KNOWLEDGE, ATTITUDES, AND PRACTICES ON FOOD SAFETY AMONG FOOD HANDLERS IN BUMBO TOWN COUNCIL, NAMISINDWA DISTRICT, UGANDA

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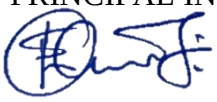
April, 2026

DECLARATION

I, **ECHASA JOEL**, declare that this proposal is my own work and has never been submitted to any university or institution for any award.

This research Dissertation is therefore submitted as partial fulfilment for an award of a Bachelor's Degree in Environmental Health Sciences of Makerere University School of Public Health, as supervised by Dr. JOHN BOSCO ISUNJU

PRINCIPAL INVESTIGATOR DATE



…… 11 May 2026

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DEDICATION

This dissertation is dedicated to the almighty God for His grace, strength, and guidance throughout my academic journey.

I also dedicate this work to my beloved wife, Khanakwa Dorine, for unwavering support, encouragement, patience, and sacrifices during the entire period of my study. Special dedication goes to my son, Earl Elliot Emureit, whose presence has been a source of joy

Finally, I dedicate this work to my parents, siblings, and family members for their prayers, love, and continuous moral support throughout my education journey.

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TABLE OF CONTENTS

DECLARATION i
DEDICATION ii
ACKNOWLEDGEMENT iii
TABLE OF CONTENTS iv
LIST OF TABLES vii
LIST OF FIGURES viii
LIST OF ACRONYMS ix
OPERATIONAL DEFINITIONS x
ABSTRACT xii
CHAPTER ONE 1
1.0 INTRODUCTION AND BACKGROUND 1
1.1 INTRODUCTION 1
1.2 BACKGROUND 2
CHAPTER TWO 5
LITERATURE REVIEW 5
2.1 Introduction 5
2.2 KAP Theoretical framework 5
2.4 Attitudes towards food safety among food handlers 8
2.5 Practices towards food safety 9
2.6 Research gaps 11
2.7 Literature Synthesis 12
CHAPTER THREE 13
PROBLEM STATEMENT, JUSTIFICATION, RESEARCH QUESTIONS, AND CONCEPTUAL FRAMEWORK 13
3.1 PROBLEM STATEMENT 13
3.2 JUSTIFICATION 14
3.3 RESEARCH QUESTIONS 15
3.4 CONCEPTUAL FRAMEWORK 16
3.5 Conceptual Framework Narrative 16
CHAPTER FOUR 19
4.0 OBJECTIVES 19
4.1 General Objective 19

4.2 Specific Objectives **19**
CHAPTER: FIVE **20**
5.0 METHODOLOGY **20**
5.1 Introduction **20**
5.2 Study Area **20**
5.3 Study Population **20**
5.4 Study Design **21**
5.5 Sample size Determination **21**
5.6 Sampling Procedure **21**
5.7 INCLUSION AND EXCLUSION CRITERIA **22**
5.8 DATA COLLECTION METHODS AND TOOLS **22**
5.9 QUALITY CONTROL (VALIDITY AND RELIABILITY) **22**
5.10 VARIABLES **23**
5.11 DATA MANAGEMENT AND ANALYSIS **24**
5.12 ETHICAL CONSIDERATION **24**
5.13 STUDY LIMITATION **25**
5.14 DISSEMINATION OF FINDINGS **25**
CHAPTER SIX: RESULTS **26**
6.0 Introduction **26**
6.1 Socio-demographic characteristics **26**
6.2 Knowledge of food safety **28**
6.3 Attitudes towards Food Safety **31**
6.4 Practice towards Food Safety **36**
6.4.1 Challenges faced in maintaining food hygiene and safety **40**
6.4.2 Overall food safety practices **41**
6.5 Observational checklist findings **41**
6.5.1 Environmental and general hygiene **42**
6.5.2 Food handling and storage **43**
6.5.3 Protective Clothing and Personal Hygiene **45**
6.5.4 Pest Control **46**
CHAPTER SEVEN: DISCUSSION **48**
7.0 Introduction **48**
7.1 Socio-Demographic Characteristics **48**

7. 2 Knowledge of Food Safety Among Food Handlers 49
7.3 Attitudes Towards Food Safety 51
7.4 Food Safety Practices Among Food Handlers 53
CHAPTER EIGHT 56
CONCLUSION AND RECOMMENDATION 56
8.1 CONCLUSION 56
8.2 RECOMMENDATIONS 57
References 58
APPENDICES 61
1.0 APPROVAL LETTER 61
1.1 CONSENT FORM 62
1.2 QUESTIONAIRE 66
1.3 OBSERVATIONAL CHECKLIST FOR FOOD HANDLERS 75

LIST OF TABLES

Table 1: Socio-demographic characteristics of participants 26
Table 2: Knowledge of Food Safety Among Respondents (N= 423) 28
Table 3: Overall Knowledge of Food Safety 29
Table 4: Attitude of food handlers toward food safety (N=423) 31
Table 5: Suggested measures to improve food safety practices among food handlers (N=423) 35
Table 6: Responses of food handlers towards food safety practices 36
Table 7: Challenges faced in maintaining food hygiene and safety (N=423) 40
Table 8: Environmental and general hygiene observations 42
Table 9: Food handling and storage Observations (N=423) 43
Table 10: Protective Clothing and Personal Hygiene Observation (N=423) 45
Table 11: Observational findings on pest control measures among food handlers (N=423) 46

LIST OF FIGURES

Figure 1: Conceptual framework 16
Figure 2: Reported Causes of Food Contamination (N= 423) 30
Figure 3: Showing Overall score for food safety practices 41

LIST OF ACRONYMS

EAC: East African Community

FAO: Food and Agriculture Organization

FBD: Food-Borne Diseases

KAP: Knowledge, Attitudes, and Practices

LMINs: Low and Middle-Income Countries

MOH: Ministry of Health

SDGs: Sustainable Development Goals

TC: Town Council

UN: United Nations

UNBS: Uganda National Bureau of Standards

WHO: World Health Organization

OPERATIONAL DEFINITIONS

Attitude: The beliefs, perceptions, opinions, and willingness of food handlers to adhere to recommended food safety and hygiene practices in Bumbo Town Council.

Bumbo Town Council: An administrative unit in Namisindwa District, Uganda, located along the Uganda–Kenya border, serving as the focus area of this study.

Cross-border Community: A settlement located near an international boundary, in this case between Uganda and Kenya, characterized by frequent movement of people and goods.

Food Handler: Any person involved in preparing, cooking, serving, storing, or selling food in any establishment within the Bumbo Town Council.

Food Safety: The conditions and practices that preserve the quality of food to prevent contamination and foodborne illnesses.

KAP Framework: A structured approach used to assess individuals' Knowledge, Attitudes, and Practices regarding a specific public health issue.

Knowledge: The level of awareness and understanding possessed by food handlers regarding food hygiene principles, contamination prevention, and safe food handling practices.

Practice: The observable actions and behaviors undertaken by food handlers during food preparation, storage, handling, and service to ensure food safety and prevention contamination.

Informal food vending: Preparation and sale of ready-to-eat food and drinks by individuals or small-scale vendors operating outside the regulatory framework of Bumbo Town Council

Personal Hygiene: Refers to the individual cleanliness practices performed by food handlers to prevent contamination and transmission of foodborne diseases. These practices include regular handwashing with soap before handling food, trimming fingernails, wearing clean protective clothing, covering hair, proper handling of cuts or wounds, and maintaining overall body cleanliness.

Street food vendors: Any person who prepares and sells food for public consumption along the streets, roadsides, and other public places in Bumbo Town Council

ABSTRACT

Food safety remains a major public health concern, particularly in low a middle-income country such as Uganda, where informal food handling is widespread and regulatory enforcement is often limited. Unsafe food handling practices contribute significantly to foodborne diseases, posing risks to consumer and communities. This study assessed the knowledge, attitudes, and practice of food handlers towards food safety in Bumbo Town Council, Namisindwa District.

A cross-sectional study was conducted among 423 food handlers. data were collected using structured questionnaires and an observational checklist to assess both self-reported and observe practices. Data were analyzed using descriptive statistics, including frequencies, percentages, means, and standard deviations.

The findings revealed that 63.6% of respondents had adequate knowledge of food safety, while attitudes were generally positive, with majority acknowledging the importance of hygiene and food safety responsibility. However, important knowledge gaps were identified in areas such as temperature control (44.0%) and awareness of foodborne pathogens (34.3%). Despite this, 57.9% of respondents demonstrated poor food safety practices. Critical gaps included low use of protective gears (21.7%) and inadequate temperature control practices (17.3%). Observational findings further confirmed poor compliance with hygiene standards, particularly in water access, sanitation, and food handling practices.

The study concludes that although food handlers possess basic knowledge and positive attitudes, these do not consistently translate into safe practices, indicating a clear knowledge attitude practice gap. Addressing this gap requires strengthening training, improving infrastructure, and enhancing enforcement of food safety regulations

Keywords: Food safety, Knowledge, attitudes, Practices, Food handlers, Namisindwa District

CHAPTER ONE

1.0 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Food safety remains a public health concern worldwide, particularly in low- and middle-income countries (LMICs), where infrastructural gaps, weak enforcement mechanisms, and limited awareness increase vulnerability. According to the World Health Organization (WHO), unsafe food containing harmful bacteria, viruses, parasites, or chemical substances can cause more than 200 diseases, ranging from diarrheal illnesses to cancers, contributing to over 600 million infections and 420,000 deaths annually (World Health Organization, 2024). These statistics highlight that food safety is not only a health concern but also a development and economic issue

The burden is disproportionately higher in LMICs due to weak regulatory frameworks, poor infrastructure, and limited awareness among food handlers (Grace, 2015). The World Bank (2021) further highlights that unsafe food results in significant economic losses, estimated at billions of dollars, exceeding USD 95 billion annually, reduces productivity, burdens healthcare systems, and limits access to trade opportunities. Therefore, improving food safety practices remains a critical prerequisite for advancing global health security and economic development.

Food handlers are individuals who prepare, cook, serve, and sell ready-to-eat foods in restaurants, roadside eateries, and street stalls. They represent a critical node in the farm-to-fork continuum (Grace, 2015).

Border towns present unique challenges in food safety. Communities such as Bumbo Town Council in Namisindwa District, which directly borders Kenya, experience high levels of informal food trade with the porous nature of the routes and population mobility. These factors increase the risk of contamination and cross-border disease transmission. In such a context, food handlers play a vital role in ensuring safety since their practices directly influence public health outcomes. Uganda faces persistent challenges in managing food safety, particularly in informal settings such as open-air markets and roadside food vending. The outlets provide affordable meals and employment but often operate with limited infrastructure and poor hygiene standards (Otim et al.,

2021). The Knowledge, Attitudes, and Practices (KAP) framework is a widely used approach to assess food safety dimensions among handlers. KAP studies reveal that even when food handlers possess basic awareness, this often does not translate into safe practices (Abunna et al., 2023). Such gaps indicate that interventions must be informed by context-specific evidence, especially in cross-border regions where diverse trading activities and socioeconomic dynamics intersect.

Although food safety knowledge is considered an important determinant of safe food handling behavior, evidence suggests that knowledge alone does not always translate into appropriate practices. Several studies have reported inconsistencies between food handlers' knowledge and their observed food safety behaviors, indicating that positive attitudes, availability of infrastructure, economic conditions, workplace environment, and regulatory supervision also influence compliance with recommended food safety practices (Sarfo et al., 2025). For instance, food handlers may possess adequate knowledge regarding handwashing and safe storage but fail to implement these practices because of limited access to clean water, inadequate storage facilities, financial constraints, or poor working conditions. Therefore, understanding food safety practices requires consideration of both individual-level factors and broader contextual determinants.

1.2 BACKGROUND

In sub-Saharan Africa, food safety risks are heightened by infrastructural gaps and weak regulatory systems(Grace, 2015), while inadequate monitoring of informal markets further aggravates the problem (Roesel and Grace, 2014). Food handlers in these settings frequently operate without adequate facilities or training, creating an avenue for unsafe practices. For example, poor access to refrigeration and potable water worsens contamination risks. Research in several African countries highlights consistent gaps in food handlers' knowledge and practices. In Ethiopia, for example, many food handlers lacked adequate training, resulting in unsafe practices such as poor handwashing, inadequate cooking, and unsafe storage of food items(Abunna et al., 2023). In Nigeria and Ghana, similar challenges have been observed, where attitudes towards food safety are shaped by economic pressures, low awareness, and inadequate supervision(Sarfo et al., 2025). These findings suggest that context-specific studies are crucial, as interventions must be tailored to the realities of each community.

Foodborne diseases pose a significant public health challenge in Uganda, contributing substantially to the national disease burden. According to the Ministry of Health (MOH, 2023), Daily Monitor, Thursday, June 08, 2023), approximately 1.3 million cases of foodborne illnesses are reported annually, accounting for about 14% of all outpatient visits in the country. These illnesses often result from consuming contaminated food and water, leading to diseases such as cholera, typhoid fever, and acute diarrheal diseases. Children under five years of age are particularly vulnerable, with studies indicating that they account for a significant proportion of foodborne disease cases. A cross-sectional study was conducted in Uganda on the Food value chain (rice value chain) found that there were inadequate training, contamination risks (including chemical and microbial hazards), and poor cold-chain or storage practices that are all relevant to informal vendors and small food enterprises(Namubiru et al., 2024). Other cross-sectional KAP surveys conducted in trading centers and markets across Uganda report that although many food handlers can identify basic food safety concepts, actual practices (consistent handwashing, safe storage, and use of protective clothing) are frequently insufficient, typically because of a lack of facilities, economic constraints, and weak routine inspection. (Afolabi et al., 2021)

Uganda's National Food Safety Strategy (2020–2025) acknowledges that the country's expanding food industry—especially in border towns and trading centers—faces complex safety challenges. Cross-border movement of goods and people, informal trade, and diverse cultural food preparation practices make border areas like Bumbo Town Council particularly vulnerable. Bumbo's proximity to Kenya encourages frequent exchange of food commodities and street-prepared meals, but the informal nature of this trade limits effective inspection and enforcement. The Public Health Act (Cap 310) and the Food and Drugs Act (Cap 278) provide Uganda's legal framework for food safety, mandating inspection of food premises and medical screening of food handlers. However, implementation remains limited, especially at the local government level, due to staffing shortages, logistical challenges, and limited funding for routine monitoring (MOH, 2022). Consequently, many food establishments operate without valid health certificates or regular inspection visits, increasing the risk of contamination and disease outbreaks.

Informal assessments and reports from Bumbo Town Council Health Department indicate that many food handlers operate in open environments without designated waste disposal areas, adequate drainage, or protective clothing. In addition, there is limited access to handwashing

facilities, irregular medical examinations, and visibly unhygienic cooking and serving areas. Some vendors use untreated water for cooking and cleaning, and food is frequently displayed uncovered, attracting flies and dust. Such conditions create favorable environments for the transmission of foodborne pathogens such as *Salmonella typhi*, *Escherichia coli*, and *Vibrio cholerae* (Bumbo Town Council Health Department, 2024). Similar challenges among informal food handlers in Uganda have been reported by(Otim et al., 2021, Afolabi et al., 2021), highlighting gaps in enforcement and hygiene compliance .

Focusing on Bumbo Town Council is particularly important because it is a border community with high population mobility, cross-border trade, and diverse cultural influences on food preparation and consumption. The town's busy roadside eateries and open-air markets provide affordable food to travelers and residents, but also create conditions conducive to contamination. By investigating the knowledge, attitudes, and practices of food handlers in this setting, the study aimed to provide evidence that informs policy, guides public health interventions, and strengthens regulatory mechanisms in Uganda's border areas.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This literature review examined the existing evidence regarding food safety, with a focus on the knowledge, attitudes, and practices (KAP) of food handlers, to situate the current study in Bumbo Town Council, a Uganda-Kenya border community. It is structured in line with specific objectives, including the KAP theory, research Gap, and literature synthesis.

