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The background of the page features a large, faint watermark of the University of Cape Coast crest. The crest is a shield with a red top section containing a yellow eagle with spread wings. The middle section has blue and white wavy horizontal stripes. The bottom section is a yellow circle with a red stylized figure inside. A red ribbon banner wraps around the bottom of the shield with the Latin motto 'VERITAS LUMEN NOBIS' in white capital letters.

FOOD SAFETY PRACTICES AND HEALTH OUTCOMES AMONG
POST-NATAL MOTHERS, NURSING 6–12-MONTH-OLD CHILDREN IN
THE SEKYERE SOUTH DISTRICT, GHANA

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UNIVERSITY OF CAPE COAST

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POST-NATAL MOTHERS, NURSING 6–12-MONTH-OLD CHILDREN IN
THE SEKYERE SOUTH DISTRICT, GHANA

BY

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Thesis submitted to the Department of Health, Physical Education and
Recreation of the Faculty of Science and Technology Education, College of
Education Studies, University of Cape Coast, in partial fulfilment of the
requirements for the award of Master of Philosophy Degree in Health
Education

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:..... Date:.....

Name: Richard Mensah

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

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ABSTRACT

This study assessed the food safety practices and health outcomes among postnatal mothers, nursing 6–12-month-old children in the Sekyere South District. The research employed a descriptive research design. Data were collected from 571 postnatal mothers attending Child Welfare Clinic sessions in six health facilities within the Sekyere South District through a multi-stage sampling method. Data were analysed using SPSS version 21. Frequency, percentage, chi-square, and Cramer's V were the main tools used for the analysis. The results showed that 365(63.9%) of the post-natal mothers were knowledgeable about food safety practices, and 292(51.0%) showed good food safety practices, but this did not translate into health outcomes. The study found that most 319(55.9%) children of postnatal mothers had diarrhoea, 94(16.5%) had dysentery and 69(12.1%) had typhoid. The study also showed a highly statistically significant relationship between sociodemographic characteristics of mothers and mothers' food safety practices, except occupation and household size, which showed no statistically significant difference ($p < 0.05$). It was therefore recommended that the District Health Directorate, in collaboration with the Community Health Workers, ensure a continuous effort to reinforce and build on the existing high level of knowledge among postnatal mothers. This could involve periodic training sessions, workshops, or educational materials that update them on the latest food safety guidelines and practices.

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DEDICATION

To the memory of the late, Nana Ama Nkrumah, my lovely mother.



TABLE OF CONTENTS

	Page
DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
DEDICATION	v
TABLE OF CONTENTS	vi
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF ACRONYMS	xii
CHAPTER ONE: INTRODUCTION	
Background to the Study	1
Statement of the Problem	7
Purpose of the Study	9
Research Objectives	10
Research Questions	10
Significance of the Study	11
Delimitation of the Study	11
Limitation of the Study	12
Definition of Terms	13
Organisation of the Study	14
CHAPTER TWO: LITERATURE REVIEW	
Introduction	16
Theoretical Framework	16
Knowledge, Attitude, and Practice Model (KAP Model)	16

Conceptual Base of the Study	20
Concept of Food Safety	22
Personal Hygiene of Mothers	23
Equipment Use in Food Preparation	25
Importance of Storage of Food	26
Concept and Importance of food safety	27
Food Hygiene Standard	30
Preventing Food Contamination	31
Food-Borne Disease	33
Three Main Types of Food-Borne Disease	34
Food-borne Illness Outbreaks	36
Overview of Child Diarrhoea in Ghana	41
Overview of Typhoid and Dysentery	43
Food Safety Practices among Post-natal Mothers	44
Knowledge of Mothers on Food Safety Practices	47
Sociodemographic Factors Influencing Food Safety Practices	48
Summary	51
CHAPTER THREE: RESEARCH METHODS	
Introduction	53
Study Design	53
Study Area	54
Study Population	56
Sampling Procedure	57
Inclusion and Exclusion Criteria	60
Inclusion criteria	60

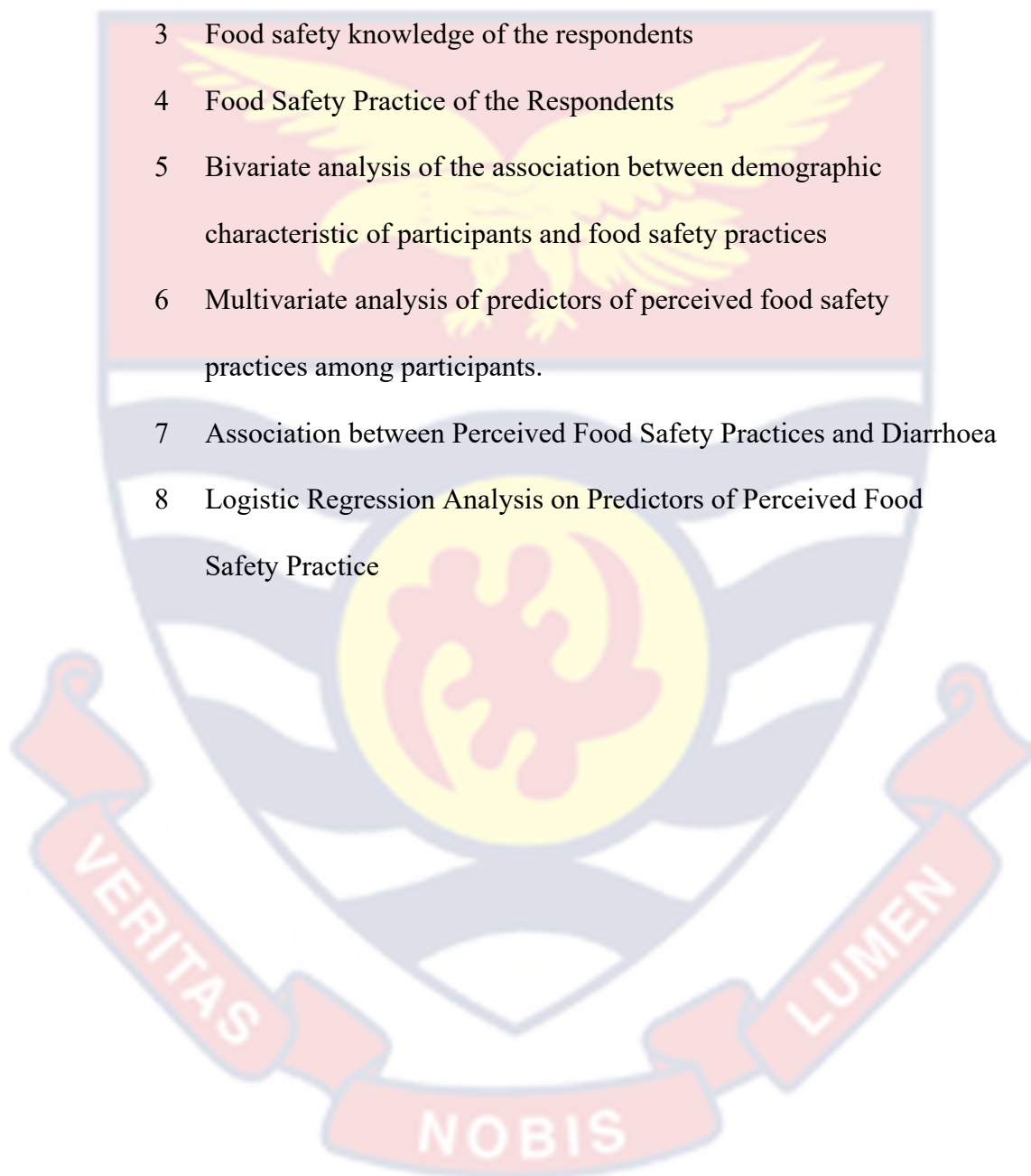
Exclusion criteria	60
Data Collection Instrument	60
Validity and Reliability of the Instrument	64
Data Collection Procedure	66
Data Processing and Analysis	67
CHAPTER FOUR: RESULTS AND DISCUSSION	
Research Question One: What is the knowledge level of food safety among post-natal mothers in Sekyere South District?	72
Research question 2: What is the level of food safety practice of mothers in Sekyere South District?	77
Research question 3: What is the prevalence of food-borne diseases among children aged 6-12 months in Sekyere South District?	81
Research question 4: What demographic factors influence food safety practices among mothers of children of age between 6 and 12 months in Sekyere South District?	84
Research question 5: What food safety practices determine the occurrence of diarrhoea among children of post-natal mothers in Sekyere South District?	93
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	
Introduction	100
Summary	100
Main Findings	102
Conclusions	103
Recommendations	104

Recommendations for Further Studies	105
Implications of findings for maternal and child health	106
REFERENCE	107
APPENDICES	138
APPENDIX A: INFORMATION SHEET	138
APPENDIX B: STRUCTURED QUESTIONNAIRE	140
APPENDIX C: ETHICAL CLEARANCE LETTER	143



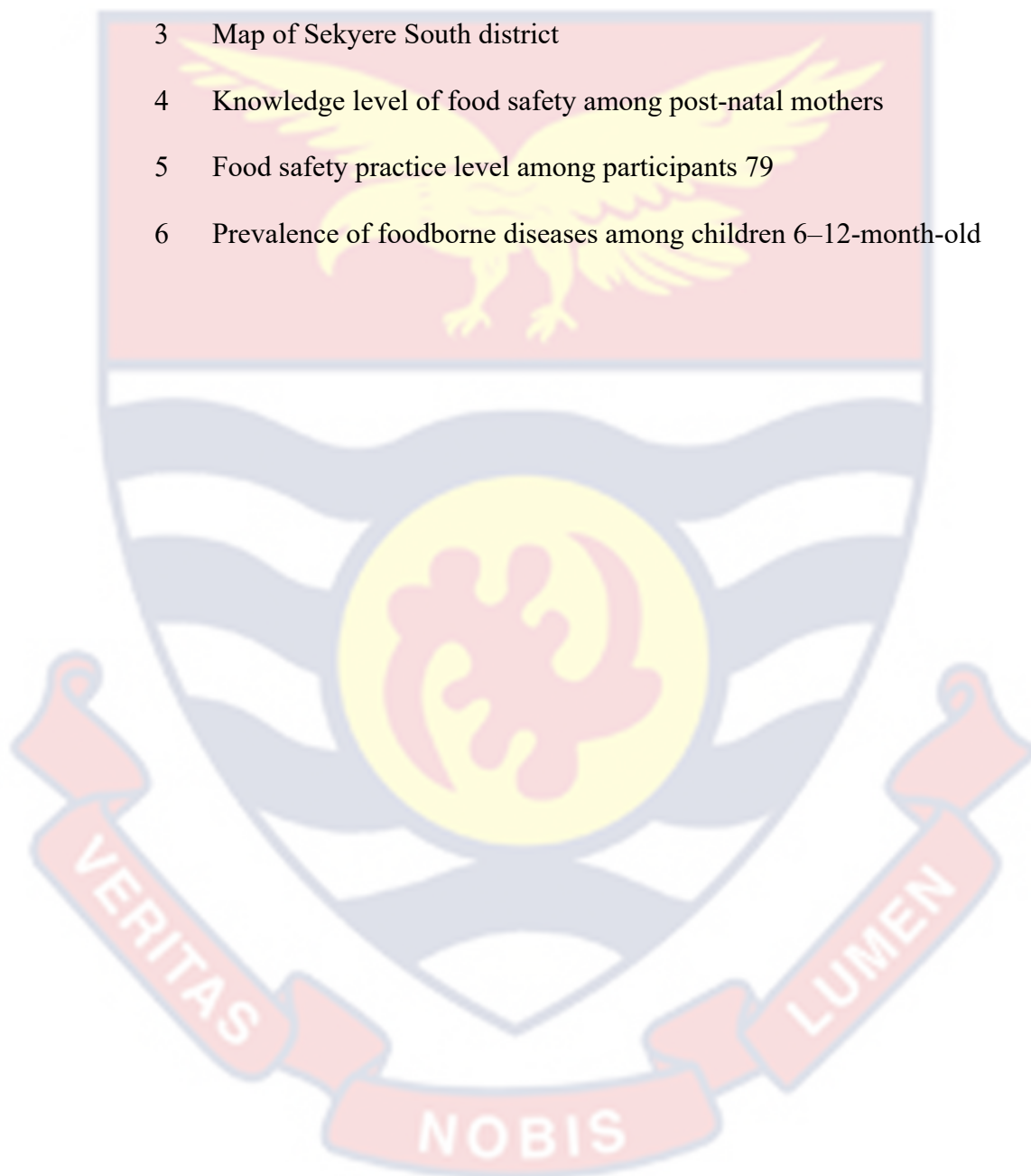
LIST OF TABLES

	Page
1 Postnatal Mothers with Infants Aged 6 months to 1 year	60
2 Demographic characteristics of respondents	72
3 Food safety knowledge of the respondents	74
4 Food Safety Practice of the Respondents	78
5 Bivariate analysis of the association between demographic characteristic of participants and food safety practices	86
6 Multivariate analysis of predictors of perceived food safety practices among participants.	87
7 Association between Perceived Food Safety Practices and Diarrhoea	95
8 Logistic Regression Analysis on Predictors of Perceived Food Safety Practice	96



LIST OF FIGURES

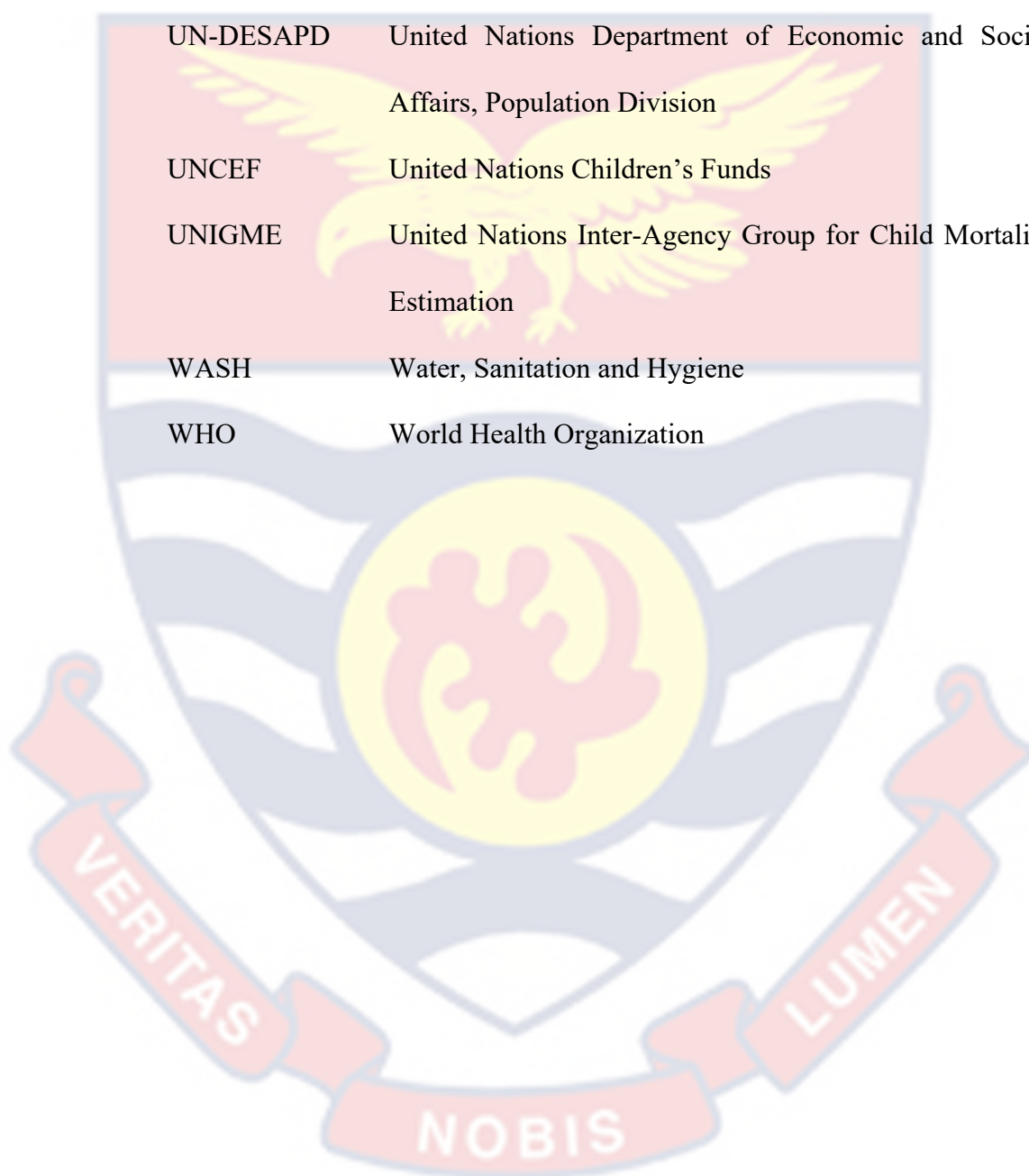
	Page
1 Model of Food Safety Knowledge, Attitude, and Practice	19
2 Conceptual base of the Study	21
3 Map of Sekyere South district	56
4 Knowledge level of food safety among post-natal mothers	75
5 Food safety practice level among participants	79
6 Prevalence of foodborne diseases among children 6–12-month-old	82



LIST OF ACRONYMS


ANC	Antenatal Care
CAC	Codex Alimentarius Commission
CDC	Center for Disease Control
CF	Complementary Feeding
CHPS	Community-Based Health Planning and Services
CWC	Child Welfare Clinic
DHIMS	District Health Information Management Service
DV	Dependent Variable
EBF	Exclusive Breastfeeding
FAO	Food and Agricultural Organization
GHS	Ghana Health Service
GSS	Ghana Statistical Service
HIV	Human Immunodeficiency Virus
HPER	Health Physical Education and Recreation
IEA	Institute of Economic Affairs
IV	Independent Variable
KAP	Knowledge, Attitude and Practice
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MMDAs	Metropolitan, Municipal and District Assemblies
MMF	Minimum Meal Frequency
MoH	Ministry of Health
PNC	Postnatal Care
RPCs	Reasonably Prevention Conditions

SDA	Seventh-Day Adventist
SDGs	Sustainable Development Goals
SPSS	Statistical Package for the Social Sciences
SSA	Sub-Saharan Africa
UN-DESAPD	United Nations Department of Economic and Social Affairs, Population Division
UNCEF	United Nations Children's Funds
UNIGME	United Nations Inter-Agency Group for Child Mortality Estimation
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization



CHAPTER ONE

INTRODUCTION

This chapter provides an overview of the study, including the background to the study, problem statement, purpose of the study, research objectives, research questions, significance of the study, delimitation of the study, limitation of the study, definition of key terms, and the organization of the study.

Background to the Study

Infant survival is a vital indicator for both the health of the mother and the infant, as well as the growth of any nation, as infants are a vulnerable and sensitive population (Alamneh, Adane, Yirga, & Desta, 2020; Appunni & Hamisi, 2013). Infant mortality, a significant public health issue, brings immense sadness to families and forces women to carry their children to term, only to lose them to preventable diseases (Kemp, Maclean, Moyo, Kemp, Maclean, & Moyo, 2021). Due to this unfortunate circumstance, many mothers are afraid to have children, especially in low- and middle-income countries (Kemp et al., 2021). The introduction of guidelines and financial and logistical support for ensuring optimal care for infants resulted from the World Health Organization (WHO) noticing a large increase in maternal concerns (Gebremeskel, Udenigwe, Etowa, & Yaya, 2023). Over the past 20 years, the mortality rate for newborns and children under five has significantly fallen; nevertheless, the infant mortality rate is declining more slowly than the under-five mortality rate (Adjei, Darteh, Netey, & Doku, 2021).

A high incidence of infant mortality is associated with food poisoning from improper food preparation, handling, and storage practices among

postnatal mothers and caregivers (Jevšnik, Česen, Šantić, & Ovca, 2021). Foodborne disease is a problem that affects public health. From WHO statistics, 31 known foodborne risks resulted in 600 million illnesses, 420,000 fatalities, including 125,000 children under five, and the loss of 33 million healthy life years (DALYs) in only 2010 (World Health Organization [WHO, 2022]). Young children are considered a high-risk group for foodborne illnesses due to their immature immune systems, insufficient production of stomach acid, lower mean body weights, and poor control over meal preparation (Kirk et al., 2015). According to Theurich, Humphreys, Gosselin, and McCool-Myers (2019), a significant fraction of diarrhoea diseases among infants and young children are caused by tainted supplementary meals.

A higher risk of having a child die before reaching the age of 5 was associated with factors such as poor hygiene, a dirty home, a lack of toilets, a lack of clean cooking fuel, lack of access to good water, and a large number of people living in the home (Bizzego et al., 2021). Diarrhoea infections are responsible for an alarming 88% of child mortality directly related to a lack of access to WASH services (Gebremedhin, 2019; Mshida, Kassim, Mpolya, & Kimanya, 2018). Poor food hygiene is believed to be a key factor in the spread of diarrhoea (Chidziwisano, Slekiene, Kumwenda, Mosler & Morse, 2019).

Diarrhoea diseases are more common in the first few months after starting supplemental feeding which may introduce potentially harmful pathogenic bacteria in the form of contaminated complementary meals (Walters, Rakotomanana, Komakech, & Stoecker, 2019). An epidemiological study suggests that food may play a greater role in diarrhoea illness transmission than water, with children under the age of 5 accounting for 40% of the burden

in African nations (Das et al., 2021). This is consistent with claims that contaminated supplemental meals may be the source of at least 70% of diarrhoea-related infections in children (Zelege, Bayeh, & Azene, 2022). Childhood diarrhoea disorders are significantly influenced by the safety of supplemental meals for babies and young children (Shati et al., 2020). Around 525,000 young children die each year from infectious diseases like childhood diarrhoea, which affect 1.7 billion people worldwide (Arikpo, Edet, Chibuzor, Odey, & Caldwell, 2018; Jiwok, Adebawale, Wilson, Kancherla, & Umeokonkwo, 2021). South Asia and sub-Saharan Africa have the highest mortality rates for children under 2 years old (Jiwok et al., 2021).

In Africa, more than 30% of children aged less than 5 years suffer from diverse contagious pathogen illnesses. Scientific evidence indicates that poor hygienic practices during complementary food feeding can have profound consequences for the growth, development, and survival of children (Abdurahman, Chaka, Bule, & Niaz, 2019). A study in Malawi found that 27% of children aged 6-24 months experienced diarrhoea in the two weeks following the start of complementary feeding (CF) treatment, leading to 80% experiencing a decrease in height and growth rate and 20% being underweight (Teshome, Yallew, Muluaem, Engdaw, & Zelege, 2022).

With funding from the government of Ghana and organisations like UNICEF, the Ghana Health Service (GHS) has implemented specialised programmes to encourage breastfeeding for the first six months of a child's life and provide universal access to safe drinking water, sanitation, and hygiene education (Tampah-Naah, 2019). In many areas of Ghana, young children suffer diarrhoea and other food-borne disorders. Diarrhoea diseases and acute

respiratory infections are major killers of children under five, according to GHS (2018). Outpatient diarrhoea morbidity cases in the country across the years were: 1,515,189 in 2015; 1,570,557 in 2016; and 1,429,990 in 2017 (GHS).

