Covering the lesions on hands during preparing a food product was also common among the respondents (Mean= 3.33, SD=1.02). Although some consumers perceive there is a risk of COVID-19 infection resulting from open food displays, there is currently no scientific evidence suggesting that food is associated with the transmission of the COVID-19 virus (Adams and Walls, 2020).

Cleaning food contact surfaces before and after preparing food was also done often (Mean= 3.33, SD=1.12) and there was a regular checking of temperature for food and refrigerator often (Mean= 3.27, SD=1.02). The cleaning of surfaces was important as indicated by Van-Doremalen et al., (2020) another important finding was that the genetic material of the virus could be stable for several hours to days in aerosols and on surfaces.

Also, Humphrey et al (2007) argue that there is no problem with products that will be cooked before consumption, but cross-contamination of other food products or contact surfaces may occur and put the consumer at risk of infection. Also, the checking of the temperature was relevant to the spread of the virus. Saba (2020) indicated that considering the local and conventional packaging materials and environmental temperature and conditions, the survival of the virus may vary.

The separation of finished from raw food among the food handlers was also often done just like the washing of fresh vegetables and fruits in tap water before eating in both cases a means of 3.26 and 3.06 with a standard deviation of 0.81 and 0.88 respectively.

4.4 Challenges Facing Food Handlers in Practices Food Safety

The final object was to examine challenges facing food handlers in practices Food Safety during COVID 19. Also, ten statements of challenges were present to the respondents on a five Likert scale and the results presented in Table 4.3.

Table 4.3: Descriptive Statistics of Challenges to Practices Food Safety

Rank	Statement	N	Mean	Std. Dev.
1	Protecting staff from the risk of infection	202	3.66	0.96
2	Maintaining physical distancing when dealing with large numbers of customers	202	3.55	0.92
3	Maintaining physical distancing when dealing with other staff	202	3.54	0.89
4	Increased administrative bottlenecks	202	3.45	0.80
5	Reduced staff resources due to reallocation	202	3.41	0.81
6	Ensuring that adequate supplies of foods are available daily.	202	3.34	0.99
7	Changes in consumer preferences and habits	202	3.23	0.99
8	provision of Personal Protective Equipment (PPE)	202	3.12	0.80
9	Sanitation and disinfection of surfaces	202	3.11	0.92
10	Maintaining the highest standards of hygiene	202	2.87	0.90

Source: Field Work, 2020.

The respondents agreed that it was challenging protecting the staff from the risk of infection (Mean =3.66, SD= 0.96), and also the maintaining physical distancing when dealing with large numbers of customers has also been challenging to the

respondents (Mean =3.55, SD=0.92). The respondents also agreed that Maintaining physical distancing when dealing with other staff was also a challenge with a mean of 3.54 and a standard deviation of 0.89. Just as indicated by WHO (2020) that Maintaining physical distancing in retail food premises is critical for reducing the risk of transmission of the disease.

The respondents also agreed that there is an increase in administrative expense (Mean =3.45, SD= 0.80). they also agreed that the reduction in staff resources due to reallocation was also a challenge to their operation (Mean =3.41, SD=0.81) and also ensuring that adequate supplies of foods are available daily was a challenge (Mean =3.34, SD=0.99). As indicated by Sharma et al. (2020) that the food retail sector faces the greatest challenges in maintaining the ensuring that adequate supplies of foods are available daily.

The change in consumers' preferences and habits was also a challenge (Mean = 3.23 and SD=0.99). The respondents also agreed that the provision of Personal Protective Equipment (PPE) was a challenge (Mean= 3.12, SD=0.80) as well as sanitation and disinfection of surfaces (Mean= 3.11, SD= 0.92). as indicated by Paster (2007) that Food and beverage processors can easily become overwhelmed as they work to meet challenging customer requirements. But the respondents disagreed that maintaining the highest standards of hygiene was a challenge (Mean =2.87 and SD=0.90).

4.5 Discussion of Results

To also answer the research questions a T-Test was done. According to Gossett (1908), a T-Test is when a t-distribution ties the test results, and you want to check statistically if the null hypothesis is valid. Gossett (1908) created it to regulate stout consistency during a brewery's work. The one-sample t-test is used to evaluate the null

hypothesis that the population mean is equal to a given value. The Test Value used for the T-Test analysis was 3 ($\{1+2+3+4+5\} \div 5$) which is the average mean of the study, this is presented in Table 4.4.