2.2 KAP Theoretical framework

The current study is guided by the Knowledge- Attitude- Practice model, which is a widely used behavioral framework in public health research. The KAP model hypothesizes that an individual's knowledge about a particular health issue shapes their attitudes, which in turn influence their practices or behaviors. In the context of food safety, this theory helps explain how food handlers' understanding of contamination routes, hygiene procedures, and prevention strategies affects perceptions and, ultimately, their handling behaviors.

According to the model, knowledge forms the cognitive foundation, such as food handlers must first know what constitutes safe and unsafe food handling practices, while attitudes represent the emotional and evaluative dimension, encompassing how individuals feel about food safety rules, the importance of cleanliness, and the perceived benefits of complying with safety standards. Practices, on the other hand, are the behavioral manifestation of both knowledge and attitude. For example, even when food handlers possess adequate knowledge, negative or indifferent attitudes can hinder proper food handling practices.

The KAP model is particularly relevant in low-resource settings like Bumbo Town Council, where socio-economic challenges, cultural norms, and limited supervision may influence how knowledge translates into behavior. As emphasized by (Launiala, 2009) and further applied in food safety studies by (Akabanda et al., 2017), understanding the interactions among these three components helps identify where interventions should target, through awareness creation, attitude changes, or behavioral reinforcement. Therefore, this KAP framework will be applied descriptively to assess the levels of knowledge, attitude, and practices among food handlers in Bumbo Town Council.

2.3 Knowledge of food safety by food handlers

Globally, unsafe food remains a profound public health issue. The World Health Organization (WHO) has reported that every year approximately 600 million people fall sick due to food-borne diseases, with about 420,000 deaths, many of them in low- and middle-income countries. Children under five are especially vulnerable. The global figures underscore the importance of addressing the cause and control of foodborne illnesses, according to the WHO (2024). Low and middle-income countries (LMICs) bear the greatest burden due to weak infrastructure, inadequate regulation, and poor surveillance systems (Havelaar et al., 2015). Beyond health consequences, unsafe food causes annual productivity losses valued at more than USD 110 billion worldwide, especially in LMICs (World Bank, 2021).

In East Africa and throughout Sub-Saharan Africa, food safety challenges are intensified by a combination of infrastructural limitations, inconsistent enforcement of food safety regulations, and the prevalence of informal markets and small food establishments. Initiatives such as the ‘‘regional strengthening of Food safety standards for trade and public Health Promotion’’ a joint project by FAO and the African Development Bank across several East African countries, seek to harmonize standards, improve laboratory capacity, and enhance regulatory oversight, especially to support micro, small, and medium enterprises (MSMEs). FAO and African Development Bank (AFDB) (2024)

What food handlers understand about pathogens, hygiene, storage, contamination routes, and legal/operational requirements is the first and necessary step toward safer food handling. In Morogoro, Tanzania, a study revealed low-capacity building and training on food safety practices among street food vendors, characterized by low levels of knowledge, attitude, and hygiene practices (Issa-Zacharia et al., 2024). These findings echo earlier studies from Ethiopia, Ghana, and Nigeria, which also highlighted the persistent knowledge practice gap among food handlers (Fekadu et al., 2024, Akabanda et al., 2017).

In Uganda, food safety knowledge varies widely by sector (formal restaurants, informal street vendors, market stall holders, value-chain actors) and by location (urban centers, peri-urban markets, border towns). Several studies show that many food handlers possess some awareness of basic hygiene principles, but have important gaps in pathogen knowledge, contamination routes.

A multi-district assessment in Uganda on fresh Nile perch handlers was conducted and found uneven knowledge levels: about half (49.8%) scored as having "good" knowledge overall, yet a majority lacked specific awareness of common foodborne pathogens (only 31.8% correctly identified *E. coli*, *Salmonella* or *Staphylococcus* spp), and handlers in export chains demonstrated substantially higher technical knowledge 74.6% compared local market counterparts. Education and gender correlated positively with higher knowledge scores. These findings show that sector (export vs local) and training access strongly shape what handlers actually know about microbiological hazards (Ssubi et al., 2024**).** The authors matched knowledge scores to microbial testing and found that lower pathogen literacy correlated with higher contamination in handling environments, illustrating how limited technical knowledge can translate to measurable food safety risks. A similar pattern on studies conducted along the rice value chain in different districts of Uganda, reported over 80% of rice handlers had high general awareness about chemical risks such as aflatoxin and pesticide contamination, among many actors, but crucially, this knowledge did not uniformly translate into safer handling or mitigation behaviors, pointing to a knowledge- practice disconnect and the need for skills and enabling resources to operationalize what is known. A similar study also emphasized fragmentation of Uganda's food control system as a structural barrier to turning knowledge into action (Namubiru, 2023).

An assessment of food safety management systems in Kampala restaurants documented that many managers and food handlers have a basic awareness of hygiene concepts but lack systematic knowledge of hazard analysis, temperature control, and supply-chain risks, shortfalls that undermine formal establishments' ability to guarantee safety across production, storage, and service. These studies underline that even within formal enterprises, there are technical knowledge gaps (Nabaggala, 2023). Whereas the similar studies on restaurants done by (Godfrey, 2022) in Nakawa trading center, Kampala, reported that many handlers have heard of "food hygiene" but lack detailed knowledge on critical control points (e.g., importance of using detergents, preventing cross-contamination, and safe cooling). Observational data on handlers still showed 75% high rates of money handling during service, and 72.5% lack of protective clothing, suggesting knowledge gaps on contamination pathways and safe serving practices.

A different study conducted on Specialty/value-added products (edible insects) by (Mugo-Kamiri et al., 2024) investigated vendors of edible long-horned grasshoppers (Ruspolia differens) and

found that although many vendors had some basic food hygiene awareness, over 90% had limited knowledge about product-specific contamination risks and safe handling/shelf-life; laboratory results in that study also revealed microbial contamination, reinforcing that knowledge gaps for non-traditional foods pose real consumer risks.

A study conducted by (Achiro et al., 2023) in northern Uganda on household caregivers' food preparations, and results showed limited understanding of safe food preparation and storage, with implications for complementary feeding and child health. This signals that knowledge deficits are not restricted to vendors but extend into household food preparation relevant when vendors supply households with ready-to-eat foods.

2.4 Attitudes towards food safety among food handlers

In KAP studies, attitude denotes the set of beliefs, feelings, and predispositions that influence whether an individual acts on their knowledge. For food handlers, this includes perception of risk, beliefs about the usefulness of preventive measures (such as handwashing, protective clothing, medical screening), and perceived fairness of regulatory enforcement. According to WHO (2022), positive attitudes are essential to translate knowledge into safe food handling behavior, but (Desye et al., 2023) observed that in low and middle-income countries, favorable attitudes often fail to result in good practices due to contextual and structural barriers such as poor or inadequate supervision.

In a study of the rice value chain among handlers in different districts in Uganda, respondents believed that chemical and microbial contamination in rice is a serious issue, signifying the level of knowledge they have. However, their knowledge didn’t translate into real practice, and this calls for necessary training to influence their behaviors towards food safety (Namubiru et al., 2022). A cross-sectional study conducted in Moroto, Uganda, of 94 meat handlers revealed that 93.62% had a good positive attitude towards food safety. They agreed that clean tools and regular handwashing are crucial. Nearly all agreed that safe handling is part of their job. However, many felt the attitude towards formal regulation (licensing, inspection) is burdensome, with many workers fearing that enforcement could be costly or disruptive (Aleper, 2024). This study is backed up by another (Galiwango, 2022), conducted in Kampala education establishments, revealing a very high agreement with basic food safety statements, such as food handlers should not work with open

wounds, handwashing prevents illness, with over 90% concurrence among respondents. However, respondents' attitudes towards licensing and inspection procedures revealed skepticism about formal regulatory burdens in addition to a strong endorsement of basic hygiene.

In Wakiso district, Uganda, in per-urban restaurants, continues to indicate that 94.6% of food handlers believe clean preparation areas prevent contamination, while 97.8% believe washing hands with soap reduces risk significantly. These high percentages show strong normative belief in hygiene among restaurant staff. However, some attitudes toward wearing protective gear or getting regular medical checks were less strong (Asasira, 2025). In Yumbe district, Uganda, a study showed 100% of food handlers had heard of foodborne illness, and most (87%) believed in handwashing before, during, and after preparation. However, some handlers expressed that frequent handwashing wastes time or resources, suggesting tension between belief and perceived cost (Vukojo, 2024). A fresh fish value chain study done in Uganda showed that positive attitudes were common among fish handlers working in the export trade than in the local market. Education level significantly predicted better attitudes. Handlers with secondary or tertiary education had significantly more favorable attitudes toward adherence to safety standards. Contrarywise, handlers in the local market had a poor attitude 57% signifying more knowledge needed on food safety to influence attitudes (Ssubi et al., 2024)

2.5 Practices towards food safety

Food handling practices comprise the actual behaviors of those preparing, cooking, serving, and selling food and represent the critical point where knowledge and attitudes are converted into action or not. Inadequate practices are often the known cause of foodborne disease outbreaks and contamination events. In Uganda, multiple studies documented that some food handlers possess awareness of safe methods; their observed practices are frequently inconsistent, incomplete, or unsafe, especially in an informal context. These lapses are shaped both by behavioral choices and structural/environmental constraints.

Food safety practices are not influenced solely by individual knowledge and attitudes, but also by broader infrastructural, environmental, and institutional factors. Several studies in low- and middle-income countries demonstrate that inadequate access to clean water, poor drainage systems, overcrowding vending spaces, limited waste disposal facilities, and insufficient

handwashing stations significantly constrain food handlers' ability to maintain safe hygiene practices even when they possess adequate knowledge (WHO, 2022). In addition, weak regulatory enforcement, irregular inspection, limited training opportunities, and inadequate public health supervision further contribute to poor compliance with food safety standards.

Economic pressure among informal vendors may also encourage practices such as food exposure, reuse of contaminated material, and operation in unhygienic environments. Border communities and informal trading centers are particularly vulnerable because of high population mobility, congestion, and weak monitoring systems. These findings suggest that food safety practices are shaped not only by individual behavior but also by the broader environmental and structural conditions within which food handlers operate

A study conducted at Nakawa Trading Center, Uganda, observed that despite handlers knowing hygiene, their practices were poor, as revealed by 75.5% handling money while serving, 72.5% lacking protective clothing, and approximately 60% using dirty utensils, indicating a gap in food safety practices (Godfrey, 2022). This study is backed up by (Rutaro et al., 2024), on street and market vendors of ready-to-eat grasshoppers in Uganda observed common unsafe practices such as irregular hand washing, unprotective cloth use, and uncovering of containers. These behaviors were found to be associated with microbial contamination, such as Salmonella Typhi and E.coli, and the presence of pathogens in processed food is linked to everyday practices of handlers. The hygiene training alone will be insufficient without the provisions of infrastructure. Similar practice patterns by (Aleper, 2024) on meat handlers in Moroto Municipality showed that most handlers expressed positive attitudes towards cleaning and handwashing, and direct observation revealed over 80% had poor practices such as irregular use of protective clothing, inconsistent sanitation, and limited routine meat inspection practices at stalls. Informal slaughter and retail practices persisted despite awareness of risk.

Another study conducted in Uganda on fresh Nile perch revealed that, despite adherence to better hygienic practices in the export chain, the local market practices were contrary. The authors linked better practices to education, training opportunities, while in the local market, handlers frequently managed with poor practices, exposing cross-contamination risks(Ssubi et al., 2024). Although the awareness of knowledge along the rice value chain revealed 80% about chemical and microbial

hazards, such as aflatoxins and pesticides, the practices to reduce the risks were still inconsistently applied. Namubiru and the colleague emphasized a strong knowledge practice disconnect driven by irregular training and fragmented regulations and enforcement(Namubiru et al., 2024). In education settings around Kampala restaurants, good knowledge and practices were revealed by 97.5%, but most were irregularly inspected, hence creating an opportunity for poor safety practices and low adherence to the guidelines (Galiwango, 2022). A similar pattern of practices around restaurants in Wakiso reported high compliance with some hygiene measures, and yet ongoing lapses in consistent protective clothing use, 56.3% and about half of food handlers with no medical examination certificates is practiced. This signals the need for regular training and supervision for practices to be implemented effectively (Asasira, 2025) and in in Yumbe Town Council although awareness of foodborne disease by food handlers is known, and belief in handwashing was but the the attitudes observed about these practices on regular handwashing were seen as a waste of their time, and this creates a disconnect between knowledge, attitude, and practices (Vukojo, 2024)

2.6 Research gaps

Although substantial literature exists on food safety knowledge, attitudes, and practices among food handlers in Uganda, several important gaps remain that justify the present study. Most Ugandan KAP studies have been conducted in urban centers such as Kampala, Wakiso, and Gulu. There is minimal evidence from cross-border settings like Bumbo Town Council, where food handling is influenced by high population movement, informal trade, and cross-cultural practices. The lack of research in such a unique context limit understanding of the specific food safety challenges in border regions.

Knowledge-practice disconnect: Numerous studies (Namubiru, 2023, Ssubi et al., 2024, Godfrey, 2022) have highlighted gaps between what food handlers know and what they do. However, few have analyzed why this gap persists, whether due to inadequate infrastructure, supervision, or economic pressure. The current study seeks to explore these contextual reasons

There is insufficient emphasis on informal vendors. While restaurant-based studies exist, informal market vendors, roadside sellers, and small-scale operators who serve the majority of the public remain under-researched. This study will prioritize such groups to generate data relevant to community-level health interventions

Lack of integrated analysis of using the KAP framework: Several existing studies assess food safety components separately (either focusing on knowledge or practices) without examining how knowledge and attitudes collectively shape behavior. This study will use the full KAP framework to understand these interactions holistically.

By addressing these gaps, the present study aims to contribute locally relevant evidence to guide public health authorities, local councils, and the Ministry of Health in improving food safety management in border areas such as Bumbo Town Council.

2.7 Literature Synthesis

The reviewed literature indicates that foodborne diseases remain a global public health concern, largely resulting from unsafe food handling and poor hygiene among handlers (WHO, 2024). Studies from low- and middle-income countries consistently demonstrate a gap between knowledge and practice, where food handlers are aware of safe food handling principles but fail to apply them effectively due to inadequate training, supervision, or infrastructure ((Issa-Zacharia et al., 2024, Akabanda et al., 2017). In Sub-Saharan Africa, weak enforcement of food control systems, limited laboratory capacity, and a lack of standardized training further undermine food safety efforts (FAO & AfDB, 2024).

In Uganda, existing research (Ssubi et al., 2024, Namubiru et al., 2024, Nabaggala, 2023) also confirms that although food handlers generally possess good knowledge and positive attitudes toward food hygiene, their actual practices are often inconsistent. Education, training, and workplace environment strongly influence compliance, with handlers in formal or export sectors demonstrating better practices compared to those in informal markets (Aleper, 2024). The reviewed studies collectively reveal that awareness alone does not guarantee safe practices; behavioral outcomes are shaped by economic constraints, limited infrastructure, and weak institutional supervision. Notably, there is very limited literature from border settings like Bumbo Town Council, where cross-border trade, especially ready-to-eat food and cultural diversity, may influence food safety behaviors. This gap highlights the importance of the present study in providing context-specific insights to enhance local food safety management in such unique environments.