Diarrhoea diseases remain a significant public health concern among children under five in Ghana. For instance, a cross-sectional study conducted in 2022 across communities in the Central, Greater Accra, and Volta regions found a diarrhea prevalence ratio of 36% among children under five, with the highest cases reported in the Anyako community (Bandoh et al., 2024). Children under the age of one continue to have a disproportionate number of cases of food-borne illness in the Ashanti Region. In 2019, 20,827 occurrences of diarrhoea were reported among children less than one year old; in 2020, the number dropped to 18,283; and in 2021, it was 19,801 (District Health Information Management System [DHIMS], 2022). The Ashanti Region's Sekyere South District also saw increased diarrhoea cases between 2019 and 2021. Some examples are 1,938, 1,489, and 1,328 (DHIMS, 2022). Despite a steady decline since 2019, the rate of diarrhoea among local children under five remains high enough to justify a further inquiry into possible food-borne disease causes. These bouts of diarrhoea in children have been connected to nutrition and environmental factors (Bari & Emon, 2022).

To improve the lives of mothers and newborns, Sustainable Development Goal 3.2 was established as a result of deaths caused by diarrhoea and other risk factors. Sustainable Development Goal 3.2 (SDG-3.2) aims to reduce under-five mortality to at least as low as 25 per 1000 live births by 2030 (United Nations Sustainable Development Goals, 2017). To reach the SDG 3 objective, effective and efficient implementation of achievable methods is

required. Therefore, the World Health Organisation recommends strategies to boost maternal and newborn mortality rates (Semanew et al., 2019; WHO, 2009). One such technique is applying of food safety regulations. According to Satin (2008), food safety is the scientific study of preventing food-borne disease via proper handling, preparation, and storage. Dagne et al. (2019) note that a complementary food safety practice includes ensuring that foods are prepared hygienically, that enough food is available in the home, and that carers use their nutritional knowledge appropriately.

There is a need to better understand the role of parents and carers in maintaining the safety of complementary foods due to the increasing occurrences of growth-faltering episodes and diarrhoea in this age group. Adults who prepare meals at home directly influence the food safety hazards of young children (Chidziwisano et al., 2019). Given the high risk of foodborne illness in infants, postnatal mothers and carers must adhere to strict standards of food safety and hygiene while preparing and handling food for ingestion (Berhanu, Alemu, & Argaw, 2019). However, the issue of actual hygienic practices in introducing supplementary foods might devastate a person's health. Due to the higher risk of foodborne disease in young children in their care, there is a need to better understand parents' and caregivers' food safety management at home.

Dagne et al. (2019) found that only half of the Ethiopian participants reported safe food handling procedures, while the other half used unsafe procedures. Despite a thorough grasp of personal hygiene and food poisoning, separate research demonstrated that women still had poor food handling behaviours; only 66.3% of postnatal moms in Western Ghana showed excellent food preparation (Odonkor, Kurantin, & Sallar, 2020). Odonkor et al. (2020),

also found that, there were notable gaps in actual practices, particularly in food handling, preparation, and storage among the post-natal mothers. A study by Tuglo, Agordoh, Tekpor, Pan, Agbanyo, & Chu (2021) in the North Dayi District, Ghana showed that while a majority had good knowledge of food safety, there were significant gaps in hygiene practices.

To avoid and manage food-borne infections in children aged 6-24 months, it is crucial to have a firm grasp of the risks associated with hygienic practices in feeding supplemental foods. The term “food safety knowledge” describes someone’s expertise in food safety concerns and procedures. According to Seidu (2020), there is a link between rule-following, knowledge, and skill use. Therefore, people should apply their knowledge of food safety to reduce the incidence of foodborne diseases. It has been shown that postnatal moms’ awareness of food safety is essential in ensuring high-quality food is produced at every stage of the food chain (Getu, 2022). Therefore, postnatal mothers who are well-informed about the potential food-contaminating dangers and proper food-handling practices may be better positioned to manage or avoid food-borne diseases in their infants (Dagne et al., 2019).

The increase in food-borne infections, however, has been linked to a lack of food hygiene education, inappropriate food handling practices, disobedience to food safety rules and regulations, and a failure to enforce food safety laws and regulations (Seidu, 2020). Among the 576 mothers and caregivers who were assessed about their supplementary food-feeding hygiene practices and related variables in the Tegedie District of Northwest Ethiopia, 365 (63.8% of the sample) reported having a good understanding of how to feed young infants safely.

Similarly, socio-demographic characteristics have been observed to affect postnatal mothers' adherence to supplemental food safety practices. Himbego, Hanfore, and Dake (2019) investigated the appropriateness of supplemental feeding among mothers of infants aged 6–24 months in the Kedida Gamela area of southern Ethiopia. In March 2017, researchers surveyed community members using a cross-sectional design. Of the participants, 21% of mothers used appropriate supplemental feeding, with younger mothers, women who had postnatal care follow-up, and those who lived in households with access to enough food being more likely to do so.

Food poisoning leading to diarrhoea and cholera in children can be avoided with a basic understanding of food safety and healthy food preparation among postnatal mothers (Zyoud et al., 2019). To achieve Sustainable Development Goal 3.2, a detailed understanding of the risk factors for infant deaths, especially inappropriate food safety practices, is essential to guide targeted interventions.

Statement of the Problem

The function of food safety in supplemental diets is under-researched, even though millions of children aged 6-24 months in underdeveloped countries are exposed to foodborne pathogens. Due to their underdeveloped immune systems, children are more vulnerable than adults to contracting food-borne diseases. Among the 2.2 million people who die from food poisoning annually in underdeveloped countries, 1.9 million are children (Ayaz, Priyadarshini, & Jaiswal, 2018). According to the Ghanaian Food and Drug Authority (2012), staphylococcal food poisoning is responsible for an estimated 185,000 cases of foodborne illness each year, and diarrhoea and dehydration kill approximately

84,000 people in Ghana each year, especially around 25% of children under five years old.

In the Ashanti Region, the case of foodborne diseases remains high among children under one year. For instance, 20,827, 18,283, and 19,801 cases of diarrhoea were recorded among children under one year old in 2019, 2020, and 2021, respectively. Out of these figures, Sekyere South District alone recorded as high as 1,938, 1,489, and 1328, which represent 9.3%, 8.1%, and 6.7% of diarrhoea cases in 2019, 2020, and 2021, respectively (District Health Information Management System [DHIMS], 2022). The high prevalence of food-borne diseases recorded in the district may be due to poor food safety practices, resulting in food poisoning among children of postnatal mothers and caregivers. Also, it is perceived that most of the post-natal mothers and caregivers may have low food safety knowledge due to low educational status since most of the communities in the district are rural. There is a need to better understand the role of parents and other caregivers in maintaining the safety of complementary meals, given the increasing occurrences of growth-faltering events and diarrhoea in this particular age group.

Naeem et al.'s (2022) study in Lahore, Pakistan, found good knowledge among 62.6% (241) mothers but good preventive practice only in 42.1% (162) mothers. The findings show that knowledge does not directly translate into practice. Further research is needed in different cultural and geographical areas for adequate evidence to understand the influence of knowledge on food safety practices among mothers. Other factors, such as sociodemographic characteristics of the mothers, may contribute to this disparity. However, studies (Odonkor et al., 2020; Zyoud et al., 2019) have reported contradictory findings

on the influence of sociodemographic characteristics on food safety practices. Odonkor et al.'s (2020) study among post-natal mothers in Western Ghana found that 86% of the respondents exhibited good food handling practices, 66.3% and 91.7% of the respondents exhibited good food preparation and proper storage practices, respectively. Zyoud et al. (2019) study among mothers in the Nablus District in Palestine found an insignificant association between age, educational status, and food safety practices. The contradictory findings demand further research on the influence of sociodemographic factors on food safety practices among post-natal mothers.

Studies have explored food safety practices among Ghanaian street vendors and other institutional settings (Akabanda, Hlortsi, & Owusu-Kwarteng, 2017; Kunadu, Ofosu, Aboagye, & Tano-Debrah, 2016; Seidu, 2020; Tuglo et al., 2021). However, to the best of knowledge, only one study has been conducted in the country (Odonkor et al., 2020), and no specific study has been conducted in Sekyere South District in the Ashanti region, although post-natal mothers are reportedly significantly contributing to the rising rate of foodborne illnesses. Therefore, there is inadequate evidence in the Sekyere South District about postnatal mothers' food safety knowledge and practices among post-natal mothers. This study aims to fill in that information gap by finding out how much post-natal mothers know about food safety and how their level of knowledge and sociodemographic factors affect how they handle food safety.

Purpose of the Study

The study aimed to determine food safety practices and health outcomes among post-natal mothers, nursing 6–12-month-old children in the Sekyere South District, Ghana.

Research Objectives

Based on the purpose of the study, the following research objectives are formulated to guide the research.

1. To determine the knowledge level of food safety among post-natal mothers in Sekyere South District;
2. To ascertain the level of food safety practices of mothers in Sekyere South District;
3. To examine the prevalence of food-borne diseases among mothers of children of age between 6 and 12 months in Sekyere South District;
4. To determine the sociodemographic factors that influence food safety practices among mothers of children between 6 and 12 months in Sekyere South District;
5. To assess the influence of food safety practices and diarrhoea among children of post-natal mothers in Sekyere South District

Research Questions

1. What is the knowledge level of food safety among post-natal mothers in Sekyere South District?
2. What is the level of food safety practices of mothers in Sekyere South District?
3. What is the prevalence of food-borne diseases among mothers of children of age between 6 and 12 months in Sekyere South District?
4. What sociodemographic factors influence food safety practices among mothers of children between 6 and 12 months in Sekyere South District?

5. What food safety practices determine the occurrence of diarrhoea among children of post-natal mothers in Sekyere South District?

Significance of the Study

The data from this research will broaden our understanding of food safety practices' impact on lowering foodborne illnesses and enhancing children's general health and nutritional status in impoverished nations like Ghana. The research findings will impact how the Ministry of Health develops policies for training and education in food safety. The study's findings will help health officials in Ghana's Ashanti Region better understand how the food handlers' programme has improved the knowledge and skills of food handlers, particularly mothers, in the Sekyere South District. The District Health Directorate's regulatory body will make planning the strategies for preventing foodborne illnesses easier.

In terms of education and research, the study will be utilised to expand knowledge in food safety practices through research and will also be used as a teaching reference tool by health institutions and colleges. The study's findings will serve as a reference source to guide future studies. It will be used by other researchers doing additional research in related fields.

Delimitation of the Study

Geographically, the study covers all post-natal mothers of 6–12-month-old children residing in Sekyere South District. They are selected to discover their knowledge about food safety, the extent to which they practise food safety, and the influence on the health status of their infants. The health outcomes were limited to diarrhoea, typhoid and dysentery. Kish's (1965) formula for known population size was used to determine the sample size for the study, which

yielded 381. However, Ogah (2013) and Cohen, Mannion, and Morrison (2007) have said that the higher the sample size, the better for cross-sectional research. As a result, the sample size of 381 was increased by 50%, totaling 571 post-natal mothers. Purposive sampling was used to select three health centres, simple random sampling technique was used to select three hospitals in the district, and a convenient sampling technique was also used to select post-natal mothers receiving postnatal care at the selected hospitals and health centres. The selected hospitals include: SDA hospital, Asamang, Agona government hospital, and SDA hospital, Wiemoase, and that of the selected health centres also include: Jamasi Health Centre, Kona Health Centre, and Boanim Health Centre. The proportion of postnatal mothers in each selected hospital and health centre was also determined. The inclusion criteria were that participants must consent to participate, must have an infant(s) aged between 6-12 months old, must be giving care, including feeding of the mother and infant(s), and must be permanent residence in the district for at least six months.

In terms of subject matter, the study covered knowledge and food safety practices among post-natal mothers and the health outcomes of 6–12-month-old children residing in the Sekyere south district. The researcher chose this topic because of the high prevalence of food-borne diseases and associated mortality among infants in the district and that having a study will partially help solve this menace.

Limitation of the Study

The study did not account for external factors, such as environmental hygiene, water quality, and healthcare access, which could also contribute to infant health outcomes beyond maternal food safety practices. The study

adopted a quantitative approach, which limited the depth of understanding regarding the reasons behind certain food safety behaviors. The study focused on diarrhoea, typhoid, and dysentery as indicators of foodborne diseases in infants. Other potential health outcomes related to poor food safety, such as malnutrition, cognitive development or bacterial infections, were not assessed. The study was conducted in the Sekyere South District, which may have unique sociodemographic and cultural factors affecting food safety practices. As a result, the findings may not be fully generalizable to other districts or regions in Ghana with different socioeconomic and environmental conditions.

Definition of Terms

Complementary feeding: When breast milk is no longer adequate, complementary feeding adds foods and liquids to a child's diet (WHO, 2008).

Cross-contamination: Centers for Disease Control and Prevention (CDC, 2010) defines cross-contamination as "the introduction of harmful substances or germs into a food product through direct contact, or contact with utensils, equipment, work surfaces, or employee hands or clothing" (p. 1).

Food-borne illness: According to the WHO (2015), food-borne illnesses are defined as resulting from "ingestion of foodstuffs contaminated with microorganisms or chemicals" (p. 1).

Knowledge: "Knowledge" refers to a person's familiarity with a topic from personal experiences, research, and observations. It implies a synthesis of knowledge, experience, judgement, skill, and the capacity to learn and use new information.

Food safety knowledge: "Food safety knowledge" describes how well someone is versed in food safety concerns and procedures.

Food safety practices: It refer to the procedures and measures taken to ensure that food is handled, prepared, stored, and consumed in a way that prevents contamination and foodborne illnesses (WHO, 2006).

Food handlers: anybody who handles or prepares or prepares food packing, handles or unpacks food packaging, and anyone who works in a kitchen.

Food hygiene practice: Precautions taken by those working with food to prevent the spread of disease.

Health outcomes: It refer to the effects of diseases or medical conditions on an individual's overall health and well-being. For this study, "For this study, Health outcomes are the measurable effects of diarrhoea diseases, typhoid fever, and dysentery on the infant's well-being.

Temperature abuse: This occurs when potentially harmful foods are stored in the temperature risk zone of 41°F to 140°F when bacterial development and foodborne illness outbreaks are possible.

Postnatal mothers: They are women who have given birth and are undergoing the postpartum period, which begins immediately after childbirth and lasts for several weeks to months (WHO, 2015).

Organisation of the Study

The study was organised into five chapters. Chapter One covered the introduction to the study, background to the study, statement of the problem, purpose statement, research questions, the significance of the study, delimitation, limitations, and organisation of the study. Chapter Two reviewed related literature to the topic. The theoretical framework and conceptual discussions were presented in this chapter. Chapter Three focused on the research methodology used. Chapter Four covered the analysis and presentation

of findings as well as discussions. Chapter Five summarised the entire research, concluded the key findings, and recommended areas for practice, policy and further research.



CHAPTER TWO

LITERATURE REVIEW

Introduction

The study aimed to determine food safety practices and health outcomes among post-natal mothers, nursing 6-12-month-old children in the Sekyere South District, Ghana. This chapter provided a literature review that addresses the study's questions. The literature is reviewed under the following headings: (a) Theoretical Framework, (b) Conceptual Base of the Study, (c) Food Safety Practices of Post-natal Mothers, (d) Food Safety Knowledge of Post-natal Mothers, and the Influence on Food Safety Practice, (e) Sociodemographic Factors, and the Influence on Food Safety Practice, and (f) Summary.

Theoretical Framework

Knowledge, Attitude, and Practice Model (KAP Model)

Several behavioural sciences theories have been proposed to better comprehend and explain the guiding principles behind human behaviour and activity and the connection between theory and application (Rennie, 1995). However, Ko's (2013) KAP model serves as a framework for this study. This model, seen in Figure 1 below, is widely utilised to describe the connection between knowledge, attitude, and behaviour (Simelane, 2005). The model proposes a robust interdependence among knowledge, attitude, and practices and characterises their dynamic interaction. The primary premise of Rennie's (1995) Knowledge, Attitude, and Practice (KAP) model is that an individual's conduct or practice is based on his or her knowledge and that just presenting information would lead immediately to a change in attitude and, ultimately, behaviour.

This approach is based on the premise that an individual's behaviour may be altered by applying newfound information, which should lead to a shift in outlook and a greater propensity for the desired action. That is why it stands to reason that when people learn more, their attitudes and behaviour will also improve. KAP model's fundamental variables—knowledge, attitude, and behaviour—are interconnected in four ways that provide the model's theoretical foundation. Schwardtz (1994) identifies four distinct connections:

- a. a connection wherein information has an indirect effect on actions but a direct effect on attitudes
- b. a connection where learning and perspective have mutual effects;
- c. a connection wherein learning and attitude both play a role in shaping one's actions and
- d. a connection in which one person's knowledge has both direct and indirect effects on the actions of the other. The attitude was shown to act as a moderator between knowledge and conduct in all the interactions described.

Efforts are being made to develop new approaches to ensuring the safety of our food supply (Havelaar et al., 2015; WHO, 2018) and the impact on health, economics, and food systems worldwide (Havelaar et al., 2015). One of the most popular frameworks for doing so is the KAP model (Zanin, da Cunha, de Rosso, Capriles, & Stedefeldt, 2017), which focuses on how individuals' beliefs and actions affect food safety. The food safety KAP model aims to identify associations between the abovementioned factors in food handlers like postnatal mothers. The model explains that there is a tight link between food safety literacy, mindset, and behaviour. Therefore, attitude is seen as a crucial

additional aspect of knowledge and practice; this is necessary to lessen the likelihood of food-borne diseases. Postpartum mothers working in the food industry have an important mediating role between knowledge and behaviour when it comes to ensuring the food's safety.

Several studies published in Food Control (Al-Kandari et al., 2019; Letuka, Nkhebenyane, & Thekiso, 2021; Ncube, Kanda, Chijokwe, Mabaya, & Nyamugure, 2020; Nyokabi et al., 2021; Siddiky et al., 2022) support this assertion on food safety. The KAP model was established in the 1950s and is widely used by scientists to investigate the mental processes involved in the preparation and consumption of food. Based on this idea, it is expected that those who work with food would take measures to ensure its safety provided they are well-educated and motivated (Baş, Ersun, & Kvanç, 2006). Food safety practices have been popularised due to the ease with which the theory may be understood and put into practice.

Ahmed, Akbar, and Sadiq (2021) and Hashanuzzaman et al. (2020) claim that knowledge may foster a positive attitude, and that attitude, in turn, determines practice when adopting the KAP model. Several scholars have voiced opposition to this notion, arguing that information alone is inadequate for forecasting behaviour (Da Cunha, Stedefeldt, & De Rosso, 2014; Elobeid et al., 2019; Gruenfeldova et al., 2019; Soon et al., 2020; Zanin, da Cunha, de Rosso, Capriles, & Stedefeldt, 2017). They observed that the variables interacted well with each other, which was confirmed by Lin and Chen (2004). Nonetheless, it has been pointed out that the model's premise that knowledge is the key antecedent to behavioural change is problematic (Ehiri, Morris, & McEwen, 1997). The model also does not account for any obstacles hindering

implementation. The KAP model is still widely used for studying food safety, despite these long-standing concerns. Therefore, this model may motivate readers to enhance the design of their food safety trials.

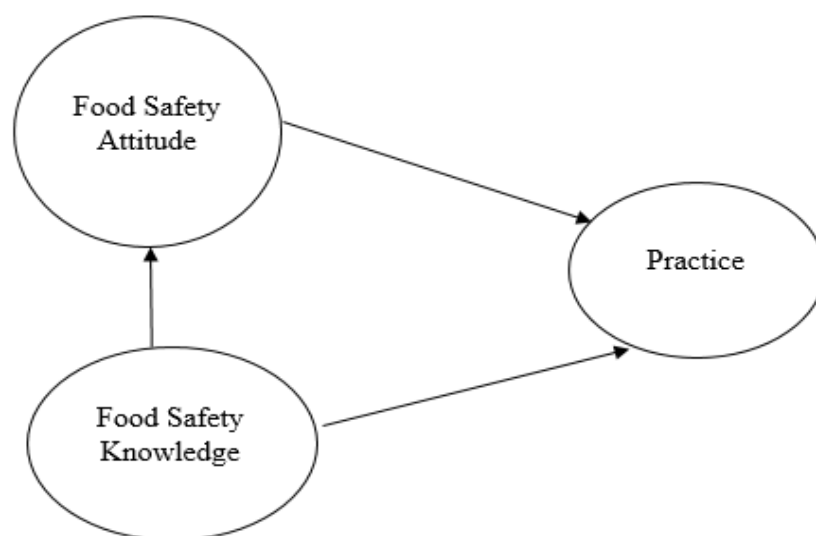


Figure 1: Model of Food Safety Knowledge, Attitude, and Practice

People with a good mentality toward food safety are more likely to put their knowledge into practice, which benefits everyone (Akabanda, Hlortsi, & Owusu-Kwarteng, 2017). Researchers in the field of food control and safety consistently conclude that safety knowledge and a handler's attitude significantly correlate (Al-Shabib, Mosilhey, & Husain, 2016; Sani & Siow, 2014). A handler's knowledge is likely an important aspect of understanding the connection between attitude and practices (Zanin et al., 2017). Knowledgeable handlers prefer to act and behave in ways that confirm their level of knowledge and vice versa.

In line with the KAP model, handlers' knowledge of safety plays a critical role in shaping their attitudes towards maintaining high personal and kitchen cleanliness standards. Numerous studies have shown that workers in the

food industry may significantly reduce the likelihood of an epidemic (Lima et al., 2013; Zanin et al., 2017). Disease prevention efforts may be undermined by careless storage practices, such as touching raw or unwrapped foods or keeping them at temperatures that promote the growth of pathogens (Angelillo, Foresta Scozzafava, & Pavia, 2001).

The KAP model predicts that workers with favourable attitudes toward food safety would also engage in beneficial food safety behaviours, such as maintaining high standards of personal cleanliness, kitchen hygiene, and disease control (Angelillo et al., 2001). Even though this information is limited, it has been shown to favourably correlate with the sanitary practices of food handlers. An improvement in safety awareness has been shown to improve the personal hygiene practices of both chefs and restaurant management (Zanin et al., 2017).

Conceptual Base of the Study

After weighing the pros and cons of the available theories and models, the researcher focused on Ko's (2013) food safety knowledge, attitude, and practice (KAP) model for the research (Figure 2). The model was modified to better fit this data. The scope of the research was narrowed by including sociodemographic factors concerning food safety practices and excluding attitudes. The updated paradigm places a premium on postnatal mothers' knowledge of food safety issues across all three domains and their socio-demographic traits and food preparation habits. Schwardtz's (1975) fourth link between information sharing and direct and indirect influences on behaviour was the framework's primary emphasis.