Table 4.4: One-Sample Test

	Test Value = 3			95% Confidence Interval of the Difference		
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Safety Practices	8.064	201	.000	.35743	.2700	.4448
Attitude and Hygienic	10.208	201	.000	.47475	.3830	.5665
Challenge	6.920	201	.000	.32871	.2350	.4224

Source: Field Survey, 2020

The first objective was to examine the safety practices among food handlers towards the prevention of COVID-19. From the result in Table 4.4, it is accepted that there are safety practices among food handlers in Kumasi Metropolis. The p-value which is 0.0000 recorded from the t-test is less than the theoretical significance level of 5%. The mean within-subject difference between Test Value and the actual mean was 0.35743, meaning the mean of the respondents is above the Test Value.

This is in confirmation of the assertion of Adams and Walls (2020), who indicated that ultimately, food safety practices in food premises should continue to be delivered to the highest hygiene standards following established food safety assurance systems during this period of the COVID 19 pandemic. WHO (2020) also recommended that food safety practices and COVID 19 protocol must be observed to prevent the spread of the viruses.

Researchers like Bolton et al. (2008) have argued that food safety and food hygiene are important as they ensure that the food you handle and produce is safe for consumption. If food safety and hygiene are not maintained, consumers could become seriously ill with food poisoning and foodborne illnesses. Therefore, food safety and food hygiene are of the utmost importance to protect the health of consumers.

The second objective of this study was to evaluate the attitude and hygienic practice among food handlers during COVID 19. Abdul-Mutalib et al (2012) Food handlers' hygiene practices and cleanliness must minimize the risk of food contamination. The hands of food handlers can be the vector to spread harmful microorganisms through cross-contamination.

From the T-Test in Table 4.6, the p-value was 0.000 at a 95% Confidence Interval of the Difference. From the results, it can be accepted that the food handlers do have a positive attitude and were following a hygienic practice. According to Hobbs (2020) in times of self-isolation and quarantine, we all rely more than ever on a safe and efficient food supply chain to ensure that food is readily available in every home under good hygiene.

The result is in accordance with the demands of both the Food and Agriculture Organization (2020) and the World Health Organization (2020). Both entities published a document on "COVID-19 and food safety: guidance for food businesses" even though it stated that it is highly unlikely that people can contract COVID-19 through food or food packaging. Base on the assertion that the raises a concern about the possible transmission of the SARS-CoV-2 through the fecal-oral route which has implications on food, water, hygiene, sanitation, and the environment.

But researchers like Saba, (2020) argue that lettuce may continue to harbor the virus until it is consumed and if the appropriate receptor of the virus is found, proliferate and may result in COVID-19 and that calls for a good attitude and practices of personal hygiene among food handlers. It was also confirmed by Van-Doremalen (2020) SARS-CoV-2 could live up to four hours on copper, up to 24 hours on cardboard, and up to two to three days on plastic and stainless steel.

A good attitude and personal hygiene among the food handler are also necessary as it will also prevent them from contracting the virus aside from spreading, just as it was indicated by Wemakor (2020). There has been a report in Accra, the Capital of Ghana often street vendors at the Achimota Government Hospital who tested COVID-19 positive in routine surveillance (Wemakor, 2020). Also, According to More (2020) another street vendor, who sold peeled oranges to the public was confirmed dead of COVID-19 in the Tamale Metropolis on the 11th of May.

The final objective was to evaluate challenges facing food handlers in practices Food Safety during COVID 19. According to Sharma et al (2020) during the COVID-19 pandemic, the food retail sector faces the greatest challenges in its operations

With a Mean Difference of .32871 at a Test Value of 3 and a p-value of 0.0000 which is less than the theoretical significance level of 5%, it is accepted challenges facing food handlers in practices Food Safety during COVID 19 in the Kumasi Metropolis.

The result confirms Sharma et al, (2020) finding that during the COVID-19 pandemic, the food retail sector faces the greatest challenges in maintaining the highest standards of hygiene, protecting staff from the risk of infection, maintaining physical distancing when dealing with large numbers of customers, remaining open, and ensuring that adequate supplies of foods are available daily.