CHAPTER THREE

PROBLEM STATEMENT, JUSTIFICATION, RESEARCH QUESTIONS, AND CONCEPTUAL FRAMEWORK

3.1 PROBLEM STATEMENT

Food safety remains a significant public health concern in Uganda, particularly within the informal food sector, where the majority of the population depends on roadside eateries, street vendors, and small restaurants for daily meals. According to the World Health Organization (2024), unsafe food causes over 600 million illnesses and 420,000 deaths annually, with developing countries carrying the greatest burden. In Uganda Ministry of Health (2023) estimates that approximately 1.3 million foodborne disease cases occur annually, accounting for 14% of outpatient visits, mainly due to consumption of contaminated food and water. Despite the existence of legal frameworks such as the Public Health Act (Cap 310) and the Food and Drugs Act (Cap 278), enforcement remains weak because of limited staffing, poor infrastructure, and inadequate resources at the local level

In Bumbo Town Council, Namisindwa District, a busy cross-border trading area between Uganda and Kenya, food vending is a common livelihood activity but is largely informal and poorly regulated. Many handlers operate in open environments without clean water, proper waste disposal, regular medical checks, protective clothing, food storage facilities, and handwashing facilities. Food is often exposed to dust, flies, and untreated water, predisposing consumers to contamination. The porous border, high population mobility, and informal trade further increase the risk of foodborne illnesses spreading across the community.

Efforts to improve food safety in Uganda have included enforcement of Public Health Act, implementation of National Food Safety Strategy, routine health inspections, and health education programs targeting food handlers. despite these interventions, evidence from several Ugandan studies suggests that many food handlers who possess basic food safety knowledge do not consistently translate this knowledge into safe food handling practices. This gap has been associated with limited infrastructure, inadequate supervision, economic pressures, insufficient training, and weak enforcement mechanisms, particularly within informal food vending settings. Such challenges may be more pronounced in border communities like Bumbo Tow Council, were

high population mobility and informal trade complicate effective food safety monitoring and compliance

Although previous studies in Uganda have shown that food handlers may possess some knowledge of hygiene, their actual practices remain inadequate (Godfrey, 2022, Namubiru et al., 2024, Aleper, 2024) and little is known about the knowledge, attitudes, and practices (KAP) of handlers in border setting like as Bumbo Town Council, where mobility, cultural diversity, and economic pressures may influence behavior differently.

If no action is taken to strengthen awareness, supervision, and training among food handlers in Bumbo, the community will remain vulnerable to foodborne disease outbreaks, economic loss, and reduced consumer confidence. This study, therefore, seeks to examine the knowledge, attitudes, and practices of food handlers in Bumbo Town Council to inform evidence-based interventions and improve local food safety management

3.2 JUSTIFICATION

Bumbo Town Council is a cross-border community that serves as the entry and exit point between Uganda and Kenya. Its vibrant, informal food trade provides employment and affordable meals but also exposes consumers to potential food safety risks. This study is justified by several reasons

Food safety is closely linked to the achievement of Sustainable Development Goals (SDGs), particularly SDG 3 on Good Health and well-being through the prevention of foodborne diseases, SDG 2 on Zero hunger through access to safe and nutritious food, and SDG 6 on Clean Water and Sanitation through promotion of hygienic hood handling practices. In addition, improving food safety contributes to SDG 8 on Decent work and Economic Growth by support safer informal food business and protecting consumer confidence. Therefore, strengthening food safety practices among food handlers contributes not only to public health protection but also to broader national and global development goals

Public health significance: Unsafe food handling contributes to diarrheal diseases, typhoid fever, which are common in Namisindwa District. Understanding the KAP of food handlers will help identify behavioral and environmental gaps that endanger community health.

Policy and regulatory importance: The study will provide evidence to guide the District Health Office, Namisindwa Local Government, and the Ministry of Health in improving inspection, training, and enforcement of hygiene regulations among food handlers

Community and economic relevance: Enhancing food handlers' practices can improve consumer confidence, attract more customers, and reduce medical costs associated with foodborne diseases. It will also encourage vendors to adopt sustainable hygienic practices.

Academic and research contribution: There is limited empirical evidence on food safety KAP in cross-border Ugandan towns. This research will fill that gap and contribute to national literature, serving as a baseline for future studies and interventions.

3.3 RESEARCH QUESTIONS

1. What are the socio-demographic characteristics of food handlers in Bumbo Town Council, Namisindwa District?
2. What is the level of knowledge of food handlers on food safety in Bumbo Town Council, Namisindwa District?
3. What are the attitudes of food handlers towards food safety practices in Bumbo Town Council, Namisindwa District?
4. What are the food safety and hygiene practices of food handlers in Bumbo Town Council, Namisindwa District?

3.4 CONCEPTUAL FRAMEWORK

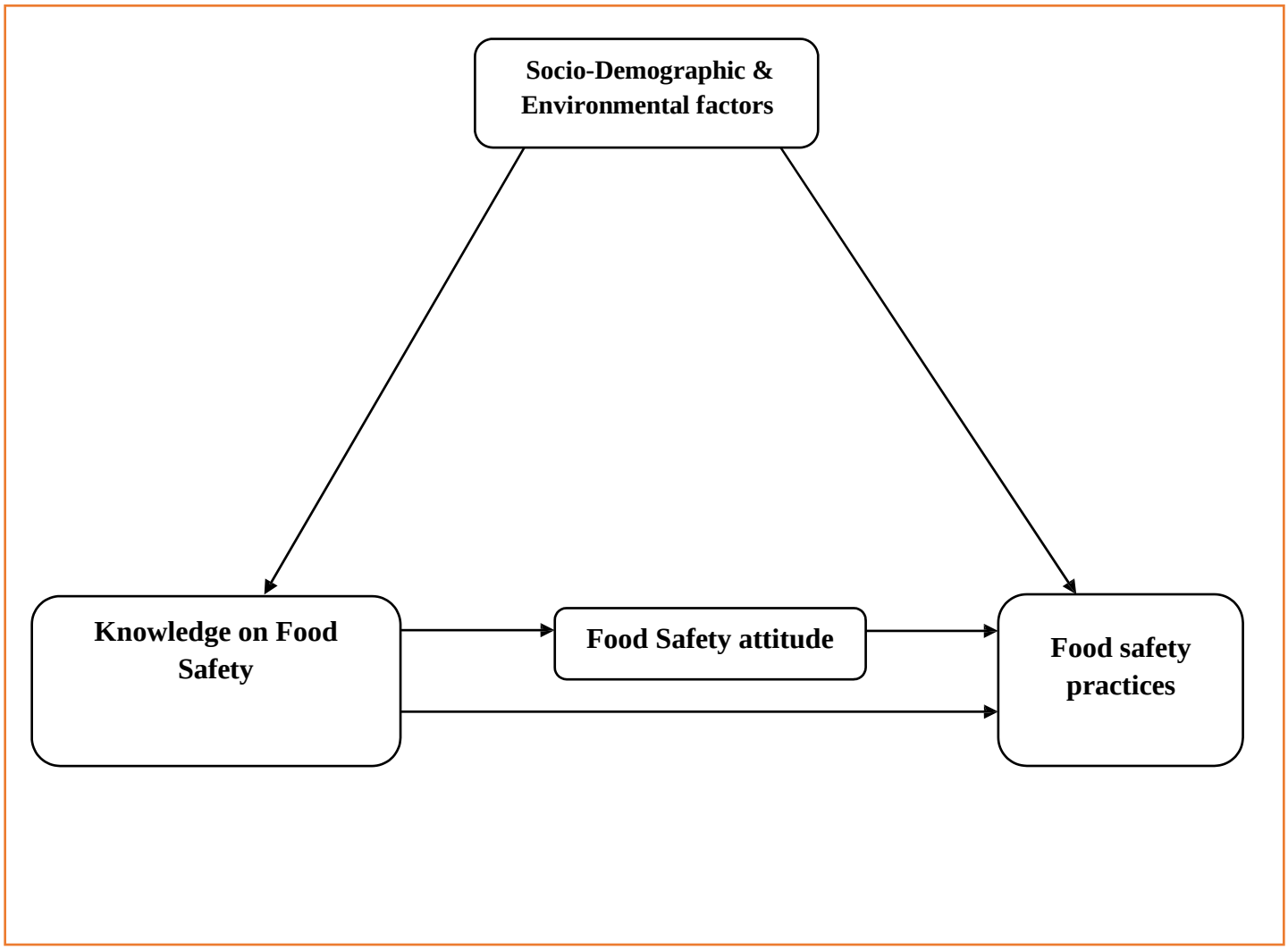


Figure 1: Conceptual framework

3.5 Conceptual Framework Narrative

The conceptual framework for this study explained how food handlers' knowledge and attitudes interact with socio-demographic factors to determine their food safety practices. It guides the analysis of behavioral and contextual elements that influence compliance with food safety standards in Bumbo Town Council.

Food Safety Practices are conceptualized as the *dependent variable*, representing the observable actions of food handlers in maintaining hygiene and preventing contamination. These include personal cleanliness, safe preparation and storage of food, appropriate waste disposal, prevention

of cross-contamination, and temperature regulation. The quality of these practices directly determines public health safety and the likelihood of foodborne disease transmission.

Knowledge of Food Safety is an *independent variable* referring to the cognitive understanding of food safety principles, such as awareness of pathogens, contamination routes, hygiene procedures, and safe storage methods. High knowledge levels equip handlers with the essential information they need to make informed decisions during food preparation and handling.

Attitudes Toward Food Safety, also an *independent variable*, captures the affective and evaluative aspects of behavior. This includes beliefs about the importance of food safety, perceived risks associated with poor hygiene, motivation to follow safe practices, and willingness to comply with food safety regulations. Positive attitudes increase the likelihood that food handlers will translate their knowledge into appropriate practices.

Other factors (socio-demographic & Environmental), such as age, gender, education level, income, marital status, work experience, occupation type, clean surfaces, lighting and ventilation, residing at food premises, and storage facilities) are treated as *moderating variables*. These variables may influence the strength or direction of the relationships between knowledge, attitudes, and practices. For example, higher education may enhance the ability to understand and apply food safety concepts. At the same time, long work experience could either improve adherence through exposure or reduce it through habitual negligence. Gender roles and income levels may also affect access to training and hygienic resources, further influencing behavioral outcomes.

The framework, therefore, hypothesizes that:

1. Knowledge of food safety has a direct positive influence on both attitudes and practices of food handlers.
2. Attitudes toward food safety have a direct positive influence on food safety practices.
3. Socio-demographic factors moderate the relationships between knowledge, attitudes, and practices.
4. The combined effect of knowledge, attitudes, and socio-demographic characteristics determines the overall level of food safety practices.

This conceptual framework provides a logical and analytical structure for examining how cognitive, emotional, and contextual factors interact to produce food safety behaviors in Bumbo Town Council. It also guides data collection, analysis, and interpretation by linking theoretical concepts with measurable variables in the study setting.

CHAPTER FOUR

4.0 OBJECTIVES

4.1 General Objective

To assess the knowledge, attitudes, and practices on food safety among food handlers in Bumbo Town Council, Namisindwa District.

4.2 Specific Objectives

1. To assess the level of knowledge regarding food safety among food handlers in Bumbo Town Council, Namisindwa District
2. To assess the attitudes of food handlers towards food safety practices in Bumbo Town Council, Namisindwa District.
3. To examine food handling and hygiene practices among food handlers in Bumbo Town Council, Namisindwa District
4. To describe the socio-demographic and environmental characteristics of food handlers in Bumbo Town Council, Namisindwa District

CHAPTER: FIVE

5.0 METHODOLOGY

5.1 Introduction

This chapter presents the methods and procedures that will be employed in conducting the study on the knowledge, attitudes, and practices regarding food safety among food handlers in Bumbo Town Council, Namisindwa District. It describes the study area, design, target population, sampling techniques, data collection methods, quality control measures, data analysis procedures, and ethical considerations. The chapter provides a systematic plan that ensured that the research process is credible, valid, and capable of answering the stated research question and achieving the objectives.

5.2 Study Area

The study was conducted in Bumbo Town Council, located in Namisindwa District, Eastern Uganda. The district borders Kenya to the east, Manafwa district to the west, Bududa district to the north, and Tororo district to the south. The district has seven Town Councils and twenty-two Sub-Counties. Bumbo Town Council has eleven wards with 111 cells and serves as a major trading hub, characterized by the movement of people and goods across the Uganda-Kenya border.

The area has an estimated population of over 20,405 people, with most residents engaged in small-scale trading, food vending, and agricultural produce handling. The main economic activities include the sale of cooked food, fish, meat, fish, vegetables, beverages, and groceries in temporary structures, open spaces, streets, markets, and restaurants. The presence of numerous informal food vending points and poor food hygiene practices made Bumbo an ideal setting for assessing food safety knowledge, attitudes, and practices among food handlers.

5.3 Study Population

The study population comprised of food handlers working in different food establishments within Bumbo Town Council, including restaurants, hotels, butcheries, roadside stalls, and open markets. Food handlers included individuals directly involved in the preparation, cooking, serving, packaging, or selling of food to the public. The study was conducted between December 2025 to January 2026.

5.4 Study Design

A cross-sectional descriptive study design was used. The design was for collecting data at a single point in time to assess the level of knowledge, attitudes, and practices (KAP) regarding food safety among food handlers. It allowed for quantitative data collection and provided descriptive insights into factors influencing food safety behaviors.

5.5 Sample size Determination

Sample size was determined using the Kish Leslie (1964) formula shown below:

$$\text{Sample size (n)} = \frac{Z^2 Pq}{d^2}$$

Where n = Desired sample size,

Z = Critical value and a standard value for the corresponding level of confidence. (At 95% CI or 5% level of significance (type-I error), it is 1.96,

P = Expected prevalence of food handlers with good food safety practices. Since no previous study has been conducted in Bumbo Town Council, a prevalence of 50% will be used to maximize the sample size and ensure representativeness.

q = 1-p and,

d = Margin of error or precision, a precision of 5% will be used as the standard error.

$$\text{Sample size} = \frac{1.96^2 x 0.05 x 0.5}{0.05^2}$$

$$= \frac{0.9604}{0.0025}$$

$$= \mathbf{384}$$

Therefore, a sample size of 384 participants will be employed in the study. To cater for the non-response rate, there will be an inclusion of 10%. Which is 38.4. Therefore, the total sample size will be **423**

5.6 Sampling Procedure

A stratified random sampling technique was employed. The study area was stratified according to major food business categories such as restaurants, market stalls, butcheries, and roadside vendors. Within each stratum, simple random sampling will be used to select respondents proportionally.

Where records of business owners were available, the lottery (piece-of-paper) method was applied. Each eligible food handler was assigned a number, and numbers were randomly selected to participants. Where records were not available, purposive identification with the help of local health officials and market leaders was used

5.7 INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria:

1. Food handlers who had worked in the Bumbo Town Council for at least three months to ensure sufficient exposure to food handling practices
2. Individual directly involved in food preparation, serving, or sale
3. Participants voluntarily provided informed consent

Exclusion criteria

1. Temporary food handlers who had worked for less than three months.
2. Individuals who were sick or absent during the data collection period
3. Persons not directly involved in food handling activities

5.8 DATA COLLECTION METHODS AND TOOLS

Data was collected using a structured questionnaire and an observation checklist. The questionnaire included both closed and open-ended questions covering socio-demographic characteristics, knowledge of food safety, attitudes towards hygiene, and self-reported practices. The observation checklist was used to verify actual hygiene practices such as handwashing, utensil cleanliness, food storage, and waste disposal. Data were collected using the Kobo Collect tool by trained research assistants under the supervision of the principal investigator

5.9 QUALITY CONTROL (VALIDITY AND RELIABILITY)

To ensure data validity, the questionnaire was pretested on 10% of the sample size in a adjacent town council with similar characteristics to Bumbo. Necessary adjustments were made before the main data collection. Reliability was ensured by using a standardized questionnaire. Daily supervision and checking of completed questionnaires were conducted to ensure consistency, accuracy, and completeness of the data

5.10 VARIABLES

Dependent Variables: food safety practices.