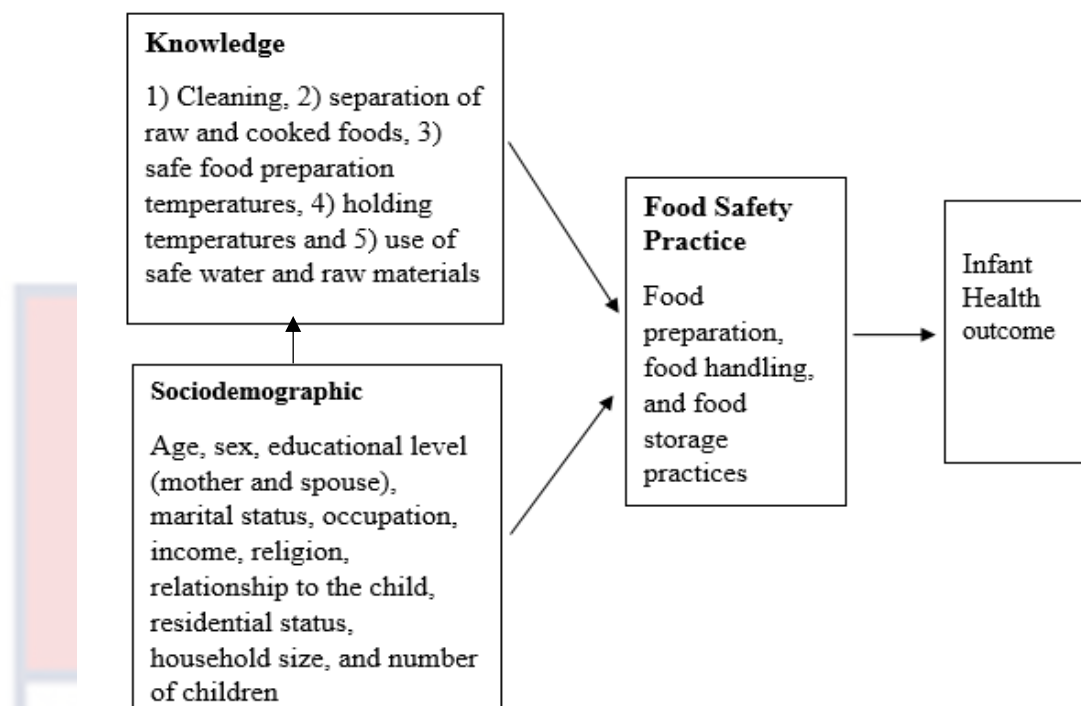


Figure 2: Conceptual base of the Study (Adapted from Ko's (2013) KAP model)

The conceptual framework analysed postpartum mothers' knowledge of food safety issues affecting their eating habits. Sociodemographic factors that are likely to affect postnatal mothers' knowledge and practices regarding food safety were also considered in this analysis. The knowledge domain is anticipated to be supplied by a combination of formal education; training received during ANC and PNC visits, personal experience, and subjective standards derived from the theory of planned activities. The postnatal mother is believed to be motivated to take action based on the information she has learned and that her level of expertise will increase with time and practice.

The framework anticipates that postnatal mothers' understanding will grow as a result of their participation in both antenatal care and postnatal care, with the former having a direct impact on the latter. Also, mothers' socioeconomic status might affect their children's ability to make healthy eating

practices. It is perceived that the postnatal mothers' food safety practices may influence their infants' health status.

Concept of Food Safety

Almost everyone has become sick from eating tainted food at least once in recent years (WHO, 2015), making food safety a major issue on many people's minds. The term "food safety" refers to the "assurance that food products do not cause adverse effects on the health of the consumer when it is prepared and/or eaten according to their intended use" (Joint, FAO/WHO, 2007). If proper precautions are not taken, eating food tainted in any way might be dangerous to the consumer. Diseases and pathogens in food, such as salmonella spp., escherichia coli, staphylococcus aureus, and parasites like cryptosporidium, have risen in most nations over the last several decades (WHO, 2018). Satin (2008) states that food safety is the scientific study of how food is handled, prepared, and stored to reduce the likelihood of becoming sick from eating it.

Food hazards are defined as biological, chemical, or physical agents in food, or condition of food, with the potential to cause an adverse health effect (Khaliq et al., 2023). A person may suffer an adverse event due to eating out, such as an accident, illness, or even death. For the sake of this discussion, "food safety" refers to the degree to which food and water are free of microbiological infections (Fung, Wang & Menon, 2018). This may include following a set of procedures that, when followed, protect against potentially life-threatening situations. Bryan (1990) identifies the following as possible triggers for food-borne illness:

1. The potential threat must exist either in the people working with the food (postnatal mother), the food itself, or the facilities where the food is being prepared or handled;
2. That danger must have tainted the meal;
3. The danger must reach epidemic proportions before it may inflict harm;
4. All processing and handling must be completed without the danger being released; and
5. To get unwell, the person must consume enough of the poison.

The primary goals of food safety procedures are to prevent, control, and eventually eliminate exposure to food-borne risks (WHO, 2010). Over the last several years, most industrialised nations have reported increased cases of illness attributable to food-borne germs and viruses. World Health Organization's five (5) Key Principles of Food Hygiene (2006) are the practices that protect against food-related risks. The following are examples:

1. Keep raw and cooked foods apart to avoid introducing bacteria to the cooked items.
2. Intense heat and time are needed to kill harmful bacteria when cooking.
3. Storing food at the appropriate temperature.
4. Making use of potable water, food-safe tools, and ingredients.

Personal Hygiene of Mothers

The prevention of food-borne illnesses is greatly helped by maintaining adequate personal cleanliness. All practices that guarantee the safety and quality of food while it is being handled fall under the category of good personal hygiene (Schoenfuss and Lillemo, 2014). Food sellers must practice good hygiene and cleanliness to prevent germs from contaminating their cuisine.

Personal hygiene includes washing hands often, not touching your face, and not wearing soiled clothing (Tan et al., 2013).

Given that food particles and pathogens might get stuck under them, all fingernails need to be maintained short. Clear your nails of any polish. Artificial nails should not be worn around food. Dirty clothing serves as a breeding ground for bacteria that may contaminate food if it comes into touch with them. As a result, all protective apparel and undergarments should always be laundered (WHO, 2008). Salmonella, non-typhi salmonellae, campylobacter, and E. coli may persist on hands and other surfaces for varying lengths of time, and in certain cases, even after hand washing (Rane, 2011). To avoid acting as a conduit for the spread of viruses, mothers should constantly maintain their fingernails short and tidy (Monney, Agyei & Owusu, 2013).

Mpeli (2004) asserts that humans constitute a rich source of possible food contamination. Personal hygiene, as it relates to food hygiene, comprises necessary precautions to stop people from contaminating the food that others consume. Poor hand hygiene is a major risk factor for the rise of food-borne illnesses, according to Klingenberg (2008). Lah (2016) postulates that food handlers (postnatal mothers) have a significant risk of spreading pathogens to food using hands contaminated with organisms from their gastrointestinal system, which may result in foodborne illness. This highlights how crucial it is to ensure that food handlers, including postpartum women, take the prevention of food-borne infections extremely seriously.

According to the Centres for Disease Control and Prevention (2010), the leading causes of food-borne infections are poor personal hygiene among food workers (postnatal women) and incorrect food temperature control. The CDC

recommends washing hands with soap after using the restroom or wiping the bottom of a baby or toddler who has just defecated. In the tropics, where primitive living conditions are common, low standards of hygiene (both personal and public) are to blame for a high number of preventable diseases (Abel, 1996).

In some cases, unhygienic food habits play a greater part in disease transmission than insanitary disposal of human excreta. Over the last decade, studies in Ghana on various aspects of food hygiene revealed that most food vendors have inadequate food hygiene knowledge and attitudes that affect the personal hygiene of the vendors (Annor & Baiden, 2011). Hygienic practices such as washing hands after using the toilet, proper cleaning of dishes, and reheating cold food were also observed by vendors. It is further supported by the account of Kiluu (2019) that the relatively high presence of parasites is transmissible by faecal contamination and poor sanitation standards.

Equipment Use in Food Preparation

Equipment in food premises refers to the physical items used to cook and serve food. Examples are stoves, pots, bowls, ladles, kitchen knives, plates, and frying pans. This equipment is vital in promoting hygiene if it is well-designed to handle it. Conversely, if it is poorly designed and poorly handled, it can seriously cause food contamination or food poisoning. Equipment where food particles can lodge, allow germs to multiply, and cause contamination should be thoroughly cleaned. To achieve a high food hygiene standard, cooking equipment must be well-designed to allow easy cleansing. Moerman (2017), also observed that equipment should be designed and constructed to facilitate

cleaning, maintenance, and inspection. Washing hands, utensils, and dishes is often done in bowls or pots of water.

It is worth noting that disinfection is occasionally carried out, and this eventually attracts pests to the vending sites, especially when there is inadequate refuse disposal (Ocloo, 2016). Parts of the equipment that come into contact with food should be capable of being easily dismantled thoroughly, cleaned, and, if necessary, sterilized or disinfected. Equipment should protect the food from external and internal contamination and perform the functions for which it was originally designed. According to Amedewonu (2020), “equipment for food preparation should be kept in good condition and must be frequently cleaned and disinfected. Equipment must also be in good state for cleansing and possibly to be sanitized”. Suitable detergents must be chosen to avoid contaminating food with chemicals. One way of destroying bacteria that are likely to cause disease to man through food contamination is by thoroughly heating utensils after use (Gautam & Curtis, 2021).

The different food categories should be presented individually and separated by display separators, according to Vidhubala Priskillal (2019). For each product, specific spoons and handling tools must be given. Different equipment colours are advised. Amedewonu (2020) asserts that germs on utensil surfaces from sources such as soiled dishwashing water pose a danger of food contamination while serving.

Importance of Storage of Food

Proper food storage is essential for year-round preservation and to offset supply changes. Mothers' sanitary practices are based on the proper preservation of food. Failure to maintain proper cleanliness and temperature

conditions can lead to food spoilage. This includes infestations with insects and rodents, mould, slime, discolourations, and staleness. Therefore, we must carefully preserve food to prevent the invasion of microorganisms that could harm humans.

The refrigerator is also critical to food hygiene standards. You should operate deep freezers, cold rooms, and refrigerators properly and efficiently to maintain their excellent operating condition. The refrigerator must always be very clean and efficient to avoid holding food at room temperature, which might encourage the formation of germs (Abotsi et al., 2021). Food serving areas need to be neat and devoid of Reasonably Preventable Conditions (RPCs), like rat infestation. Poor housekeeping practices and disarray particularly attract rodents and insects (Uzoama, 2022). The space should also be tidy, with smooth walls and floors for simple cleaning and a cobweb-free ceiling to avoid germs harbouring there that may contaminate ingested meals.

Concept and Importance of food safety

Food safety is essential for promoting the best possible health for newborns, especially those between the ages of 6 and 12 months, when breastfeeding is supplemented (WHO, 2020). Unsafe methods for handling, storing, and preparing food might expose babies to foodborne pathogens, which can have major negative health effects such growth retardation, malnourishment, and diarrheal illnesses (Kirk et al., 2017). A study by Theurich, Humphreys, Gosselin & McCool-Myers (2019) revealed that infants are highly vulnerable to foodborne illnesses due to their immature immune systems and developing digestive tracts. Several studies have shown that, safe food handling and preparation reduce the risk of contaminated food exposure, ensuring that

infants receive safe and nutritious meals for proper growth and development. For instance, Okpala & Ezeonu (2019) studies emphasize that handwashing with soap, sterilization of feeding utensils, and hygienic food preparation significantly reduce microbial contamination. The WHO (2020) highlights that introducing nutrient-rich, safely prepared complementary foods at six months is essential to prevent malnutrition while reducing infection risks. Contaminated food and water are major contributors to diarrhoea diseases, which result in severe dehydration and nutrient loss (Checkley et al., 2008). Diarrhea is the leading cause of infant morbidity and mortality in developing countries, with an estimated 500,000 deaths annually among children under five (WHO, 2021).

Poor food safety procedures can result in the contamination of food with dangerous organisms including *Shigella*, *Salmonella*, and *Escherichia coli* (*E. coli*), which can be extremely dangerous to health, especially for vulnerable groups like newborns (Fauziah, Aviani, Agrianfanny & Fatimah 2022). Infants between the ages of 6 and 12 months are particularly susceptible to foodborne infections because of their developing immune systems and the switch to supplemental foods. Since their immunological and digestive systems are still maturing, they are more vulnerable to illnesses from tainted food or water at this point (Gourama, 2020). According to Dondi et al. (2020), eating unsafe food can result in both immediate and long-term health problems, such as diarrhea, malnourishment, and delayed cognitive development. While breastfeeding confers passive immunity, the danger of pathogen exposure rises as supplemental feeding takes place. According to WHO (2021), infant morbidity and mortality are considerably decreased by following proper food safety

procedures, such as washing hands before preparing food, ensuring that food is cooked and stored correctly, and exclusively breastfeeding for up to six months.

Several studies establish a direct link between food safety practices and infant health outcomes, particularly among infants aged 6-12 months. According to Mosisa et al. (2021), contaminated water and food are the main sources of diarrhea, which is one of the main causes of illness and mortality among children under five. As stated by the WHO (2020), 70% of infant fatalities from diarrhea are caused by inadequate sanitation and poor food hygiene. Improper food handling, such as keeping prepared food at dangerous temperatures, dramatically raised the incidence of Rotavirus and *E. coli* infections in infants, Oduoye et al. (2024). Dysentery, caused by *Shigella* bacteria or *Entamoeba histolytica*, results in severe diarrhea with blood and mucus, leading to dehydration and malnutrition (Kugathasan, 2009). Unsafe weaning practices, such as feeding infants with raw or improperly cooked food, increase the risk of dysentery. Research highlights that infants consuming improperly stored food or food prepared in unhygienic conditions have a 60% higher chance of developing dysentery-related complications (Teshome et al., 2022). Typhoid fever, caused by *Salmonella Typhi*, spreads through contaminated food and water, with infants being particularly susceptible due to their developing gut microbiota (Stanley et al., 2023). Studies indicate that infants exposed to unhygienic feeding practices, such as feeding with unclean bottles or utensils, have a higher likelihood of contracting typhoid (Ayaz et al., 2017). Proper sterilization of feeding equipment and use of clean water in food preparation are crucial preventive measures (CDC, 2018).

Food Hygiene Standard

The World Health Organisation (WHO, 2009) defines food hygiene as the practice of preventing the spread of disease through the safe handling of foods, beverages, and the environment in which they are prepared, served, and consumed. Ojide et al. (2020) defines “food hygiene” as “the cleanliness of the place where food is prepared and served as it relates to the consumer’s health and safety” (p. 13). Poor food hygiene may spread disease among customers and possibly result in mortality in severe cases (Wickrematilake, Arnold, Karthikeyan, & Jayathilake, 2022). Food hygiene and safety from a public health perspective aims to reduce the number of disease cases caused by eating out (Gizaw, 2019). People cannot maintain good health and flourish without access to nutritious food regularly (Mekuriaw, 2021).

Food safety is predicated on two pillars: avoiding and containing contamination (Kamboj, Gupta, Bandral, Gandotra, & Anjum, 2020). Even the cleanest kitchen may be the source of food poisoning, while the uncleanest kitchen can still provide dangerous food (Kamboj et al., 2020). Physical cleanliness is a key component of excellent food hygiene; nevertheless, it may be made ineffective by an unseen and unanticipated source of contamination, making it necessary to consider how the food is handled and stored (Kamboj et al. 2020). It has been stated that “in essence, the regulations require a suitable standard of construction and cleanliness in food premises, the hygienic handling of food, the cleanliness of the employees, and suitable facilities for them” (van der Meulen et al., 2022, p. 11). “Most outbreaks originate in meat or poultry which is already infected with salmonella or clostridium perfringens when delivered” (Amedewonu, 2020, p.). However, temperatures of 70°C or above

are lethal to salmonella germs (De Jonge, 2019). Salmonella may be spread from one person to another through houseflies, cockroaches, and rats (Lah et al., 2022; WHO, 2010). The time it takes for symptoms to appear after eating contaminated food ranges from 5 to 72 hours (Lah et al. 2022). This is based on how much food was consumed and how quickly it was digested.

Sometimes, the microbes do not cause much deterioration, and the food may seem normal, but this is not always the case (Samuel et al., 2004; Ehuwa, Jaiswal, & Jaiswal, 2021). Any microorganisms present in food are ingested with the meal, and once in the stomach, they may cause serious disease or even death (Gourama, 2020). Botulism is an extremely unusual food poisoning that is lethal in half of cases (Chaidoutis et al., 2022).

Preventing Food Contamination

Food-borne diseases may be acquired via eating tainted or dangerous foods, as stated by the World Health Organisation, 2009 (Todd, 2020; WHO, 2009). Globally, food poisoning is still a big issue for public health. Abebe, Gugsu, and Ahmed (2020) predict that microbiological food-borne illnesses impact one-third of the global population annually. As explained by Amedewonu (2020), food-borne illnesses affect up to 10% of the population of industrialised nations each year. The eating of tainted food is thought to be the cause of over 70% of instances of diarrhoea illnesses.

The annual incidence of food-borne illness is projected to be 76 million in the United States (26,000 per 100,000 people) and 2 million in the United Kingdom (3,400 per 100,000 inhabitants) (Riana, Azahadi, Ariffin, Maznieda, & Zubaidah, 2022). Most illnesses and deaths in these areas are still caused by microorganisms found in food and water (Cissé, 2019). Many eateries are at risk

of supplying poisoned food since, as Marcella et al. (2021) stated, only the most serious occurrences are often investigated.

Rakha et al. (2022) state that several factors contribute to food contamination in developing countries, including the use of antiquated processing methods, insufficient holding temperatures, and poor personal hygiene of food workers. High rates of food-borne disease in developing countries are associated with additional economic and developmental challenges, such as inadequate legislation, infrastructure, and enforcement mechanisms (Rakha et al. 2022).

Between 450,000 and 700,000 Africans lose their lives yearly to diarrhoea infections spread by contaminated food and water, and many more cases go unreported (Amegah et al., 2020). Between 3.3 and 4.1 cases of food- and water-borne illnesses are reported annually per African kid. Commonly found pathogens in these cases include *Escherichia coli*, *Bacillus cereus*, aureus, *Campylobacter*, rotavirus, and enteric bacteria (Amegah et al. 2020). Recent reports of food-borne illness and enteric bacterial contamination of street meals in numerous regions suggest that improvements in food safety procedures have not been completely implemented (Hossen et al., 2020). It is estimated that 25% of Ghanaian children under the age of five die from diarrhoea each year (Berg, 2021). There have been many reported outbreaks in Ghana recently. According to the Ghana News Agency (2013), four individuals in Sheho (Upper East Region of Ghana) died after consuming contaminated beef.

In addition, nine people lost their lives due to a cholera epidemic in Atebubu (Brong Ahafo Region), according to Ghana Web (2013), while a different outbreak in Obuasi (Ashanti Region) resulted in one death and over 50

hospitalisations, according to Joy News (2013). A cholera outbreak in Coaltar Township (EHSD/GHS, 2014) claimed 60 cases of food poisoning. According to data, more than 5,000 children under five pass away in Ghana yearly from diarrhoea brought on by contaminated water and subpar sanitation (iDE, 2017). Despite these concerning statistics, not nearly enough investigation into the causes of food-borne disease, especially among postnatal moms, has been conducted in Ghana.

Food-Borne Disease

Food-borne illnesses are serious global public health issues (WHO, 2008), causing infections among one-third of the world population yearly. Eating food or drinking water that has been tainted with faeces is the primary cause of the majority of foodborne diseases. Poor personal hygiene among food workers often contributes to food contamination (Esen & Owusu, 2013).

Kaferstan et al. (2019), suggest that as much as 10% of the population in wealthy countries may become ill each year due to contaminated food. The term “food-borne illness” encompasses a wide range of conditions that develop after consumption of a contaminated substance. Toxins produced by bacteria are responsible for the vast majority of known cases of food poisoning. Toxins originate in food before being ingested, and cannot be detected by sight, smell, or taste (Saucedo-Alderete, 2013).

According to the World Health Organisation (WHO, 2020), some germs that cause foodborne illness can spread through improper food handling, preparation, and storage, as well as poor personal hygiene practices of food vendors. Food vendors who are carriers can easily spread illness to other people who are ill as well. Headaches are included among the symptoms of typhoid

fever and non-typhoidal salmonellosis, categorised as bacterial food-borne infections (Esen & Owusu, 2013). Research has also shown that educating and training food sellers is one of the greatest ways to prevent food-borne illness (Clayton et al, 2002: Asumah et al., 2023). Most food handlers are considered to have little to no formal education, which is another important factor contributing to food-borne illnesses. To avoid food contamination, workers in the food industry need training on safe food handling practices since it is assumed that customers have limited knowledge and practices of food safety problems (Ababio & Lovatt, 2015: Abera et al., 2023).

Three Main Types of Food-Borne Disease

Food Infection

It is possible to become sick by eating some foods if the bacteria already present in them are allowed to grow. According to the Food and Agriculture Organisation, food-borne illnesses cause the deaths of about 1.8 million people annually in developing and under-developing countries. In the case of salmonella, for instance, the bacteria responsible for the illness multiplies in the host's intestines following consumption. People and other warm-blooded animals are the primary vectors for food-borne salmonella outbreaks. Foods like eggs and other poultry products, particularly susceptible to contamination, make it into restaurant menus this way. Cooking chicken to 165°F for 15 seconds can kill any salmonella that could be present (FAO, 2002).

Food Intoxication

Toxic food poisoning occurs when bacteria in food generate a toxin, rather than the germs themselves, as the causal agent of sickness. Toxins that are not destroyed by cooking temperatures and that are undetectable, because

they do not alter the meal's flavour, look, or odour, are the sole means of preventing food poisoning. The most prevalent cause of food poisoning is staphylococcus. An enterotoxin is one of the byproducts. Severe responses such as nausea, vomiting, and diarrhoea will occur within a few hours of ingesting the poison. Acne infections might be caused by these bacteria, which also cause the more prevalent boils. Proper hygiene practices such as hand washing and workspace disinfection may prevent staphylococcus food poisoning.

“Ham salad,” “chicken salad,” “tuna salad,” “sandwiches,” “meat products,” “dairy products,” and inadequately frozen or reheated foods are all potential sources of staphylococcal food poisoning (Baldock, Ward & Flick, 1997). The most serious kind of food poisoning is botulism. Toxins produced by the bacterium clostridium botulinum are the direct cause of this illness. Botulism food poisoning may be caused by eating acidic foods, cooked potatoes, or smoked meats and seafood (Prescott, 2014).

Chemical food-borne illness

This sickness develops when harmful chemicals are ingested by consuming spoiled food or drinking water. Clarence et al. (2009) state that these substances may cause severe food-borne disease if consumed in significant quantities. Toxic chemicals and cleaning products should be marked and kept in a location inaccessible to food. High-acid foods, lemonade, and tomatoes should never be stored in galvanised containers (Kimon, Cesenani, & Foskett, 2003). Moreover, several studies have shown that proper food-handling procedures might have averted or limited food-related sickness and mortality (Haapala & Probart, 2004; Odo et al., 2023).

Food-borne Illness Outbreaks

The widespread spread of food-borne diseases is a major international concern. Odonkor (2012) argues that food-borne illnesses are among today's most pressing health issues. According to the World Health Organisation (2021), food-borne illnesses affect roughly 30% of the population in developed nations annually. Also, the World Health Organisation (2015) states that contaminated food and water are responsible for 3 and 5 billion infectious diarrhoea and around 1.8 million fatalities worldwide. Food poisoning kills almost two million people annually, most of whom live in underdeveloped nations (WHO, 2015).

About 3,000 individuals die each year from food-related illnesses, as reported by the CDC's 2017 update. The World Health Organization (2018) reported that one in ten people gets unwell after consuming tainted food, and 420,000 people die each year due to food-related illnesses. 40% of those affected are children less than five years old. Food poisoning affects an estimated 5.8 million people in Ghana each year, according to data provided by Salas (2013). In Africa, where there is already a large disparity in education, poverty, public health policy, and funding for the health care system, food poisoning epidemics are pressing. Bacterial contamination in processed foods has been linked to using dirty or improperly cleaned cooking equipment (Nigusse & Kumie, 2012; Rane, 2011). It has been noticed that processed goods are sometimes stored or transported in containers, pumps, or tanks previously used for unprocessed raw food items without proper washing and disinfection (Rane, 2011). The unsanitary conditions and low food production standards in these nations may be to blame.