As also indicated by Laborde et al., (2020) that the COVID-19 pandemic is a health and humanitarian crisis threatening the food security and nutrition of millions of people around the world. In the longer term, the combined effects of COVID-19 itself, as well as corresponding mitigation measures and the emerging global recession could, without large-scale coordinated action, disrupt the functioning of food systems (WHO, 2020).



CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

5.0 Introduction

The section provides a summary of the findings, conclusions, and recommendations of the research. Finally, it also provides proposals for future research studies for researchers.

This study was conducted to study is to assess the impact of COVID 19 on food safety practices among food handlers in Kumasi Metropolis. The descriptive research design was adopted for the study.

5.1 Summary of Findings

The findings of the research are presented below under each of the objectives of the study:

5.1.1 Safety Practices Among Food Handlers Towards the Prevention of COVID

The study revealed that the food handlers were making use of Personal Protective Equipment (PPE) like disposable gloves, face masks, sleeves, or clean apron in order to prevent the spread of the virus. Their temperatures are checked regularly when returning to work for COVID19 symptoms so that staff doesn't belong the virus to the workplace.

It was also revealed that there was regular use of spray disinfectants, hand sanitizers, and surface sanitizers as recommended in the fight against COVID 19. The was adherence to physical distancing at least 2-m among the workers at the workplace while a barrier is made between the employees and any gust at the receiving area as well.

The food handlers at work have been reduced and regulated in working areas to prevent overcrowding and the making working teams to reduce the interaction between the employees.

But it was also revealed in the study that the use of electronic reminders to warn the employees to keep physical distancing and clean and sanitize their hands was not common among the food handlers. Some of the food services were making use of digital alarm clock as a reminder to the food handlers to observe the protocol.

5.1.2 Attitude and Hygienic Practice among Food Handlers during COVID

The food handlers were making the using mouth mask during the transformation of agricultural products into food. Washing of hands with water and soap before preparing food and the sanitization of their hands before food preparation was regularly done. vegetables and fruits

Sanitizing vegetables and fruits before slicing them was also common and regularly done among the food handlers. Food handlers also made sure their lesions on their hands are covered during preparing a food product.

The food handlers make sure the cleaning of food contact surfaces before and after preparing food and also regularly check the temperature for food and refrigerator periodically. The separation of finished from raw food and washing fresh vegetables and fruits in tap water before eating was also a regular practice.

5.1.3 Challenges Facing Food Handlers in Practices Food Safety during COVID

Protection of staff from the risk of getting infected by the virus was the biggest challenge facing the fight against contracting the virus. Maintaining physical distancing when dealing with large numbers of customers was also a challenge.

The food handlers were also facing the challenge of maintaining physical distancing when dealing with other staff and also customers. The purchasing of PPEs has led to an increase in administrative bottlenecks, therefore, affecting staff resources. There was also a challenge of having assessed adequate supplies of foods and maintaining the highest standards of hygiene.

It was also revealed that there was a change in consumer preferences and eating habits because of the pandemic. The regular disinfection of surfaces of their place of work was also a problem.

5.2 Conclusions

The main aim of the study is to assess the impact of COVID 19 on food safety practices among food handlers in Kumasi Metropolis. But specifically, the study will seek to: examine the safety practices among food handlers towards the prevention of COVID-19, evaluate the attitude and hygienic practice among food handlers during COVID 19 and examine challenges facing food handlers in practices Food Safety during COVID 19.

In literature, the theory of Planned Behavior was reviewed. The theory was intended to explain all behaviors over which people can exert self-control. Theory of Reasoned Action in 1980 to predict an individual's intention to engage in a behavior at a specific time and place. As indicated by the World Health Organization (1996) that street food is prepared or cooked food sold by vendors in a street or other public location for immediate consumption. Street foods in Africa are generally ready-to-eat foods sold in stationary stalls, opened, semi-closed, or closed tables, or by hawkers who roam about with the foods to find customers. Hawkers are commonly found in schools, at bus stations, government workplaces or offices, markets, social events, at places where

major construction works are going on, by the windows of vehicles in heavy traffic, and from door to door. It was necessary to examine how the food handlers handle food during this time of the pandemic.

