BINDURA UNIVERSITY OF SCIENCE EDUCATION

DEPARTMENT OF ENVIRONMENTAL SCIENCE

A STUDY INTO KNOWLEDGE, ATTITUDES, AND PRACTICES TOWARDS FOOD SAFETY ISSUES AMONG INFORMAL FOOD HANDLERS IN BINDURA TOWN.

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SUBMITTED: JUNE 2024

DECLARATION

To be compiled by the student

Registration number B203036B

I **Ireen Mugabe** do hereby declare that this work- related project is my original work and has not been submitted before. All the information derived from other sources is indicated in the project.

Signature of the student……..

Date…….

To be compiled by the supervisor

This dissertation is suitable for submission to the faculty and has been checked for conformity with the faculty guidelines.

Signature of the supervisor……

Date……...

DEDICATION

I dedicate this academic research project to all the students and researchers who will read and build upon the work presented here. May it inspire you to continue exploring the depths of this field and contribute to the advancement of knowledge.

ACKNOWLEDGEMENTS

I want to sincerely thank God, for in him all things were made possible. My sincere gratitude is extended to my supervisor, Mr. Nyamugure, for his steadfast support, direction, tolerance, and expert counsel during my research study.

In addition, I would like to thank my family, closest friends, and parents, Mr. and Mrs. Mugabe, for providing moral guidance during my research. Additionally, I want to express my gratitude to all of the responders who took part in the survey conducted in Bindura town.

ABSTRACT

Ensuring food safety is of critical importance to public health, food handlers have a significant influence on the prevention of foodborne illnesses because their knowledge, attitudes, and practices, can directly affect food safety. The study aimed to assess informal food handlers' knowledge, attitudes, and practices (KAP) related to food safety in Bindura. The researcher wanted to understand how the informal food handlers' KAP might be impacting the occurrence of foodborne illnesses in the area. The goal was to identify gaps in food safety knowledge and practices, and then use those insights to recommend strategies for improving food safety standards.

A cross-sectional survey was carried out among n=30 food handler's, 26 being female. Data was collected through a questionnaire that evaluated participant's knowledge of food protection principles, their opinions regarding food safety as well as their self-reported methods for managing food. The findings showed that informal food handlers had a moderately high level of awareness about food safety, with the majority demonstrating a good understanding of key concepts such as personal hygiene, and proper food handling scoring 96.7%. However gaps in knowledge where identified in specific areas, such as cross-contamination prevention scoring 43.3%.The data also showed positive attitudes towards food safety practices , Eighty percent of participants decided that it is significant to observe food protection protocols for the public health and to prevent illnesses caused by food.

Despite the positive attitudes, the analysis of self-reported food handling practices indicated that a considerable number (60%) of food handlers do not use gloves when handling food and respondents admitted to occasional lapses in their food safety practices, including working when sick, reusing oil and cutting raw and cooked food on the same board without rinsing it.

The necessity of focused and efficient food safety education is highlighted by these findings and training interventions to increase the competency of informal food handlers and are expected to contribute to better food safety policies and training programs. Recommendations include enhancing food safety programs, strengthening monitoring and enforcement mechanisms, and fostering a stronger food safety culture within food service establishments.

Key terms: Knowledge, Attitudes, Practices, Food-borne illnesses, food handling, and food safety

ACRONYMS AND ABBREVIATIONS

EFSA-European Food Safety Authority

ECDC-European Centre for Disease Prevention and Control

FAO-Food and Agriculture Organization

FSA-Food Safety Attitudes

FSP-Food Safety Practices

KAP-Knowledge, attitudes and practices

WHO-World Health Organization

ZNSA-Zimbabwe National Statistics Agency

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Each consumer has the right to safe food consumption since food quality or safety represents one of the key pillars for a productive and healthful nation. In accord with the references of the United Nations Food and Agriculture Organization [FAO,] 2021, food safety is the avoidance of contamination of food, degradation, adulteration, and the assurance of food quality to conserve consumer health. Foodborne infections, food poisoning, and malnourishment can result from contaminated food, posing a serious threat to human health. Foodborne illnesses outbreaks result in substantial medical costs, lost productivity, and reputational damage to food producers and retailers. A global disease or pandemic may be sparked by infections and illnesses brought on by contaminated food.

Foodborne illnesses can cause severe illness or death, and they are persistent and significant problems. According to the World Health Organization (2020), foodborne illness affects one (1) out of every ten (10) individuals worldwide, and 420,000 people pass away yearly. Production processing errors account for thirty percent (30%) of the causes of food spoilage due to bacteria. The main reason for the issues is that particular food health treatment regimens need to be followed. Bacterial contaminations can also be caused by basic raw materials, inadequately sanitary technological equipment, instruments, as well as staff personal hygiene.

The main factors influencing the prevalence of foodborne illnesses are inadequate food safety understanding, attitudes, and habits (Herdia and Grarcia, 2018). Food handlers in both developed and developing nations continue to have serious issues with understanding food safety. Around 1.3 million cases of food-borne diseases were described in England and Wales; of these, 27.5 percent result in hospitalization each year. In 2018, According to data from the European Institute for Disease Control and Prevention (ECDC), around 14 million illnesses are brought on by food contamination by various pathogen microorganisms; of these, 60 000 required hospitalization, and 1700 resulted in fatalities in the United States (European Food Safety Authority) [EFSA], 2018).

In Africa foodborne illnesses still remains a threat, with an estimate of 91 000 000 people affected and 137,000 deaths in a single year (WHO, 2015). In the Southern Africa region, over 325 foodborne diseases in 2013 occurred in South Africa which resulted in 11 155 people affected and a death number of 49 people.

Later in 2018 over 1060 listeriosis cases were recorded which resulted in 216 deaths. The cause of such outbreak fatality was meat processed products. In emerging economies, inadequate knowledge, negative opinions, or unsafe food safety practices might be a major role in the transmission of illnesses like cholera (the first case of cholera occurred in Zimbabwe in February 2023, affecting more than 20,000 people and 370 deaths as of January 23, 2024). For this reason, it's important to recognize the significance of understanding, adopting, and practicing food safety procedures to lessen the risk of foodborne illnesses. Contrary to industrialized nations, foodborne infections are more corporate in Africa because of low living standards, inadequate personal cleanliness, and limited access to quality healthcare (Odeyemi and Bamidele, 2016). In poorer nations, inadequate knowledge, unfavorable attitudes, or unsafe food handling procedures could be a major factor in occurrences of illnesses caused by food.