Diarrhoea: Causes and Burden

Causes of diarrhoea

One of the most frequent medical concerns is diarrhoea. The Greek word for diarrhoea is *diarrhoea*, which translates to “flowing through.” Diarrhoea is defined as passing three or more loose or watery stools daily (or more often than is typical for the person), as stated by the World Health Organisation (2021). Diarrhoea may indicate various things beyond this basic explanation to various people.

Many different types of bacteria, viruses, and parasites may cause diarrhoea, and they can be passed from person to person due to unsanitary conditions or via tainted food and water. The immune systems of young children and adolescents, particularly those under five, are more compromised than those of adults and older children and adolescents (Black et al., 2013). According to the World Health Organisation (2015), diarrhoea is the most common infectious disease in children and the main cause of death and illness in children under five (0-59 months). In 2015, this illness took the lives of 5.9 million children less than 5 years old, or around 16,000 children every day. Above 100 fatalities per 1,000 live newborns (UNICEF, 2015) were recorded in Africa, making it the worst. According to projections, diarrhoea was the second leading cause of childhood mortality, accounting for about 9% of all fatalities in children under the age of five, with an estimated 1,400 young children dying every day and 526,000 worldwide (UNICEF, 2015).

The severity of diarrhoea may range from a little nuisance to a serious medical emergency. According to Frank-Briggs (2012), the three primary kinds of diarrhoea are acute watery diarrhoea, bloody diarrhoea, and chronic

diarrhoea. The symptoms of acute watery diarrhoea include a quick start of loose or watery stools without any obvious blood and a duration of fewer than 14 days (most bouts last less than seven days). You could vomit and feel feverish. Acute watery diarrhoea may be caused by dehydration and malnutrition, especially if food intake is restricted. *Escherichia coli* and the virus's rotavirus and cholera are among the pathogens that cause acute watery diarrhoea. The most frequent cause of diarrhoea in children is dysentery or shigella because blood often accompanies a child's stool.

In addition, those living with HIV/AIDS are disproportionately affected by acute but long-lasting (at least 14 days) diarrhoea. Watery or dysentery diarrhoea and significant weight loss are common symptoms. Dehydration is another risk associated with diarrhoea because of the large amounts of faeces that might be passed. There is no one microbiological cause of chronic diarrhoea. Bacteria like *E. coli*, shigella, and cryptosporidium have a more significant role than other agents. Persistent diarrhoea, however, should not be confused with chronic diarrhoea, which is recurring or long-lasting but not attributable to an infection (Frank-Briggs, 2012).

Chronic, secretory, osmotic, and inflammatory diarrhoea are further types of the condition. Large stool volumes are common in diarrhoea episodes, which may lead to dehydration and weight loss (Schiller et al., 2014). Schiller et al. report that the duration of chronic diarrhoea is often more than four (4) weeks. The likelihood that an infection causes diarrhoea decreases with time, and a month appears to be a good cutoff for persistent diarrhoea. Chronic diarrhoea has no definitive aetiology and does not react to specific therapy (Schiller et al., 2014).

Burden of Diarrhoea

Diarrhoea is one of the top 10 main causes of death and disability-adjusted life-years (DALYs) for individuals of all ages, according to the World Health Organisation (WHO). Even though the worldwide prevalence of diarrhoeal disease is declining, it is still the second greatest cause of morbidity and mortality among children and young adolescents (Wierzba & Muhib, 2018). For instance, diarrhoea kills about 525,000 children annually (or 8% of all child deaths). In 2018, an estimated 6.3 million children and adolescents under 15 died, according to the United Nations Inter-Agency Group for Child Mortality Estimation (UN IGME). Avoiding risk factors like diarrhoea may have prevented many of these deaths. About half of these fatalities (2.5 million) happened in the first month of birth, another 1.6 million between 1 and 11 months, and another 1.3 million between 1 and 4 years.

African and Asian countries account for a disproportionate share of these deaths, with SSA accounting for over half of these occurrences. According to the United Nations Department of Economic and Social Affairs, Population Division (UN-DESD) (2017a), 24% of the world's population under the age of five resides in Sub-Saharan Africa (SSA). Diarrhoea contributes to child mortality, and even when it does not result in death, it still places a heavy cost on communities, particularly those in which children under the age of five are already at a disadvantage (Veenah et al., 2023). The impacts of diarrhoea are not limited to health, although it is the second leading cause of mortality and sickness worldwide. According to Melese et al. (2023), the prevalence of diarrhea and intestinal parasites among under-five children was 20.8% (95% CI: [16.8-37.8] and 32.5% (95% CI: [28.6, 37.8], respectively.

Diarrhoea that lasts a long time is very severe, and may even be deadly can occur in persons with the human immunodeficiency virus (HIV) or who have developed AIDS (Churchyard, 2003). Furthermore, children who often have diarrhoea also have underlying malnutrition, making diarrhoea both a cause and an effect of malnutrition. The average age of a kid with diarrhoea is 24 months, and they are, on average, 1 cm shorter in height (Lee et al., 2012). In addition to stunted growth in height, linear deficits in infancy may indicate lost human potential, Victora et al. (2010) note that infections caused by diarrhoea contribute to infant malnutrition. Students' attendance and performance in the classroom might be significantly impacted by diarrhoea because it can impair physical and cognitive development, reduce infection resistance, and perhaps create long-term gastrointestinal difficulties (CDC, 2018). Malaria and shigellosis (bacillary dysentery) are two examples of epidemics that produce diarrhoea, and their effects, especially in times of crisis, are well documented (Hunter, 2003).

Rapid electrolyte and water loss due to diarrhoea, leading to dehydration and mortality if the fluids are not restored, are the most pressing danger of diarrhoea. Mild dehydration manifests itself in symptoms like pale skin, sunken eyes, and irritability; moderate dehydration manifests itself in these symptoms plus decreased skin elasticity; and severe dehydration manifests itself in symptoms like pale skin, shock, and altered consciousness (Guarino, Guandalini, & Vecchio, 2015), as for the massive monetary cost. Diarrheal illnesses compel individuals to lose time from work, education, and other productive activities and drive communities to spend millions of dollars on prevention and treatment (Buono, Mathur, Averitt, & Andrae, 2017).

Overview of Child Diarrhoea in Ghana

Over 30 million people live in Ghana, with 56% living in cities and 44% living in rural areas. Children under five account for around 15% of Ghana's population (GSS, 2019). World Bank (2006) rightly pointed out that children under five are the country's future, yet every year, most children under five die from diarrhoea caused by a lack of clean water. Diarrhoea is a prominent cause of illness and death among children under five, despite significant treatments that have delivered beneficial health benefits. Ghana Health Services (2009) classified diarrhoea as the fourth leading cause of death among all ages between 2006 and 2009. The same diarrhoea infections ranked number 4 on the 2009 list of the top ten ailments affecting Ghanaians of all ages. This demonstrates why, despite widespread reports of a high incidence of diarrhoea in Ghana, improvements in health outcomes cannot be linked to deaths among children under the age of five.

According to the World Health Organisation, diarrhoea is the most common infectious disease in children under five years old, with the highest prevalence seen in children aged 12-23 months (16.8%) and a greater disparity between males (13.1%) and females (10.2%). Anyorikeya et al. (2016) found that an estimated 113,786 episodes of diarrhoea occurred in 2011, with 354 fatalities documented as a result of severe dehydration in children under the age of five. Additionally, 2,318 episodes of diarrhoea were documented in 2013. Asamoah et al. (2016) researched the prevalence of diarrhoea and found that, out of a total of 7,642,431 cases of morbidity between 2008 and 2012, 4% (306,854/7642,431) were attributable to diarrhoea illnesses.

From 2015 to 2017, diarrhoea-related outpatient visits in Ghana increased from 1,515,189 in 2015 to 1,570,557 in 2016 and 1,429,990 in 2017 (GHS, 2018). In addition, the World Health Organization's (WHO) and the United Nations Children's Fund's (UNICEF) joint monitoring programme research found that diarrhoea kills more than 4,000 Ghanaian children annually (WHO, 2018). Furthermore, the survey shows that almost 23% of children are stunted due to diarrhoea-impaired growth and development due to poor diet, frequent illness, and insufficient psychosocial stimulation. These findings on child diarrhoea in Ghana are consistent with those of a 2016 research that compared 46 African nations and found that Ghana is one of only eight showing very little improvement in under-five mortality (Kipp et al., 2016).

Among children in Ghana, diarrhoea is the leading cause of death (Asare et al., 2022; Cha et al., 2015; Dekoleadenu, 2015; Essilfie, Padi, & Addor, 2017). This is mostly due to a lack of access to clean water, appropriate sanitation, and basic hygiene practices. Armah et al. (2018), Webb & Cabada, (2018) discovered that the prevalence of diarrhoea and other water-related disorders drops significantly when individuals have access to improved water sources. Nonetheless, many people in Ghana do not have adequate means of protecting themselves at home. There is a large divide between urban and rural communities in terms of access to piped drinking water in Ghana, although around 87% of the population does. Despite significant improvement over the last several decades, a lack of clean or quality water remains one of Ghana's most severe public health challenges, particularly in rural regions. Reese, Sinharoy and Clasen (2019) report that just 53% of rural families have constant access to improved drinking water, whereas 66% of urban households do.

Overview of Typhoid and Dysentery

Worldwide, newborns are susceptible to serious bacterial diseases including typhoid fever and dysentery, especially in low- and middle-income (LMIC) nations. Infants between the ages of 6 and 12 months are particularly vulnerable because of their developing immune systems, the introduction of supplemental foods, and unsanitary surroundings. According to studies, these illnesses are associated with increased newborn mortality, severe malnutrition, and dehydration (WHO, 2021; Amadu et al., 2023). *Salmonella enterica* serovar Typhi is the bacterium that causes typhoid fever, a potentially fatal illness. According to Gal-Mor (2018), the main way it spreads is by consuming contaminated food or water. Infant mortality is greatly increased by typhoid and dysentery, especially in areas with inadequate sanitation and little access to medical care (Mebratom et al., 2022). A systematic review conducted by Fischer Walker, Perin, Aryee, Boschi-Pinto & Black (2012) shows that, dysentery accounts for over 200 million cases annually, with the highest rates in sub-Saharan Africa, South Asia, and Latin America. The assessment of drinking water quality and waterborne diseases in primary schools of District Khyber revealed that, diarrhoea and typhoid were the most common waterborne disease among the school children (Afridi et al., 2024).

In sub-Saharan Africa, *Shigella dysenteriae* causes severe dysentery outbreaks, leading to high hospitalization and death rates (Bagamian et al., 2020). Poor sanitation, overcrowding, and unsafe food handling practices increase transmission rates in developing countries. Studies indicate that unsafe drinking water is the primary transmission route for typhoid and dysentery in infants (Meki, Ncube & Voyi, 2022; Deborah, 2023). Infants in households

without proper sanitation are 2–3 times more likely to contract typhoid and dysentery (Fischer Walker et al., 2012). Untreated typhoid cases have a 10–30% fatality rate, especially in malnourished infants (Troeger et al., 2019). In Ghana, a study conducted by Osei-Tutu & Anto (2016) revealed that typhoid fever, dysentery, and cholera were common among children during the onset of raining season and initiation of complementary feeding.

Food Safety Practices among Post-natal Mothers

Practice is the application of skills, techniques, methodologies, or standard operating procedures (Abotsi et al., 2021). The use of self-reported questionnaires and observational techniques by researchers allowed them to evaluate food handlers' ways of handling food. In other words, questionnaires were used to evaluate self-reported practices, whereas observations were used to determine real practices. Children under the age of five in semi-urban areas of northeastern Ethiopia were studied by Natnael, Lingerew, and Adane (2021), who investigated the relationship between the self-reported component of assessing food safety practices and the prevalence of acute diarrhoea. According to Bedada et al. (2021), mothers of children aged 12-23 months had higher odds to practice good food hygiene measures than those of aged 6-11 months [AOR, 1.82 95% CI (1.21, 2.73)].

Dagne et al. (2019) examined food safety practices and their associated variables. About 210 (49.6%) of those surveyed reported following proper food safety procedures. Children under the age of five in Woldia Town, Amhara Region, northeastern Ethiopia, were studied by Getahun and Adane (2021), who looked at the incidence of acute diarrhoea and variables related to water, sanitation, and hygiene (WASH). From March to June 2018, researchers in the

neighbourhood performed a cross-sectional study of 485 children younger than five. Only 46.5 percent of the 225 mothers and caregivers polled had adequate handwashing practice during high-risk situations. Acute diarrhoea was also shown to be linked to factors including not having access to good sanitation, improperly disposing of human waste, and not washing hands when they were most needed.

Parents' knowledge, attitudes, and preventative practices about food poisoning in Lahore, Pakistan, were investigated by Naeem et al. (2022). Naeem et al. (2022) conducted a cross-sectional survey of Lahore parents using a comprehensive questionnaire. Their research determined that only 42.1 percent (162 parents) had a sufficiently high degree of preventative practices. 57% of people use soap and water to clean their hands before handling food, and five-eight percent cover their mouths with their hands when they cough or sneeze. 76% of people use soap and water to clean up after using the lavatory, and 62% of people who handle raw meat disinfect their cutting boards, knives, and plates before using them again. However, only 45.5% of people who get a wound while cooking cover it with a bandage and use gloves. 71% keep raw poultry or beef separate from other foods; eighty-four percent keep rodents and insects away from raw food; and ninety-two percent do the same for cooked food. 53.2% of moms and dads check the expiration date before buying packaged goods. A study by (Geresomo, 2019) shows that the majority of mothers (82%) were not following recommended child feeding practices

Shati et al. (2021) explored parents' knowledge, attitudes, and practices regarding food poisoning in the Aseer Region, Southwest Saudi Arabia. The parents of 3011 children were the subjects of descriptive cross-sectional

research. They discovered that 86.8% of people said they wash their hands with soap and water after handling raw, unwashed vegetables, and that 84.5% said they did the same thing after using the loo. Sixty-nine percent of respondents said they always wash their hands with soap and water before handling food.

Similarly, Mekonnen et al. (2021) found that more than half of those surveyed (55.8%) reported always washing their hands with soap and water before eating or preparing food, after contact with animals (55.4%), and after using the loo (55.6%). After handling raw, unwashed vegetables, more than half of people (57.4%) say they immediately wash their hands with soap and water.

Zyoud et al. (2019) examined parents' food poisoning-related knowledge, attitudes, and behaviours. Primary healthcare facilities in the Nablus area conducted a cross-sectional survey from May to July 2015. Participants in the survey reported washing their hands with soap and water 95.9% of the time before eating or preparing food, 98.3% of the time after coming into contact with animals, and 99.1% of the time after using the lavatory. After handling raw, unwashed veggies, 72.3% of people say they wash their hands with soap and water.

In addition, Odonkor et al. (2020) surveyed 300 mothers after they had their babies to see how they were keeping their food safe. The results indicate that most responders (86%) followed safe food handling procedures. In addition, 66.3% of respondents showed appropriate practices in food preparation, and 91.7% showed adequate food storage. A study by Abera et al. (2023), shows that vendors had good knowledge (81%), moderate attitude (74%) but very poor practice (14%) in food safety.

Knowledge of Mothers on Food Safety Practices

Naeem et al.'s (2022) study in Lahore, Pakistan, found that despite having high knowledge of foodborne illness, only 42.1% of parents had good preventative practices. Pathogenic bacteria are blamed for foodborne illness, and most parents showed positive attitudes but subpar measures. Most parents agreed that using gloves, washing hands before cooking, and handling raw food are effective ways to avoid food poisoning. Most respondents agreed that storing food in the refrigerator and well-cooked food are safe. Only 44.7% considered young children, expectant mothers, and the elderly at higher risk.

A study by Shati et al. (2021) in Saudi Arabia found that 79.1% of respondents believe poor hygiene in food processors can cause food poisoning. Unwashed fruits and raw or undercooked meat are also risky. Only 39% of respondents believed pasteurized milk has no food poisoning risk, while 48.7% believed leftovers stored in the refrigerator pose no risk. However, 81.1% of respondents believed washing hands with soap and water before preparing food is crucial. The majority of respondents also believed thoroughly cleaning produce under running water is crucial. The study found that 50.7% of respondents had sufficient awareness about food poisoning.

Mekonnen et al. (2021) conducted a study in the Bench-Sheko Zone of Southwest Ethiopia and found that 42% of participants viewed eating raw meat, 75% viewed raw vegetables, and 73.4% viewed drinking raw milk as extremely risky. 78% recognized raw white cheese as harmful, 74% identified unwashed fruits as unsafe, and 75% correctly identified covered leftover cooked food as safe. Nearly half of respondents believed that keeping food in the fridge would prevent food illness, and 88% believed that cooked food would not contain

bacteria causing food poisoning. 75% of respondents were concerned about filthy conditions in homes causing foodborne diseases. A good correlation was found between parental knowledge and food poisoning preventive techniques. Furthermore, there was a good correlation between parental knowledge and food poisoning preventive techniques ($r = 0.312$, $p \text{ value} = 0.001$). Mohammed et al. (2019), concluded that, 43.3% of mothers had fair level of knowledge and 67.2% had satisfactory level of practice about food handling.

A survey conducted in Palestine found that 88.4% of respondents believe pathogenic bacteria are responsible for foodborne illness (Zyoud et al., 2019). Raw or partially cooked meat, unwashed vegetables, and raw milk are highly hazardous. Raw white cheese, unwashed fruits, exposed leftovers, untreated surfaces, and rainfall are unsafe foods. Well-cooked food is devoid of microorganisms that cause food poisoning, and storing food in the refrigerator can slow germ development and prevent food poisoning (Zyoud et al., 2019). About two-thirds of respondents believe that consuming prepared food stored in the refrigerator for an additional two to three days poses no threat of food illness. However, only 49.0% believe certain poisons generated by bacteria responsible for food poisoning are resistant to heating temperatures.

Sociodemographic Factors Influencing Food Safety Practices

Dagne et al.'s (2019) research in Debarq Town, Ethiopia, revealed that mothers with higher levels of education (high school, college, or university) were more likely to follow proper food safety procedures. Factors such as age, gender, education level, number of children, and monthly income also influenced supplemental food preventative practices. Younger parents aged 31-40 who followed a healthy preventative routine were more likely to have healthy

children. Female parents were more likely to engage in beneficial preventative measures. Parents with a college degree were also more likely to follow safe food handling procedures (Sumampouw et al., 2019). El-Mezayen et al. (2020) study revealed that more than half (50.2%) and nearly one-third (32.6%) of the studied mothers had a poor and fair level of knowledge pre-intervention compared to the majority (87.9%) of them had a good level of knowledge regarding food safety post intervention. Sociodemographic characteristics, including lower education level and living in a household with children, were determinants of food safety practices (Nelson et al., 2022).

Shati et al. (2021) conducted research in Southwest Saudi Arabia and found that parents with a high level of knowledge were more likely to be over 30 (57.9%) than under (46.8%). Compared to 48.7 percent of mothers, 60% of fathers scored well on the knowledge scale. University-educated dads (52.9%) were more knowledgeable than their low-skilled counterparts (38.5). Only 45.2% of non-college-educated mothers possessed the same level of knowledge, compared to 55.3% of college-educated moms. Knowledge was much greater among working moms (55.2% vs. 47.7%) than housewives (55.2% vs. 0%). Participants from urban areas had a 51.8% higher average knowledge level than those from rural areas (46%). There was a significant difference in the levels of knowledge between those who ate outside more than twice a week (56%) and those who did not (42.6%). Postpartum mother's nutritional knowledge, education level and household food security were main predictors of complementary feeding practices (Afolabi et al., 2021).

Based on their research in Bench-Sheko Zone, Southwest Ethiopia, Mekonnen et al. (2021) revealed that gender, education level, and place of

residence were significantly correlated with behaviours and precautions taken in response to food poisoning. Mekonnen et al. (2021) found no significant correlation between food poisoning and any other socio-demographic characteristics (age, occupation, household size, number of children, age of children, or food preparation habits). Findings showed that mothers do a better job of keeping their children clean than fathers. Another finding was that people with higher education levels also demonstrated higher standards of personal hygiene. The hygiene habits of urban parents are also higher than those of their rural counterparts.

When looking into food poisoning practices in the Nablus area of Palestine, Zyoud et al. (2019) discovered that gender, work position, and residence all had important roles. Age, education, and money were also not significantly associated with behaviour toward food poisoning. Hygienic practices related to preventing food poisoning were more prevalent among female participants (median = 18.0) than male participants (median = 16.0). Customers who are not employed are more likely to take precautions against food poisoning. People who reside in rural areas are more likely to take precautions against food poisoning (median = 19.0) than urban dwellers (median = 18.0). Camp dwellers reported the lowest levels of cleanliness (median = 16.0). Hygienic measures to prevent food poisoning do not need to be taken in conjunction with a general improvement in living conditions.

Among moms in Western Ghana, Odonkor et al. (2020) showed that those whose ages fell between 36 and 45 were more likely to follow safe food handling procedures than younger mothers. Mothers with college degrees were

more likely to follow safe food handling procedures than their primary school-educated counterparts.

Summary

This chapter presented the review of related literature to the topic. This chapter provided an overview of the conceptual framework for the research, as well as relevant theoretical model concerning food safety knowledge and practice. The researcher adopted a conceptual framework developed from the KAP model, describe how human behaviours are directed, namely the knowledge, attitude, and practice model (KAP). These conceptual frameworks were chosen because they are relevant to the subject and may help explain the findings. The chapter then examined food handlers' knowledge and conduct empirically and a review of the relevant literature on food safety concepts. Studies indicate that food safety practices vary significantly based on socioeconomic and educational factors. Handwashing before food preparation and after handling raw food remains inconsistent across different regions. Despite relatively high knowledge of foodborne illnesses, preventive practices remain inadequate. Gender differences in food safety practices suggest that women are generally more cautious than men regarding food hygiene. Most studies focus on general food safety knowledge among parents, rather than specific practices for infants aged 6–12 months. There is a lack of research examining how food safety lapses directly affect infant health outcomes, particularly concerning diarrhoea diseases. This study focusses on infant-specific food safety practices to address the gap in research. Identifying key risk factors for foodborne illnesses in infants will help in designing targeted

interventions. The following chapter discusses of the research design and technique used.



CHAPTER THREE

RESEARCH METHODS

Introduction

The study aimed to determine food safety practices and health outcomes among post-natal mothers, nursing 6–12-month-old children in Sekyere South District, Ashanti Region. The chapter consists of the research design, study area, population, sampling procedure, data collection instruments used to collect relevant information, data collection procedures, data processing and analysis, and the chapter summary.

Study Design

The type of design for the study was a descriptive quantitative survey. The study adopted a quantitative research design because numbers were generated from the responses and analysed with appropriate statistics to determine the influence of knowledge about food safety and sociodemographic characteristics on food safety practices. Also, quantitative surveys use structured questionnaires with closed-ended questions, making it easier to measure and compare food safety knowledge levels, adherence to safe practices, and associated health outcomes (Levitt et al., 2018). In this design, I draw a sample from the population of interest, the postnatal mothers with children aged six months to one year, and generalisations are made, considering responses from the study subjects. This is because the quantitative approach offers a high level of generic representational capabilities for a large population (Bhatt & Wallgrün, 2013). Also, it can extract data that is close to the exact attributes of the larger population. Furthermore, the quantitative design is extremely objective, effectively analysing various factors (Bernard, 2013).