Firstly, the study sought to examine the safety practices among food handlers towards the prevention of COVID-19. The study found that food handlers were following the laid down safety practice in an effort to control the spread of the virus. Although it is highly unlikely that people can contract COVID-19 from food. COVID-19 is a respiratory illness and the primary transmission route is through person-to-person contact and through direct contact with respiratory droplets generated when an infected person coughs or sneezes. It's advisable that food handlers must observe safety practices to avoid person to person contact.

Secondly, the attitude and hygienic practice among food handlers during COVID 19 was examined. It was revealed that the food handlers were exhibiting a good attitude and following the hygienic practices. Base on the assertion that the raises a concern about the possible transmission of the SARS-CoV-2 through the fecal-oral route which has implications on food, water, hygiene, sanitation, and the environment good attitude and hygienic practice among food handlers is necessary.

Finally, the challenges facing food handlers in practices Food Safety during COVID 19 was also examined. It was revealed that these food handlers were facing challenges in the effort to help prevent the transmission of the virus. The food retail sector faces the greatest challenges in maintaining the ensuring that adequate supplies of foods are the available daily basis.

Therefore, it can be concluded that COVID 19 pandemic has positively impacted food safety practices among food handlers in Kumasi Metropolis. The food handlers have a fair knowledge of the prevention of the virus.

Food safety practices were on the rise because of the COVID 19 pandemic among the food handlers although they are facing challenges in their effort to stay safe and prevent the spread of the virus.

5.3 Recommendations

Based on the finding of the study, the following recommendations are made:

1. Base on the finding that the companies were not using electronic reminders to warn the employees to keep physical distancing and clean and sanitize their hands at work. It is recommended that these companies should provide their employee with an electronic system at will regularly. When this is done the food handlers can be reminded of the need to observe the COVID 19 protocols.
2. Base on the finding that food handlers having a good attitude and the practices of personal hygiene, there should be regular training for an employee on these practices. When this is done the food handlers will improve upon their knowledge and interest in the practices.
3. As it was also found that the provision of Personal Protective Equipment (PPE) was a challenge to food handlers. It is recommended that these food services companies provide their employee with the necessary PPE. When this is done the employees can use the necessary PPEs to use when working.

5.4 Recommendations Future Research Studies

The researcher also recommends that the following area should be researched:

1. The impact of COVID 19 on the hospitality industry as a whole. Examining the impact of COVID 19 on the hospitality industry is necessary for especially in the Ghana context.

2. Also, the impact of COVID 19 on food quality should be examined. The views of customers and food service providers will be relevant.



REFERENCES

- Abankwah, A. (2018). Effect of 'chop-bar'foods and its health implications on consumers in Kumasi metropolis, Ghana. *International Journal of Education and Research*, 6.
- Abdul-Mutalib, N. A., Abdul-Rashid, M. F., Mustafa, S., Amin-Nordin, S., Hamat, R. A., & Osman, M. (2012). Knowledge, attitude and practices regarding food hygiene and sanitation of food handlers in Kuala Pilah, Malaysia. *Food Control*, 27(2), 289-293.
- Acter, T., Uddin, N., Das, J., Akhter, A., Choudhury, T. R., & Kim, S. (2020). Evolution of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as coronavirus disease 2019 (COVID-19) pandemic: A global health emergency. *Science of the Total Environment*, 138996.
- Adams, J. G., & Walls, R. M. (2020). Supporting the health care workforce during the COVID-19 global epidemic. *Jama*, 323(15), 1439-1440.
- Antignac, M., Diop, B. I., de Terline, D. M., Bernard, M., Do, B., Ikama, S. M., & Toure, I. A. (2017). Fighting fake medicines: first quality evaluation of cardiac drugs in Africa. *International Journal of Cardiology*, 243, 523-528.
- Beargie, S. M., Higgins, C. R., Evans, D. R., Laing, S. K., Erim, D., & Ozawa, S. (2019). The economic impact of substandard and falsified antimalarial medications in Nigeria. *PloS one*, 14(8), e0217910.
- Bolton, D. J., Meally, A., Blair, I. S., McDowell, D. A., & Cowan, C. (2008). Food safety knowledge of head chefs and catering managers in Ireland. *Food control*, 19(3), 291-300.