The main dependent variable in this study was food safety practices. This represented the actual behaviors and actions of food handlers in relation to hygiene and safe food management. Indicators included handwashing before and during food preparation, use of protective clothing (aprons, gloves, and head covers), safe storage and temperature control of food, proper waste disposal, prevention of cross-contamination, and regular medical check-ups.

These practices were measured using two **methods**: a self-reported questionnaire and an

observational checklist.

Self-reported practices were assessed using Likert-scale items (Always, Sometimes, Rarely, Never). A composite practice score was computed for each respondent. Scores above the mean were categorized as "good," while scores below the mean were categorized as "poor."

Observed practices were assessed using an observational checklist. Each behavior was scored as "Yes = 1" if performed correctly and "No = 0" if not performed, while "Not Applicable (N/A)" items were excluded. The observational checklist was administered to all 423 food handlers and their respective food establishments, allowing direct assessment of hygiene and food safety practices. Total scores were computed and categorized as good or poor based on the mean score.

Independent Variables:

a) Knowledge of food safety

The variables referred to the cognitive understanding of food handlers regarding food hygiene, contamination, and prevention. The knowledge was assessed using structured questions, wth correct answers scored as 1and incorrect answers scored as 0. A composite knowledge score was computed for each respondent and categorized as adequate or inadequate based on the mean score

b) Attitudes towards Food Safety

This variable referred to beliefs and perceptions influencing food safety behavior. Attitudes were measured using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5).

A composite attitude score was computed and categorized as positive or negative based on the mean score

c) Socio-demographic variables

Social-demographic variables included age, gender, level of education, marital status, work experience, and business type. The variables were analyzed descriptively using frequencies and percentages to describe the distribution of respondents.

5.11 DATA MANAGEMENT AND ANALYSIS

Data were collected electronically using the Kobo Collect application and exported to STATA version 14 for cleaning and analysis. Data cleaning involved checking for completeness, consistency, and accuracy. Univariate (descriptive) analysis was performed to describe the knowledge, attitudes, and practices of food handlers

Categorical variables such as gender, education level, and types of food business were summarized using frequencies and percentages, while **continuous variables** such as age and work experience were summarized using means, standard deviations, and ranges.

KAP scoring:

Knowledge: The correct responses were scored as 1, and incorrect responses as 0. The total scores were computed and categorized as adequate or inadequate based on the mean

Attitude: Likert-scale responses were scored from 1 (strongly disagree) to 5 (strongly agree), and a composite score was computed and categorized as positive or negative based on the mean

Practice: Likert-scale responses were scored and averaged, and the composite score was categorized as good or poor based on the mean score

5.12 ETHICAL CONSIDERATION

Ethical approval was obtained from Makerere University School of Public Health. Permission was obtained from the District Health Officer of Namisindwa District and the Town Clerk of Bumbo Town Council. Informed consent was obtained from all participants after explaining the purpose of the study. Participation was voluntary, and confidentiality of the data was strictly maintained.

5.13 STUDY LIMITATION

This study faced some limitations. First, reliance on self-reported data may introduce social desirability bias, as some respondents could overstate their knowledge or hygiene practices. To address this, observation checklists were used alongside questionnaires.

Secondly, recall bias may occur since some food handlers might not accurately remember past experiences or training; this was minimized by focusing on recent practices.

The study was limited to Bumbo Town Council, which reduced generalizability to other border areas; however, its findings will still provide valuable insights for similar settings in Uganda. Finally, language and literacy barriers among some participants may have been posed.

5.14 DISSEMINATION OF FINDINGS

The study report will be submitted to Makerere University School of Public Health in partial fulfillment of the requirements for the award of the Bachelor's degree in Environmental Health Science. The study findings will be disseminated through conferences, seminars, and academic publications. The dissertation will also serve as a reference for future researchers and policymakers.

CHAPTER SIX: RESULTS

6.0 Introduction

The chapter presents the findings of the study on the knowledge, attitude, and practices regarding food safety among food handlers in Bumbo Town Council, Namisindwa District. The results are presented in tables and accompanying narratives based on the study objectives, including socio-demographic characteristics, knowledge, attitudes, and food handling practices.

6.1 Socio-demographic characteristics

Table 1: Socio-demographic characteristics of participants

Variable	**Category**	**Frequency (n= 423)**	**Percentage (%)**
Age group (years)	15–24	164	38.8
	25–34	121	28.6
	35–44	88	20.8
	45–54	39	9.2
	55–64	11	2.6
Sex	Male	248	58.6
	Female	175	41.4
Religion	Catholic	214	50.6
	Anglican	137	32.4
	Moslem	56	13.2
	Others	16	3.8
Marital status	Married	249	58.9
	Single	148	35.0
	Divorced	21	5.0
	Widowed	5	1.2
Education level	Primary	193	45.6
	Secondary	171	40.4

	Tertiary/University	43	10.2
	No formal education	16	3.8
Type of food business	Street food vending	228	53.9
	Restaurant	101	23.9
	Butchery	50	11.8
	Market stall	44	10.4
Work experience (years)	Less than 1	142	33.6
	1–3	126	29.8
	4–6	87	20.6
	7–10	44	10.4
	Above 10	24	5.7
Training on food safety	Yes	126	29.8
	No	297	70.2
Source of training (n = 126)	Local Government	79	62.7
	MOH	27	21.4
	NGO	20	15.9
Presence of a medical certificate	Yes	61	14.4
	No	362	85.6
Last medical check-up (n = 61)	Less than 3 months	5	8.2
	6 months	15	24.6
	1 year	22	36.1
	More than 1 year	19	31.2

A total of 423 food handlers participated in the study. The mean age of respondents was 29.9 years (SD = 10.6), with ages ranging from 15 to 62 years. The majority of respondents were aged 15-24 years, 164 (38.8%), followed by those aged 25-34 years, 121 (28.6%). More than half of the

respondents were male, 248 (58.6%). Most respondents were catholic, 214 (50.6%), while more than half of the respondents were married, 249 (58.9%), and nearly half had attained primary education, 193 (45.6%), followed by secondary education, 171 (40.4%). The majority of respondents were engaged in street food vending, 228 (43.9%), and most had less than three years of work experience. A large proportion of respondents had received training on food safety and hygiene, 297 (70.2%), and the majority did not possess a medical certificate, 362 (85.6%).

6.2 Knowledge of food safety

Table 2: Knowledge of Food Safety Among Respondents (N= 423)

Knowledge Question	**Yes n (%)**	**No n (%)**
Poor handling can cause foodborne diseases	306 (72.3)	117 (27.7)
Washing hands before food preparation prevents contamination	264 (62.4)	159 (37.6)
Importance of keeping raw and cooked food separate	268 (63.4)	155 (36.6)
Unclean water can contaminate food	381 (90.1)	42 (9.9)
Heard of diseases such as typhoid, cholera, dysentery, food poisoning	389 (92.0)	34 (8.0)
Proper waste disposal reduces contamination risks	347 (82.0)	76 (18.0)
Knowledge of correct temperatures for storing perishable foods	186 (44.0)	237 (56.0)
Ever been taught about food-borne pathogens (e.g., E. coli, Salmonella)	145 (34.3)	278 (65.7)
Food handlers with wounds should not handle food	262 (61.9)	161 (38.1)
Improper cleaning of utensils can contaminate food	321 (75.9)	102 (24.1)

A total of 423 food handlers were assessed for their knowledge of food safety. The mean knowledge score among respondents was 6.8 (SD=1.8), with scores ranging from 0 to 10, indicating a moderate level of knowledge. Overall, the majority of respondents demonstrated adequate knowledge of food safety, 269 (63.6%), where 154 (36.4%) exhibited inadequate knowledge **(Table 2).**

With respect to specific knowledge items, a substantial proportion of respondents were aware that foodborne diseases can result from poor handling practices, 306 (72.3%). Similarly, 264 (62.4%) indicated that handwashing prior to food preparation prevents contamination, while 268 (63.4%) recognized the importance of separating raw and cooked foods.

A very high proportion of respondents acknowledged that unclean water can contaminate food, 381 (90.1%0, and 389 (92.0%0 had heard of foodborne diseases such as typhoid, cholera, and dysentery. In addition, 347 (82.0%) reported that proper waste disposal reduces contamination risks.

However, notable knowledge gaps were identified in certain areas. Less than half of the respondents were aware of the correct temperatures for storing perishable foods, 186 (44.0%), and only 145 (34.3%) had received education on food-borne pathogens such as E. coli and Salmonella. Furthermore, 262 (61.9%) recognized that food handlers with wounds should not handle food, while 321 (75.9%) were aware that improper cleaning of utensils can lead to contamination **(Table 3)**

Table 3: Overall Knowledge of Food Safety

Knowledge Level	**Frequency (n)**	**Percentage (%)**
Inadequate	154	36.4
Adequate	269	63.6
Total	423	100.0

Overall, the majority of respondents demonstrated adequate knowledge of food safety, accounting for 269 (63.6%), while 154 (36.4%) exhibited inadequate knowledge

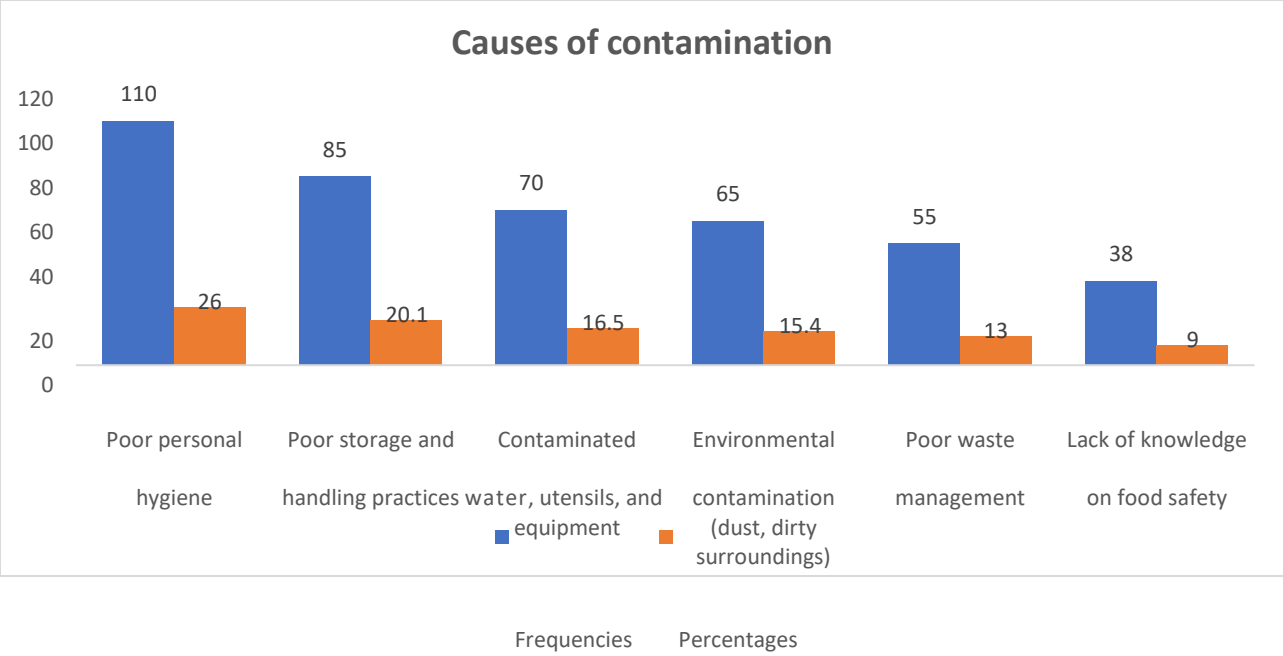


Figure 2: Reported Causes of Food Contamination (N= 423)

Respondents identified several causes of food contamination in their area. The most frequently reported cause was poor personal hygiene, 110(26.0%), including practices such as inadequate handwashing and handling food with dirty hands. This followed by poor storage and handling practices, 85 (20.1%), such as leaving food uncovered and improper storage.

A considered proportion of respondents also reported the use of contaminated water, utensil, and equipment, 70 (16.5%), while 65 (15.4%) highlighted environmental contamination, including dust and unclean surroundings. In addition, 55 (13.0%) identified poor waste management as a contributing factor, and a smaller proportion of respondents, 38 (9.0%), attributed food contamination to lack of knowledge on food safety practices

6.3 Attitudes towards Food Safety

Table 4: Attitude of food handlers toward food safety (N=423)

Variable	Response	Frequency (n=423)	Percentage (%)
Food safety is everyone's responsibility	Strongly Agree	191	45.2
	Agree	225	53.2
	Neutral	4	0.9
	Disagree	2	0.5
	Strongly Disagree	1	0.2
Regular medical check-ups are important	Strongly Agree	125	29.6
	Agree	269	63.6
	Neutral	23	5.4
	Disagree	3	0.7
	Strongly Disagree	3	0.7
Using gloves and aprons is unnecessary	Strongly Agree	34	8.0
	Agree	167	39.5
	Neutral	90	21.3
	Disagree	93	22.0
	Strongly Disagree	39	9.2
Confident in handling food safety at workplace	Strongly Agree	126	29.8
	Agree	250	59.1
	Neutral	42	9.9
	Disagree	3	0.7
	Strongly Disagree	2	0.5
Food safety laws help protect public health	Strongly Agree	228	53.9
	Agree	178	42.1

	Neutral	8	1.9
	Disagree	7	1.7
	Strongly Disagree	2	0.5
Reporting foodborne illness is important	Strongly Agree	178	42.1
	Agree	230	54.4
	Neutral	6	1.4
	Disagree	5	1.2
	Strongly Disagree	4	0.9
Cleaning and sanitation are essential parts of my daily routine	Strongly Agree	164	38.8
	Agree	248	58.6
	Neutral	7	1.7
	Disagree	2	0.5
	Strongly Disagree	2	0.5
Food inspection by local authority is necessary	Strongly Agree	187	44.2
	Agree	225	53.2
	Neutral	7	1.7
	Disagree	3	0.7
	Strongly Disagree	1	0.2
Should not handle food with cuts/wounds	Strongly Agree	120	28.4
	Agree	254	60.0
	Neutral	41	9.7
	Disagree	4	0.9
	Strongly Disagree	4	0.9
Cleaning surfaces and utensils before food preparation prevents contamination	Strongly Agree	138	32.6
	Agree	275	65.0
	Neutral	5	1.2

	Disagree	3	0.7
	Strongly Disagree	2	0.5
Handling money while serving food increases contamination risk	Strongly Agree	99	23.4
	Agree	246	58.2
	Neutral	67	15.8
	Disagree	7	1.7
	Strongly Disagree	4	0.9
Regular trainings improve food safety practices	Strongly Agree	217	51.3
	Agree	184	43.5
	Neutral	17	4.0
	Disagree	2	0.5
	Strongly Disagree	3	0.7
Use of separate knives and cutting boards for different food is important	Strongly Agree	102	24.1
	Agree	246	58.2
	Neutral	66	15.6
	Disagree	7	1.7
	Strongly Disagree	2	0.5

The findings indicate that food handlers generally demonstrated favorable attitudes toward food safety practices across most of the assessed items. The majority of the respondents agreed that food safety is everyone's responsibility, with 225 (53.2%) agreeing and 191 (45.2%) strongly agreeing. Similarly, more than half acknowledged the importance of regular medical check-ups, with 269 (63.6%) agreeing and 125 (29.6%) strongly agreeing.