Despite its advantages, the quantitative design has some limitations. For instance, respondents or participants may not be truthful with their responses (Grimes & Schulz, 2002). Also, there may be poor control due to the large sample size, so respondents may not answer honestly, and written responses may not represent actual behaviour (Punch, 2013). To overcome the weakness of this design, the current study emphasised the anonymity and confidentiality of the study's participants.

Study Area

The Sekyere South District (previously Afigya Sekyere District) is one of the 43 MMDAs in the Ashanti Region and the capital city of Agona. It is one of Ghana's 261 Metropolitan, Municipal, and District Assemblies (MMDAs). Along the Kumasi-Mampong trunk route, the Sekyere South District is 37 kilometres from Kumasi in the northern Ashanti Region. 416.8 square kilometres, or around 1.7% of the Region's total area of 24,389 square kilometres, comprise the district's entire land area. The area is bounded by longitudes 10 40'W and 10 25'W and latitudes 60 50'N and 70 10'N.

The district shares boundaries with the following municipalities: Offinso Municipality to the west, Kwabre East Municipal to the south, Mampong Municipal to the east, and Ejura Sekyedumase Municipal to the north. According to the 2021 Population and Housing Census, the district has a population of 120,076 people, with 58,065 men and 62,011 women. A patient need not travel more than 5 kilometres to obtain healthcare in the district thanks to the equitable distribution of the district's six health centres and three hospitals. The district also features a maternity clinic and a CHPS facility. There is just one doctor in the district, with a patient-to-doctor ratio of 1:114,836.

The top five prevalent diseases in the district are malaria, diarrhoea, hypertension, anaemia, and rheumatism. The district, since 2019, has recorded a high prevalence of diarrhoea and other food-borne diseases. In 2019, the district recorded as high as 1,938 diarrhoea cases among children under five years and below with the following break-down: 10 cases of diarrhoea (males 4, females 6) among children from zero to 28 days, 576 (males 310, females 266) among children between 28 days and 11 months, and 1,352 (males 675, females 677) among children from one year to four years.

Moreover, in 2020, the district recorded as many as 1,489 diarrhoea cases among children under five years with the following break-down: nine cases of diarrhoea (males 5, females 4) among children from zero to 28 days, 418 (males 229, females 189) among children aged between 28 days and 11 months, and 1,062 (males 495, females 567) among children from one year to four years.

Additionally, in 2021, the district recorded as many as 1,328 diarrhoea cases among children under five years with the following break-down: 32 cases of diarrhoea (males 6, females 26) among children from zero to 28 days, 404 (males 214, females 190) among children aged between 28 days and 11 months, and 892 (males 464, females 428) among children from one year to four years (District Health Information Management System [DHIMS], 2022). Even though diarrhoea cases among children under five in the district have declined steadily since 2019, the rate is still high and demands research to identify the possible causes of food-borne diseases, which could be attributed to improper food safety practices among postnatal mothers in the district.

Moreover, 2,553 women in the district delivered babies in 2022. Out of this number, 50 delivered more than one child. Facility-based deliveries in 2022 are as follows: Agona Government Hospital recorded 906 deliveries, Seventh-day Adventist Hospital, Asamang recorded 730, Seventh-day Adventist Hospital Wiamease recorded 487, Kona Health Centre recorded 227, Jamasi Health Centre recorded 131, and Boanim Health Centre recorded 72 women deliveries (DHIMS, 2022).

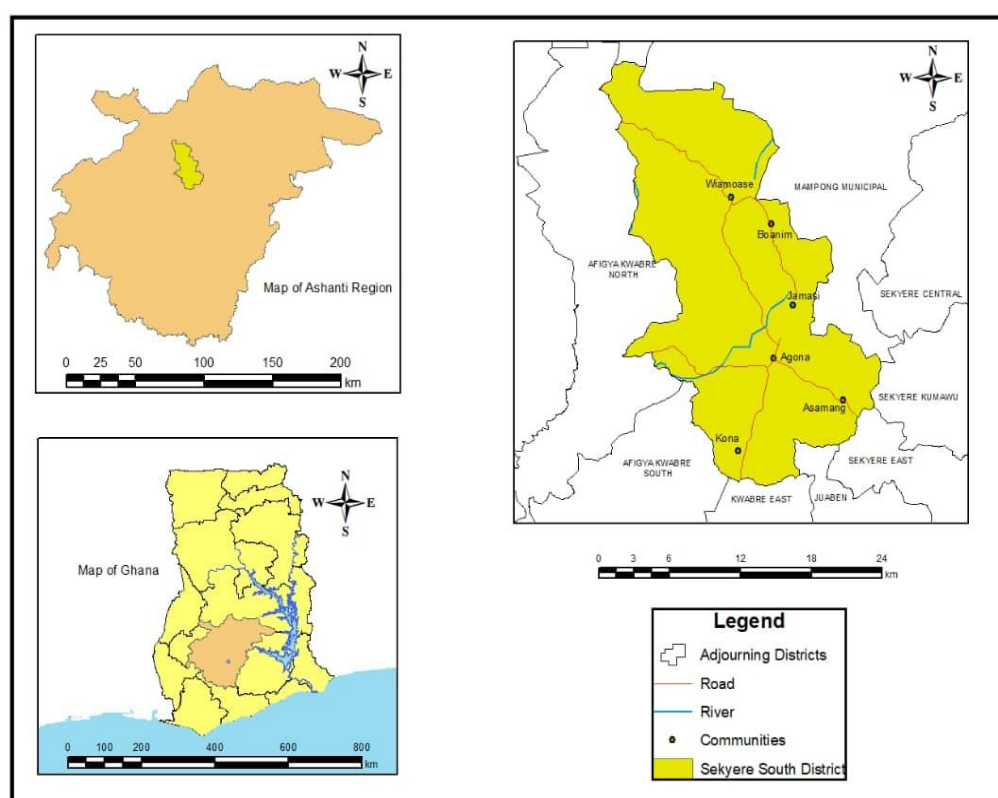


Figure 3: Map of Sekyere South district.

Source: Sekyere South District Assembly (Town and Planning Department, 2023)

Study Population

The target population of this study consisted of all the postnatal mothers with an infant(s) of age 6-12 months who were receiving postnatal care at SDA Hospital Asamang, Agona Government Hospital, SDA hospital Wiamease, Jamasi Health Centre, Kona Health Centre, and Boanim Health Centre. Hence,

the study population was 2,553. Of this number, 50 delivered twins and the remaining 2,503 of the mothers delivered single babies. The total number of children for all the 2,553 postnatal mothers is 2603. The distribution of maternal age groups is essential to understanding variations in food safety knowledge and practices. The age range of the mothers was expected to vary from adolescent mothers to older reproductive-age women. Mothers may have different levels of education, including no formal education, primary, secondary, or tertiary education. The population include married, single, divorced, or widowed mothers. The study population consists of employed, self-employed, and unemployed mothers. The study covers mothers receiving postnatal care at six different healthcare facilities across urban and rural locations in the district. Mothers may follow different cultural and traditional food practices, which could affect food handling, preparation, and feeding methods for infants. Household income levels and living conditions could impact food purchasing, storage, and preparation practices.

Sampling Procedure

Kish's (1965) approach for known study populations was used to choose an appropriate sample size that adequately reflects the total research population. The Kish method is predicated on the accessibility of sample frames. When the sample population or sample frame is known, the Kish (1965) approach, according to Puopiel & Chimsi (2015), is the most accurate way to determine the sampling size.

The generic formula for this approach is;

$$n = N / [1 + N (\alpha)^2]$$

Where:

n = sample size,

N = sampling frame and

α = margin of error or confidence level.

Given the population size, [N] of the postnatal mothers with children between the ages 6 and 12 months in the district was 2,553, the margin of error [α] is 5% (i.e., $\alpha = 0.05$) and a 95% confidence interval, this gave a sample size of 346. A 10% upward adjustment was calculated to account for the non-response rate, which equals 35 respondents. The study's ultimate adjusted sample size was 381. However, Ogah (2013) and Cohen, Mannion, and Morrison (2007) have said that the higher the sample size, the better for cross-sectional research. As a result, the sample size of 381 was increased by 50%, totalling 571 postnatal mothers.

A multi-stage sampling technique was used. A multi-stage sampling technique was appropriate for this study as it allowed for the systematic selection of study locations and participants in a structured and unbiased manner. Purposive sampling technique was used to select three health centres and simple random was used to select three hospitals in the Sekyere South District because they provided postnatal care services to a large number of postnatal mothers. This was to get a larger sample size representing the target population. The selected health facilities include SDA Hospital Asamang, Agona Government Hospital, SDA hospital Wiemoase, Jamasi Health Centre, Kona Health Centre, and Boanim Health Centre. The use of purposive sampling

technique has been selected to capture differences in urban, peri-urban, and rural settings, ensuring a more comprehensive understanding of food safety challenges. Also, selecting hospitals randomly ensured that the study incorporated a mix of different facility types, including district hospitals, primary hospitals, or referral hospitals, leading to a well-rounded dataset.

Quota sampling was utilised to choose the necessary number of participants from each facility based on the projected monthly attendees at the different facilities. To obtain a sample size of 571, 200 respondents were chosen from Agona Government Hospital (894), 165 from SDA Hospital Asamang (738), 107 from SDA Hospital Wiamease (478), 51 from Kona Health centre (228), 32 from Jamasi Health centre (143), and 16 from Boanim Health centre (72). This is shown in Table 1.

After participants had given their informed permission, those who satisfied the inclusion criteria were conveniently selected. Selecting individuals that fit a certain profile is possible using “convenient sampling” (Gall, Gall, & Borg, 2007). Participants whose children fulfilled the age requirements for inclusion were chosen using this method. In addition, this allowed me to focus on finding moms and other carers who feed the children in my studies. Convenience sampling enabled easy access to postnatal mothers attending healthcare facilities, ensuring efficient data collection. One drawback of this sampling strategy is that results are limited to individual characteristics (Gall et al., 2017).

Table 1: Postnatal Mothers with Infants Aged 6 months to 1 year

S/No	Name of selected health facilities	X = estimated number of postnatal mothers with children aged 6-12 months old from the various facility	Proportional representation [(x/y)*z]
1	Agona government hospital	894	200
2	SDA hospital Asamang	738	165
3	SDA hospital Wiemoase	478	107
4	Kona Health centre	228	51
5	Jamasi Health centre	143	32
6	Boanim Health centre	72	16
Total		Y =2,553	Z = 571

Inclusion and Exclusion Criteria

Inclusion criteria

1. The participant had a child within the age range of 6-12 months.
2. The participant had lived in the district for more than six months before the study.
3. The participant was a mother or caregiver who purchased foodstuffs and prepared food for their babies.
4. The individuals should be feeding the child for at least six months from birth.

Exclusion criteria

1. The person willfully refused to offer consent to participate in the study.
2. Participants with sick children on admission.

Data Collection Instrument

The study used a questionnaire as a data collection tool. Questionnaires were used because they provide a standardised data collection format, ensuring that all respondents receive the same set of questions. This consistency gave the

study room for easier comparison and analysis of responses (Ball, 2019). Also, using a questionnaire provides a level of anonymity to respondents, as they do not need to reveal their identity while answering. This can encourage participants to provide more honest and accurate responses, particularly when the current researcher inquires about sensitive or personal information from participants (McLafferty, 2016). However, questionnaires typically collect quantitative data and are less effective at capturing detailed narratives from participants. This restricts the depth of information that can be obtained from respondents and may overlook important contextual factors (Andrade, 2020). This study was not interested in obtaining in-depth information from participants but rather in quantifying the food safety practices among postnatal mothers and the health outcomes of 6–12-month-old children. Hence, the questionnaire was the most appropriate tool for this study.

The questionnaire contained 38 items intended to answer the research questions of this study. These items were grouped into four sections (A, B, C, and D). The questionnaire was first designed in English, then converted to the local dialect (Asante Twi) and translated back to English to ensure the reliability and simplicity of the question. Section A contained information on the demographic characteristics of participants. Some questions under Section A included: age, mother's education level, household size, number of children ages 6 to 24 months, marital status, employment, and monthly income. Participants responded to this 7-item section by either selecting the best choice or writing their response in the provided space for the numeric variables.

Section B measured the knowledge level of respondents on food safety. The WHO Five Keys to Safer Foods tool (WHO, 2006) was adapted to measure

the food knowledge level of participants in this study. All items measuring general food safety knowledge were removed. For instance, items such as *“Placing raw food items (garlic, onions, potatoes, fruits, meat, fish, chicken,) in a separate bag away from other food items in the grocery bag,” “Water cannot be contaminated with dangerous disease-causing microorganism,” “Boiling drinking water is not important in our bodies,” “Select vegetables which have shrunk since they will be sold at a cheaper price,”* and others. The scale has been proven to be reliable in determining the knowledge level of food safety among food handlers. For instance, Gottems, Carvalho, Guilhem and Pires (2018) recorded a good reliability value (Cronbach Alpha) of 0.78.

Sample questions under food safety knowledge include: *“Washing hands after changing a diaper decreases the chance of getting foodborne diseases”* and *“Washing the dishes the same day is important as well as proper storage of the clean utensils in order to prevent contamination,” “The same knife which was used to cut raw meat can be used to cut fruits or vegetables without washing it,” “Improper cooking of food like meat, poultry, and eggs can lead to foodborne diseases,” “Keeping raw, canned and cooked foods together leads to food contamination,” “Leftover food should not be stored for more than 3 days and should not be reheated more than once”,* and *“When buying or preparing food, avoid food that is damaged or rotting”*. The “True” or “False” scale measured the respondents’ food safety knowledge. The respondents were to indicate whether the 17 statements were “true” or “false.” Each statement was worth one point. The percentage of questions answered correctly determined how well a responder understands the material. Respondents were given a food safety knowledge test consisting of 17 multiple-

choice questions. The percentage of questions answered correctly indicated how well respondents understand food safety issues. The knowledge variables were coded and labeled as “1 = yes” and “0 = no”.

Section C measured the food safety practices of the respondents. The food safety practice scale was developed by Odonkor et al. (2020) to measure the food safety practices of food handlers. The scale has good internal reliability (Cronbach’s Alpha value of 0.8) (Odonkor et al., 2020). All items with duplicate meanings were removed. For instance, items such as: “Use clean water to wash hands and plates.” Items that were measuring knowledge instead of practice were removed. For instance, items such as: *“Cross-contamination occurs when microorganisms are transferred by the food handler’s hand”* and *“Prepared food that will be consumed 3-4 hours later (‘Put it on the table/counter, then reheat before consumption’ ‘Put it in the refrigerator, then reheat before consumption,’ ‘Store it in the microwave oven or regular oven, then reheat before consumption,’ and ‘Reheating cooked foods contributes to food contamination’)* were removed. All items measuring general food safety practice were removed. For instance, items such as: *“I wear gloves while handling food to reduce the risk of food contamination,” “I purchase frozen/refrigerated food at the end of the shopping trip,” and “Reheated leftovers (in a microwave) still not eaten completely, I put them in the refrigerator immediately and reheat again before consumption.”*

The instrument was also modified to include a “yes” or “no” response. The modified instrument contained 11 items, and participants were to indicate their level of practice by indicating “yes” or “no.” Correct responses (“yes”) was scored as 1, and incorrect responses (“no”) was scored as 0. The practice

variables were coded and labeled as “1=yes” and “0=no”. Sampled questions included: *“I wash hands before handling food to reduce the risk of food contamination,” “I ensure that fingernails are kept short and clean when cooking,” “I check the expiry date of canned food before purchasing,” “I read the nutritional facts on package foods before purchasing,” “I wash hands with soap and water after using the toilet before cooking.”*

Section D measured the health outcomes of infants belonging to the respondents. It was a self-structured instrument after a review of related literature. It contained three items on the respondents’ prevalence of food-borne diseases. Items were assigned one mark for a “yes” response and a zero for a “no” response. The number of “yes” scores obtained by each respondent indicated the number of food-borne diseases the child was suffering from, which could probably be a result of the bad safety practices of the respondent. Sample questions were: *“My child has experienced the symptoms of diarrhoea in the past month” “My child has experienced the symptoms typhoid in the past one month.”* and *“My child has experienced the symptoms of dysentery in the past one month.”*

Validity and Reliability of the Instrument

This study ensured the validity of the instruments before the actual data collection. This was necessary because some of the items in the questionnaire were adapted from other standardised instruments and also used in a different environment. Establishing the validity of the current questionnaire was essential because the psychometric measures of some of the adapted instruments were not found.

The study initially ensured the face validity of the instruments. This was done by giving the instruments to three Master of Philosophy (MPhil) candidates to check for grammatical errors, clarity, appropriateness, and comprehensiveness of the instruments. This was necessary because it helped to provide an initial judgement of the comprehensiveness and appropriateness of the instruments before conducting further validity assessments (Laver-Fawcett, Brain, Brodie, Cardy, & Manaton, 2016). Secondly, the content validity of the instruments was ensured by giving them to my supervisors to review to ensure that the items truly measure what they are intended to measure (Heale & Twycross, 2015).

Thirty postnatal mothers from Mampong Municipal were purposely and conveniently selected to take part in pretesting the instrument. In the process of conducting pretesting for a quantitative research instrument, a sample size ranging from 20 to 30 is deemed sufficient for attaining the requisite level of instrument reliability (Gottens et al., 2018).

Four research assistants assisted in the pretesting of the instrument. The questionnaire administration lasted 25 minutes per respondent. However, for those unable to read or comprehend English, the research assistants administered the questionnaire. The participants were encouraged to report any ambiguities or difficulties they encountered while responding to the questionnaire. The retrieved questionnaires were meticulously examined, coded, and analysed using Statistical Package for the Social Sciences (SPSS) software. The pretesting data's internal consistency and reliability were calculated and reported using the Kuder-Richardson 20 Test (KR-20). The study revealed an overall internal consistency reliability with a Kuder-Richardson-20

test value of 0.85 for the knowledge items, 0.7 for the practice items and 0.74 for the health outcome items.

Data Collection Procedure

Permission to conduct the study was sought from the Institutional Review Board, University of Cape Coast. An introductory letter was sought from the Head of the Department of Health, Physical Education and Recreation of the University of Cape Coast. Also, permission was sought from the Ghana Health Service (GHS) to conduct a healthcare-related study in the country. The Sekyere South Health Directorate granted permission to carry out the study in the district.

Informed consent was sought from the study participants in order to make free decisions about their involvement. Respondents did not receive any incentives for participating in this study, and no participant was forced to answer questions they did not wish to. Study codes on data documents, such as completed questionnaires, ensured confidentiality and anonymity for participants. The participants were informed about the purpose and the benefits of the study. This was done prior to the data collection. Also, the possible risks of the research and the autonomy of each participant were made known to them. The opportunity for respondents to withdraw from the study was emphasised if they felt like doing so. Identifiable data containing identifiers (for example, names and addresses) was removed from the survey instruments. The data were collected through four trained research assistants, which lasted for about 25 minutes per respondent. Data collection was done face-to-face by self-administering questionnaires to the participants. Any responses to each question were noted. It was done to ensure consistency and interpretation of the

questions. However, questionnaires were given to the participants, who were able to fill them on their own, and guidance was given to them. Due to the sample size, the data collection lasted one month, three weeks.

Data Processing and Analysis

The manual screening was done on the data after they were collected. In addition, the homogeneity of variance was assessed using Leven's equality test of error variance for knowledge about food safety, food safety practice, and the infant's health outcome of postnatal mothers. SPSS version 21.0 was used for the analysis. Moreover, each question of the study was analysed individually. The following shows how each of the research questions was analysed.

Research question one: What is the knowledge level of food safety among postnatal mothers in Sekyere South District?

The Knowledge Section of the questionnaire contained 17 items on knowledge of food safety with three likely responses; "true", "false", and "do not know". Each of the responses were scored where a positive response was assigned "1" while negative response and "I don't know" response was assigned "0". The third choice, "do not know," was included in the knowledge questions to make it easier for postnatal mothers to respond and to serve the interests of those who were unsure or uncertain (Yenealem et al., 2020). Also, the study used the cumulative percentage approach, which only takes into account the positive or acceptable response; hence, the third choice, "do not know", always receives a score of "0" (Al Rubaish, 2010). The evaluation method known as cumulative percentage scoring only takes into account the correct response, converting the overall cumulative score to 100% (Al Rubaish, 2010). Guided by the WHO's Five Keys to Safer Food Awareness Test, a cumulative score

below 70% were categorised as "low knowledge," and cumulative scores above 70% were deemed "high knowledge" (WHO, 2006). The results were presented using pie chart and table.

Research question two: What is the level of food safety practices of mothers in Sekyere South district?

Research question two aimed to determine the level of food safety practices among postnatal mothers in Sekyere South District. The study measured the food safety practices using 11 items, with each of the items being measured on two levels: "yes" and "no". The responses of each of the items were scored where positive responses to the practice questions was assigned "1" and negative responses was assigned "0". Prior research has employed this evaluation technique (Al Rubaish, 2010). The grouping method was appropriate and suitable for studies allied to the assessment "of food handlers" KAP of food safety and hygiene. The evaluation method known as cumulative percentage scoring only takes into account the positive response, converting the overall cumulative score to 100% (Al Rubaish, 2010). On the WHO's Five Keys to Safer Food Awareness Test, cumulative scores falling below 70% of allowed answers were deemed "poor food safety practice," and cumulative scores above 70% were deemed "good safety practice" (WHO, 2006). The results were presented using pie charts and tables.

Research question three: What is the prevalence of food-borne diseases among children of age between 6 and 12 months in Sekyere South District?

Research question three aimed to determine the prevalence of food-borne diseases among children of age between 6 and 12 months in Sekyere South District. It contained three items, with each measuring a prevalence of a

specified food-borne disease. Descriptive statistics such as frequencies and percentages were used to determine the mothers' prevalence of the specified food-borne diseases. The results were presented using bar graph.

Research question 4: What demographic factors influence food safety practice among mothers of children of age between 6 and 12 months in Sekyere South District?

The fourth research question aimed to determine the influence of sociodemographic factors on food safety practices among postnatal mothers in the Sekyere South district. The independent variables (IVs) include age, educational level (mother and spouse), marital status, occupation, monthly income, household size, number of children, and level of food safety knowledge. These variables were measured as categorical variables. The dependent variable (DV), food safety practice, was measured as a nominal variable. Also, the DV was transformed into two categories: good and poor perceptions of food safety practices. In analysing this research question, a preliminary chi-square analysis was conducted. The IVs that showed that a level of significance at the bivariate level were further put into a binary logistic regression model to determine the level at which the IVs predicted the food safety practices of the participants. According to Chicco, Warrens and Jurman (2021), binary logistic regression is the ideal statistical test to conduct when one is interested in predicting the extent to which the IVs influence DV and the DV is being measured on two levels. The current study measured food safety practices on two levels (good safety practices and poor safety practices); hence, binary logistic regression was the most suitable statistical test for this research question. Moreover, similar studies on food safety practices use binary logistic

regression in their analysis (Gebre, Legesse, & Fikadu, 2023; Serrem, Illés, Serrem, Atubukha, & Dunay, 2021; Uzoama, Kimm, & Konlan, 2023). The logistic regression analysis was conducted at a significant level of $p\text{-value} < 0.05$ and at 95% level of confidence.