- Camp, W. (2001). Formulating and evaluating theoretical frameworks for career and technical education research. *Journal of Vocational Education Research*, 26(1), 4-25.
- Clayton, D. A., Griffith, C. J., Price, P., & Peters, A. C. (2002). Food handlers' beliefs and self-reported practices. *International Journal of Environmental Health Research*, 12(1), 25-39.
- Cook, D. A., & Beckman, T. J. (2006). Current concepts in validity and reliability for psychometric instruments: theory and application. *The American Journal of Medicine*, 119(2), 166-e7.
- Dikko, M. (2016). Establishing Construct Validity and Reliability: Pilot Testing of a Qualitative Interview for Research in Takaful (Islamic Insurance). *Qualitative Report*, 21(3).
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1-4.
- FAO and WHO (2020) COVID-19 and Food Safety: Guidance for Food Businesses. Interim guidance. WHO/2019-nCoV/Food_Safety/2020.1 Accessed on 14th of May 2020 on <https://www.who.int/publications-detail/covid-19-and-food-safety-guidance-for-food-businesses>.
- Ghana. Statistical Service. (2014). *2010 Population and Housing Census Report*. Ghana Statistical Service.
- Hair, J.F., Ringle, C.M. & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), pp.139-152.

- Henao, O. L., Jones, T. F., Vugia, D. J., & Griffin, P. M. (2015). Foodborne diseases active surveillance network—2 decades of achievements, 1996–2015. *Emerging infectious diseases*, *21*(9), 1529.
- Humphrey, T., O'Brien, S., & Madsen, M. (2007). Campylobacters as zoonotic pathogens: a food production perspective. *International Journal of Food Microbiology*, *117*(3), 237-257.
- Jenner, E.A., Watson, P.W.B., Miller, L., Jones, F., and Scott, G.M. (2002) Explaining hand hygiene practice: an extended application of the Theory of Planned Behaviour: *Psychology, Health & Medicine*: *7*(3) 311-326.
- Kaiser, F. G., & Scheuthle, H. (2003). Two challenges to a moral extension of the theory of planned behavior: Moral norms and just world beliefs in conservationism. *Personality and Individual Differences*, *35*(5), 1033-1048.
- Laborde, D., Martin, W., Swinnen, J., & Vos, R. (2020). COVID-19 risks to global food security. *Science*, *369*(6503), 500-502.
- Legesse, D., Tilahun, M., Agedew, E., & Haftu, D. (2017). Food handling practices and associated factors among food handlers in arba minch town public food establishments in Gamo Gofa Zone, Southern Ethiopia. *Epidemiology (Sunnyvale)*, *7*(302), 2161-1165.
- Marshall, D. L., Dickson, J. S., & Nguyen, N. H. (2016). Ensuring food safety in insect based foods: Mitigating microbiological and other foodborne hazards. In *Insects as Sustainable Food Ingredients* (pp. 223-253). Academic Press.
- Montaño, D. E., & Kasprzyk, D. (2015). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. *Health behavior: Theory, Research and Practice*, *70*(4), 231.

- Mullan, B. A., Wong, C., & Kothe, E. J. (2013). Predicting adolescents' safe food handling using an extended theory of planned behavior. *Food Control*, 31(2), 454-460.
- Newman, A., & Cullen, P. (2002). *Retailing: environment & operations*. Cengage Learning EMEA.
- Nyabor, J. (2020). Coronavirus: Government bans religious activities, funerals, all other public gatherings. Citi Newsroom.
- Panghal, A., Chhikara, N., Sindhu, N., & Jaglan, S. (2018). Role of food safety management systems in safe food production: A review. *Journal of Food Safety*, 38(4), e12464.
- Parker, D., Manstead, A. S., Stradling, S. G., Reason, J. T., & Baxter, J. S. (1992). Intention to commit driving violations: An application of the theory of planned behavior. *Journal of Applied Psychology*, 77(1), 94.
- Paster, T. (2007). *The HACCP Food Safety Employee Manual*. John Wiley & Sons.
- Peng, M., Dai, J., Sugali, C. K., Rayana, N. P., & Mao, W. (2020). The role of the ocular tissue in SARS-CoV-2 transmission. *Clinical Ophthalmology (Auckland, NZ)*, 14, 3017.
- Rao, G. S., Sudershan, R. V., Rao, P., Rao, M. V. V., & Polasa, K. (2007). Food safety knowledge, attitudes and practices of mothers—Findings from focus group studies in South India. *Appetite*, 49(2), 441-449.
- Ravishankar, S., Zhu, L., & Jaroni, D. (2010). Assessing the cross contamination and transfer rates of *Salmonella enterica* from chicken to lettuce under different food-handling scenarios. *Food Microbiology*, 27(6), 791-794.
- Saba, C. (2020). COVID-19: Implications for Food, Water, Hygiene, Sanitation, and Environmental Safety in Africa: A Case Study in Ghana. *Preprints*.