A comparable pattern was observed in perceptions of regulatory and preventive measures. A substantial proportion of respondents strongly agreed that food safety laws help protect public health, 228 (53.9%), while 178 (42.1%) agreed. Similarly, the importance of reporting foodborne illnesses to authority was widely recognized, with 230 (54.4%) agreeing and 178 (42.1%) strongly

agreeing. Food inspection by local authorities was also perceived as necessary by most respondents, as reflected by 225 (53.2%) who agreed and 187 (44.2%) who strongly agreed.

Regarding hygiene and safe handling practices, more than half of the respondents expressed positives attitudes. For instance, 248 (58.6%) agreed and 164 (38.8%) strongly agreed that cleaning and sanitation are essential parts of daily routines. Similarly, 275 (65.0%) agreed and 138 (32.6%) strongly agreed that cleaning surfaces and utensils before food preparation is important for preventing contamination. In addition, 254 (60.0%) agreed and 120 (28.4%) strongly agreed that food should not be handled when the food handler has cuts or wounds.

Furthermore, a considerable proportion of respondents recognized the risks associated with unsafe practices. More than half, 246 (58.2%), agreed that handling money while serving food increases the risk of contamination, while 99 (23.4%) strongly agreed. Similarly, 246 (58.2%) agreed and 102 (24.1%) strongly agreed that using separate knives and cutting boards for different foods is important. Training was also highly valued, with over half, 217 (51.3%), strongly agreeing and 184 (43.5%) agreeing that regular training could improve food safety and hygiene practices.

However, one notable exception was observed in relation to the negatively worded statement regarding the use of protective gear. A considerable proportion of respondents, 167 (39.5%0 agreed and 34 (8.0) strongly that using gloves and aprons when handling food is unnecessary, indicating the presence of some unfavorable attitudes towards the use of protective equipment.

Table 5: Suggested measures to improve food safety practices among food handlers (N=423)

Theme	**Frequency (n)**	**Percentage (%)**
Regular training and health education	165	39.0
Enforcement and supervision by authorities	110	26.0
Provision of infrastructure (water, waste management, sanitation)	60	14.2
Incentives and motivation (rewards, capital, recognition)	40	9.5
Collaboration with authorities and stakeholders	25	5.9
Improved working environment and conditions	23	5.4
Total	423	100.0

The open-ended responses revealed several key factors that could motivate food handlers to adopt better food practices. The most frequently mentioned suggestion was the need for regular training and health education, reported by approximately 165 (39.0%) respondents. Participants emphasized continuous sensitization, training on food hygiene, and education on safe food handling practices as essential for improving compliance.

Enforcement and supervision by local authorities were also commonly highlighted, with about 110 (26.0%) respondents suggesting regular inspections, monitoring, and stricter enforcement of food safety regulations. Respondents indicated that consistent follow up and supervision would enhance adherence to proper food handling practices.

Provision of basic infrastructure and services was another important them. Around 60 (14.2%) respondents mentioned the need for reliable water supply, improved waste management, and better sanitation facilities, including regular garbage collection and drainage improvement.

In addition, some respondents suggested the use of incentives and motivation strategies, such as rewards, recognition, and financial support, as reported by 40 (9.5%) participants. These measures were perceived to encourage compliancy and promote positive behavior among food handlers

A smaller proportion of respondents emphasized the importance of collaboration with local authorities and stakeholders 25 (5.9%), as well as improving the working environment and conditions 23 (5.4%), including better hygiene facilities and supportive supervision.

Overall, findings suggest that a combination of training, enforcement, infrastructures support and motivation strategies is necessary to enhance food safety practices among food handlers.

6.4 Practice towards Food Safety

Table 6: Responses of food handlers towards food safety practices

Variable	Response	Frequency (n=423)	Percentage (%)
wash hands with soap before preparing or serving food	Never	3	0.7
	Rarely	4	0.9
	Sometimes	227	53.7
	Always	189	44.7
Wearing of protective clothing (e.g., aprons, gloves, head cover, shoes) during Food handling	Never	34	8.0
	Rarely	175	41.4
	Sometimes	122	28.8
	Always	92	21.7
keeping raw and cooked foods separately during preparation and storage	Never	13	3.1
	Rarely	35	8.3
	Sometimes	225	53.2
	Always	150	35.5
Cleaning utensils, tables, and surfaces before and after food preparation	Never	20	4.7
	Rarely	60	14.2
	Sometimes	202	47.8
	Always	141	33.3
Use of safe and clean water for cooking and washing food items	Never	4	0.9
	Rarely	36	8.5
	Sometimes	200	47.3

	Always	183	43.3
Storing perishable food at appropriate temperatures	Never	59	13.9
	Rarely	193	45.6
	Sometimes	98	23.2
	Always	73	17.3
Covering cooked food to protect it from flies, dust, and other contaminants	Never	8	1.9
	Rarely	65	15.4
	Sometimes	200	47.7
	Always	150	35.5
Disposal of food waste properly and regularly	Never	2	0.5
	Rarely	7	1.7
	Sometimes	178	42.1
	Always	236	55.8
Regular health check-ups as required for food handlers	Never	1	0.2
	Rarely	264	62.4
	Sometimes	75	17.7
	Always	83	19.6
handling or processing of food when I am sick	Never	47	11.1
	Rarely	55	13.0
	Sometimes	65	15.4
	Always	256	60.5
I remove jewelry (rings, Bracelets, watches) when preparing food	Never	85	20.1
	Rarely	187	44.2
	Sometimes	90	21.3
	Always	61	14.4
Washing of hands after handling money before serving food	Never	94	22.2
	Rarely	182	43.0

	Sometimes	77	18.2
	Always	70	16.5
Use of separate knives and cutting boards for or raw and cooked foods	Never	65	15.4
	Rarely	207	48.9
	Sometimes	93	21.0
	Always	58	13.7
I clean food storage areas before placing new food items	Never	14	3.3
	Rarely	13	3.1
	Sometimes	238	56.3
	Always	158	37.4
I take measures to protect food from flies and pests	Never	7	1.7
	Rarely	17	4.0
	Sometimes	230	54.4
	Always	169	40.0

The findings revealed varying levels of adherence to recommended food safety practices among respondents.

A substantial proportion of respondents reported washing hands with soap before food preparation or service, with 189 (44.7%) indicating always and 227 (53.7%) sometimes, while only 7 (1.6%) reported doing so rarely or never. In contrast, the use of protective clothing during food handling was consistent, with 92 (21.7%) reporting always and 122 (28.8%) sometimes. Whereas a considerable proportion, 175 (41.4%), reported rarely and 34 (8.0%) never.

Regarding separation of raw and cooked foods, 150 (35.5%) reported always and 225 (53.2%) sometimes, while 48 (11.4%) indicated limited adherence. Cleaning of utensils and food preparation surfaces was moderately practiced, with141 (33.3%) reporting sometimes and notable proportion lower levels of consistency.

Use of safe and clean water reported by 183 (43.3%) as sometimes, with fewer respondents indicating consistent use. Similarly, appropriate storage of perishable food showed limited adherence, with only 73 (17.3%) reporting always, while the majority reported rarely, 193 (45.6%), or sometimes, 98 (23.2%)

Covering pf cooked food to prevent contamination was reported was always by 150 (33.5%) and sometimes by 200 (47.3%), indicating moderate compliance. Disposal of food waste was relatively well practiced, with more than half, 236 (55.8%), reporting always and 178 (42.1%) as sometimes

Attendance of regular health checkups was notable low, with 264 (62.4%) reporting rarely and only 83 (19.6%) indicating always. Concerning unsafe practices, a high proportion of respondents reported handling food while sick, with 256 (60.5%) indicating always and 65 (15.4%) as sometimes

Removal of jewelry during food preparation was inconsistently practiced, with 61 (14.4%) reporting always, while the majority reported rarely, 187 (44.2%), or never, 85 (20.1%). Similarly, handwashing after handling money was limited, with only 70 (16.5%) reporting always, while 182 (43.0%) reported rarely and 94 (22.2%) as never.

Use of separate knives and cutting boards for raw and cooked foods was low, with only 58 (13.7%) reporting always, while nearly half, 207 (48.9%), reported rarely. Cleaning of food storage areas showed better adherence, with 158 (37.4%) reporting always and 238 (56.3%) as sometimes

Finally, measures to protect food flies and pests were moderately practiced, with 169 (40.0%) reporting always and 230 (54.4%) sometimes.

6.4.1 Challenges faced in maintaining food hygiene and safety

Table 7: Challenges faced in maintaining food hygiene and safety (N=423)

Theme	**Frequency (n)**	**Percentage (%)**
Limited water supply / lack of clean water	110	26.0
Lack of knowledge / training gaps	85	20.1
Financial constraints (limited funds/capital)	72	17.0
Inadequate infrastructure (space, storage, equipment)	60	14.2
Poor waste management / sanitation systems	38	9.0
Environmental factors (dust, weather conditions)	30	7.1
Weak enforcement / supervision	15	3.5
Social and behavioral factors (attitudes, customers, coworkers)	13	3.1
Total	423	100.0

Response to the open-ended question were grouped into key thematic areas reflecting the major challenges faced by food handlers.

Limited access to clean water emerged as the most frequently reported challenge, cited by 110 (26.0%) of respondents. Issues related to knowledge gaps and lack of training were also prominent, reported by 85 (20.1%) of respondents. Financial constraints, including limited capital and resources to maintain hygiene standards, were mentioned by 72 (17.0%0

In addition, 60 (14.2%) of respondents identified infrastructure limitations such as inadequate working space, lack of storage facilities, and insufficient equipment. Poor waste management

systems were reported by 38 (9.0%), while environmental factors such as dust and adverse weather conditions were cited by 30 (7.1%)

A smaller proportion of respondents highlighted challenges related to weak enforcement and supervision, 15 (3.5%), as well as social and behavioral factors including poor attitudes and non-compliance among customers or coworkers, 13 (3.1%)

6.4.2 Overall food safety practices

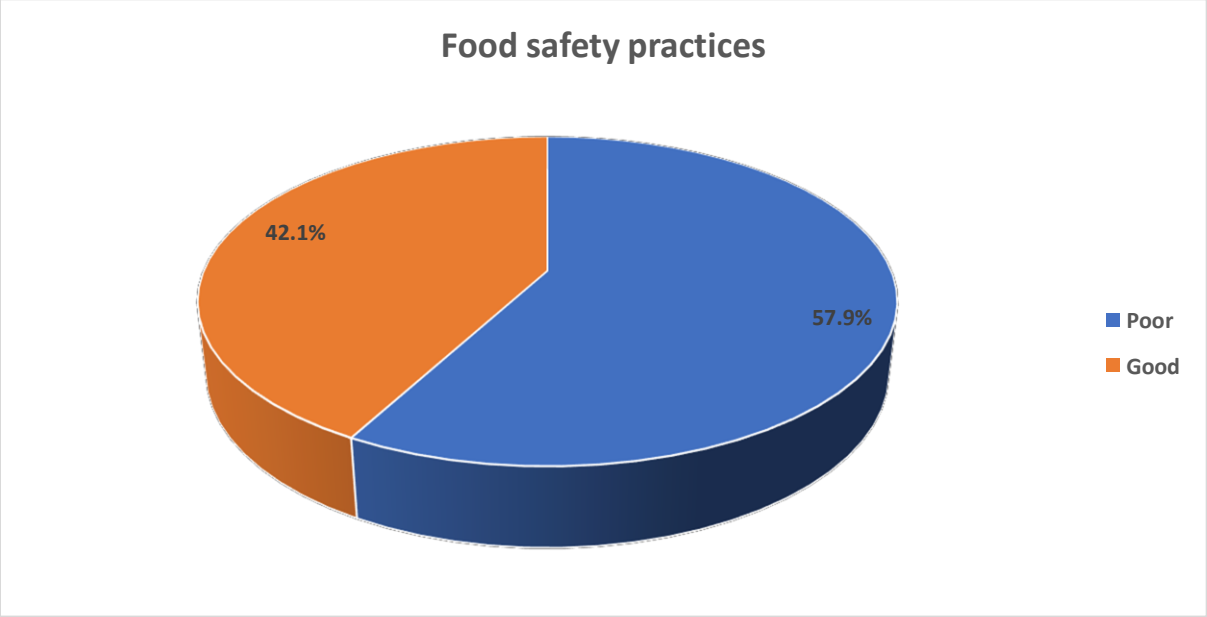


Figure 3: Showing Overall score for food safety practices

Overall, more than half of the respondents exhibited poor food safety practices, accounting for 245 (57.9%), while 178 (42.1%) demonstrated good practices

6.5 Observational checklist findings

The observational checklist was used to assess the level of compliance with food safety and hygiene standards among food establishments. Observational were grouped into four domains: environmental and general hygiene, food handling and storage practices, personal hygiene and protective measures, and pest control

6.5.1 Environmental and general hygiene

Table 8: Environmental and general hygiene observations

Observation	**Yes n (%)**	**No n (%)**
Compound/surroundings are clean and well-maintained	184 (43.5)	239 (56.5)
Waste is properly disposed of and not accumulated	179 (42.3)	244 (57.7)
No evidence of vermin (flies, cockroaches, rats)	247 (58.4)	176 (41.6)
Ventilation is adequate	128 (30.3)	295 (69.7)
Lighting is adequate	304 (71.9)	119 (28.1)
Handwashing facility is present and functional	184 (43.5)	239 (56.5)
Water supply is clean and sufficient for food preparation	165 (39.0)	258 (61.0)
Sanitary facilities (toilets/latrines) are clean and usable	205 (48.5)	218 (51.5)

The findings indicated notable variation in environmental and general hygiene conditions across the observed food establishments. Less than half of the establishments had clean and well-maintained surrounding, accounting for 184 (43.5%), while a larger proportion, 239 (56.5%), were observed to have inadequately maintained compounds. A similar pattern was evident in waste management practices, where 179 (42.3%) of establishments demonstrated proper waste disposal, compared to 244 (57.7%) where wastes was not adequately managed

In relation to pest presence, more than half of the establishment, 247 (58.4%), showed no evidence of vermin, although a considerable proportion, 176 (41.6%), still exhibited signs of infestation. Structural condition varied across establishments, ventilation was found to be inadequate in a substantial majority, with 295 (69.7%) lacking sufficient airflow, whereas only 128 (30.3%) met the required standards. In contrast, lighting conditions were relatively better, with a larger proportion, 304 (71.9%), having adequate lighting compared to 119 (28.1%) that did not.

Availability of essential hygiene infrastructure remained limited. Handwashing facilities were present and function in 184 (43.5%) of establishment, while 239 (56.5%) lack such facilities. Similarly, access to clean and sufficient water supply was observed in 165 (39.0) of establishments, whereas a greater proportion, 258 (61.1%), did not meet this requirement. Sanitary facilities were

clean and useable in nearly half of the establishments, 205 (48.5%), while 218 (51.5%) were found to have inadequate sanitary conditions

Overall, the findings demonstrated that while certain aspects such as light and absence of vermin were relatively satisfactory in a proportion of establishments, critical components including waste management, water supply, ventilation, and handwashing facilities were inadequate in a substantial number of cases

6.5.2 Food handling and storage

Table 9: Food handling and storage Observations (N=423)

Observation	**Yes n (%)**	**No n (%)**
Raw and cooked foods are stored separately	169 (40.0)	254 (60.0)
Food storage areas are clean	252 (59.6)	171 (40.4)
Perishable food is stored at appropriate temperatures	120 (28.4)	303 (71.6)
Food is covered to protect from flies, dust, and contamination	259 (61.2)	164 (38.8)
Utensils (knives, cutting boards, hooks) are clean before use	240 (56.7)	183 (43.3)
Separate utensils are used for raw and cooked food preparation	184 (43.5)	239 (56.5)
Work surfaces are clean before food preparation	251 (59.3)	172 (40.7)

The findings indicate variability in compliance with recommended food handling and storage practices across the observed establishment. A smaller proportion of establishments, 169 (40.0%), stored raw and cooked foods separately, whereas a larger proportion of establishments, 254 (60.0%), did not adhere to this practice. In contrast, cleanliness of food storage areas was relatively better maintained, with 252 (59.6%) of establishments observed to have clean storage environments compared to 171 (40.4%) that did not.