Research question five: 5: What food safety practices determine the occurrence of diarrhoea among children of post-natal mothers in Sekyere South District?

Research question five aimed to determine the influence of food safety practices on diarrhoea among infants of post-natal mothers in Sekyere South District. The DV for this research question was measured on two levels: Yes or No (a “yes” response meant participant’s infant has experienced diarrhoea in last one month whereas a “no” response mean participant’s infant did not experience diarrhoea in the past one month). Chi-square and binary logistic regression analysis were used to analyse this research question. A $p\text{-value}$ of < 0.05 was set as the level of significance at 95% confidence interval.

CHAPTER FOUR

RESULTS AND DISCUSSION

The purpose of this study was to determine food safety practices and health outcomes among post-natal mothers, nursing 6–12-month-old children in the Sekyere South District. This section presents the results and discussion of the study's findings based on the study's formulated research questions. The mean age of the participants was 25 years. Also, most of the participants, 219 (38.4%) were aged 24–29 years. Moreover, most of the participants 321(56.2%) were married and 315(55.2%) were self-employed. Besides, the majority of the participants, 244(42.7%) earned less than GHC500.00 as their monthly income with most of them, 216(37.8%) having SHS/vocational as their highest level of education. Again, the majority of the participants 532(93.2%) had only one child aged 6-24 months old with most of them 269(47.1%) living in a house containing about 4-6 people (table 2).

Table 2: Demographic characteristics of respondents

Variable	Frequency (n)	Percentage (%)
Age (years)		
18-23	140	24.5
24-29	219	38.4
30-34	124	21.7
Above 34	88	15.4
Marital status		
Single	192	33.6
Married	321	56.2
Divorced/separated	52	9.1
Widowed	6	1.1
Occupation		
Unemployed	172	30.1
Self employed	315	55.2
Civil servant	52	9.1
Private employed	32	5.6
Monthly income (GHC)		
<500	244	42.7
500-1000	231	40.5
>1000	96	16.8
Highest level of education		
No formal education	41	7.2
Primary	56	9.8
JHS	213	37.3
SHS/Vocational	216	37.8
Tertiary	45	7.9
Number of people living household		
1-3	252	44.1
4-6	269	47.1
Above 6	50	8.8
Children 6-24 months in household		
1	532	93.2
2	39	6.8

Source: Field data, 2023

Research Question One: What is the knowledge level of food safety among post-natal mothers in Sekyere South District?

Almost all (94.4%) of the postnatal mothers knew that in preparing food, hands should be free of wounds. The majority of the postnatal mothers (94.9%) knew that in preparing food, hands should be properly washed with soap under running water to reduce the risk of food contamination. Also, the majority of the participants (81.4%) knew that it is important to wash dishes on the same

day and also properly store them in a clean environment in order to prevent contamination. Further, most of the participants (94.4%) knew that washing hands after changing a diaper decrease the chance of getting food-borne diseases. Most of the postnatal mothers (96.0%) knew that, in feeding a baby, hand should be properly cleaned. Also, the majority of the participants (78.6%) knew that improper cooking of food like meat, poultry, and eggs can lead to food-borne diseases.

The majority of the participants (93.3%) knew that it is important to wash the child's hands while eating. Also, the majority of the participants (70.8%) knew that different foods require different cooking time and temperature. Most of the participants (94.0%) knew that, to prepare safe food, nails should be short and unvarnished. The majority of the postnatal mothers (70.1%) knew that leftover foods should be reheated at a high temperature and served hot. Most of the participants (94.4%) knew that fruits and vegetables should be washed before eating. Also, the majority of the participants (94.4%) knew that when buying or preparing food, avoid food that is damaged or rotting. However, the majority of the postnatal mothers (40.8%) did not know that leftover food should not be stored for more than 3 days and should not be reheated more than once. Also, the majority of the postnatal mothers (37.0%) did not know that adding food supplements to baby's porridge once the porridge is cooked increases the risks of getting food borne illness (Table 3)

Table 3: Food safety knowledge of the respondents

Knowledge questions	Responses n (%)		
	True	False	Don't Know
To prepare safe food, hands should be free of wounds	539(94.4)	24(4.2)	8(1.4)
To prepare safe food, nails should be short and unvarnished	537(94.0)	30(5.3)	4(0.7)
In preparing food, hand should be properly washed with soap, moisten, under running water to reduce the risk of food contamination	542(94.9)	20(3.5)	9(1.6)
It is important to wash the child's hands while eating	536(93.9)	23(4.0)	12(2.1)
In feeding a baby, hand should be properly clean	548(96.0)	14(2.5)	9(1.6)
Washing hands after changing a diaper decreases the chance of getting foodborne diseases	539(94.4)	16(2.8)	16(2.8)
Washing the dishes, the same day is important as well as proper storage of the clean utensils in order to prevent contamination	465(81.4)	51(8.9)	55(9.6)
The same knife should not be used to cut raw meat, fruits or vegetables	273(47.8)	183(32.0)	115(20.1)
Keeping raw, canned and cooked foods together leads to food contamination	372(65.1)	93(16.3)	106(18.6)
Improper cooking of food like meat, poultry and eggs can lead to food borne diseases	449(78.6)	42(7.4)	80(14.0)
Leftover foods should be reheated at a high temperature and served hot	400(70.1)	28(4.9)	143(25.0)
Different foods require different cooking time and temperature for food safety.	404(70.8)	25(4.4)	142(24.9)
Adding food supplements to baby's porridge once the porridge is cooked increases the risks of getting food borne illness	169(29.6)	191(33.5)	211(37.0)
Leftover food should not be stored for more than 3 days and should not be reheated more than once.	210(36.8)	128(22.4)	233(40.8)
Water can be contaminated with dangerous disease-causing microorganism.	441(77.2)	36(6.3)	94(16.5)
Fruits and vegetables should be washed before eating.	540(94.4)	10(1.8)	21(3.7)
When buying or preparing food, avoid food that is damaged or rotting	539(94.4)	16(2.8)	16(2.8)

Source: Field data, 2023

The purpose of this research question was to determine the level of food safety knowledge among post-natal mothers in the Sekyere South District. Each of the responses on the knowledge variables were scored, where a positive response was assigned “1” while negative response and “I don’t know” response was assigned “0”. A cumulative score was generated using all the 17 knowledge variables by summing up all the responses on the knowledge variables. Further, the cumulative scores were categorised into two (low knowledge and high knowledge) to generate knowledge level of participants on food safety. Based on the WHO’s five keys to safer food guide, a cumulative score below 70% was coded “0” and labelled “low knowledge” and any score equal or above 70% was assigned a value code of “1” and labeled as “high knowledge level” (WHO, 2006). The results show that, most (63.9%, n=365) of the participants had high level of knowledge on food safety (see Figure 2).

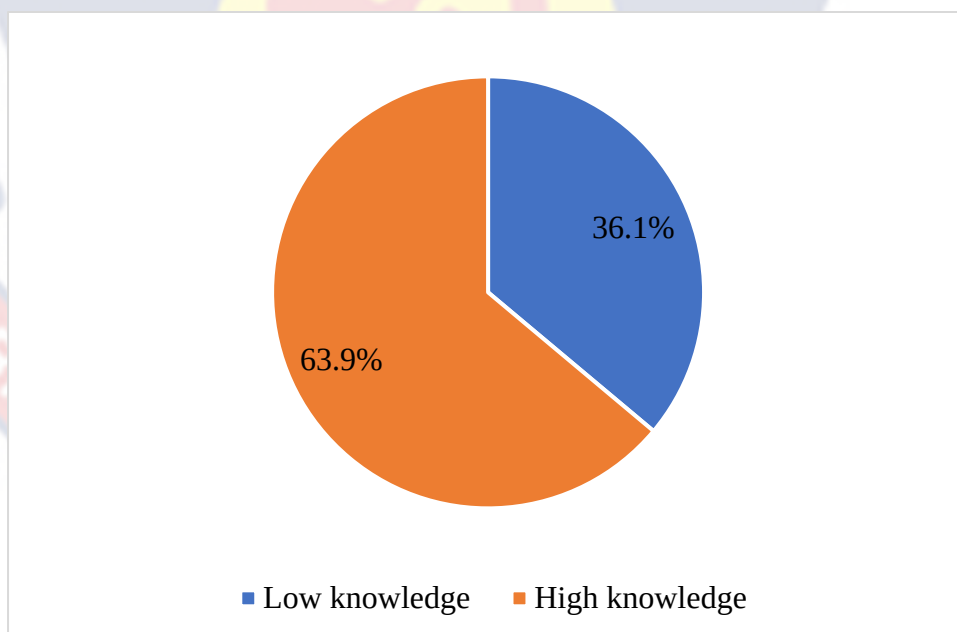


Figure 4: Knowledge level of food safety among post-natal mothers

The current finding is that 63.9% of postnatal mothers in the Sekyere South district have high knowledge of food safety. This implies that the majority of participants possess a strong understanding of the principles, guidelines, and best practices related to food safety. The possible explanation for the finding could be due to the high educational status among the postnatal mothers involved in the study. Most (84.9%) of the mothers had at least basic education (primary, JHS and SHS), which might have enabled them to read and understand basic food safety procedures. Educational attainment is associated with health literacy and healthcare utilisation, which create awareness on food safety (Naeem et al., 2022). Persistent food safety education at various ANC and PNC clinics within the district could potentially contribute to the high knowledge level on food safety among the current study participants. According to Perumal et al. (2013), effective educational interventions during antenatal and child welfare clinics improve the level of mothers' knowledge and practices regarding food safety.

The current high knowledge level on food safety among postnatal mothers is in line with a Ghanaian study that recorded a food safety knowledge level of 66.3% (Odonkor et al., 2020). Also, Naeem et al.'s (2022) findings in Saudi Arabia are in line with the current findings. Naeem et al. also found about 62.6% of their post-natal mothers had a high knowledge level of safety. Contrary to the current findings, El-Mezayen et al.'s (2020) research in Egypt reported a 32.6% level of knowledge on food safety among mothers. The differences in the findings could be partly explained by the fact that the current study included only postnatal mothers, while El-Mezayen et al. (2020) included mothers with children aged two to five years old. The age group differences in

the study populations (postnatal mothers in Sekyere South District vs. mothers with children aged 2 to 5 years in Egypt) may contribute to the variations. Mothers with older children may have different priorities or may not have received recent health education compared to post-natal mothers. Also, another possible explanation for the disparities in the finding's is could be the differences in cultural practices and regional variations may have caused the disparities in the knowledge level of post-natal mothers in the current study and the Egyptian study. The Sekyere South District and Egypt may have distinct cultural norms and practices related to food safety, influencing the understanding of postnatal mothers.

The implications of the current findings are that mothers with high knowledge about food safety practices are more likely to handle, prepare, and store food in a way that minimises the risk of contamination and foodborne illnesses. This is crucial for protecting both the mothers and their infants, as newborns and young children are particularly vulnerable to food-borne diseases, thereby facilitating the achievement of SDG 3.2. Knowledgeable mothers can contribute to the overall health of the community by sharing their knowledge with others, fostering a culture of awareness and good food safety practices.

Research question 2: What is the level of food safety practice of mothers in Sekyere South District?

The majority of the postnatal mothers (97.7%) washed their hands before handling food to reduce the risk of food contamination. Also, the majority of the participants (93.3%) washed their hands with soap and water, after using the toilet before cooking. Almost all of the participants (95.8%) ensured that their fingernails are kept short and clean when cooking. Most of

the participants (91.4%) used potable water for cooking. Also, the majority of the participants (81.3%) cover their hair when preparing food. Most of the participants (87.0%) cover their mouths with handkerchief when sneezing or yawning when cooking.

The majority of the participants (91.8%) cleaned foodstuffs before cooking them. Also, the majority of the participants (74.1%) cover dustbins where food is prepared. Moreover, most of the participants (52.0%) checked if canned food was dented before buying. However, the majority of the postnatal mothers (72.2%) did not read the nutritional facts on package foods before purchasing. Also, the majority of the postnatal (50.6%) mothers did not check the expiration date of canned food before purchasing.

Table 4: Food Safety Practice of the Respondents

Food safety practice questions	Responses n (%)	
	Yes	No
I wash hands before handling food to reduce the risk of food contamination	559(97.9)	12(2.1)
I check the expiry date of canned food before purchasing	282(49.4)	289(50.6)
I read the nutritional facts on package foods before purchasing	159(27.8)	412(72.2)
I check if a canned food is dented before I buy	297(52.0)	274(48)
I cover dustbins where food is prepared	423(74.1)	138(24.2)
I use potable water for cooking	522(91.4)	49(8.6)
I cover hair when preparing food	464(81.3)	107(18.7)
I ensure that fingernails are kept short and clean when cooking	547(95.8)	24(4.2)
I cover mouth with handkerchief when sneezing or yawning when cooking	497(87.0)	74(13.0)
I wash hands with soap and water after using the toilet before cooking	533(93.3)	38(6.7)
I clean foodstuffs before cooking them	524(91.8)	47(8.2)
Source: field data, 2023	n=571	

The purpose of this research question was to determine the level of food safety practice among postnatal mothers in the Sekyere South District. Based

on the WHO's five keys to safer food guide, a cumulative score below 70% was coded "0" and labelled "bad practice" and any score equal or above 70% was assigned a value code of "1" and labelled as "good practice" (WHO, 2006). Similar studies have employed this approach (Odonkor et al., 2019; Tuglo et al., 2021). The results show that most of the participants (51.0%, n=292) had good level of practice on food safety (see Figure 3).



Figure 5: Food safety practice level among participants

The study found that 51% of the postnatal mothers involved in the study had good food safety practices. It indicates that half of the postnatal mothers comply with the WHO's five keys to safer food guide. Postnatal mothers with good food safety practices are likely to have healthy children and record low morbidity and mortality, which facilitates the achievement of SDG 3.2 (WHO, 2022). The current study's high knowledge level may have contributed to the participants' high perception of good food safety practices. Studies have shown that postnatal mothers with high knowledge about food safety are more likely to abolish unhygienic food-related cultural practices (Ayaz et al., 2018;

Odonkor et al., 2020). Also, postnatal mothers with high knowledge of food safety may know the importance of good food safety practices and the negative consequences of poor food safety practices on infants' health (Odonkor et al., 2020).

Further, the persistent health education during PNC, CWC and ANC in the various health facilities in the Sekyere South district could have influenced the high level of adequate food safety practices in the current study. Childcare education that is provided during ANC and PNC exposes mothers to good childcare practices, such as good food safety practices and other practices that are pertinent to the growth and development of newborns. Besides, the regular health education campaigns on adequate food safety practices among mothers in the Sekyere South district might have influenced the current level of food safety practices among the participants. The current finding is consistent with a Ghanaian study where about 66.3% of post-natal mothers had good food preparation practices (Odonkor et al., 2020). Also, another similar study conducted in northeastern Ethiopia (Natnael et al., 2021) recorded 54.9% prevalence of adequate food safety practices among postnatal mothers.

Contrary to the current finding, Shati et al. (2021) in Southwest Saudi Arabia recorded a relatively high prevalence (86.8%) of adequate food safety practices among postnatal mothers. The observed differences in the findings could be partly explained by the cultural disparities and regional variations which may have influenced the disparities in the practice level of post-natal mothers the two studies. The Sekyere South District and Saudi Arabia have distinct cultural norms and practices related to food safety, influencing the understanding of postnatal mothers. Another possible reason could be the

method used in collecting the data. This study used questionnaire to solicit responses whilst the Saudi Arabia study employed observational checklist.

The implications of this current finding are that there may be moderate risk of food-borne illnesses for both post-natal mothers and their infants. While these practices might not be optimal, they might still provide some level of protection against contamination. An increased risk of foodborne illnesses may also halt the achievement of SDG 3.2. It may also contribute to high cost of living since much must be spend in healthcare to reduce the number of hospital visits and medical treatments associated with food-borne illnesses.

Research question 3: What is the prevalence of food-borne diseases among children aged 6-12 months in Sekyere South District?

This research question intended to estimate the prevalence of food-borne diseases among postnatal mothers of children of aged 6-12 months in the Sekyere South District. The food-borne diseases were: dysentery, typhoid, and diarrhoea. Frequencies and percentages were used to analyse this research question. The study found that, most children 319(55.9%) of the post-natal mothers had diarrhoea, 94(16.5%) had dysentery and 69(12.1%) had typhoid (see Figure 4).

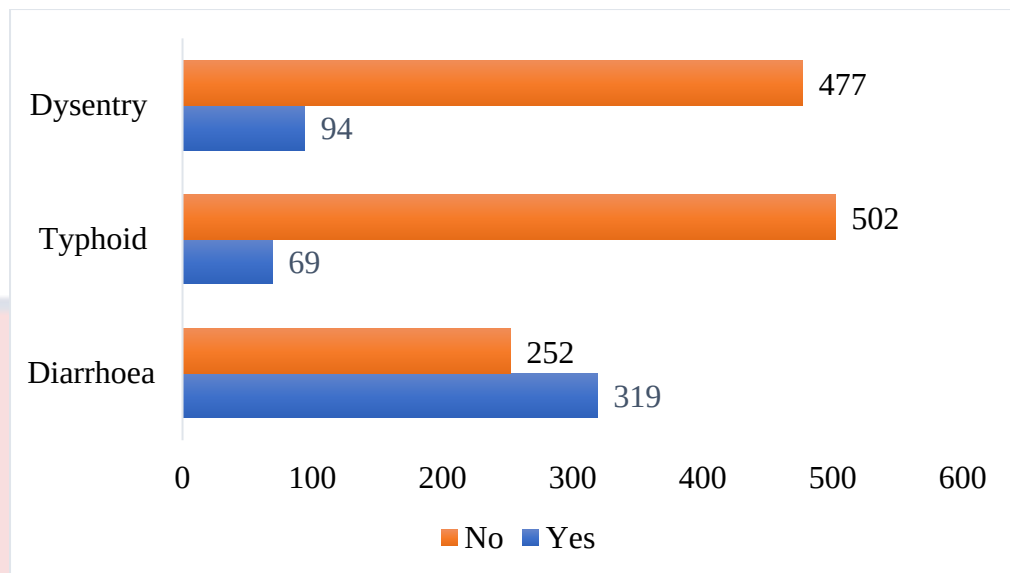


Figure 6: Prevalence of foodborne diseases among children 6–12-month-old

Although half of the postnatal mothers involved in the study had high perceptions of good food safety practices, diarrhoea was the major disease reported by the mothers among their infants. This indicates that, the remaining 50% of the study participants exhibited poor food safety practices. Perhaps poor food safety practices of caregivers, dirty physical surroundings of the mother, and the child's physiological composition might have contributed to the high prevalence of diarrhoea among the infants of respondents (Geresomo, 2019). In Ghanaian communities, infants are mostly raised by significant others, such as grandmothers, siblings, and other close relations (Baataar, 2023). A caregiver who has poor food safety practices is likely to poison the foods of infants during preparation, handling, and storage, leading to a high food-borne disease among the infants. Lack of breastfeeding may increase susceptibility to infections, including diarrhoea diseases (Webb & Cabada, 2018).

Additionally, dirty surroundings due to poor drainage systems as well as poor refuse disposal system expose infants to water and food-borne diseases beyond the control of the mother. Also, lack of potable or clean water in some

communities in Sekyere South District could also contribute to the finding. For instance, Reese et al. (2019) reported that just 53% of rural families have constant access to improved drinking water, whereas 66% of urban households do. Under such condition, a good food safety practice of the mother will have minimal impact on health outcome of the infant. Environmental factors, such as living conditions and climate, can influence the prevalence of diarrhoea. Crowded living spaces and unsanitary environments may facilitate the transmission of infections (Asare et al., 2022). A study by Veenah et al. (2022) shows that 19% of diarrhoea diseases among children under five were attributed to unsafe water, inadequate sanitation, and poor hygiene (WASH).

Another possible reason could be the low socioeconomic status of the participants. Families with lower socioeconomic status may face challenges in providing adequate healthcare, nutrition, and sanitation, contributing to a higher prevalence of diarrhea. This current high prevalence of diarrhoea among infant of postnatal mothers is in line with other studies. For instance, a study by Sumampouw et al. (2019) showed significant influence from socioeconomic factors on diarrhea incidence in under-five children. According to Odo et al. (2023), study showed that children < 2 years from low socioeconomic areas were associated with more diarrhea.

Moreover, weak immunity due to poor genetic or physiological endowment of a baby could likewise contribute to high prevalence of diarrhoea among the infants involved in the study. Children with such condition are prone to persistent sickness under poor conditions, making the good food safety practices of the mother have little impact on them (Mohammed et al., 2022).

Contrary to the finding, Asamoah et al.'s (2016) study in the Central Region of Ghana found that 4% (306,854/7,642,431) of cases of morbidity between 2008 and 2012 were attributed to diarrhoea illnesses. Again, in a study (Amadu et al., 2023) in sub-Saharan Africa, it was found that 16% of the 307,741 mothers interviewed reported an incidence of diarrhoea disease among children under-five years in their households. The possible justification for this could be partly explained by the cultural disparities and regional variations that may have influenced the disparities in the practice level of postnatal mothers in the two studies.

The implications of this current findings are that there should be urgency for targeted interventions to address and improve food safety practices among postnatal mothers, which may increase the workload of the nation, thereby affecting the achievement of SDG 3.2.

Research question 4: What demographic factors influence food safety practices among mothers of children of age between 6 and 12 months in Sekyere South District?

This research question aimed at determining the factors that influence food safety practices among postnatal mothers of children aged 6-12 months in the Sekyere South District. The study conducted a preliminary bivariate analysis to determine the association between the demographic characteristics of participants and the food safety practices. The bivariate analysis results showed that a significant association exists between age and food safety practice [$\chi^2=36.920$, $p<0.001$, $\phi_c=.254$]. Since Cramér's V is between zero and one, a value of 0.254 indicates a weak association. Again, a statistically significant relationship exists between marital status and food safety practices [$\chi^2=6.603$,

$p < 0.05$, $\phi_c = .108$], with a weak degree of association (Cramer's $V = 0.108$). Also, a significant association exists between occupation and food safety practices [$\chi^2 = 12.148$, $p < 0.01$, $\phi_c = .146$]. Similarly, Cramer's V value of 0.146 indicated a weak level of association between the variables. Additionally, level of education was significantly associated with food safety practices [$\chi^2 = 15.491$, $p < 0.01$, $\phi_c = .165$] with a weak degree of association (Cramer's $V = 0.165$). Also, a significant association exists between household size and food safety practices [$\chi^2 = 8.876$, $p < 0.05$, $\phi_c = .125$], with a weak magnitude of association (0.125). However, there was no significant association between monthly income, the number of children aged 6-24 months in the household and food safety practices (see Table 5).

Furthermore, a multinomial logistic regression analysis was conducted separately for food safety practices, based on the bivariate results to determine the extent to which the IVs influence food safety practices. The results show that, postnatal mothers aged above 34 were 1.43 times more likely to practice good food safety as compared to those within the age of 18-23 (AOR=1.425, 95%CI=.184-.980, $p < .001$). The results also show that, significantly, divorced/separated participants were 0.48 times less likely to be involved in good food safety practices compared to the single participants (AOR=.478, 95%CI=.207-1.633, $p < .001$). Further, those whose income level is >GHC1000 were 1.55 times more likely to practice good food safety compared to those whose income level is <GHC500 (AOR=1.545, 95%CI=.350-2.384, $p = .000$). Again, those who have completed tertiary education were 4.99 times more likely to have good food safety practice compared to those with no formal education (AOR=4.989, 95%CI=.804-30.975, $p = .000$). Additionally, the odds of

practising food safety were low among participants who had two children between the age of 6-24 months as compared to participants with only one child aged 6-24 months (AOR=.475, 95%CI=.166-1.067, $p>.05$) (see Table 6).