- Sekheta¹, M. A. F., Sahtout¹, A. H., Soukhaita¹, I. F., Airoud, M. A., Airoud, K. A., & Qudsieh¹, H. Y. (2008). The insidious food hazards as new categories in HACCP and ISO-22000 based systems. *Internet Journal of Food Safety*, *10*, 50-57.
- Sharma, H. B., Vanapalli, K. R., Cheela, V. S., Ranjan, V. P., Jaglan, A. K., Dubey, B., & Bhattacharya, J. (2020). Challenges, opportunities, and innovations for effective solid waste management during and post COVID-19 pandemic. *Resources, Conservation and Recycling*, *162*, 105052.
- Todd, E. C. (2013). *Food Safety Management: Chapter 28. Personal Hygiene and Health*. Elsevier Inc. Chapters.
- Van der Spiegel, M., Noordam, M. Y., & Van der Fels-Klerx, H. J. (2013). Safety of novel protein sources (insects, microalgae, seaweed, duckweed, and rapeseed) and legislative aspects for their application in food and feed production. *Comprehensive Reviews in Food Science and Food Safety*, *12*(6), 662-678.
- Van Doremalen, N., Bushmaker, T., Morris, D. H., Holbrook, M. G., Gamble, A., Williamson, B. N., ... & Lloyd-Smith, J. O. (2020). Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *New England Journal of Medicine*, *382*(16), 1564-1567.
- van Egmond, H. P., Schothorst, R. C., & Jonker, M. A. (2007). Regulations relating to mycotoxins in food. *Analytical and Bioanalytical Chemistry*, *389*(1), 147-157.
- World Health Organization [WHO] (2020). COVID-19 and food safety: guidance for food businesses. *Interim Guidance*) (<https://www.who.int/publications-detail/covid-19-and-food-safety-guidance-for-food-businesses>, 07 April 2020).
- World Health Organization. (1996). *Essential safety requirements for street-vended foods* (No. WHO/FNU/FOS/96.7 Rev1). World Health Organization.

- Wu, M. Y. C., Hsu, M. Y., Chen, S. J., Hwang, D. K., Yen, T. H., & Cheng, C. M. (2017). Point-of-care detection devices for food safety monitoring: Proactive disease prevention. *Trends in biotechnology*, 35(4), 288-300.
- Wu, Y., Wen, J., Ma, Y., Ma, X., & Chen, Y. (2014). Epidemiology of foodborne disease outbreaks caused by *Vibrio parahaemolyticus*, China, 2003–2008. *Food Control*, 46, 197-202.
- Xiao F., Tang M., Zheng X., Liu Y., Li X. & Shan H., (2020). Evidence for gastrointestinal infection medRxiv 2020.04.12.20062679.
<https://doi.org/10.1101/2020.04.12.20062679>.
- Yeung, R. M., & Morris, J. (2001). Food safety risk. *British Food Journal*.
- Yilmaz, K. (2013). Comparison of quantitative and qualitative research traditions: Epistemological, theoretical, and methodological differences. *European Journal of Education*, 48(2), 311-325.
- Zhang, N., Gong, Y., Meng, F., Bi, Y., Yang, P. & Wang, F. (2020). Virus shedding patterns in nasopharyngeal and fecal specimens of COVID-19 patients. MedRxiv 2020.03.28.20043059. <https://doi.org/10.1101/2020.03.28.20043059>
- Zheng, J. (2020). SARS-CoV-2: an emerging coronavirus that causes a global threat. *International Journal of Biological Sciences*, 16(10), 1678.

APPENDIX
QUESTIONNAIRES
AAMUSTED COLLEGE OF TECHNOLOGY
HOSPITALITY DEPARTMENT

This questionnaire is designed to enable the researcher to obtain data for **Assessing the Impact of COVID 19 On Food Safety Practices Among Food Handlers in Kumasi Metropolis**. You are required to produce as accurate information as possible. The confidentiality of such information is guaranteed as the results are purely for academic purposes.

Section A. Characteristics of Respondents

1. Gender of Respondent	Male	[]
	Female	[]
2. Age	20 and below	[]
	21–30	[]
	31–40	[]
	41–50	[]
	51 and above	[]
3. Educational level	No formal education	[]
	JHS	[]
	SHS/ Vocational	[]
	Tertiary	[]

4. Sector of work
- Restaurant []
 - Fast Food []
 - Hotel []
 - Chop Bar []

Section B Safety Practices Towards Prevention of COVID 19

Rank the following from the least (1) to the most common (5) Safety Practices toward prevention of COVID 19 among Food handler in Kumasi Metropolis using a Likert of the scale of 1 – 5 (Where 1= **Never**, 2= **Rarely**, 3= **Sometimes**, 4= **Very Often** and 5= **Always**).

Code	Statement	1	2	3	4	5
SP1	Adhere to physical distancing at least (2-m) among the workers.					
SP2	Checking the temperature for the employees and other COVID19 symptoms.					
SP3	Identify the most uses equipment and utensils (hand doors, scales, trolleys) and confirm their cleaning and disinfectants					
SP4	Make a barrier between the employees and any gust at the receiving area.					
SP5	Make working teams to reduce the interaction between the employees.					
SP6	Reduce and regulate the numbers of employees in working areas to prevent overcrowding.					
SP7	Use electronic reminders to warn the employees to keep physical distancing and clean and sanitize their hands					
SP8	Use of Personal protective equipment (PPE) (disposable gloves, face masks, sleeves, clean apron)					

SP9	Use signs for wearing gloves and mask and use floor signs for physical distance.					
SP10	Use spray disinfectants, hand sanitizers, surface sanitizers					

Section B Attitude and Hygienic Practice during COVID 19

Rank the following from the least (1) to the most common (5) attitude and hygienic practice among food handlers during COVID 19 in Kumasi Metropolis using a Likert of the scale of 1 – 5 (Where 1= **Never**, 2= **Rarely**, 3= **Sometimes**, 4= **Very Often** and 5= **Always**).

Code	Statement	1	2	3	4	5
AH1	Checking of temperature for food and refrigerator periodically					
AH2	Cleaning food contact surfaces before and after preparing food.					
AH3	Covering the lesions on hands during preparing a food product					
AH4	Deep washing of vegetables and fruits					
AH5	Sanitizing vegetables and fruits before slicing them					
AH6	The separation of finished from raw food					
AH7	Using mouth mask during processing time					
AH8	Washing and sanitizing your hands before food preparation					
AH9	Washing fresh vegetables and fruits in tap water before eating					
AH10	Washing hands with water and soap before preparing food					

Section D Food Safety Challenges Facing Food Handlers During COVID 19

Rank the following from the least (1) to the most common (5) challenges facing food handlers in practices Food Safety during COVID 19 in Kumasi Metropolis using a Likert of the scale of 1 – 5 [where 1=**Strongly Disagree**; 2=**Disagree**; 3=**Neutral**; 4=**Agree** and 5 =**Strongly Agree**].

Code	Statement	1	2	3	4	5
CF1	Changes in consumer preferences and habits					
CF2	Ensuring that adequate supplies of foods are available daily.					
CF3	Increased administrative bottlenecks					
CF4	Maintaining physical distancing when dealing with large numbers of customers					
CF5	Maintaining physical distancing when dealing with other staff					
CF6	Maintaining the highest standards of hygiene					
CF7	Protecting staff from the risk of infection					
CF8	provision of Personal Protective Equipment (PPE)					
CF9	Reduced staff resources due to reallocation					
CF10	Sanitation and disinfection of surfaces					