There has recently been an outbreak of cholera in Zimbabwe where authorities banned the selling of food in informal outlets and some food outlets continued to sell under cover. The spread of cholera may be due to poor knowledge and attitudes that resulted in bad practice. This research seeks to find out the food handlers self-reported knowledge, attitudes and practices. In order to determine what factors contribute to knowledge, favorable perspectives, and appropriate practices, this study will evaluate the understanding, mindset, and behaviors of informal food handlers in Zimbabwe about food safety. Food handlers' attitudes may be beneficially affected by their understanding of food safety and foodborne illness, which could lead to improved food safety procedures and an improved healthcare system in Zimbabwe. Creating successful treatments and legislation to encourage proper handling of food ad proper behaviors requires an understanding of the (KAP), knowledge, attitudes and practices of informal consumers on food safety.

1.2 PROBLEM STATEMENT

Irrespective of enforced laws and guidelines that ensures food safety by the government and international governing bodies concerning regulations that cover all aspects of food supply and distribution processes, from the production, processing, and distribution as well as sale, recently there have been an outbreak of cholera. There is therefore reason to investigate food handlers knowledge, attitudes and practices of food handlers in order to get insights into what perpetuates the occurrence of food borne diseases.

1.3 JUSTIFICATION

According to a World Health Organization research, one (1) in ten (10) people fall sick every year by eating contaminated food (Mohamed L.,et al 2020). Identifying the factors that influence food handlers' knowledge, behaviours, and attitudes toward food security is crucial because food protection is a serious distress that is important for developing strategies to reduce the economic and social costs of foodborne illnesses, and to improve food safety education and training as FAO states “Food safety is everyone’s business, from farm to fork” (FAO, 2021). Conducting research on food handlers' beliefs, behaviours, and understanding of food security is essential for creating focused teaching initiatives, improving food policies, and enhancing consumer awareness. By understanding the factors that influence food safety behaviours, interventions can be designed to address the specific needs and barriers faced by informal food handlers.

This study will provide valuable information that can be used to improve food handler’s education, awareness and practices about food safety, which can ultimately help create effective food interventions. It can help identify knowledge gaps among food handlers, this knowledge can then be used to improve food safety education and training programs, in order to better equip informal food handlers with the information they need to make safe food choices. The results of the study

can be contribute to improving policies and actions of the Zimbabwean government regarding the safety of food.

1.4 AIM

In order to facilitate the development of effective strategies for raising awareness, improving food safety and changing food handler's behaviours, it is necessary to assess the informal food handler's knowledge, attitudes, and practices towards food security problems.

1.5 OBJECTIVES

The study key objectives were as follows:

i. To determine knowledge of informal food handlers towards food safety.

ii. To evaluate informal food handlers attitudes towards food safety.

iii. To determine informal food handlers practises towards food safety.

1.6 RESEARCH QUESTIONS

i. What knowledge do informal food handlers have towards food safety?

ii. What attitude do informal food handlers portray towards food safety?

iii. What practices are being done by informal food handlers towards food safety?

1.7 LIMITATIONS

The results were self-reported and might be biased towards social desirability. Furthermore, because of the study's focus on a particular region, it's possible that the results will not apply to other demographics. The precision and thoroughness of the information participants provide will also be crucial to the study's effectiveness, informal food handlers may provide responses that are socially acceptable rather than their true behaviour’s, leading to an overestimation of good food safety practices.

CHAPTER 2: LITERATURE REVIEW

2.0 INTRODUCTION

Food is a basic requirement in maintaining people's lives as it provides energy and sustains the fundamental processes that perpetuate life (Wan Nawawi, et. al., 2022) However, in the food value chain, it is handled by multiple people from production, storage, packaging, distribution, processing and consumption (Akabanda, et., al., 2017). During all the stages above, food may be vulnerable to contamination which can cause people to contract food borne diseases that can inflict dire consequences in terms of human health and the costs of redemption.

It is thus very critical to ensure that food is protected from contamination throughout its value chain in order to protect public health and to avoid the spread of food related pandemics such as cholera. The contamination source can be chemical, physical or biological. The reasons for this contamination varies from inadequate facilities for proper storage processing, lack of adequate onsite environmental control as well as bad practice. Bad food handling practices may owe to lack of knowledge or negative attitudes about food handling among the handlers who are in the business of food vending in the streets. In order to improve KAP (Wan Nawawi, et. al., 2022)

2.1 KNOWLEDGE OF INFORMAL HANDLERS TOWARDS FOOD SAFETY

Knowledge forms the foundation for safe food handling practices. Formal food handlers must possess adequate knowledge across various domains to minimize food safety risks. Wrong food handling can be a critical source of food contamination and thus foodborne diseases. In order to prevent this food handlers have to have good knowledge about food safety and hygiene practices. Knowledge about food handling and safety can be divided into four categories: personal hygiene, time and temperature control, cross contamination and food borne diseases (Putri and Susanna 2020).

In a study in Ghana, the majority (>90%) of food handlers were aware of the food handling sanitation activities like washing of hands, the need to wear gloves, and the requirement to clean utensils using detergents. The food handlers were also aware that food is not a route foe AIDS/HIV transmission. However, the majority of food handlers did not have adequate knowledge on time and temperature controls to avoid food borne diseases. (Akabanda, et. al, 2017). In a study in Iran, although overall knowledge was high, knowledge was lacking in aspects such as the need to cook food thoroughly as well as with regard to the need to store food at conducive temperatures.

In Malaysia, a study found out that although most respondents were aware of the necessity of hand washing as a hygienic practice, only 50 % were aware of the storage process of storing raw food in the refrigerator. This indicates lack of basic knowledge about the possibility of food contamination during refrigeration. Furthermore, most of the food handlers did not have much knowledge about the different types of bacteria that can cause food contamination although E. coliform was better known than salmonella, which was known by only 6 percent of the respondents (Mustafa, et. al., 2017).

Another study by Putri and Susanna (2020) also found that although respondents had high knowledge about food cross contamination, most of them lacked knowledge pertaining to food borne diseases. They did not know that Salmonella typhii is a food borne germ that causes diseases of the stomach. Contrary to these findings, a study by Bakar, et. al., (2020) found out that over 90% of respondents were knowledgeable about the need to wash hands before and after wearing of gloves. Furthermore, a study by (Abdul-Mutalib et al., 2012) also found that the majority (73%) of respondents were knowledgeable about food borne pathogens. Regarding cross contamination of food through using the same gloves on vegetables and meat the majority of respondents were knowledgeable. The majority (>90%) were also knowledgeable about cross contamination of food through the wearing of watches and jewelry during the preparation of food.

Knowledge about food handling sanitary practices does not always translate into good practices even if attitudes are largely positive. In Nigeria, food handlers most (81%) had adequate knowledge about food handling hygiene. However only 37 % of the food handlers practiced good hygienic practices. The study thus recommended training for the food handlers as only 30% of them had received some form of pre-job training activity (Iwu, et. al., 2017).

Knowledge about food handling can be affected by a number of predictors. For example work experience can be associated with better knowledge about and handling safety and hygiene. Whereas it is so, a study in found that experience was only significant for workers who had worked for more than ten years. Furthermore, knowledge was revealed to be significantly associated with the length of training with those that have received more training being more knowledgeable (DaVitoria, et. al. 2021)

2.2 ATTITUDES OF INFORMAL HANDLERS TOWARDS FOOD SAFETY

Attitudes towards food safety significantly influence behavior and compliance with food safety protocols among food handlers. Determining the attitudes of food handlers is very critical as they affect the behavior and perceptions of food handlers towards food safety and hygiene. The determination of attitudes towards food safety and hygiene among food handlers is critical for policy makers and management to come up with properly informed training sessions to target an improvement in practices owing to realigned attitudes (Wan Nawawi, et. al., 2022).

It is however surprising that in some studies, even with positive attitudes and good knowledge, the practices still remained critically low. Iwu, et. al., discovered that in spite of high knowledge and positive attitudes (71%), only 37% of the handlers exercised good practices. A study in Malaysia revealed that the majority of respondents (80) had a positive attitude towards food handling as they regarded themselves as being responsible for good food handling. The same respondents had a positive willingness to undergo training pertaining to food handling and practice (Mustafa, et. al., 2017)

Attitudes towards food handling and safety can be influenced by background factors. A study by di Vitori, et. al., (2021) concluded that attitude towards food handling and safety were related to training and schooling. The higher the number of trainings or the educational level attain, the more positive the attitudes. The study thus recommended for there to be held more training programs so as to positively change people’s attitudes.

2.3 PRACTICES OF INFORMAL HANDLERS RELATED TO FOOD SAFETY

Actual practices in food handling reflect the application of knowledge and attitudes in real-world settings. Effective practices are essential for minimizing foodborne illness risks and ensuring consumer safety. Good food safety practices are vital in preventing food contamination and transmission of food borne diseases. In order for people to exercise good food handling practice, it is necessary though not sufficient for them to have knowledge and positive attitudes towards food handling and safety. Ncube, et. al., (2020) found a positive correlation between food safety and handling attitudes and good practice in a study on food safety handling among restaurant workers.

Although good knowledge and positive attitudes are expected to manifest in good practices this is not always the case. In Nigeria, Iwu, et. al. (2017), found that in spite of good knowledge and positive attitudes, food handler's practices were poor. In a study among food handlers in restaurants, Ncube, et. al., (2020) reveled that there was an association between attitudes and practices with those who had a positive attitudes performing well in practice. The same study revealed that although knowledge was relatively high, some food handlers still washed hands in places designed for washing of cutlery items. Furthermore, the study discovered that close to 60% did not employ standard ways of drying their hands.

Moreover close to 20% did not properly thaw food as this was done at room temperature or using hot water above 45 degree Celsius. However in a different study, Makhunga, et. al, (2023) found a poor ($r<0.3$) association between attitudes and practice. On the other hand, the association between knowledge and practice was fairly moderate ($r=0.3$-0.7). In the same study, more than half of the food handlers reported that they did not adequately re-heat food. Bad practice was revealed with respect to temperature control and the avoidance of cross contamination. Good practice was mostly done by food handlers who had received some form of training.

CHAPTER 3: RESEARCH METHODOLOGY

3.0 INTRODUCTION

The chapter outlines the research methodology employed in this study to investigate informal food handlers' knowledge, attitudes, and practices related to food safety. It covers the overall study design, the specific data collection methods used, how the sample of participants was selected, and the techniques applied to analyze the collected data.

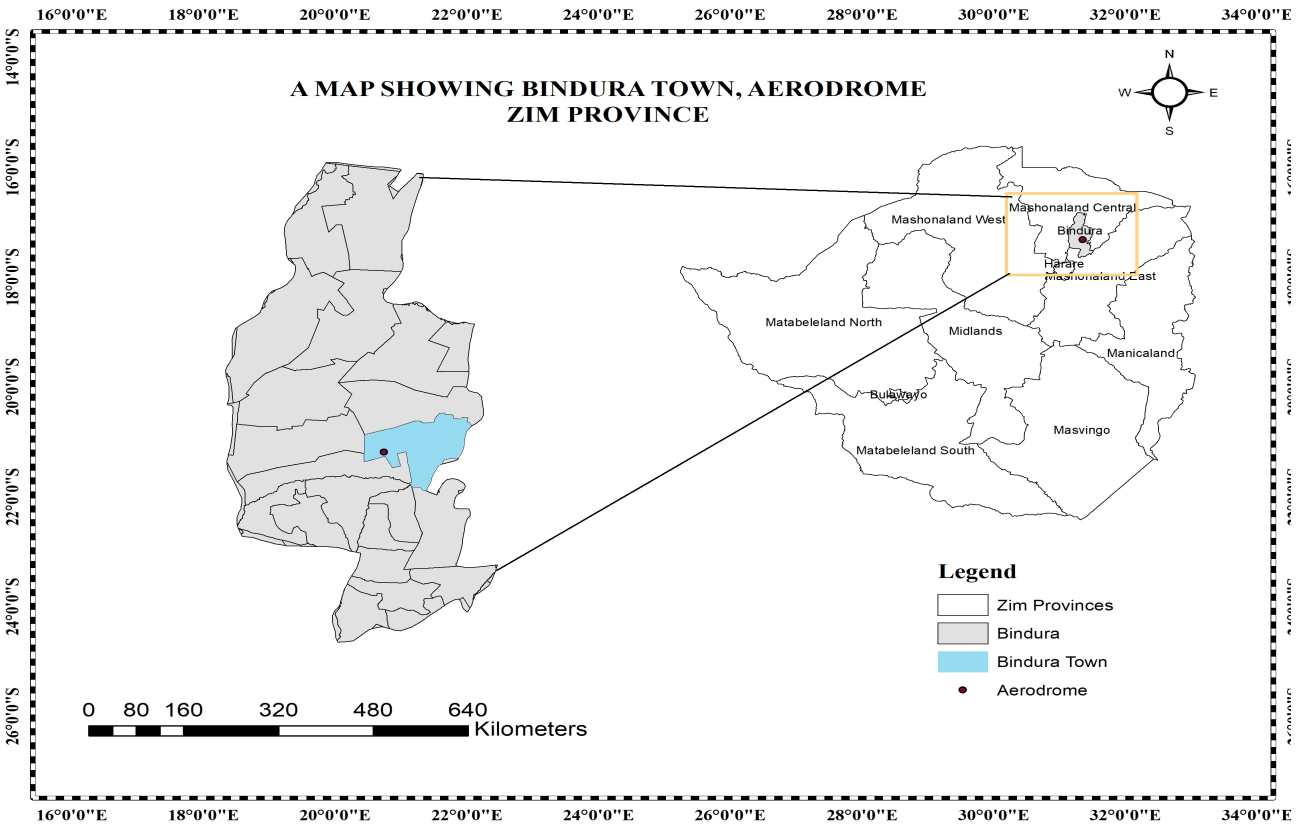
3.1 STUDY AREA

The research study was conducted in the town of Bindura, located in the Mashonaland Central province of Zimbabwe. Bindura is situated approximately 88 kilometers northeast of the country's capital city, Harare, within the Mazowe Valley region.

According to census data, the population of Bindura town has grown significantly over the past few decades. In 1982, the town had a recorded population of 18,243 residents. By the most recent 2022 census, the population of Bindura had expanded to 51,394 people (ZNSA 2022).

It was within this geographic context of Bindura, Zimbabwe that the researcher carried out the investigation into the knowledge, attitudes, and practices of informal food handlers towards food safety.

Figure 3.1: Map display the study area



3.2 STUDY DESIGN

This study utilized a quantitative, cross-sectional survey approach to collect data from a sample of 30 informal food handlers in Bindura, Zimbabwe. The researcher specifically targeted street food vendors as the participants for this study.

The cross-sectional survey design allowed the researchers to assess the current state of knowledge, attitudes, and practices related to food safety among this group of informal food handlers. It also enabled the identification of factors that may influence these variables.

Data was collected through the use of a self-administered questionnaire. The questionnaire was designed based on previous studies in this field, ensuring the content validity of the data collection instrument.

3.3 DATA SOURCES

The researcher used sources that were secondary as well as primary. The primary data source for this study was a self-administered questionnaire completed by participants. Secondary data was obtained from printed and electronic journal articles, government and non-governmental agent sources and other websites on the internet.

3.4 SAMPLING

The researcher used a convenient sampling technique to collect data from the informal food handlers in Bindura. This non-probability sampling method targeted participants based on their availability and accessibility within the study area.

To identify the 30 eligible participants for the study, the researcher first mapped out the locations where informal food handling activities commonly take place within Bindura town. By targeting these established sites of informal food vending, the researcher was able to conveniently access and recruit the necessary sample of 30 informal food handlers.

The use of this convenient, non-probability sampling approach allowed the researcher to efficiently gather data from a targeted group of informal food handlers in Bindura, based on their presence and accessibility within the identified areas of informal food handling activity in the town.

Table 3.1: Sample size

Confidence Level	**Margin of error(e)**	**Sample Size (n)**
95% (z=1.96)	±5%	30
	±10%	30
	±15%	30

Sample size formula

$n = (z^2 * p * (1-p)) / e^2$

Where:

- The sample size is n.
- z is the z-score for the desired confidence level
- p is the expected proportion or percentage(For the maximum sample size, if unknown, use 0.5)
- e is the anticipated margin of error

n = (1.96 ^ 2 * p0.5* (1-0.5)) / 0.18 ^ 2

n = 30, margin of error of approximately 18% at a 95% confidence level.

3.5 DATA COLLECTION METHODS

This research study utilized a structured questionnaire to collect data from the 30 participants. The questionnaire consisted of closed-ended questions that gathered demographic information like gender, age, and education level. It also included questions assessing the participants' attitudes, practices, and knowledge related to food safety.

The food safety-focused section of the questionnaire was based on the World Health Organization's "Five Keys to Safer Food" framework.

The researcher chose to use a structured questionnaire as the data collection method because it was an efficient way to gather information, which was necessary to achieve the objectives of the study. Additionally, the questionnaire was developed based on a review of relevant literature, with each question specifically designed to address the research objectives.

By employing this structured questionnaire approach, the researcher were able to systematically collect demographic data as well as insights into the participants' food safety-related knowledge, attitudes, and practices in an efficient manner that aligned with the goals of the investigation.

3.6 DATA ANALYSIS

The researcher used a systematic approach to analyze the data collected in this study. This involved statistical techniques, including descriptive statistics .For the descriptive analysis, the researcher calculated frequencies, percentages, means, and standard deviations to summarize the data and provide an overview of the key findings. The data from the questionnaires was first exported from Excel into SPSS version 23 statistical software for further analysis.

The researcher calculated the response frequencies and percentages for each survey item and tabulated the results. Additionally, the researcher developed a scoring system where correct answers received a score of 1. These total knowledge, attitude, and practice scores were then categorized as poor ($\leq 50\%$), fair (51-79%), or good ($\geq 80\%$), based on a referenced classification system. (Norhanslinda et al., 2016).

This multi-faceted data analysis approach allowed the researchers to thoroughly explore the survey data, identify significant patterns and relationships, and categorize the participants' food safety competencies.

3.7 ETHICAL CONSIDERATIONS

Before collecting data, the researcher obtained informed oral consent from the informal food handlers who participated in the study. The researcher provided a brief explanation to the participants about the nature and purpose of the research.

The researchers emphasized to the participants that their responses would be kept confidential and anonymous. They also stressed that participation was voluntary, and the participants had the right to refuse to take part in the study. The researcher explained the objectives of the study to the participants in clear terms.

No personal details of the participants were written down during the data collection process. Instead, the researcher only used numbered identifiers to keep track of the sample. This informed

consent process ensured the participants understood the study and their rights, and allowed them to make a voluntary decision to participate without having their personal information recorded. The confidentiality and anonymity measures also protected the participants' privacy throughout the research.

CHAPTER 4: RESULTS

4.0 INTRODUCTION

This chapter shows the presented, analyzed, and discussed results from the research conducted. The data is presented on tables.

4.1 SECTION A: DEMOGRAPHY

Table 4.1: Summary of demographic characteristics

Demographic variable	Category	Frequency(n)=30	%=100
Gender	Female	26	86.7
	Male	4	13.3
Age	21-30	20	66.7
	31-40	10	33.3
Education	Primary School	3	10.0
Level	Secondary School	19	63.3
	Tertiary School	7	23.3
	None	1	3.30
Work Experience	<5 Years	23	76.7
	5-9 Years	07	23.3

Table 2 displays the demographic data of the study participants. 13.3% of participants were men, while 86.7 percent of participants were women. 20 individuals, or 66.7 percent, were between the ages of 21 and 30. The remaining 10 participants, or 33.3%, were between the ages of 31 and 40. In terms of education most participants had secondary education (n= 19, 63.3%), while few had tertiary education (n=7, 23, 3%) and primary level (n=3, 10.0%). However, on years of experience (n=23, 76.7%) had <5 years of experience and (n=7, 23.3%) had 5-10 years of experience.

4.2 SECTION B: KNOWLEDGE OF FOOD SAFETY

Table 4.2: Knowledge on food safety

***Correct answers are highlighted in bold format**

Knowledge Variable	**Participant Response**			**Preferred response**	**Score**
		n	**%**		
K1. Have you received any training regarding food Handling and food safety protocols?	YES	23	76.7	**YES**	**0.767**
K2. Food borne illnesses can spread through improperly Handled unsafe food?	YES	29	96.7	**YES**	**0.967**
K3. Food contamination can be reduced by using Disposable gloves?	YES	30	100	**YES**	**1**
K4. Cross contamination of food can be caused by Contact of cooked and uncooked food?	YES	23	76.7	**YES**	**0.767**
K5. Germs can contaminate food if food safety Practices are not observed?	YES	30	100	**YES**	**1**
K6. A food handler with a disease such as diarrhea, flue And sore throat poses a risk of food contamination?	YES	30	100	**YES**	**1**
K7. Is it important to separate raw and cooked food?	YES	13	43.3	**YES**	**0.433**
K8. Can food be contaminated by reheating?	YES	17	56.7	**YES**	**0.567**
K9. Does washing utensils with detergent leave	YES	25	83.3	**YES**	**0.833**

Them free of contamination?	
TOTAL KNOWLEDGE SCORE	**7.3347**

Total food knowledge = $\frac{K1+ K2 +……..+K9}{9} \times 100$

Table 3, sums up what the participants in Bindura Town know about food safety. The knowledge level as a whole is 7.3 out of 9, or 81%, which is good.

The majority of the participants demonstrated inadequate understanding of the significance of keeping cooked and raw food separate (43.3%) and the possibility of food poisoning when reheating food again (56.75). Only 76.7% of participants got training on handling of food and safety precautions for food, despite the fact that 100% of participants correctly recognized that wearing gloves when handling food can minimize contamination of food. Every informal food handler is aware that if food safety procedures are not followed, germs could contaminate food.

All participants were aware that food handlers suffering from illnesses including the flu, diarrhea, or sore throats can potentially contaminate food. While 13.3% of respondents were unsure, the majority of respondents (83.3%) thought that cleaning utensils with detergent kept them free of contamination.

4.3 SECTION C: ATTITUDES TOWARDS FOOD SAFETY

Table 4.3: Attitudes towards food safety

Attitude	**Participant response**			**Preferred**	**Score**
Variable		**n**	**%**	**response**	
A1. Do you believe that following food safety practices Is essential for public health?	YES	24	80	**YES**	**0.8**
A2. Food handlers can have long nails and wear Jewellery on their hands. It does not pose any risk To the food being prepared?	NO	26	86.7	**NO**	**0.867**
A3. Food that is beyond expiry date Should be thrown away?	YES	28	96.6	**YES**	**0.966**
A4. Dish towels can be A source of contamination?	YES	20	66.7	**YES**	**0.677**
A5. Properly cooked food is Free from contamination?	YES	27	90	**YES**	**0.9**
A6. Handling food safely is an important part of my Responsibility?	YES	29	96.7	**YES**	**0.967**
A7. Defrosted foods should Not be refrozen?	YES	6	20	**YES**	**0.2**
A8. Wearing disposable gloves	YES	30	100	**YES**	**1**

is an important behavior to reduce The risk of food contamination?	
TOTAL ATTITUDE SCORE	**6.367**

From table 4 shows the informal food handler's perspective concerning food safety, the attitude score is 6.367 out of 8 meaning the percentage attitude score is 80% which is good.

Furthermost of the respondents(80%) agreed that food safety practices is essential for public health. 86.7 % agreed that long nails and jewelry pose a risk to the food being prepared. The majority, 96.6% regarded the importance of disposing expired food. Dish cloths can potentially contaminate food, according to over half (66.7%) of respondents, whilst 23.3% disagreed. 90% of respondents agreed that food that has been cooked thoroughly is contaminant-free. Merely 20% of participants concurred that food that has been defrosted should not to be frozen again. Using gloves is a significant behavior to lower the possibility of food contamination, everyone who responded agreed.

4.4. SECTION D: PRACTICES TOWARDS FOOD SAFETY

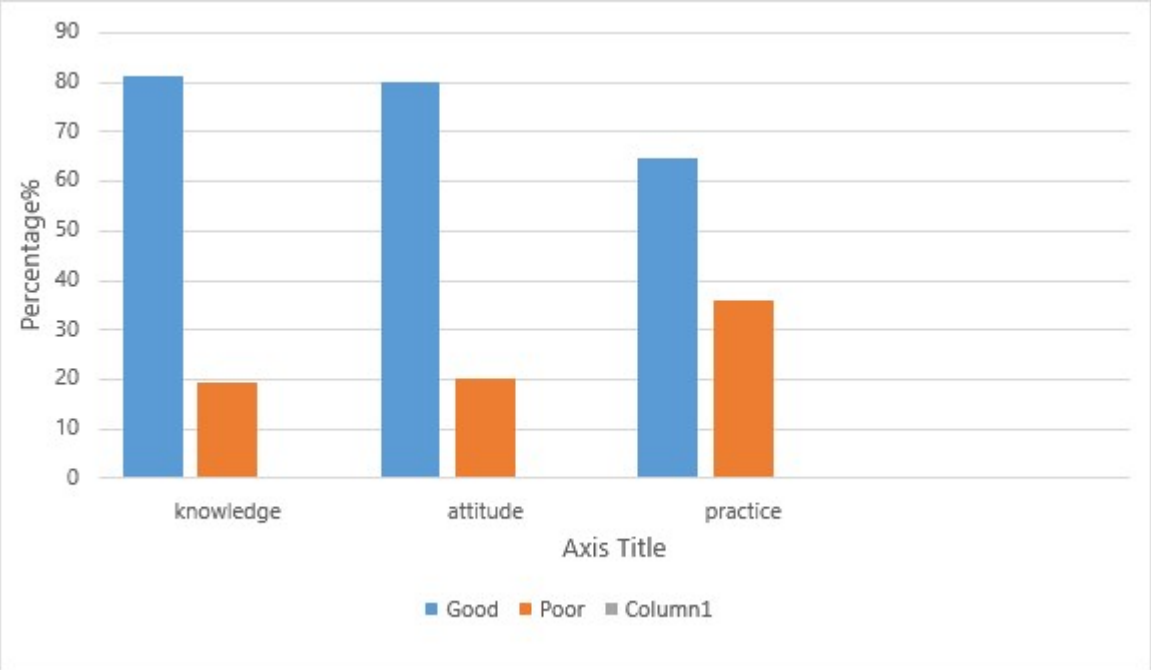
Table 4.4: Practices towards food safety

Practices	**Participant response**			**Preferred**	**Score**
Variable		**n**	**%**	**response**	
P1. Do you separate raw meat from other food During preparation?	YES	23	76.7	**YES**	**0.767**
P2. Do you always wear gloves When handling food?	YES	12	40	**YES**	**0.4**
P3. Do you wash your hands before handling and Cooking food with soap and water?	YES	27	90	**YES**	**0.9**
P4. Do you cover your hands with cut/sore before Preparing food?	YES	26	86.7	**YES**	**0.867**
P5. Do you use the same Cutting board for raw and cooked foods?	NO	17	56.7	**NO**	**0.567**
P6. Do you continue working when You are sick?	NO	23	76.7	**NO**	**0.767**
P7. Do you reuse oil?	NO	11	36.7	**NO**	**0.367**
TOTAL PRACTISES SCORE	**4,635**				

Table 5 summarizes the food security practices of informal food handlers. A fair performance score of 64.3% was obtained for practices, giving them a rating of 4.635 out of 7.

As for separating uncooked meat from cooked food during preparation, 70% of respondents with a yes . Gloves are not being used when preparing food, according to the majority of those surveyed (60.8%). Prior to handling food, the majority of respondents (90%) said they cleaned their hands with soap and water. When handling food, 86.7% of respondents claimed they always cover any injuries or wounds. The majority of participants (60%) indicated that they did not utilize the same chopping board for both raw and cooked meals. 76.7% of informal food handlers agreed that they do not report to work when ill, earning favorable ratings in this practice. When preparing meals, 63.3% of food handlers reuse oil.

Fig 4: Chart representing an overall knowledge, attitude and food safety practice of informal food handlers



CHAPTER 5: DISCUSSION OF RESULTS

5.1 KNOWLEDGE OF FOOD SAFETY

Education and training programs may be helpful strategies to enhance safety precautions and increase food handlers understanding of food safety. The present study's findings demonstrated a similar pattern: food handlers who claimed to have been trained on matters regarding food security had better knowledge and practices regarding food safety, which were mirrored in their attitudes. Al Kandari et al.,(2019) produced comparable findings, demonstrating a strong correlation between the training of the research participants and their degree of food safety understanding and implementation.

Merely 76.7% of informal food handlers in this research, who were assessed for their understanding of food protection, had received training on the handling of food and safety procedures. This figure is marginally higher than that of a research by (M.H Ahmed et al., 2021). According to comparable research done in Ethiopia (Azanaw et al., 2019), where the percentage was less than 50% on knowledge, the respondents in this study demonstrated insufficient knowledge on the significance of separating raw and cooked foods (43.3%). It indicates a lack of training in food safety. Sani and Siow (2014) conducted a similar study in Malaysia, findings indicated that consumers had a high knowledge score.

The results show that respondents quietly understood the significance of food contamination issues and how can be avoided. The findings show that respondents showed significant understanding (100%) risks of food contamination can be reduced by wearing disposable gloves while findings (87%) in Maldives were slightly lower (Aidin, David, Halim-Lim, Jamaludin and Sukki, 2023).

Moreover, the findings also show that the respondents correctly knew that it is important to avoid cross-contamination of cooked and uncooked food (76.7%) which is slightly consistent with the findings (67.5%) by Marima in Bindura (2019). A Study by Agbanyo et al, (2021) in Dayi District, Ghana was low (55%) while Dagnaw, Dessalegn, Dejene, Fekadu, Kinde, and Gessesse (2023) findings in Ethiopia, Lemi Kura sub city was high (95%).

According to the results, 83, 3% of respondents accurately indicated that washing cooking utensils with detergent lowers the chance of contamination, which is consistent with research conducted in Tehran, Iran (Ehsan, Fariba, Gholamreza, Masoud, & Saharnaz, 2018). This also coincide with findings in South Africa by Kesa, Nyawo and Onyenweaku (2021) in which the respondents regarded cleanness begins before the preparations to reduce food contamination. Cleaning utensils with detergent prevents the spread of micro-organisms to other foods and surfaces.

Approximately 96.7 percent of the respondents were aware that food may cause foodborne illnesses when it is handled incorrectly. This percentage is quite comparable to an 86.6% study finding by Ali Akbar (2021) that was done in the Lahore district of Pakistan.

Conferring to the study's discoveries, 81% of the respondents had an excellent understanding of food safety, but there is still room for growth in their comprehension of related issues. This could be because of differences in sample size, research background, and level of education. It was greater than the study done in Ethiopia (49.4%) by Azanaw J et al., 2021.The results from South Africa and Ethiopia similarly support this, showing that most individuals had a reasonable degree of awareness of food safety overall but little knowledge of particular food safety issues like handling and preparing food safely (Essel, Thomas Shonhiwa, McCarthy and Ntshoe, 2019).

5.2 ATTITUDES TOWARDS FOOD SAFETY AND HYGIENE

Understanding and outlook on food security are interrelated in which the attitude of consumers may be based on the knowledge that they pose which influences how they practice food safety. The respondents scored (80%) overall average on the attitude questions which is in line with a survey that was carried out in Haiti (Samapundo S et al., 2022).

Additionally, according to the study's outcomes, informal food handlers who got training on food safety and preparation have a positive attitude compared to those who had not (23.3%). Studies carried out in Ghana (Tuglo LS et al., 2021) and Ethiopia (Zenbaba D et al., 2022) show that training had a favorable impact on food handlers' attitudes, which is consistent with this finding.

Moreover, (96.6%) of the respondents felt that it was necessary to throw away food that had gone beyond its expiry date which is comparably with (91%) on the study done in Ghana (Tuglo et al, 2021). In addition, the respondents highly (66.7%) believed that dish towels can cause food

contamination while Tuglo et al., (2021) study findings were slightly low (67%). Dish towels can harbor bacteria, especially if there are not washed and dried properly.

In the study 100% of the respondents considered properly wearing disposable gloves as an important behavior to reduce food contamination unlike 30% findings by (Aidin et al., (2023)) in Malaysia. However, Barnabas, Bavorova, Madaki and Kachele (2023) study findings in Nigeria had an average score. The possibility of contamination of food is decreased when food is prepared using disposable gloves (Ahmed, Akbar, 2021).

More than 86.7% of informal food handlers were aware that having long nails and wearing jewelry can lead to food contamination, Al-Shabib et al. (2016) reported comparable outcomes this shows a positive attitude regarding food safety and safeguarding human health. (96.7%) responded that handling food safely was a significant part of their responsibilities, which is comparable to the results of a survey done in Pakistan by M.H. Ahmed et al. (2021), which had 88.6%.

5.3 PRACTICES TOWARDS FOOD SAFETY

Regarding food handling practices, the respondents coined a fair total score having a percentage score of 64.3%. This articulates that participants had a fair considerate understanding of food safety principles and practices, these findings might be due to lower educational level of participants. In the study, 76.7% responders distinctly stated that other foods should be separated from raw food during preparation which is slightly the same with findings by Aluh (2019) in Turkey which revealed 78% practiced it. However, other comparable study findings disagrees such as a study conducted in India by Ahmed, Awasthi, Janardhanan, Taneja, Malhotra, Pal, Shankar (2020) which was 46.6%.

In the study, 90 % of the respondents said they practice washing of both hands using soap and water while preparing food, while findings by Dagnaw et al., (2023) was higher (91%). Comparably other studies obtained a lesser percentage than the current study, a study conducted in Vietnam revealed that 52% of the respondents did not practice using water and soap to clean their hands before handling food (Nguyen, Latkin and Ho, 2018). However, study findings by (Ceylan et.al, 2021) in Turkey revealed that only (46%) practiced washing of hands with soap and water. This shows that the

informal handlers in Bindura understand that hygiene practices are important to minimize the risks associated with food contamination.

Furthermore, 86.7% of the respondents said they covered their injuries or wounds before preparing food, thus being comparable to a research done in Pakistan where food handlers were cautious about handling food when they have cuts or wounds.

In the study, only 56.7% of the respondents stated that when preparing food they use different utensils and cutting board for cooked and raw foods unlike research findings by Dewanti, Mutaqin and Nurtama, (2022) in Indonesia which was high (72%) nonetheless, research results by Agbanyo et al, (2021)in Ghana said lower (57.5%). However, comparatively, findings (6.6%) by Husodo, Iravati, Lestantyo, and Shaluhivah, (2017) were much less.

Majority of informal food handlers (76.7%) avoid reporting to work while ill, which is a desirable practice as it reduces the possibility of food contamination. This is in contrast to a research by M.H. Ahmed et al. (2021) that found that 70.8% of food handler continued their job when ill. A large percentage among food handlers (63.3%) reuse oil; this indicates that there may be gaps in their understanding of appropriate protocols for food safety. Reusing oil can raise the risk of developing foodborne illnesses and can lead to build up of harmful compounds in the body.

Food security knowledge, attitude and practice is essential to promoting global health therefore is important to promote awareness and continuous practice of it on a daily basis as it emphasizes good hygiene.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

Regarding food safety in Bindura, this research has shed more light on the KAP of informal food handlers. The results of the data analysis, which were given in Chapter 5, have brought to light both the positive and the negative elements of the existing level of knowledge around food protection or security. In summary, the informal food handlers showed a respectable degree of expertise, although there is still room for improvement.

They showed poor knowledge regarding the importance of avoiding contact between both cooked and uncooked food and the need of keeping cooked and uncooked food separate to reduce contamination. The respondents demonstrated positive attitude towards food safety although there is need to maintain it on a daily basis. The participants did not show an exceptional attitude towards hygiene issues that can cause food contamination and the right attitude that reduces food borne diseases.

More so, the respondents demonstrated positive practices towards food safety. Despite the score, in comparative to other questions they lacked practicing good hygiene such as wearing of gloves when preparing food, use of different utensils and boards for cooked and raw food, and separating raw meat from other food during preparation which might cause foodborne diseases.

6.2 RECOMMENDATIONS

The results of the study revealed gaps in the knowledge and practices of informal food handlers regarding appropriate methods for safeguarding food. Training programs, public awareness campaigns, and policy support can help address these gaps and reduce the risk of foodborne illnesses. As a result, thorough food security initiatives that address issues like personal sanitation,

preventing cross-contamination, preparing and preserving food properly, and disinfection techniques must be mandatory. Additionally, responsible bodies for public health must make resources that offer clear and concise information on how to safeguard food readily accessible, such as guidelines, advertisements, and web pages.

Authorities, and relevant entities such as NGOs and municipalities must collaborate to make sure informal food handlers have access to the essential tools, items, and apparatus (such as soap, sterilizers, and thermometers).

Based on the conclusion it is necessary to conduct campaigns and trainings in towns and residential areas to educate and promote food safety practice culture. To provide comprehensive training to food handlers and also for them to educate consumers upon purchase. There's also need to promote awareness of food safety via social networking sites including Twitter, Instagram, Facebook, and WhatsApp.

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APPENDICES

APPENDIX 1: RESEARCH QUESTIONNAIRE

RESEARCH QUESTIONNAIRE: (Knowledge, Attitudes and Practices towards Food Safety).

SECTION A: INTRODUCTION

Dear respondent

The purpose of this questionnaire is to understand food handler's knowledge, attitudes and practices regarding food safety. Your participation is voluntary, and all responses will be kept anonymous and confidential. The results of this study will be used to inform future efforts to promote food safety in our community.

INSTRUCTIONS TO RESPONDENTS

- *Tick all the appropriate boxes*
- *Do not write your name on any part of the paper.*

SECTION B: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Gender: Male ☐ Female ☐

2. Age (years): 18-20 ☐ 21-30 ☐ 31-40 ☐ 41-50 ☐ 51+ ☐

3. Highest Education Level: Primary ☐ Secondary ☐ Tertiary ☐ None ☐

4. Industry experience: <5 years ☐ 5-9 years ☐ 10-20 years ☐

>20 years ☐

	SECTION C: KNOWLEDGE ON FOOD SAFETY AND HYGIENE	
Number	**Knowledge**	**Answers**
1.	Have you received any training regarding food handling and food safety protocols?	Yes ☐ No ☐ Not Certain ☐
2.	Food borne illnesses can spread through improperly handled unsafe food?	Yes ☐ No ☐ Not Certain ☐
3.	Using gloves while handling food reduces the risk of food contamination?	Yes ☐ No ☐ Not Certain ☐
4	Contact between cooked and uncooked foods causes cross-contamination?	Yes ☐ No ☐ Not Certain ☐
5.	Eating, drinking, talking, and smoking when preparing or serving food increase the risk of food contamination.	Yes ☐ No ☐ Not Certain ☐
6.	Germs can contaminate food if food safety practices are not observed.	Yes ☐ No ☐ Not Certain ☐
7.	A food handler with a disease such as diarrhea, flu and sore throat poses a risk of food contamination.	Yes ☐ No ☐ Not Certain ☐
8.	Is separating raw and cooked food important?	Yes ☐ No ☐ Not Certain ☐

9.	Reheating cooked food can contribute to food contamination?	Yes ☐ No ☐ Not Certain ☐
10.	Washing utensils with detergent leaves them free of contamination?	Yes ☐ No ☐ Not Certain ☐
	SECTION D ATTITUDES	
11.	Do you believe that following food safety practices is essential for public health?	Yes ☐ No ☐ Not Certain ☐
12.	Food handlers can have long nails and wear jewellery on their hands. It does not pose any risk to the food being prepared.	Yes ☐ No ☐ Not Certain ☐
13.	Is it important to throw away food that is beyond its expiry date?	Yes ☐ No ☐ Not Certain ☐
14.	Dish towels can be a source of food contamination?	Yes ☐ No ☐ Not Certain ☐
15.	Well cooked food is free from contamination	Yes ☐ No ☐ Not Certain ☐
16.	Handling food safely is an important part of my responsibility?	Yes ☐ No ☐ Not Certain ☐
17.	Defrosted foods should not be refrozen.	Yes ☐ No ☐ Not Certain ☐
18.	Wearing gloves is an important behavior to reduce the risk of food contamination.	Yes ☐ No ☐ Not Certain ☐
	SECTION E: PRACTICES	

19.	Do you separate raw meat from other food during preparation?	Yes ☐ No ☐
20.	Do you always wear gloves when handling food??	Yes ☐ No ☐
21.	Do you wash your hands before handling and cooking food with soap and water?	Yes ☐ No ☐
22.	Do you cover your hands with cut/sore before preparing food?	Yes ☐ No ☐
23.	Do you use separating cutting boards and utensils for raw and cooked foods?	Yes ☐ No ☐
24.	Do you continue working when you are sick?	Yes ☐ No ☐
25.	Do you reuse oil?	Yes ☐ No ☐

APPENDIX 2: APPROVAL LETTER

FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCE
DEPARTMENT OF ENVIRONMENTAL SCIENCE

P. Bag 1020
Bindura, Zimbabwe
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Email : tnyamugure@buse.ac.zw

BINDURA UNIVERSITY OF SCIENCE EDUCATION

4 April 2024

Dear Sir/Madam

REQUEST FOR PERMISSION TO COLLECT DATA FOR ACADEMIC RESEARCH PROJECT

This letter serves to inform you that....Ireen Mugabe..... is a fourth year student at Bindura University of Science Education, in the Department of Environmental Science. During his/her fourth year of study he/she is supposed to do a research project in his/her area of specialisation.

Please assist in any possible way. Data collected will be used for academic purposes only and will not be published without your prior consent.

Thank you for your assistance.

Yours faithfully.

CHAIRPERSON
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OFFICIAL

Mr .T .Nyamugure
Chairperson - Department of Environmental Science