Table 5: Bivariate analysis of the association between demographic characteristic of participants and food safety practices

Variable	Food safety practice		Chi-square (χ^2)	Cramer's V (ϕ_c)
	Poor practice	Good practice		
Age			36.92***	.254
18-23	8(5.7%)	132(94.3%)		
24-29	38(17.4%)	181(82.6%)		
30-34	37(29.8%)	87(70.2%)		
Above 34	5(5.7%)	83(94.3%)		
Marital status			6.603*	.108
Single	20(10.4%)	172(89.6%)		
Married	58(18.1%)	263(81.9%)		
Divorced/Separated	10(19.2%)	42(80.8%)		
Widowed	0(0.0%)	6(100.0%)		
Occupation			12.148**	.146
Unemployed	22(12.8%)	150(87.2%)		
Self employed	61(19.4%)	254(80.6%)		
Civil servant	1(1.9%)	51(98.1%)		
Private employed	4(12.5%)	28(87.5%)		
Monthly income			1.403	.050
Less than 500	39(16.0%)	205(84.0%)		
500-1000	38(16.5%)	193(83.5%)		
Greater than 1000	11(11.5%)	85(88.5%)		
Level of education			15.491**	.165
No formal education	2(4.9%)	39(95.1%)		
Primary	11(19.6%)	45(80.4%)		
JHS	42(19.7%)	171(80.3%)		
SHS/Vocational	33(15.3%)	183(84.7%)		
Tertiary	0(0.0%)	45(100.0%)		
Household size			8.876*	.125
1-3	34(13.5%)	218(80.7%)		
4-6	52(19.3%)	217(80.7%)		
Above 6	2(4.0%)	48(96.0%)		
Children from 6-24 month			.207	.019
One	81(15.2%)	451(84.8%)		
Two	7(17.9%)	32(82.1%)		

Note: ***= $p<0.001$, **= $p<0.01$, *= $p<0.05$

Source: Field data, 2023

Table 6: Multivariate analysis of predictors of perceived food safety practices among participants.

Sociodemographic Factors of Food Safety Practices	B	Wald	AOR	p- value	95%CI	
					Lower	Upper
Age		15.563		.001		
18-23					Ref	
24-29	-1.027		.358		.200	.642
30-34	-1.372		.254		.122	.529
Above 34	-.857		1.425		.184	.980
Marital status		7.131		.008		
Single					Ref	
Married	-.747		.474		.273	.824
Divorced/separated	.738		.478		.207	1.106
Occupation		4.757		.178		
Unemployed					Ref	
Self employed	.351		1.421		.852	2.368
Civil servant	1.187		3.277		.888	12.096
Private employed	-.103		.903		.361	2.255
Monthly income		19.586		.000		
<500					Ref	
500-1000	-.852		.427		.521	1.633
>1000	.435		1.545		.350	2.384
Highest level of education		46.472		.000		
No formal education					Ref	
Primary	.1802		.517		.060	.454
JHS	1.605		.430		.086	.467
SHS/Vocational	4.470		.427		.271	1.442
Tertiary	1.607		4.989		.804	30.975
Number of people in household		1.689		.430		
1-3					Ref	
4-6	.048		.234		.663	1.661
Above 6	.590		2.465		.725	4.488
Number of children 6-24 months in household		3.323		.068		
1					Ref	
2	-.865		.475		.166	1.067

Note: Hosmer and Lemeshow Test= $\chi^2=5.257$, $n(8)$, $p=.730$. Nagelkerke

$R^2=.230$

Source: Field data, 2023

The current study found that the age of the postnatal mother was significantly associated with food safety practices. This implies that the age of the mother has an impact on how she engages in food safety practices. Mothers

aged 34 and above years were 1.5 times more likely to have good safety practices compared to those aged between 18 and 23 years. In this case, as the age of the post-natal mother increases, her food safety practices also increase. Older mothers may be more likely to adhere to recommended food safety guidelines (Odonkor et al., 2020). The possible justification could be that older mothers may have several numbers of births, which might have increased their experience of food safety and other childcare practices (Naeem et al., 2022). Also, mothers with higher parity may have a high number of ANC and PNC visits and have received persistent health education and counselling from healthcare professionals, which might have improved their knowledge of food safety practices (Asumah et al., 2023).

The finding is corroborated by other studies. For instance, Shati et al. (2021) study in Southwest Saudi Arabia found that a high level of food safety practice was more likely among mothers over the age of 30 years (57.9%) than those under 30 years (46.8%). Studies have also reported similar findings (Bedada et al., 2021; Mohammed et al., 2019). Conversely, those findings disagreed with the study of Zyoud et al. (2019) about “Knowledge, attitude and practices among parents regarding food poisoning: a cross-sectional study from Palestine”, which found that there was no statistically significant relation between the age of mothers and their total practices about safe and unsafe food. The observed difference could be due to the category of respondents involved in the study. The current study employed only postnatal mothers while the study in Palestine employed parents (both mother and father).

The implications of the findings are age-related patterns in food safety practices can contribute to the development of preventive measures to reduce

the risk of foodborne illnesses among post-natal mothers and their infants which may result in the achievement of SDG 3.2.

Also, the current study found that the marital status of the postnatal mother was significantly associated with food safety practices. This indicates that married mothers may have different sources of information or support networks that impact their understanding and adherence to WHO's five keys to a safer food guide. Postnatal mothers who were divorced or separated were 0.5 times less likely to engage in good food safety practices compared with those single. A possible explanation could be that divorced or separated mothers may have a more limited support system compared to single mothers. A lack of support, either emotionally or practically, can make it more challenging for these mothers to prioritise and consistently follow food safety guidelines (Nelson et al., 2022). Also, mothers who are divorced or separated may experience higher levels of stress due to the challenges associated with the dissolution of a marriage or relationship. Elevated stress levels can affect various aspects of daily life, including the ability to focus on and implement good food safety practices.

The current study finding is in line with other studies (Bedada et al., 2021; Mohammed et al., 2022). Contrary to the current finding, Zyoud et al. (2019) recorded no significant association between food safety practice and marital status. These findings imply that policymakers can use this information to develop strategies that are more effective in promoting food safety practices among mothers with different marital statuses.

Moreover, the current study found that the income level of the postnatal mother was significantly associated with food safety practices. It implies that

the income level of post-natal mothers may serve as an economic indicator, and the association could imply that those with lower incomes face economic barriers that affect their ability to practice food safety. Post-natal mothers who earn more than GH¢1000.00 monthly were 1.5 times more likely to have good food safety practices. A possible explanation of the finding could be that mothers who earn high income monthly could afford the cost of transportation to ANC and PNC for health education on child food safety practices. Also, they could afford materials such as detergents, and potable water, for enhancing proper food safety practices. The finding is corroborated by the study by Naeem et al. (2022) who found that mothers' monthly income was connected with supplemental food preventative practice.

The current income level was significantly associated with food safety practices among postnatal mothers is in line with a study conducted in Egypt (Mohammed et al., 2022). Contrary to the current findings, Odonkor et al. (2020) in Ghana reported there was no significant association between income level and food handling practice of the respondents. The differences in the findings may have resulted from the different habits and economic status of the two study' samples: Sekyere South women, particularly those in rural areas (where the highest percentage of the studied mothers reside), used to buy fresh foods from traditional markets and rarely bought packaged foods, whereas Western Ghana women, as mentioned in their study, relied on buying packaged food from malls.

The findings imply that they may help consider implementing policies that address the social determinants of health, including income disparities.

Social policies that support families financially and provide access to affordable, nutritious food can positively impact food safety practices.

Furthermore, the current study found that the educational level of the post-natal mother was significantly associated with food safety practices. Post-natal mothers with tertiary education were five times more likely to have good food safety practices compared with those having no formal education. The possible explanation could be that most of the postnatal mothers with tertiary education are either in private or civil service, which might have enhanced their socioeconomic status. Mothers who have high socioeconomic status could afford the cost of transportation to ANC and PNC for health education on child food safety practices. Also, they could afford materials such as potable water and diapers to ensure proper food safety practices. Again, postnatal mothers with high educational status are more likely to have a high knowledge of food safety practices. This is because their educational level could enhance them with the expertise to search for knowledge on food safety from the internet, magazines, and journals. The finding is consistent with other studies. For instance, several studies (Mekonnen et al., 2021; Naeem et al., 2022; Odonkor et al., 2020) have revealed that mothers' education level was connected with supplemental food preventative practice. Conversely, the current findings disagreed with the study of Zyoud et al. (2019) who found that there was no statistically significant relation between the educational status of mothers and their total food safety practices.

Finally, the current study found that the number of children from 6-24 months in a household was significantly associated with food safety practices. It might indicate that households with more young children are more likely to

adhere to recommended WHO's five keys to safer food guide. A household with two children was 0.5 times less likely to engage in food safety practices. A possible justification could be that managing the needs of two young children may place additional demands on post-natal mothers' time and attention. With two young children, caregivers might experience time constraints that make it challenging to follow food safety practices consistently. Time pressures could affect tasks such as thorough cooking, proper storage, and careful handling of food. The current finding aligned with Odonkor et al.'s (2020) study.

Conversely, the current study findings disagreed with Mekonnen et al.'s (2021) study in Ethiopia, which found that there was no statistically significant relation between the number of children in a household and the practice towards food poisoning. The observed differences in the findings could be partly explained by the participants recruited for the studies. The current study recruited postnatal mothers while Mekonnen et al. (2021) recruited parents (both father and mother).

The findings may heighten caregivers' awareness of the vulnerability of young children to foodborne illnesses. This could lead to a greater need for and emphasis on food safety practices within the household. Caregivers may recognise the unique dietary needs and vulnerabilities of infants and toddlers, prompting them to be more conscientious about food safety to protect the health of their young children thereby leading to the achievement of SDG 3.2.

Research question 5: What food safety practices determine the occurrence of diarrhoea among children of post-natal mothers in Sekyere South District?

This analysis was to identify the food safety practices that determine the occurrence of diarrhoea among infants of post-natal mothers in the Sekyere South District. The bivariate analysis shows that there is a significant association between reading the nutritional facts on packaged foods before purchasing and the risk of diarrhoea [$\chi^2=23.584$, $p<0.001$, $\phi_c=.203$]. Since Cramér's V is between zero and one, a value of 0.203 indicated a weak magnitude of association. Again, a statistically significant relationship exists between covering dustbins where food is prepared and the risk of diarrhoea [$\chi^2=7.625$, $p<0.01$, $\phi_c=.117$]. Similarly, Cramér's V value of 0.117 indicated a weak level of association between the variables. Also, a significant association exists between using potable water for cooking and the risk of diarrhoea [$\chi^2=21.403$, $p<0.001$, $\phi_c=.194$] with a weak magnitude of association (0.194).

Additionally, covering hair when preparing food is significantly associated with the risk of diarrhoea [$\chi^2=11.612$, $p<0.01$, $\phi_c=.143$], with a weak degree of association (Cramer's V = 0.143). With a weak magnitude (Cramer's V = 0.165), the association between ensuring that fingernails are kept short and clean when cooking and the risk of diarrhoea showed a significant χ^2 value [$\chi^2=15.614$, $p<0.001$, $\phi_c=.165$]. Furthermore, covering the mouth with a handkerchief when sneezing or yawning when cooking significantly relates to a weak degree (Cramer's V = 0.182) with the risk of diarrhoea [$\chi^2=18.937$, $p<0.001$, $\phi_c=.182$]. Also, cleaning foodstuffs before cooking them had a

significantly weak association (Cramer's $V = 0.080$) with the risk of diarrhoea [$\chi^2=3.682$, $p<0.05$, $\phi_c=.080$].

The chi-square results also showed no significant association between washing hands before handling food, checking the expiry date of canned food before purchasing, checking if a canned food is dented before buying, washing hands with soap and water after using the toilet and the risk of diarrhoea among infants of post-natal mothers (see Table 7).

Also, a multivariate analysis was conducted to determine the extent to which IVs predict the risk of diarrhoea among postnatal mothers with children aged 6-12 months, using logistic regression analysis. The finding indicates that participants who do not keep their fingernails short and clean when cooking were 2.1 times more likely to be at risk of having their child experiencing diarrhoea compared to those who keep their fingernails short and clean when cooking [AOR=2.057, 95%CI (1.138-3.719), $p=.05$]. Moreover, participants who read the nutritional facts on packaged foods before purchasing were 0.4 times less likely to be at risk of having their child experiencing diarrhoea compared to participants who do not read the nutritional facts on packaged foods before purchasing [AOR=.406, 95%CI (.265-.621), $p=.001$]. Also, participants who use potable water for cooking were 0.5 times less likely to be at risk of having their child experiencing diarrhoea compared to those who do not use potable water for cooking [AOR=.4797, 95%CI (2.191-10.501), $p=.001$]. Additionally, the odds of being at risk of having their child experiencing diarrhoea were high among participants who do not clean foodstuffs before cooking compared to participants who clean foodstuffs before cooking them [AOR=1.616, 95%CI (.982-2.660), $p=.05$]. (see Table 8).

Table 7: Association between Perceived Food Safety Practices and Diarrhoea

Variable		Diarrhoea		Chi-square (χ^2)	Cramer's V (ϕ_c)
		Yes	No		
Wash hands before handling food	Yes	311(54.5%)	246(43.1%)	3.100	.074
	No	8(1.4%)	4(0.7%)		
Check the expiry date of canned food before purchasing	Yes	149(26.1%)	133(23.3%)	2.075	.060
	No	170(29.8%)	119(20.8%)		
Read the nutritional facts on package foods before purchasing	Yes	63(11.0%)	96(16.8%)	23.584***	.203
	No	256(44.8%)	156(27.3%)		
Check if canned food is dented before buying	Yes	162(28.4%)	135(23.6%)	.438	.028
	No	157(27.5%)	117(20.5%)		
Cover dustbins where food is prepared	Yes	247(44.0%)	176(31.4%)	7.625**	.117
	No	62(11.1%)	76(13.5%)		
Use potable water for cooking	Yes	307(53.8%)	215(37.7%)	21.403***	.194
	No	12(2.1%)	37(6.5%)		
Cover hair when preparing food	Yes	275(48.2%)	189(33.1%)	11.612**	.143
	No	44(7.7%)	63(11.0%)		
Ensure that fingernails are kept short and clean when cooking	Yes	315(55.2%)	232(40.6%)	15.614***	.165
	No	4(0.7%)	20(3.5%)		
Cover mouth with handkerchief when sneezing or yawning	Yes	295(51.7%)	202(35.4%)	18.937***	.182
	No	24(4.2%)	50(8.8%)		
Wash hands with soap and water after using the toilet	Yes	299(52.4%)	234(41.0%)	.173	.017
	No	20(3.5%)	18(3.2%)		
Clean foodstuffs before cooking them	Yes	299(52.4%)	225(39.4%)	3.682*	.080
	No	20(3.5%)	27(4.7%)		

Note: ***= $p < 0.001$, **= $p < 0.01$, *= $p < 0.05$, Hosmer and Lemeshow Test= $\chi^2=11.178$, $n(8)$, $p=.192$. Nagelkerke $R^2=.226$

Source: Field data, 2023

Table 8: Logistic Regression Analysis on Predictors of Perceived Food Safety Practice

Variable	Levels of measurement	B	AOR	95% C.I. for EXP(B)	
				Lower	Upper
Wash hands before handling food	No			Ref	
	Yes	-.038	.963	.270	3.436
Check the expiry date of canned food before purchasing	No			Ref	
	Yes	-.118	.888	.578	1.367
Read the nutritional facts on package foods before purchasing	No			Ref	
	Yes	-.901	.406***	.265	.621
Checked if a canned food is dented before buying	No			Ref	
	Yes	-.202	.817	.524	1.274
Cover dustbins where food is prepared	No			Ref	
	Yes	-.043	.957	.583	1.572
Use potable water for cooking	No			Ref	
	Yes	1.568	4.797***	2.191	10.501
Cover hair when preparing food	No			Ref	
	Yes	.887	2.429	.690	8.550
Ensure that fingernails are kept short and clean when cooking	No			Ref	
	Yes	.721	2.057*	1.138	3.719
Cover mouth with a handkerchief when sneezing or yawning when cooking	No			Ref	
	Yes	-.467	.627	.281	1.396
Wash hands with soap and water after using the toilet before cooking	No			Ref	
	Yes	.081	1.084	.490	2.398
Clean foodstuffs before cooking them	No			Ref	
	Yes	.480	1.616*	.982	2.660

Note: ***= $p < 0.001$, **= $p < 0.01$, *= $p < 0.05$, Hosmer and Lemeshow Test= $\chi^2=36.759$, $n(8)$, $p=.068$, Nagelkerke $R^2=.187$

Source: Field data, 2023

The current study found that the likelihood of experiencing diarrhoea was low among postnatal mothers who read food nutritional labels before purchasing. This finding could mean that the incidence of diarrhoea in the Sekyere South District could be reduced if postnatal mothers read nutritional labels before, they purchase them. Perhaps post-natal mothers who read food

nutritional labels are able to purchase unexpired foods and also ensure that the foods they buy contain adequate nutritional contents that meet their nutritional needs. Studies have also reported similar findings (Mohammed et al., 2022; Osaili et al., 2022). The common reasons for such findings in the literature are that mothers who read the nutritional content of packaged foods will prevent themselves from purchasing foods that are not recommended for their children (Alsini et al., 2023). However, a study in Ghana (Bannor et al., 2022) and Nigeria (Afolabi et al., 2021) contrasts the current findings. The discrepancies in the results may be attributed to differences in educational attainment. Whereas the current study recruited about 86% of its participants who had at least basic education, Nigeria's (Afolabi et al., 2021) had only 35% who had at least basic education. Perhaps the ability to read and understand nutritional labels plays a key role in diarrhoea prevention among postnatal mothers. Hence, there is a need to promote a higher level of education among postnatal mothers and also increase education on the need to read nutritional labels before patronising processed foods.

The implication is that having more post-natal mothers reading nutritional labels could reduce food-borne diseases outbreak and promote good health and wellbeing among children aged under 5. Moreover, the cost of managing childhood diarrhoea and the burden on health facilities in Ghana may reduce if adequate measures are put in place to increase safe food practice.

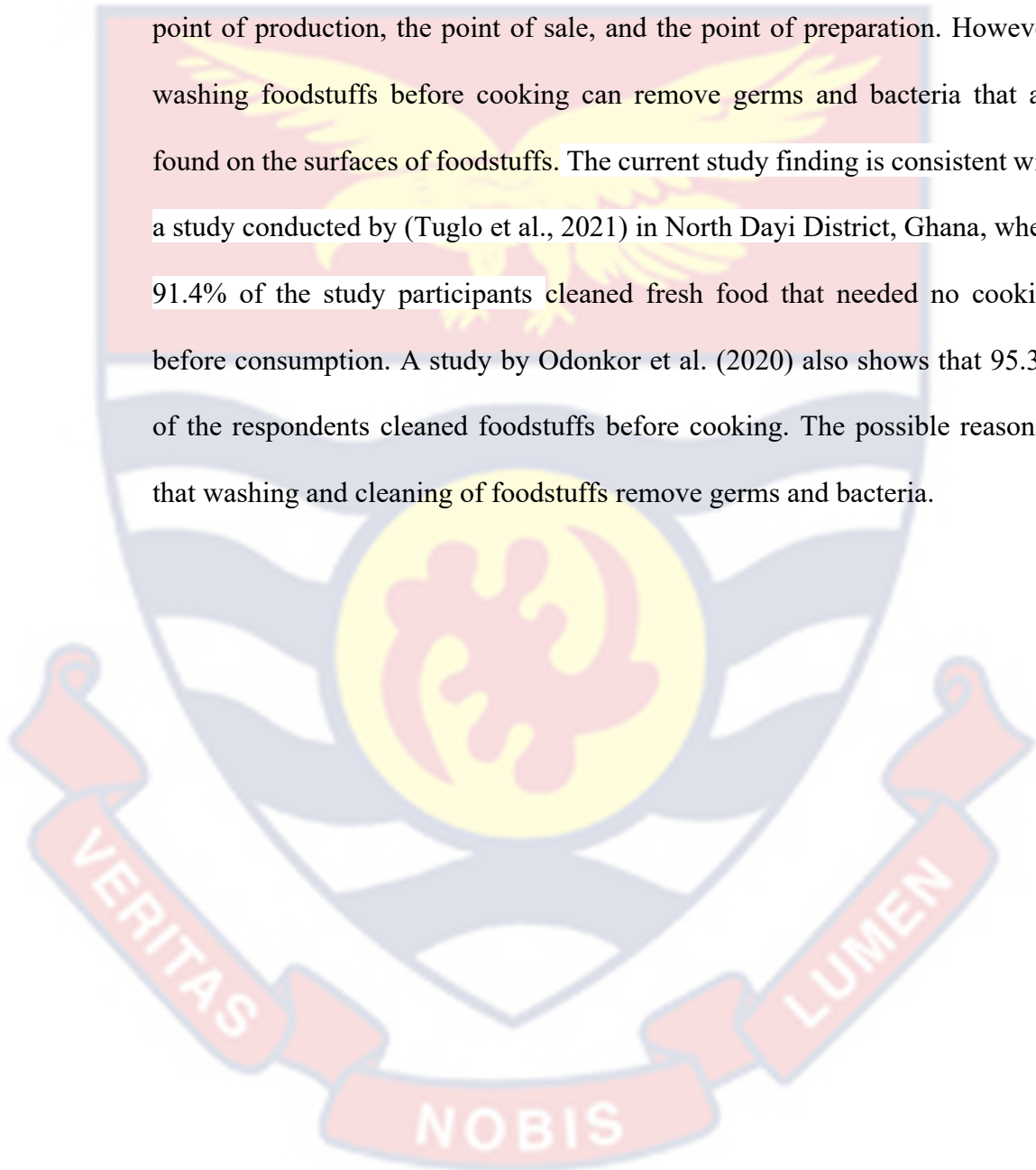
Secondly, the current study found that the likelihood of experiencing diarrhoea was low among post-natal mothers who use potable water for cooking. This finding could imply that the incidence of diarrhoea in the Sekyere South District could be reduced if postnatal mothers would use potable water

for cooking. The finding is consistent with the study conducted by Amadu et al. (2023) in sub-Saharan Africa, which found that households, depending on an unimproved source of drinking, were not significantly associated with childhood diarrhoea. Also, another similar study conducted in Northwest Ethiopia (Melese et al., 2023) recorded that treatment of water before consumption was statistically significant for diarrhoea disease.

Also, the current study found that the likelihood of experiencing diarrhoea was low among postnatal mothers who keep their fingernails short and clean when cooking. This implies that clean and short fingernails are free from debris which may lead to food contamination, resulting in food borne diseases. This current finding supports the World Health Organization debate which emphasises the need for food handlers to always keep their nails short and clean (WHO, 2015). The current finding aligns with Rakha et al. (2022). The common reasons for such findings in the literature is cutting finger nails and washing hands thoroughly with soap and clean water can remove bacteria causing organism from contaminating cooked foods (Abera et al., 2023).