Temperature control for perishable foods was notably inadequate, with only 120 (28.4%0 of establishment storing perishable items at appropriate temperatures, while a substantial majority, 303 (71.6%), failed to meet this requirement. However, more than half of the establishment, 259 961.2%), covered food to protect it from contamination, although 164 (38.8%) did not consistently apply this measure.

With respect to utensils hygiene, 240 (56.7%) of established used clean utensils prior to food preparation, while 183 (43.3%) did not meet this standard. The use of separate utensils for raw and cooked food preparation was less commonly practiced, with 184 (43.5%) adhering to this requirement and a larger proportion, 239 (56.5%), failing to do so. Similarly, work surface cleanliness prior to food preparation was observed in 251 (59.3%) of establishments, whereas 172 (40.7%) did not maintain adequately clean surfaces.

Overall, while certain practices such as food covering, storage cleanliness, and work surface hygiene were observed in more than half of the establishments, critical gaps persisted in areas including temperature control and separation of raw and cooked foods.

6.5.3 Protective Clothing and Personal Hygiene

Table 10: Protective Clothing and Personal Hygiene Observation (N=423)

Observation	**Response**	**Frequency (n)**	**Percentage (%)**
Wearing clean protective clothing (apron, coat, gloves)	Yes	160	37.8
	No	263	62.2
Headgear or hair covering worn	Yes	130	30.7
	No	293	69.3
Hands visibly clean	Yes	297	70.2
	No	126	29.8
Jewelry removed (rings, bracelets, watches)	Yes	147	34.8
	No	276	65.2
No visible cuts, wounds, or injuries on hands	Yes	343	81.1
	No	80	18.9
Washing hands after handling money	Yes	126	29.8
	No	297	70.2
Washing hands after using the toilet	Yes	228	53.9
	No	195	46.1
Practicing good hygiene when coughing/sneezing	Yes	237	56.0
	No	186	44.0
Does not handle food when sick	Yes	276	65.2
	No	147	34.8

The observational assessment of protective clothing and personal hygiene practices revealed notable variability in compliance among food handlers. a substantial proportion of food handlers were not wearing clean protective clothing, with 263 (62.2%) observed without appropriate attire,

while only 160 (37.8%) adhered to this requirement. Similarly, the use of headgear or hair covering was limited, with 293 (69.3%) not wearing any form of hair protection.

In contrast, personal cleanliness of hands appeared relatively better, as 297 (70.2%) of food handlers had visibly clean hands at the of observation. Additionally, a high proportion, 343 (81.1%) had no visible cuts, wounds, or injuries, suggesting relatively low risk from open lesions during food handling

However, several critical hygiene practices were inadequate observed. The majority of food handlers, 276 (65.2%), did not remove jewelry during food preparation, which poses a contamination risk. Furthermore, hand hygiene after handling money was notable poor, with 297 (70.2%) failing to wash hands afterward. Handwashing after toilet use showed moderate compliance, with 228 (53.9%) adhering to the practice.

Regarding respiratory hygiene, 237 (56.0%) of food handlers demonstrated appropriate practices when cough or sneezing, although a considerable proportion, 187 (44.0%), did not. Encouragingly, 276 (65.2%) of food handlers were observed not handling food when sick indicating some levels of adherence to safe practices in this regard.

Overall, while certain aspects of personal hygiene such as visibly clean and absence of wounds were relatively well maintained, critical gaps were identified in the use of protective clothing, hand hygiene practices, and adherence to contamination prevention measures

6.5.4 Pest Control

Table 11: Observational findings on pest control measures among food handlers (N=423)

Observation	Response	Frequency (n)	Percentage (%)
Measures in place to repel flies and pests (screens, covers, chemicals)	Yes	164	38.8
	No	259	61.2
No animals present in the food preparation area	Yes	380	89.8
	No	43	10.2

The assessment of the pest control measures revealed mixed levels of compliance among food establishments. A majority of the establishments, 259 (61.2%) had implemented appropriate control strategies such as screens, covers, or chemical deterrents. This indicates a substantial gap in preventive measures aimed at minimizing contamination from vectors.

In contrast, the presence of animals with the food preparation areas was relatively well controlled. The findings showed that 380 (89.8%) of establishment had no animals observed within the food preparation areas, whereas only 43 (10.2%) had animals present at the time of observation.

Overall, while restriction of animals in food preparation areas was largely maintained, the limited implementation of pest control measures highlights a critical area requiring improvements to ensure comprehensive food safety hygiene standards

CHAPTER SEVEN: DISCUSSION

7.0 Introduction

This chapter presents discussion of the study findings in relation to the study objectives and the existing literature. The findings on sociodemographic characteristics, knowledge, attitudes, and practices of food handlers are interpreted and compared with results from similar studies. The chapter focuses on explaining the main findings and their implications for food safety and public health

7.1 Socio-Demographic Characteristics

The socio-demographic characteristics of respondents provide important context for understanding food safety knowledge, attitudes, and practices. In this study, the majority of respondents were younger, with a mean age of 29.9 years and a large proportion with 15–24-year age group. While younger individuals may be more physically active and adaptable, they may have limited experience and exposure to food safety practices, which can influence their compliance with recommended standards. However, age alone is not a strong determinant of food safety behavior, as adherence is more closely linked to training and supervisions.

Education level emerged as acritical factor, with a substantial proportion of respondents having attained only primary education. Lower levels of education may limit the ability of food handlers to fully understand food safety principles, particularly those related to contamination and hygiene practices. This may negatively affect the adoption of safe food handling behaviors. Similar findings have been reported in other studies, where higher levels of education were associated with improved food safety knowledge and practices(Ssubi et al., 2024)

The nature of occupation, particularly the predominance of street food vending, is also significant. Street food vending is typically characterized by informal settings with limited infrastructure, inadequate access to clean water, and weak regulatory oversight. These conditions may hinder the implementation of proper food safety practices, regardless of the individual's level of knowledge. Similar challenges have been documented in studies of informal food sector in Sub-Saharan Africa, where environmental constraints limit compliance with food safety standards (Issa- Zacharia et al., 2024)

Although a majority of respondents reported having received training in food safety and hygiene, most had less than three years of work experience. This suggests that while training is being conducted, its effectiveness may be limited to lack of practical exposure or insufficient reinforcement over time. Furthermore, the absence of medical certification among most respondents raises concerns about compliance with public health regulations and the potential risk of foodborne disease transmission

Overall, these findings highlight that while demographic factors such as education, training, and work environments play an important role, they must be supported by effective regulatory enforcement and continuous supervision to ensure safe food handling practices.

7. 2 Knowledge of Food Safety Among Food Handlers

The findings of this study indicate that the majority of the respondents demonstrated adequate knowledge of food safety (68.6%), with a men knowledge score of 6.8, suggesting a moderated level of knowledge among food handlers. while this is a positive finding, the presence of a substantial proportion of respondents with inadequate knowledge (36.4%) raises concerns regarding potential food safety risks.

The moderate level of knowledge observed in this study is consistent with findings from several studies conducted in low and middle-income countries, where food handlers often demonstrate general awareness of hygiene practices but lack comprehensive understanding of critical food safety principles. In Uganda, studies have reported uneven knowledge levels among food handlers, with many demonstrating basic awareness but limited technical knowledge of foodborne pathogens and contamination pathways (Ssubi et al., 2024). Similar findings have been reported in Tanzania, where low levels of food safety knowledge and limited training among street food vendors were observed (Issa-Zacharia et al., 2024), as well as in other African countries such as Ghana and Ethiopia (Akabanda et al., 2017, Fekadu et al., 2024).

A key strength identified in this study is high levels of awareness regarding basic hygiene and contamination sources. A large proportion of respondents recognized that unclean water can contaminate food (90.0%) and were aware of common foodborne diseases such as typhoid and

cholera (92.9%). These findings are consistent with previous studies in Uganda, which indicated that food handlers often possess general awareness of food safety risks, particularly those that are visible or commonly experienced (Nabaggala, 2023)

However, despite this general awareness, significant knowledge gaps were identified in more technical areas. Less than half of the respondents (44.0%) were knowledgeable about correct temperature control for perishable foods, and only a small proportion (34.3%) had taught about foodborne pathogens such as E. coli and Salmonella. This findings aligns with studies conducted in Uganda, where only a minority of food handlers were able to correctly identify common foodborne pathogens, highlighting gaps in microbiological knowledge (Ssubi et al., 2024). Similar knowledge deficiencies have been reported in studies assessing food safety management systems, where handlers lacked understanding of critical control points such as temperature regulations and contamination pathways (Nabaggala, 2023, Godfrey, 2022).

These findings highlight a critical gap between general awareness and technical knowledge, which has important implication for food safety. While food handlers may understand that contamination occurs, limited knowledge od how it occurs at a microbiological level reduces their ability to effectively prevent it. This observation is supported by previous studies, which have demonstrated that limited pathogen knowledge is associated with higher level of contamination in food handling environments (Ssubi et al., 2024).

Furthermore, although a substantial proportion of respondents reported having received training in food safety, the persistence of knowledge gaps suggests that such training may be inadequate or not sufficiently practical. Similar concerns have been raised in other studies, which indicate that food safety in many low-resource setting is often theoretical and does not adequately address practical skills required for safe food handling (Issa-Zacharia et al., 2024)

The findings from the open-ended responses further support this pattern, as respondents frequently identifies poor personal hygiene and improper food handling as major causes of contamination, while fewer mentioned technical factors such as microbial contamination. This suggests that food handlers tend to have surface level knowledge rather a comprehensive understanding of food safety

Overall, the findings of this study are consistent with existing literature, which shows that although food handlers may possess basic knowledge of hygiene, there are persistent gaps in critical areas such as temperature control and pathogens awareness. From a public health perspective, this highlights the need for targeted interventions focusing on practical and technical aspects of food safety. Strengthening training as essential programs, improving supervision, and enhancing enforcement of food safety regulations are essential to ensure that knowledge is effectively translated into safe food handling practices

7.3 Attitudes Towards Food Safety

The findings of this study indicate that food handlers generally demonstrated favorable attitudes towards food safety, with the majority of respondents agreeing or strongly with most positive food safety statements. For instance, a substantial proportion agree that food safety is everyone's responsibility (52.2% agree, 45.2% strongly agree), reflecting a strong sense of collective responsibility among food handlers. Similarly, most respondents acknowledge the importance of regular medical check-ups (63.6% agree, 29.6% strongly agree), suggesting recognition of preventive health measures.

The high level of positive attitudes observed in this study is consistent with findings from other studies in Uganda and similar settings. For instance, studies in Moroto and Kampala have reported high levels of agreement with basic food safety principles such as handwashing and sanitation (Aleper, 2024, Galiwango, 2022). Similarly, studies in Wakiso district reported strong beliefs in hygiene practices among food handlers (Asasira, 2025). These similarities suggest that positive attitudes towards food safety are relatively widespread among food handlers in Uganda.

A notable strength in this study is the strong agreement on regulatory and preventive measures. More than half of the respondents strongly agreed that food safety laws help protect public health (53.9%), while a similar large proportion acknowledged the importance of reporting foodborne illnesses and food inspection by authorities. These findings indicate a positive perception of both individual and institutional roles in ensuring food safety, which is essential for effective compliance with public health regulations.

Furthermore, respondents demonstrated strong positive attitudes towards hygiene and safe food handling practices, including cleaning and sanitation, prevention of cross-contamination, and avoiding food handling when having wounds. These findings align with previous studies which have shown that food handlers often hold strong normative beliefs regarding hygiene practices (Asasira, 2025, Vukojo, 2024). Such attitudes are critical in promoting safe food handling behaviors

However, despite the generally positive attitudes, some important inconsistencies were identified. Notably, a considerable proportion of respondents agreed that the use of protective gear such as gloves and aprons is unnecessary (39.5% agree, 8.0% strongly agree) these indicated the presence of unfavorable attitudes towards specific preventive measures, particularly those that may be perceived as inconvenient. Similar findings have been reported in other studies, where food handlers expressed reluctance towards certain safety practices due to perceived cost or discomfort (Vukojo, 2024)

In addition, although respondents expressed confidence in their ability to handle food safety (59.1% agree, 29.8% strongly agree), such confidence does not necessarily translate into safe practices. This observation aligns with findings from previous studies, which indicate that positive attitudes alone are insufficient to ensure good food handling practices, especially in resource- limited setting (Desye et al., 2023). Similarly, studies in Uganda have demonstrated that awareness and beliefs do not always lead to improved behavior (Namubiru et al., 2022).

These findings highlight a critical attitude practice gap, where favorable attitudes do not consistently result in safe food handling behaviors. This gap may be influenced by contextual factors such as limited resources, inadequate infrastructure, and weak enforcement of food safety regulations.

The open-ended responses further support this interpretation, as respondents emphasized the need for regular training (39.0%) and stronger enforcement (26.0%) to improve food safety practices. This suggests that while food handlers are willing to adopt safe practices, they require continuous support, supervision, and an enabling environment. Similar recommendations have been

highlighted in previous studies, which emphasize the importance of training and regulatory enforcement in improving food safety outcomes.

Overall, the findings suggest that while food handlers exhibit generally positive attitude towards food safety, there are important gaps in specific areas and a disconnect between attitudes and actual practices. Addressing these gaps requires strengthening practical training, improving supervision, and ensuring availability of necessary resources to translate positive attitudes into consistent safe practices.

7.4 Food Safety Practices Among Food Handlers

The findings of this study indicate that food safety practices among food handlers were generally inadequate, with more than half of the respondents demonstrating poor practices (57.9%). This is a critical public health concern, as food handling practices represent the point at which knowledge and attitudes are translated into action. Poor practices therefore increase the risk of food contamination and foodborne disease transmission.

The overall poor level of practices observed in this study is consistent with findings from previous studies conducted in Uganda and similar settings. For instance, studies in Nakawa and other informal food sectors have reported widespread unsafe practices, including handling money while serving food, lack of protective clothing, and use of unclean utensils (Godfrey, 2022, Rutaro et al., 2024). Similarly, studies in Moroto and other parts of Uganda have shown that despite having knowledge and positive attitudes, food handlers often fail to consistently implements safe practices (Aleper, 2024). These similarities suggest that poor safety practices remain a persistent challenge, particularly in informal food handling environments.

Although some practices in this study showed moderate compliance, such as handwashing before food preparation (44.7% always, 53.7% sometimes) and proper waste disposal (55.8% always), many critical practices were inconsistently applied. For example, the use protective clothing was notably low, with only 21.7% reporting always using such equipment, while a substantial proportion reported rarely (41.4%) or never (8.0%). This finding is consistent with previous studies, which have documented low use of protective gear among food handlers due to factors such as discomfort, cost, or lack of enforcement (Asasira, 2025, Vukojo, 2024).

In addition, practices related to temperature control and food storage were particularly poor, with only 17.3% of respondents reporting always storing perishable foods at appropriate temperatures, while the majority reported rarely doing so (45.6%). This is a critical gap, as improper storage conditions significantly increase the risk of microbial growth and food spoilage. Similar deficiencies in temperature control practices have been reported in studies assess the food safety management systems in Uganda (Nabaggala, 2023)

Unsafe practices were also evident in behaviors that directly increase contamination risks. a high proportion of respondents reported handling food while sick (60.5% always), and handwashing after handling money was limited (only 16.5% always). These findings are particularly concerning, as they represent direct pathways for the transmission of pathogen. Similar behaviors have been widely documented in previous studies, where food handlers continued unsafe practices despite awareness of associated risks (Godfrey, 2022, Rutaro et al., 2024)

Furthermore, practices related to cross-contamination prevention, such as the use of separate knives and cutting boards, were poorly adhered to, with only 13.7% reporting consistent use. This indicated a significant gap in the application of critical food safety measures. Previous studies have similarly reported inconsistent application of such practices, particularly in informal setting where resources and supervision are limited (Ssubi et al., 2024)

The observational findings further reinforce the inadequacies identified in self-reported practices. While respondents reported moderate adherence to several food safety measures, direct observation revealed substantial gaps in the actual implementation of these practices across food establishments. For example, essential hygiene infrastructure such as access to clean water and availability of functional handwashing facilities was inadequate in many establishments. In addition, critical practices such as proper temperature control (28.4%) and separation of raw and cooked foods (40.0%) were poorly observed. Personal hygiene practices were also inconsistent, with low use of protective clothing (37.8%) and poor hand hygiene after handling money (29.8%).

This discrepancies between reported and observed practices suggest the presence of social desirability bias, where respondents may over-report compliance with recommended practice. Similar differences between reported and observed practices have been documented in previous

studies, particularly in informal food handling environments, where practices are often poorer than reported (Godfrey, 2022, Rutaro et al., 2024). Furthermore, these findings highlight those poor practices are not only behavioral but are strongly influenced by environmental and infrastructural constraints such as limited water supply, poor sanitation, and inadequate facilities

The findings of this study clearly demonstrate a knowledge-attitude-practice gap, where food handlers possess reasonable knowledge and positive attitudes but fail to consistently translate these into safe practices. This observation is consistent with findings from studies along food value chain in Uganda, which highlight that awareness alone does not guarantee safe behavior due to structural and environmental constraints (Namubiru et al., 2024)

The open-ended finding further provide insight into the underlying causes of poor practices. The most commonly reported challenges include limited access to clean water (26.0%), lack of training (20.1), and financial constraints (17.0%). These factors indicate that poor practices are not solely a result of individual behavior but are strongly influenced by external conditions. Similar challenges have been reported in previous studies, which emphasize that inadequate infrastructure and limited resources hinder the implementation of safe food handling practices (Rutaro et al., 2024)

In addition, respondents highlighted the need for regular training, improved enforcement, and better infrastructures to support safe practices. These suggestions align with existing literature, which emphasizes that effective food safety interventions must go beyond knowledge provision to include continuous supervision, regulatory enforcement, and provision of enabling environments (Galiwango, 2022, Asasira, 2025)

Overall, the findings of this study indicate that food safety practices among food handlers are inadequate and inconsistent, despite the presence of moderate knowledge and positive attitudes. Addressing this gap requires a comprehensive approach that includes strengthening practical training, improving access to essential resources such as clean water and protective equipment, and enhancing enforcement of food safety regulations. Such measures are essential to ensure that knowledge and attitudes are effectively translated into safe and consistent food handling practices.

CHAPTER EIGHT

CONCLUSION AND RECOMMENDATION

8.1 CONCLUSION

This study was conducted to assess the knowledge, attitudes, and practices of food handlers towards food safety. The findings provide important insights into the current state of food safety compliance and highlight critical gaps that pose a risk to public health.

Overall, the study demonstrates that while food handlers possessed moderate knowledge of food safety and generally positive attitudes towards safe food handling practices, these did not consistently translate into appropriate behavior. Significant knowledge gaps were identified in key technical ear such as temperature control and understanding of foodborne pathogens. Despite widespread agreement on the importance of hygiene, safety regulations, and preventive practices, actual implementation remained inconsistent.

The study further revealed that food safety practices were largely inadequate, with more than half of the respondents exhibiting poor practices. Critical risk behaviors such as improper food storage, inadequate use of protective equipment, poor hand hygiene, and handling food while sick were commonly reported. Observational findings reinforced these results, showing that actual practices in food establishments were often poorer than self-reported behaviors, with notable deficiencies in hygiene infrastructure, food handling, and contamination control measures.

These findings collectively demonstrate a clear knowledge attitude practice (KAP) gap, where awareness and positive perceptions of food safety do not necessarily result in safe practices. This gap is influenced not only by individual behavior but also by structural and environmental constraints, including limited access to clean water, inadequate infrastructure, and weak regulatory enforcement.

Inclusion, the study highlights that improving food safety among food handlers requires more than knowledge and positives attitudes alone. Without addressing the underlying systemic an behavioral barriers, unsafe practices will persist, increasing the risk of foodborne diseases. Therefore, a comprehensive approach that integrates training, infrastructure improvements, and effective regulatory enforcement is essential to ensure safe and consistent food handling practices

8.2 RECOMMENDATIONS

1. Namisindwa District local Governments

The District and Bumbo Town council authorities should strengthen routine inspection and supervision of food establishments, particularly among street food vendors and informal food handlers. regular monitoring and enforcement of the food safety regulations will improve compliance with hygiene standards.

There is also need to enforce requirements for medical examination and certification of food handlers to reduce the risk of foodborne disease transmission

2. The public health Department

The public health officer such the health assistants, Health Inspectors and Environmental health officers at the district and Town council levels should intensify health education and community sensitization programs targeting food handlers. These programs should focus on critical areas identified in the study, including, Safe food storage and temperature control, Hand hygiene practices, Prevention of cross contamination and Risks of handling food while sick

Supportive supervision and follow-up should be strengthened to ensure that knowledge is translated into practice.

3. Infrastructure and Resource support by the Town council

Given that limited water supply and poor sanitation were key challenges, there is need for the Town council to invest in basic infrastructure, including, reliable access to clean water, improved sanitation facilities and waste management systems. This will enable food handlers to implement safe food practices effectively.

4. Food handlers and food establishment owners

Food handlers should be encouraged by the Town council and District authorities to consistently adhere to recommended food safety practices such as regular handwashing with soap, use of protective gear, avoiding food handling when sick to ensure food safety

5. Further Research

Further studies should be conducted in similar rural and semi-urban setting to explore barriers to food safety compliance and evaluate the effectiveness of intervention programs.

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APPENDICES

1.0 APPROVAL LETTER

BUMBO TOWN COUNCIL

NAMISINDWA DISTRICT

P.O.BOX 335, Mbale

4th December, 2025

Echasa Joel

Student

Makerere University

School of Public Health

RE: APPROVAL TO CONDUCT RESEARCH IN BUMBO TOWN COUNCIL

Reference is made the introductory letter from Makerere University School of Public Health Dated 26th November 2025, regarding your request conduct research titled **"Knowledge, Attitude and Practices on Food Safety Among Food Handlers in Bumbo Town Council, Namisindwa District."**

I am pleased to inform you that Bumbo Town Council grants you permission to carry out your research within its Jurisdiction

Furthermore, upon completion of your study, you will be required to submit a copy of the final research report to Bumbo Town Council. This will enable us to review the findings and, where appropriate, utilize the recommendations to inform planning, policy formulation, and interventions aimed at improving public health and food safety within the Town Council.

The council looks forward to your corporation and wishes you success in your academic work.

Your faithfully

TOWN CLERK
BUMBO TOWN COUNCIL
04 DEC 2025
NAMISINDWA DISTRICT
LOCAL GOVERNMENT

Wafula Isaac

Town Clerk

Bumbo Town Council

1.1 CONSENT FORM

KNOWLEDGE, ATTITUDES, AND PRACTICES ON FOOD SAFETY AMONG FOOD HANDLERS IN BUMBO TOWN COUNCIL, NAMISINDWA DISTRICT:

Introduction

Hello, my name is……. A student of Makerere University School of Public Health, conducting research on knowledge, attitudes, and practices on food safety among food handlers in Bumbo town council, Namisindwa district: I kindly request you to participate in this study.

Purpose of the study

You are being invited to take part in a study that seeks to assess the knowledge, attitudes, and practices related to food safety among food handlers in Bumbo Town Council, Namisindwa District. The findings will help identify areas for improvement and inform interventions to strengthen food safety and public health in the community.

Procedure

By our sampling procedure, you have been selected to participate in this study, and I will collect some information about your social demographics and request you to answer the questions concerning food safety as the online form requires. The questionnaire will take about 10 to 15 minutes

Risks and Benefits

There are no anticipated risks or discomforts from participating in this study. While there will be no direct financial benefit to you, your contribution will help improve the understanding and management of food safety among food handlers in border communities.

Confidentiality

All information collected will be confidential, and no indication of participants' names will be disclosed. The collected data will only be accessible to the researcher and will be kept under lock with passwords.

Voluntary Participation

Taking part in this study is completely your choice. You choose to participate or not to participate. In case you choose to participate and, along the way, you change your mind, it will still be fine, and no penalties are attached in case someone chooses to quit the study.

Compensation:

No compensation will be given.

Questions:

Do you have any questions about the study that you would like me to attend to?

Contact information: In case you have any other questions or concerns about this study later, you may contact Mr. Joel Echasa, the Principal Investigator, on his telephone numbers: +2567784564522 or +256704640743.

Significance of your signature: Indication of your signature below means that you understand the information given to you in this consent form and that you have agreed to participate.

Participants Signature ……... Date…….

Signature of the interviewer …….

TRANSLATED CONSENT FORM

1.1 EKIFUUMO she khufukilisa

AMAGEZI, OBUYIIYA N'OBUKWAFU KU BY'OKULYA OBUTALINA BULABE MU BAKOLA EBY'OKULYA MU BUMBO TOWN COUNCIL, NAMISINDWA DISTRICT

Okutandikawo

Shirembo, erinnya lyange ……. Ndi muyizi wa Makerere University School of Public Health, nkola okunoonyereza ku magezi, obuyiiya n'obukwafu ku by'okulya obutalina bulabe mu bakola eby'okulya mu Bumbo Town Council, Namisindwa District. Nkusaba obutalina bulabe okwetaba mu kunoonyereza kuno.

Ekigendererwa ky'okunoonyereza

Okwetaba kwo kukusaba mu kunoonyereza okwekenneenya amagezi, obuyiiya n'obukwafu ku by'okulya obutalina bulabe mu bakola eby'okulya mu Bumbo Town Council, Namisindwa District. Ebivudde mu kunoonyereza bino bijja kuyamba okutegeera ebifo ebyetaaga okunywezebwa era bitwale ku bikolwa eby'okunyweza obutalina bulabe mu by'okulya n'obulamu bw'abantu mu kitundu.

Enkola

Okusinziira ku nkola y'okulonda, olondeddwa okwetaba mu kunoonyereza kuno. Nnaakusaba obutalina bulabe okumpa ebikwata ku bulamu bwo era okuddamu ebibuuzo ku by'okulya obutalina bulabe nga bwe biri mu fomu. Ekibuuza kino kijja kutwala wakati w'eddakiika 10–15.

Obulabe n'Emiganyulo

Tewali bulabe oba obutalina bulungi obulindiddwa mu kwetaba mu kunoonyereza kuno. N'okuwa tewali ssente zonna, obutalina bulabe bwo bujja kuyamba okutegeera n'okulongoosa engeri y'okukola ku by'okulya obutalina bulabe mu bitundu ebiri ku nsalo.

Obukuumi bw'Obubaka

Ebikwata ku muntu byonna bijja kuba mu kyama era tebijja kulaga mannya g'abatabaako. Ebibuuza bijja kuba bigyiddwa mu kyama era bijja kukwatibwa mu kifo ekikuumiddwa ne passwords.

Okwetaba kw'Obuyiiya

Okutabaako mu kunoonyereza kuno kye kyo kyokka. Osobola okukkiriza oba okugaana. Bw'oba okukkirizza era mu kkubo ne wakyusa omutima gwo, kijja kuba bulungi era tewali kibonerezo.

Okusasulwa

Tewali kusasulwa kujja kuweebwa.

Ebibuuzo

Waliwo ebibuuzo ku kunoonyereza kuno by'oyagala nkuweeyo?

Obubaka obw'okukwatagana

Bw'oba olina ebibuuzo ebirala oba okweraliikirira ku kunoonyereza kuno mu biseera eby'omu maaso, osobola okukwatagana ne Mr. Joel Echasa, Principal Investigator, ku nnamba za ssimu: +2567784564522 oba +256704640743.

Obukulu bw'Omukono gwo

Okusiga omukono wansi wano kulaga nti otegedde obubaka obuweddewo mu kifuumo kino era okukkirizza okwetaba.

Omukono gw'Omwetaba: …….. Olunaku…….
Omukono gw'omubuuzisa: …….

1.2 QUESTIONAIRE

KNOWLEDGE, ATTITUDE, AND PRACTICES ON FOOD SAFETY AMONG FOOD HANDLERS IN BUMBO TOWN COUNCIL, NAMISINDWA DISTRICT

Please answer the following questions by circling the appropriate option or typing your answer in the space provided.

PART A: Social Demographics

A1. Age in complete years _____

A2. Gender (Single response only)

a) Male b) Female c) Prefer not to specify

A3. What is your religion?

a) Catholic b) Anglican c) Moslem d) Others specify……..

A4. Marital status (Single response only)

a) Single b) Married c) Divorced d) Widowed

A5. Level of Education

a) No formal education b) Primary c) Secondary d Tertiary/ University

A6. Type of food business are you doing

a) Restaurant b) Street vending c) Market stall d) Butchery

e) Others specify_____

A7. Work experience as a food handler? (in years)

a) Less than 1 b) 1-3 c) 4-6 d) 7-10 e) Above 10

A8) Have you ever received any training on food safety/hygiene? A) Yes b) No

A9) If yes, who provided the training?

a) MOH b) Local Government c) NGO d) Others specify____

A10) Do you possess a medical certificate for food handlers? a) Yes b) No

A11) If yes, when were you last given the certificate

a) Less than 3 months b) 6 months c) 1 Year d) More than 1 year

PART B: Knowledge of food safety

Scoring: Yes=1, No/Not sure=0

B1) Do you know that poor handling can cause foodborne diseases? a) Yes b) No

B2) Do you think washing hands before food preparation prevents food contamination?

a) Yes b) No

B3) Do you know the importance of keeping raw and cooked food separate? a) Yes b) No

B4) Do you know that unclean water can contaminate food? a) Yes b) No

B5) Have you ever heard of diseases such as typhoid, cholera, dysentery, or food poisoning?

a) Yes b) No

B6) Do you think proper waste disposal reduces contamination risks? a) Yes b) No

B7) Do you know the correct temperatures for storing perishable foods? a) Yes b) No

c) Not sure

B8) Have you ever been taught about food-borne pathogens (e.g., E. coli, Salmonella)? a) Yes

b) No

B9) Do you know that food handlers with cuts, wounds, or bruises should not handle food? a) Yes

b) No

B10) Do you know that improper cleaning of knives, cutting boards, and utensils can contaminate food? a) Yes b) No

B11) In your own words, what are the main causes of food contamination in your area?_____

PART C: Attitudes towards food safety

Scoring: Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1

Note: Reverse score negatively worded items (e.g., using gloves and aprons is unnecessary)

C1) Food safety is everyone's responsibility

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C2) It's important for food handlers to have regular medical check-ups

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C3) Using gloves and aprons when handling food is unnecessary *(reverse-coded)*

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C4) I feel confident that I can handle food safety at my workplace

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C5) Food safety laws help protect public health

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C6) Reporting foodborne illness to authorities is important

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C7) Cleaning and sanitation are essential parts of my daily routine

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C8) Food Inspection by local authorities is necessary

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C9) I should not handle food if I have cuts, wounds, or bruises on my hands

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C10) Cleaning surfaces and utensils before food preparation is important to prevent contamination

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C11) Handling money while serving food increases the risk of contamination

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C12) Regular training could improve food safety and hygiene practices

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C13) Using separate knives and cutting boards for different foods is important

a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

C14) What do you think can motivate food handlers in Bumbo Town Council to follow better food practices? _____

PART D: Practices on food safety

Scoring: Always=4, Sometimes=3, Rarely=2, Never=1

Instructions: Please indicate how often you perform the following food safety practices by ticking the appropriate option

D1) I wash my hands with soap before preparing or serving food

a) Always b) Sometimes c) Rarely d) Never

D2) I wear protective clothing (e.g., aprons, gloves, head cover, shoes) during food handling.

a) Always b) Sometimes c) Rarely d) Never

D3) I keep raw and cooked foods separately during preparation and storage.

a) Always b) Sometimes c) Rarely d) Never

D) I clean utensils, tables, and surfaces before and after food preparation

a) Always b) Sometimes c) Rarely d) Never

D5) I use safe and clean water for cooking and washing food items.

a) Always b) Sometimes c) Rarely d) Never

D) I store perishable food at appropriate temperatures

a) Always b) Sometimes c) Rarely d) Never

D7) I cover all cooked food to protect it from flies, dust, and other contaminants

a) Always b) Sometimes c) Rarely d) Never

D8) I dispose of food waste properly and regularly

a) Always b) Sometimes c) Rarely d) Never

D9) I attend regular health check-ups as required for food handlers

a) Always b) Sometimes c) Rarely d) Never

D10) I handle or process food when I am sick

a) Always b) Sometimes c) Rarely d) Never

D11) I remove jewelry (rings, bracelets, watches) when preparing food

a) Always b) Sometimes c) Rarely d) Never

D12) I wash my hands after handling money before serving food

a) Always b) Sometimes c) Rarely d) Never

D13) I use separate knives and cutting boards for or raw and cooked foods

a) Always b) Sometimes c) Rarely d) Never

D14) I clean food storage areas before placing new items

a) Always b) Sometimes c) Rarely d) Never

D15) I take measures to protect food from flies and pests

a) Always b) Sometimes c) Rarely d) Never

D16) What challenges do you face in maintaining proper hygiene and safety? _____

Thank You

1.2 TRANSLATED QUESTIONNAIRE

AMAGEZI, OBUYIIYA N'OBUKWAFU KU BY'OKULYA OBUTALINA BULABE MU BAKOLA EBY'OKULYA MU BUMBO TOWN COUNCIL, NAMISINDWA DISTRICT

Ustsa kwilamu bireebo ibi nga ura ingara khu byesi wambasa khuba nga nibyo bituufu..

PART A: BIBIKHUWAMBAKHO

A1. Kimiiko uli nakiinga? _____

A2. Uli uwe sisetsa namwe uwesikelema?

b) Uwesisetsa b) uwesikelema c) sewandikanile khusikanikhakho taa

A3. Uli uwa'ddini shiina?

b) Catholic b) Anglican c) Moslem d) namwe ?.....……..

A4. Ukhwalikha?

b) Taa b) yee c) mwalekhana noomukanwa d) Namulekhwa

A5.Wasomakho wolawa?

b) Sanasomakho taa b) Primary c) Secondary d Tertiary/ University

A6. Business siina iye biilyo bisi ukulisa

b) Restaurant b) ukulisila khu street c) khumudaala kwe khatale d) Butchery e) namwe?_____

A7. Wamlile kimiiko kinga nga ukulisa biilyo?

b) Asiii wa 1 b) 1-3 c) 4-6 d) 7-10 e) khutumisa 10

A8) wafuna kho kumusomo mukhulinda bilyo biili bilayi ate nga biyonjo?

A) Yee b) Taa

A9) nga yee, naanu wakhuwa kumusomo ukwo?

b) Ministr iye byebulamu b) idistulikiti c) NGO d) namwe?

A10ulikho ni certificate iye byebulamu isi wepimisilakho? a) Yee b) Taa

A11) mga yee, wasembayo khukifuna liiina?

b) Lwanyuma lwe kimyeesi 3 b) Lwanyuma lwe kimyeesi 6 c) Lwanyuma lwe kimyeesi 12 d) khutumisa kumwiiko 1

PART B: Amagezi ku by'okulya obutalina bulabe

Okubalirwa: Yee = 1, Nedda/Obutamanya = 0

B1 Omanyi nti okukola obubi ku by'okulya kuyinza okuleeta endwadde? a) Yee b) Nedda

B2 Olowooza nti okunaaba engalo nga tonatandika okukola ku by'okulya kuziyiza okutabaaza? a) Yee b) Nedda

B3 Omanyi obukulu bw'okutereka ebyakulya ebibisi n'ebiweddeko mu bifo eby'enjawulo? a) Yee b) Nedda

B4 Omanyi nti amazzi agatali malongo gayinza okutabaaza eby'okulya? a) Yee b) Nedda

B5 Wawulidde ku ndwadde nga typhoid, cholera, dysentery, oba food poisoning? a) Yee b) Nedda

B6 Olowooza nti okusuula obutale obubi kuziyiza obulabe? a) Yee b) Nedda

B7 Omanyi ebipimo eby'obulungi eby'okutereka eby'okulya ebisoboka okuzikirira? a) Yee b) Nedda c) Sikyamanya

B8 Waliwo olutendeke ku mikyafu egiyinza okuleeta endwadde mu by'okulya (E. coli, Salmonella)? a) Yee b) Nedda

B9 Omanyi nti omukola eby'okulya nga alina ebisago oba ebisago ku mikono tasobola kukola ku by'okulya? a) Yee b) Nedda

B10 Omanyi nti obutakukuta obulungi ebyokutema (ebiso, ebikuta, ebikozesebwa) kuyinza okutabaaza eby'okulya? a) Yee b) Nedda

B11 Mu bigambo byo, ebisoko eby'amaanyi ebireeta okutabaaza eby'okulya mu kitundu kyo byeebi? _____

PART C: Obuyiiya ku by'okulya obutalina bulabe

Okubalirwa: Okukkiriza nnyo = 5, Okukkiriza = 4, Obutali ku ludda = 3, Obutakkiriza = 2, Obutakkiriza nnyo = 1 (Ebibuuzo ebirina ebigambo ebibi byebalirwa mu ngeri ey'enjawulo)

C1 Obutalina bulabe mu by'okulya kye kimu ku buli muntu

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C2 Ky'amaanyi abakozi b'eby'okulya okukebera obulamu buli kiseera

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C3 Okukozesa engoye ez'okukuuma (gloves, aprons) tekiriiko kye kireeta (reverse-coded)

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C4 Nnina obwesige nti nsobola okukola ku by'okulya obutalina bulabe mu kifo kyange

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C5 Amateeka ku by'okulya agayamba okukuuma obulamu bw'abantu

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C6 Okutegeeza ab'obuyinza ku ndwadde eziva mu by'okulya kye kintu ky'amaanyi

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C7 Okutukuvu n'okunaaba buli lunaku kye kimu ku mulimu gwange

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C8 Okukeberwa eby'okulya okuva mu buyinza bw'ekyalo kye kintu ky'amaanyi

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C9 Ssikyalina kukola ku by'okulya nga nnina ebisago ku mikono

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C10 Okunaaba ebifo n'ebikozesebwa nga tonatandika okukola ku by'okulya kye kintu ky'amaanyi

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C11 Okukola ku ssente nga weeyambisa eby'okulya kuyinza okuleeta obulabe

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C12 Olutendeke olutalina bulabe luyinza okwongera ku mikwafu gy'abakozi b'eby'okulya

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C13 Okukozesa ebiso n'ebikuta eby'enjawulo ku by'okulya ebibisi n'ebiweddeko kye kintu ky'amaanyi

a) Okukkiriza nnyo b) Okukkiriza c) Obutali ku ludda d) Obutakkiriza e) Obutakkiriza nnyo

C14 Kiki ekisobola okukubiriza abakozi b'eby'okulya mu Bumbo Town Council okunyweza obukwafu? _____

PART D: Obukwafu mu by'okulya

Okubalirwa: Buli kiseera = 4, Ebiseera ebimu = 3, Ebiseera bitono = 2, Nedda = 1

D1 Nnaaba engalo n’ensabuni nga tonatandika okukola ku by’okulya

a) Buli kiseera b) Ebiseera ebimu c) Ebiseera bitono d) Nedda

D2 Nnyambala engoye ez’okukuuma (aprons, gloves, head cover, shoes) nga nkola ku by’okulya

a) Buli kiseera b) Ebiseera ebimu c) Ebiseera bitono d) Nedda

D3 Ntereka eby’okulya ebibisi n’ebiweddeko mu bifo eby’enjawulo

a) Buli kiseera b) Ebiseera ebimu c) Ebiseera bitono d) Nedda

D4 Nnaaba ebikozesebwa, emmeeza n’ebifo nga tonatandika era nga nkomaliriza

a) Buli kiseera b) Ebiseera ebimu c) Ebiseera bitono d) Nedda

D5 Nkozesa amazzi amalongo mu kukola n’okunaaba eby’okulya

a) Buli kiseera b) Ebiseera ebimu c) Ebiseera bitono d) Nedda

D6 Ntereka eby’okulya ebisoboka okuzikirira mu bipimo ebibulungi

a) Buli kiseera b) Ebiseera ebimu c) Ebiseera bitono d) Nedda

D7 Nfunika eby’okulya ebikoleddwa okukuuma okuva mu nsenene, enfuufu n’ebirala

a) Buli kiseera b) Ebiseera ebimu c) Ebiseera bitono d) Nedda

D8 Nsuula obutale obubi mu kiseera ekituufu

a) Buli kiseera b) Ebiseera ebimu c) Ebiseera bitono d) Nedda

D9 Nkolako ku kebera obulamu buli kiseera nga bwe kyetaagisa

a) Buli kiseera b) Ebiseera ebimu c) Ebiseera bitono d) Nedda

D10 Nkola ku by’okulya nga ndi mulwadde _____

Wanyala naabi.

1.3 OBSERVATIONAL CHECKLIST FOR FOOD HANDLERS

ID NO: _____

Date: _____

Name of food establishment: _____

Location/Cell/Ward: _____

Instruction for observer: Tick Yes if the item is observed or compliant, No if not, and N/A if not applicable.

1. Environmental and General Hygiene

No	Observation	Yes	No	N/A
1	Compound/surroundings are clean and well-maintained			
2	Waste is properly disposed of and not accumulated			
3	No evidence of vermin (flies, cockroaches, rats)			
4	Ventilation is adequate			
5	Lighting is adequate			
6	Handwashing facility is present and functional			
7	The water supply is clean and sufficient for food preparation			
8	Sanitary facilities (toilets/latrines) are clean and usable			

2. Food Handling & Storage

No	Observation	Yes	No	N/A
9	Raw and cooked foods are stored separately			
10	Food storage areas are clean			
11	Perishable food is stored at appropriate temperatures			
12	Food is covered to protect from flies, dust, and contamination			
13	Utensils (knives, cutting boards, hooks) are clean before use			
14	Separate utensils are used for raw and cooked foods			
15	Work surfaces are clean before food preparation			

3. Protective Clothing & Personal Hygiene

No	Observation	Yes	No	N/A
16	The food handler is wearing clean protective clothing (apron, coat, gloves)			
17	Headgear or hair covering is worn			
18	Hands are visibly clean			
19	Jewelry (rings, bracelets, watches) is removed			
20	The food handler has no visible cuts, wounds, or injuries on their hands			
21	A food handler washes their hands after handling money			
22	A food handler washes their hands after using the toilet			
23	Food handler practices good hygiene when coughing/sneezing			
24	A food handler does not handle food when sick			

4. Pest Control

No	Observation	Yes	No	N/A
25	Measures are in place to repel flies and pests (screens, covers, chemicals)			
26	No animals are present in the food preparation area			

5. Notes/comments

Record any additional observations, violations, or good practices:

_____

_____

Thank you

TRANSLATED OBSERVATIONAL CHECKLIST

1.3 EKIKALAKALU KY'OKUKEBERA ABAKOZI B'EBY'OKULYA

ID NO: _____ Olunaku: _____ Erinnya ly'ekifo ekikola eby'okulya: _____ Ekifo/Cell/Ward: _____

Ekiragiro eri omukebera: Kuba akabonero ku *Yee* bw'oba olabye oba ekituufu, *Nedda* bw'oba tekiriiko, era *N/A* bw'oba tekikwatako.

1. Obutukuvu bw'Obutonde n'Obulamu Obwawamu

No	Ekirabibwa	Yee	Nedda	N/A
1	Ekibuga/ebitundu biri bitukuvu era byalungi			
2	Obutale busuulibwa bulungi era tebugattiddwa			
3	Tewali kabonero ka mikyafu (ensenene, obusiri, empuku)			
4	Omukka gutambula bulungi			
5	Okutangaala kulungi			
6	Ekifo ky'okunaabiramu engalo kiri era kikola			
7	Amazzi malongo era gali mu bungi okuteekateeka eby'okulya			
8	Ebifo by'obutukuvu (toilets/latrines) bitukuvu era bisoboka okukozesebwa			

2. Okukola n'Okutereka eby'okulya

No	Ekirabibwa	Yee	Nedda	N/A
9	Eby'okulya ebibisi n'ebiweddeko biterekebwa mu bifo eby'enjawulo			
10	Ebifo by'okutereka eby'okulya bitukuvu			
11	Eby'okulya ebisoboka okuzikirira biterekebwa mu bipimo ebibulungi			
12	Eby'okulya bifunikiddwa okukuuma okuva mu nsenene, enfuufu n'okutabaaza			
13	Ebikozesebwa (ebiso, ebikuta, ebikozesebwa) bitukuvu nga bikozesebwa			
14	Ebikozesebwa eby'enjawulo bikozesebwa ku by'okulya ebibisi n'ebiweddeko			
15	Ebifo by'okukoleramu bitukuvu nga tonatandika okukola ku by'okulya			

3. Engoye ez'okukuuma n'Obutukuvu bw'omuntu

No	Omukozi w'eby'okulya ayambadde engoye ezitukuvu ez'okukuuma (apron, coat, gloves)	Yee	Nedda	N/A
16	Ayambadde ekisunsuluzo ku mutwe oba ekisunsuluzo ky'ebyoya			
17	Engalo zirabika nga zitukuvu			
18	Ebikomo (rings, bracelets, watches) byaggiddwa			
19	Omukozi talina bisago, ebisago oba ebisago ebirabika ku mikono			
20	Omukozi anaaba engalo nga amaze okukola ku ssente			
21	Omukozi anaaba engalo nga amaze okukozesa kabuyonjo			
22	Omukozi akola obutukuvu obulungi nga akolokota/akikoona			
23	Omukozi akola obutukuvu obulungi nga akolokota/akikoona			
24	Omukozi takola ku by'okulya nga mulwadde			

4. Okukuuma okuva mu Nsenene n'Obulabe

No		Yee	Nedda	N/A
25	Waliwo ebipimo eby'okuziza nsenene n'ebikoko (screens, covers, chemicals)			
26	Tewali nsolo mu kifo ky'okuteekateeka eby'okulya			

5. Obubaka/Okunnyonnyola

Wandika ebirabiddwa ebirala, ebikyamu, oba ebikolwa ebirungi:

Webale _____

Wanyala naabi