On the contrary, a study in Ghana (Odonkor et al., 2020) found that (80.4%) of the postnatal mothers indicated that it was not always necessary to keep finger nails short and clean during food preparation. The observed differences in the findings could be partly explained by the sampling techniques employed in the studies. This study used convenient sampling technique in selection of study participants whilst the (Odonkor et al., 2020) study employed stratified sampling technique. In order to successfully accomplish SDG 3.2, the study's implications may lead to a decrease in food contamination among mothers and the prevention of food-borne illnesses.

Lastly, the current study found that the likelihood of experiencing diarrhoea was high among postnatal mothers who did not clean foodstuffs before cooking them. This indicates that foodstuffs need to be cleaned before cooking. Foodstuffs are normally infected with germs and bacteria from the point of production, the point of sale, and the point of preparation. However, washing foodstuffs before cooking can remove germs and bacteria that are found on the surfaces of foodstuffs. The current study finding is consistent with a study conducted by (Tuglo et al., 2021) in North Dayi District, Ghana, where 91.4% of the study participants cleaned fresh food that needed no cooking before consumption. A study by Odonkor et al. (2020) also shows that 95.3% of the respondents cleaned foodstuffs before cooking. The possible reason is that washing and cleaning of foodstuffs remove germs and bacteria.



CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This study determined food safety practices and health outcomes among post-natal mothers, nursing 6–12-month-old children in the Sekyere South District, Ghana. This study particularly determined the knowledge level of food safety practices and the prevalence of food-borne diseases among mothers of children aged between 6–12-month-old. Lastly, the study determined the sociodemographic factors that influence food safety practices and the relationship between food safety practices and diarrhoea among infants of post-natal mothers in Sekyere South District.

The study employed a quantitative survey as well as a self-administered questionnaire. Multi-stage sampling technique was used. Purposive sampling was used to select three health centres, simple random sampling was used to select three hospitals in the district, and a convenient sampling technique was also used to select post-natal mothers receiving post-natal care at the selected hospitals and health centres. Quota sampling was utilised to choose the 571-study population. Statistical Package for Social Sciences version 21 software was used for data entry and analysis. Descriptive statistics such as frequencies and percentages were used to analyse the results obtained.

Summary

The study found that 94.4% of postnatal mothers were aware of the importance of washing hands properly with soap under running water. However, 40.8% were not aware that storing leftover food for more than 3 days or reheating it more than once, and 37.0% were unaware that adding food

supplements to baby porridge after cooking increases the risk of foodborne illness. Moreover, 63.9% of postnatal mothers possess a high level of knowledge on food safety, indicating a strong understanding of principles, guidelines, and best practices.

The study found that the majority (97.7%) of post-natal mothers washed their hands before handling food to reduce the risk of food contamination, and 93.3% washed their hands with soap and water after using the toilet before cooking. Most participants ensured short and clean fingernails (95.8%), used potable water for cooking (91.4%), and covered their hair (81.3%) when preparing food. A significant proportion did not consistently check the expiration date of canned food (49.4%) or read nutritional facts on packaged foods (27.8%). Furthermore, 51.0% of participants perceived food safety as good practice.

Analysis revealed that 55.9% of the children had diarrhoea, 16.5% had dysentery, and 12.1% had typhoid (see Figure 6). 50% of participants engaged in poor food safety practices, which could lead to contaminated food and subsequent illness among infants. Poor food safety practices of caregivers, dirty physical surroundings, lack of breastfeeding, inadequate access to clean water, and low socioeconomic status contribute to poor food safety practices. Environmental factors, such as crowded living spaces and unsanitary conditions, play a role in facilitating the transmission of infections.

Bivariate analysis revealed significant associations between several demographic factors and food safety practices. Age, marital status, occupation, level of education, and household size were all found to be significantly associated with food safety practices. However, no significant associations were

found for monthly income or the number of children aged 6-24 months in the household. Multinomial logistic regression analysis further elucidated the impact of these demographic factors on food safety practices. Age emerged as a significant predictor, with post-natal mothers aged 34 and above being 1.5 times more likely to engage in good food safety practices compared to those aged 18-23.

The study revealed that postnatal mothers who read nutritional labels before purchasing food were 0.4 times less likely to have infants with diarrhoea. Similarly, the likelihood of diarrhoea among infants decreased when potable water was used for cooking, indicating a protective effect of water quality on food safety. Moreover, maintaining clean fingernails and ensuring thorough cleaning of foodstuffs before cooking were associated with lower rates of diarrhoea among infants.

Main Findings

The following are the findings of the study:

1. The knowledge level of the postnatal mothers categorised into two levels revealed that 63.9% and 36.1% of the respondents have high and low levels of knowledge, respectively.
2. The study also revealed that the postnatal mothers had varied levels of food safety practices. 51.0% of the respondents showed good food safety practice while 49.0% exhibited bad level of food safety practices.
3. The study found that 319(55.9%) children of the postnatal mothers had diarrhoea, 94(16.5%) had dysentery and 69(12.1%) had typhoid.
4. The study showed that there was a highly statistically significant relation between sociodemographic characteristics of mothers and mother's food

safety practices except occupation and household size that showed there was no a statistically significant difference.

5. The study revealed that “reading the nutritional facts on package foods before purchasing, use potable water for cooking, ensure that fingernails are kept short and clean when cooking, and clean foodstuffs before cooking them” were the food safety practices that have a significant association with diarrhoea.

Conclusions

Based on the key findings, the following conclusions are drawn.

1. A considerable proportion of post-natal mothers have a high level of knowledge, indicating a promising understanding of relevant health information. The targeted educational interventions can effectively disseminate important health information, leading to improved health outcomes for both mothers and children. Postnatal mothers will be able to comply with measures that will ensure food safety.
2. The postnatal mothers’ perceptions of food safety practices varied. There is a relatively balanced distribution of food safety practices among post-natal mothers, with neither good nor bad practices dominating the overall sample. The study concludes that we should prioritise adherence to safe food handling practices through culturally tailored interventions and community-based initiatives.
3. There is a significant prevalence of diarrhoea diseases among children of postnatal mothers, with more than half experiencing diarrhoea. This emphasises the need for targeted interventions to address and reduce the incidence of diarrhoea in this population.

4. Sociodemographic factors play a significant role in influencing mothers' food safety practices. Characteristics such as education, income, or cultural background may contribute to differences in how mothers implement food safety measures.
5. Food safety practices, including reading nutritional labels, using potable water for cooking, maintaining personal hygiene, and cleaning food items before cooking, are significantly associated with the prevalence of diarrhoea among children. Implementing interventions that promote these practices may be an effective strategy for reducing the burden of diarrhoea.

Recommendations

1. It is recommended that the District Health Directorate, in collaboration with the Community Health Workers, should ensure that there is a continuous effort to reinforce and build on the existing high level of knowledge among postnatal mothers. This could involve periodic training sessions, workshops, or educational materials that update them on the latest food safety guidelines and practices.
2. The postnatal mothers had varied levels of food safety practices. There is a relatively balanced distribution of food safety practices among postnatal mothers, with neither good nor bad practices dominating the overall sample. It is recommended that the Ministry of Health develop targeted educational campaigns that address specific areas such as personal hygiene practices, safe food handling and preparation, proper food storage practices, safe water usage, reading food labels and understanding expiry dates where improvement is needed. Identify

commonly overlooked or misunderstood key food safety practices and design interventions to enhance knowledge and implementation in these areas.

3. There is a significant prevalence of diarrhoea diseases among children of post-natal mothers, with more than half experiencing diarrhoea. It is recommended that the MoH integrate specific strategies for diarrhoea prevention and management into existing maternal and child health programmes. Incorporate relevant training for healthcare providers, emphasising early detection and prompt treatment.
4. The MoH should implement community-based initiatives to reach mothers from diverse socio-demographic backgrounds, as socio-demographic factors influence mothers' perceived food safety practices. These initiatives can include workshops, seminars, and cooking demonstrations conducted in local neighbourhoods or community centres to provide hands-on training and education on food safety.
5. There is significant association between food safety practices and the prevalence of diarrhoea among children. The public health sector should establish awareness campaigns directed at the general population regarding the measures that make food safe.

Recommendations for Further Studies

These further study areas are also suggested:

1. There is a need to explore the factors influencing food safety practices among postnatal mothers and evaluate the long-term impact of interventions on reducing the prevalence of foodborne illnesses in children.

2. Further studies can investigate understanding the roles and practices of caregivers in ensuring food safety and contributing to child health outcomes.

Implications of findings for maternal and child health

1. Since 36.1% of postnatal mothers had a low level of knowledge about food safety, targeted educational interventions are crucial. Health authorities and community health workers should provide accessible and culturally appropriate food safety education to ensure that all mothers understand proper hygiene, safe food handling, and preparation practices.
2. The nearly equal split between good (51.0%) and bad (49.0%) food safety practices indicates a gap in behavior despite knowledge. This suggests that merely knowing food safety principles is not enough there is a need for more practical training and reinforcement through counseling, demonstrations, and follow-up visits.
3. Public health interventions should focus on improving water quality, encouraging exclusive breastfeeding, and promoting handwashing with soap to reduce disease transmission.
4. The study found that certain food safety practices such as reading nutritional facts on packaged foods, using potable water, maintaining short and clean fingernails, and washing foodstuffs before cooking had a significant impact on reducing diarrhea. Public health campaigns should emphasize these specific practices through community outreach, posters, and social media to improve child health outcomes.

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APPENDICES

APPENDIX A:

UNIVERSITY OF CAPE COAST
SCHOOL OF GRADUATE STUDIES
COLLEGE OF EDUCATION STUDIES

FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF HEALTH, PHYSICAL EDUCATION &
RECREATION
MPHIL HEALTH EDUCATION

Information Sheet

Greeting: Good morning / afternoon

I am a data collector for master of philosophy health education student thesis at the above-named university on “***PERCEIVED FOOD SAFETY PRACTICES AMONG POSTNATAL MOTHERS AND PERCEIVED HEALTH OUTCOMES ON 6–12-MONTH-OLD CHILDREN IN THE SEKYERE SOUTH DISTRICT, GHANA***”. Now, everyone in the research, including yourself, is chosen purposively. It takes between 20 to 25 minutes to complete the questions.

The goal of the study is to determine the level of Knowledge on food safety, and the extent to which it influence food safety practice; determine the barriers to food safety practice, and to determine the relationship between food safety practices and the health outcome of infants of age between six months and one year belonging to postnatal mothers.

It's possible that the study will have no direct benefit to you. However, the results of this study, on the other hand, will assist the health authority in developing evidence-based interventions to reduce food borne diseases and

improve child(s) health. There is no danger or damage in participating in this study.

You have the option to engage in this study or not, and you will not be penalized for doing so. You can answer all of the questions or skip the ones you don't want to answer, and you can stop answering the questions whenever you choose to. You are free to ask any questions that are unclear to you.

Any information you provide will remain private, and no names or address should be written or mentioned on any document.

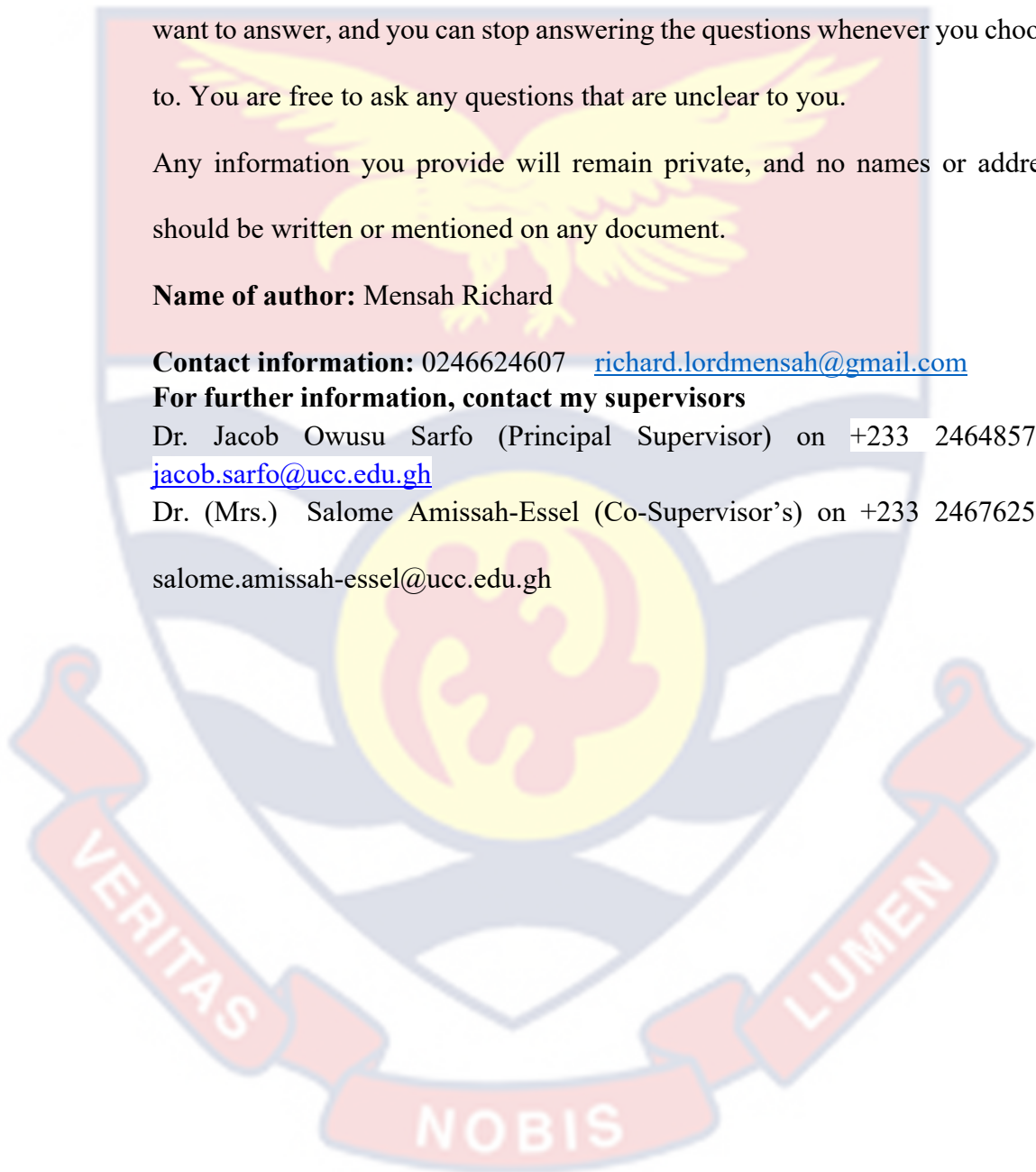
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APPENDIX B:

STRUCTURED QUESTIONNAIRE

SECTION A: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Instruction: Circle or tick the response from the alternative and/or write your responses on the space provided.

SN	QUESTION	RESPONSES
Q1	Age	Numeric:
Q2	Marital Status	a) Single b) Married c) Divorced/separated d) Widowed e) Other, specify
Q3	Occupation	a) Unemployed b) Self employed c) Civil servant d) Private employed
Q4	Monthly income	Numeric:
Q5	Highest level of Education	a) No formal education b) Primary c) JHS d) Secondary/Technical e) Tertiary
Q6	Number of people living in your household	Numeric:
Q7	Number of children 6 – 24 months in your household	Numeric:

SECTION B: KNOWLEDGE OF FOOD SAFETY PRACTICES

Instruction: Please respond to the following statements by marking [X] the column that most accurately represents your opinion of the extent to which you agree or disagree to these statements on knowledge about food safety. There are no 'correct' or 'wrong' responses; it is your own views that are essential.

		Don't know		
		False		
		True		
Q1	To prepare safe food, hands should be free of wounds			
Q2	To prepare safe food, nails should be short and unvarnished			
Q3	In preparing food, hand should be properly washed with soap, moisten, under running water to reduce the risk of food contamination			
Q4	It is important to wash the child's hands while eating			
Q5	In feeding a baby, hand should be properly clean			

Q6	Washing hands after changing a diaper decreases the chance of getting foodborne diseases			
Q7	Washing the dishes, the same day is important as well as proper storage of the clean utensils in order to prevent contamination			
Q8	The same knife should not be used to cut raw meat, fruits or vegetables			
Q9	Keeping raw, canned and cooked foods together leads to food contamination			
Q10	Improper cooking of food like meat, poultry and eggs can lead to food borne diseases			
Q11	Leftover foods should be reheated at a high temperature and served hot			
Q12	Different foods require different cooking time and temperature for food safety.			
Q13	Adding food supplements to baby's porridge once the porridge is cooked increases the risks of getting food borne illness			
Q14	Leftover food should not be stored for more than 3 days and should not be reheated more than once.			
Q15	Water can be contaminated with dangerous disease-causing microorganism.			
Q16	Fruits and vegetables should be washed before eating.			
Q17	When buying or preparing food, avoid food that is damaged or rotting			

SECTION C: FOOD SAFETY PRACTICES OF RESPONDENTS

Instruction: Please respond to the following statements by marking [X] the columns that most accurately represents your opinion of the extent to which you agree or disagree to these statements on your food safety practices. There are no 'correct' or 'wrong' responses; it is your own views that are essential.

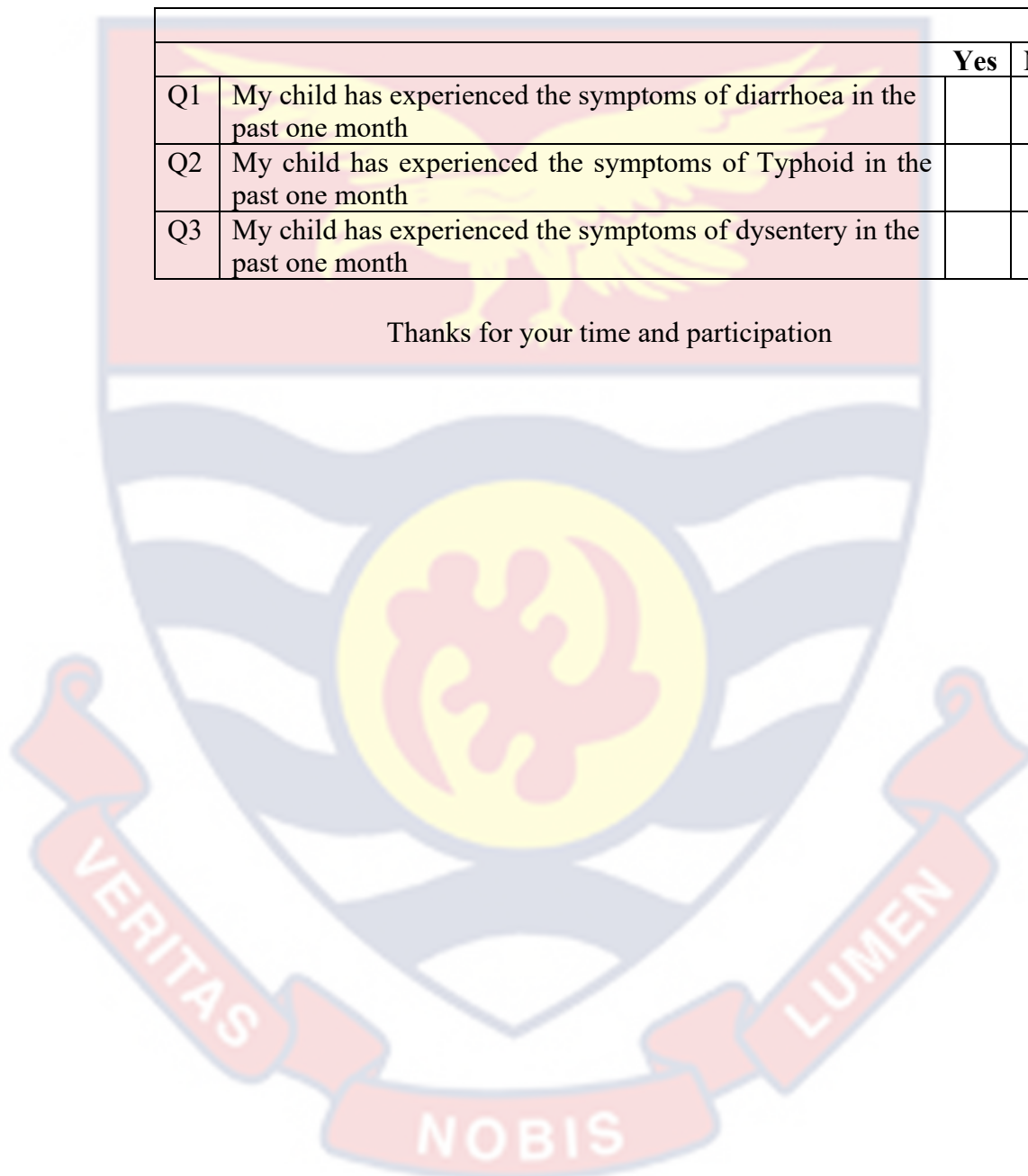
		Yes	No
Q1	I wash hands before handling food to reduce the risk of food contamination		
Q2	I check the expiry date of canned food before purchasing		
Q3	I read the nutritional facts on package foods before purchasing		
Q4	I check if a canned food is dented before I buy		
Q5	I cover dustbins where food is prepared		
Q6	I use potable water for cooking		
Q7	I cover hair when preparing food		
Q8	I ensure that fingernails are kept short and clean when cooking		
Q9	I cover mouth with handkerchief when sneezing or yawning when cooking		
Q10	I wash hands with soap and water after using the washroom before cooking		
Q11	I clean foodstuffs before cooking them		

SECTION D: HEALTH OUTCOME OF INFANTS OF THE POSTNATAL MOTHERS

Instruction: Please respond to the following statements by marking [X] the columns that most accurately represents your opinion of the extent to which you agree or disagree to these statements on health status of your child in the past one month. There are no 'correct' or 'wrong' responses; it is your own views that are essential.

		Yes	No
Q1	My child has experienced the symptoms of diarrhoea in the past one month		
Q2	My child has experienced the symptoms of Typhoid in the past one month		
Q3	My child has experienced the symptoms of dysentery in the past one month		

Thanks for your time and participation



APPENDIX C:

ETHICAL CLEARANCE LETTER

UNIVERSITY OF CAPE COAST

INSTITUTIONAL REVIEW BOARD SECRETARIAT

TEL: 0558093143 / 0508878309

E-MAIL: irb@ucc.edu.gh

OUR REF: IRB/C3/Vol.1/0473

YOUR REF:

OMB NO: 0990-0279

IORG #: IORG0011497

9TH NOVEMBER, 2023

Mr Richard Mensah

Department of Health, Physical Education, and Recreation
University of Cape Coast

Dear Mr Mensah

ETHICAL CLEARANCE – ID (UCCIRB/CES/2023/130)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted Provisional Approval for the implementation of your research **Food Safety Practices Among Postnatal Mothers and Perceived Health Outcomes on 6–12-Month-Old Children in the Sekyere South District, Ghana**. This approval is valid from **9th November 2023** to **8th November 2024**. You may apply for an extension of ethical approval if the study lasts for more than 12 months.

Please note that any modification to the project must first receive renewal clearance from the UCCIRB before its implementation. You are required to submit a periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us about this protocol.

Yours faithful

Kofi F. Amuquandoh
Ag. AdministratorADMINISTRATOR
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST