THE EFFECT OF MOTHERS' KNOWLEDGE AND ATTITUDES ON PRACTICES REGARDING INFANT AND YOUNG CHILD FEEDING: A CROSS-SECTIONAL ANALYSIS AT CHILD WELFARE CLINICS IN KIAMBU COUNTY, KENYA

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ABSTRACT

Background: Optimal Infant and Young Child Feeding (IYCF) practices are essential for preventing malnutrition and child mortality, particularly during the first 1,000 days. In Kenya, poor IYCF practices remain a major contributor to child undernutrition.

Objective: To assess the knowledge, attitudes, and practices (KAP) related to IYCF among mothers of children aged 6–23 months across rural, urban, and slum settings in Kiambu County.

Methods: This study employed a facility-based, comparative cross-sectional study design across two purposively selected Child Welfare Clinics (CWC's): Wangige Subcounty Hospital and Kiandutu Health Centre. The study recruited 354 mothers of children aged 6–23 months. Data were collected using structured questionnaires via KoboCollect assessing maternal IYCF knowledge, attitudes, and practices (KAP). All data were analysed using STATA software (version 14, StataCorp).

Results: Of the 354 mother–child pairs, 67.2% had adequate IYCF knowledge, yet only 7.9% knew the recommended complementary feeding frequency. While 96.9% reported positive attitudes, 23% supported early complementary feeding and 17% avoided colostrum. Overall, 73.2% practiced adequate IYCF, though dietary diversity remained low (57.6%) and protein intake limited (meat/fish: 16.4%). Facility-level differences outweighed residential effects, with attendees of Wangige Health Centre demonstrating better practices than those at Kiandutu (78.2% vs. 68.0%, $p = 0.030$). Slum areas showed the strongest knowledge practice association (+28.8%, $p = 0.002$), while rural areas demonstrated attitude driven patterns ($p = 0.018$).

Conclusion: Critical gaps were identified between IYCF knowledge and its implementation, particularly regarding complementary feeding. Marked facility-level variations pointed to inconsistencies in service quality. Notably, higher maternal education emerged as a strong and consistent predictor of appropriate IYCF practice adoption, alongside caregiving experience. These findings underscore the importance of educational empowerment and advocate for a shift from passive information-sharing to tailored, competency-based interventions that reflect the diverse socio-economic realities of rural, slum, and urban settings.

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ABBREVIATIONS /ACRONYMS

ANC:	Antenatal Care
BFHI:	Baby-Friendly Hospital Initiative
CHW:	Community Health Worker(s)
CNAP:	County Nutrition Action Plan
CWCs:	Child Welfare Clinics
DPT:	Diphtheria, Pertussis, and Tetanus
EBF:	Exclusive Breastfeeding
FAO:	Food and Agriculture Organization
HCP:	Health Care Providers
ICF:	Inner City Fund (ICF International)
IYCF:	Infant and Young Child Feeding
KAP:	Knowledge, Attitudes, and Practices
KDHS:	Kenya Demographic and Health Survey
KIIs:	Key Informant Interviews
MCHC:	Maternal and Child Health Clinic
MAD:	Minimum Acceptable Diet

MDD:	Minimum Dietary Diversity
MMF:	Minimum Meal Frequency
MMR:	Measles, Mumps, and Rubella
MIYCN:	Maternal, Infant and Young Child Nutrition
MtMSGs:	Mother-to-Mother Support Groups
MUAC:	Mid-Upper Arm Circumference
NGO:	Non-Governmental Organization
PNC:	Postnatal Care
SDG:	Sustainable Development Goal
UNICEF:	United Nations Children's Fund
UNOPS:	United Nations Office for Project Services
WASH:	Water, Sanitation and Hygiene
WHO:	World Health Organization

DEFINITION OF TERMS

Complementary feeding refers to the inclusion of other foods alongside breastfeeding for children between the age of 6 and 23 months (WHO & UNICEF, 2021).

Early initiation of breastfeeding refers to infants who were breastfed within one hour of birth (Kenya National Bureau of Statistics [KNBS] & ICF, 2023).

Exclusive breastfeeding refers to the practice of providing an infant with only breast milk for the first six months, without introducing any other liquids or solid foods, except for oral rehydration solutions (ORS), drops, or syrups such as vitamins, minerals, or medications, as recommended by the World Health Organisation (WHO & UNICEF, 2021).

Infant and Young Child Feeding (IYCF) encompasses exclusive breastfeeding for the first 6 months, followed by continued breastfeeding alongside complementary feeding up to 2 years of age (WHO & UNICEF, 2021).

Maternal In this study, the term "maternal" pertains to aspects related to mothers, especially those influencing child care, feeding, health, and nutrition. It encompasses the

knowledge, attitudes, behaviours, and roles undertaken by women in their capacity as mothers or primary caregivers in relation to child health and development.

Maternal IYCF Attitude refers to the beliefs, perceptions, and values held by mothers regarding IYCF (FAO, 2014; Qiquan & Hua, 2021).

Maternal nutrition knowledge refers to the information, understanding, and awareness that mothers possess regarding appropriate feeding practices for their infants and young children (FAO, 2014; Qiquan & Hua, 2021).

Minimum Acceptable Diet (MAD) 6–23 months refers to the percentage of children who receive both Minimum Dietary Diversity (MDD) and Minimum Meal Frequency (MMF) appropriate for their age (WHO & UNICEF, 2021).

Minimum dietary diversity (MDD) 6–23 months refers to the proportion of children aged 6–23 months who consume foods from at least five out of eight specified food groups within a 24-hour period (WHO & UNICEF, 2021).

Minimum Meal Frequency (MMF) 6–23 months refers to the proportion of children aged 6–23 months who received solid, semi-solid, or soft foods (including milk for non-breastfed children) at the minimum

required frequency or more, based on their age during the previous day. Breastfed infants aged 6–8 months should be fed 2–3 times daily; breastfed infants aged 9–23 months, 3–4 times daily; and non-breastfed infants aged 6–23 months, 4 times daily (WHO & UNICEF, 2021).

Mothers For the purposes of this study, the term "mothers" refers not only to biological mothers but also to primary caregivers such as grandmothers, aunts, or guardians who are responsible for the feeding and care of children aged 6–23 months. Due to the small sample size and for consistency in terminology, the term "mothers" is used throughout this document to represent both biological mothers and primary caregivers

Mother-to-mother support group refers to a group of women, regardless of age, who unite to share knowledge and provide support to each other in caring for their children (Kitiyo et al., 2020).

Nutrition status refers to an individual's health condition, influenced by the intake and utilisation of nutrients, as indicated by anthropometric measurements such as weight, height, and mid-upper arm circumference. These indicators

classify both undernutrition and overnutrition (UNICEF & WHO, 2023).

Optimal feeding practices refers to the World Health Organisation's guidelines for children aged 0–24 months, which include initiating breastfeeding within the first hour of birth, exclusive breastfeeding for the first 6 months, continued breastfeeding up to 2 years, introducing complementary feeding at 6 months, and providing a diversified diet as part of complementary feeding (WHO, 2021).

Slum (Informal Settlement) For the purpose of this study, the term "slum" refers to areas that are categorised as informal settlements characterised by inadequate access to safe water, sanitation, housing, and basic services. This terminology is used in alignment with classifications from the Kenya Demographic and Health Survey (KDHS) and UN-Habitat, where "slum" and "informal settlement" are used interchangeably." (KNBS & ICF, 2023); UN-Habitat, 2003

Stunting refers to a condition in which a child is significantly shorter than expected for their age, as compared with standard growth references. It is expressed as height-for-

age with a Z-score of less than –2 standard deviations (UNICEF & WHO, 2023).

Underweight refers to a condition in which a child's weight is low compared to a standard child of the same age. It is expressed as weight-for-age, with a Z-score of less than –2 standard deviations (SD) from the WHO Child Growth Standards median (UNICEF & WHO, 2023).

Wasting Rate refers to the prevalence of acute malnutrition, measured by weight-for-height with a Z-score of less than –2 standard deviations from the WHO Child Growth Standards median (UNICEF & WHO, 2023).

CHAPTER 1: INTRODUCTION

1.1 Background of the Study

Infant and Young Child Feeding (IYCF) encompasses exclusive breastfeeding for the first 6 months, followed by continued breastfeeding alongside complementary feeding up to 2 years of age (WHO & UNICEF, 2021). Maternal knowledge, attitudes, and practices (KAP) regarding IYCF play a crucial role in determining the health outcomes of children, particularly in the first two years of life (Abebe et al., 2016). Adopting appropriate IYCF practices is essential for physical and cognitive development, as well as the overall health of infants, as inadequate feeding practices have been associated with malnutrition and adverse health outcomes (UNICEF, 2020). Kenya has a stunting rate of 18%, with some counties recording over 30%, and a wasting rate of 5%, with certain counties experiencing rates exceeding 20% among children under five years of age (Kenya National Bureau of Statistics [KNBS] & ICF, 2023). In Kiambu County, stunting in children rate of 14.9%, wasting dropped to 1.7%, and underweight prevalence stood at 4.3%, all slightly below national averages. (KNBS & ICF, 2023) This underscores the importance of examining maternal KAP to address infant feeding challenges in the country.

Specifically, the 6–23-month age range represents a critical developmental phase, during which children transition from exclusive breastfeeding to the introduction of complementary foods. According to the WHO, this period presents heightened risks if complementary foods are not prepared in a timely, adequate, safe, and appropriate manner (WHO, 2021). Mothers' understanding of when and how to introduce complementary

foods, as well as their attitudes towards recommended feeding practices, significantly influence infant health outcomes.

The WHO developed key IYCF indicators to facilitate monitoring of these practices (UNICEF et al., 2010). Regarding breastfeeding, the exclusive breastfeeding rate (EBF) is a key indicator. Globally, this rate is 48%, and in Kenya, it has increased by one-fifth to 60% (KNBS & ICF, 2023; UNICEF, 2023). According to the literature, transitioning from EBF to complementary feeding also remains a challenge (Harrison et al., 2017; Kamudoni et al., 2024; Kostecka et al., 2020; Sichalwe et al., 2023). Globally, only 21% of children aged 6–23 months meet the minimum acceptable diet (MAD), whereas in Kenya, this proportion is approximately one-third higher, at 32% (KNBS & ICF, 2023; UNICEF, 2022).

Research indicates that maternal knowledge and attitudes are often linked and can contribute to effective IYCF practices (Shirazi et al., 2023). However, this relationship is not consistent across studies, indicating that knowledge does not always translate into practical application (Harrison et al., 2017; Jemide et al., 2016; Majidah et al., 2021; Shirazi et al., 2023; Sicha lwe et al., 2023).

The literature suggests a stronger association between maternal attitudes and IYCF practices compared to other factors. In some studies, this association was found to be strong, while in others, it was moderate (Assefa et al., 2021; Hien et al., 2020; Mohamed et al., 2018). Additionally, maternal attitudes were influenced by various socio-demographic, socio-economic, and socio-environmental factors (Ara et al., 2023). These

same factors also correlate with maternal knowledge and practices regarding IYCF (Harrison et al., 2017; Jemide et al., 2016; Uusimäki et al., 2023).

Mothers' sources of information on IYCF vary contextually and include healthcare services (such as BFHI, healthcare professionals [HCPs], health promoters [HPs]), media, community members, mothers or relatives, friends, and formal education (Abebe et al., 2016; Harrison et al., 2017; Pizzatto et al., 2020).

Numerous studies have been conducted in Kenya on IYCF practices and nutritional status; however, fewer have explored knowledge and attitudes towards IYCF practices. The Maternal, Infant and Young Child Nutrition (MIYCN) reports of 2017–2018 and the latest Kenya Demographic Health Survey (KDHS) of 2022 indicate that breastfeeding practices generally perform better than complementary feeding practices. This study will assess whether similar trends are observed in urban, rural and slum settings within Kiambu County.

To facilitate effective nutrition interventions targeting maternal and childcare practices concerning IYCF, it is essential to comprehensively assess current gaps in knowledge and practices, alongside understanding the factors influencing IYCF practices. This study aims to achieve a deeper understanding of the various factors influencing mothers' knowledge and practices regarding IYCF in Kiambu County. Specifically, it seeks to contextualise these factors by comparing populations from urban, rural and slum areas.

1.2 Statement of the Problem

Inappropriate Infant and Young Child Feeding (IYCF) practices remain a pressing public health concern in Kenya, contributing to malnutrition, morbidity, and mortality in children under five (KNBS & ICF, 2023). Malnutrition is a major driver of child mortality, estimated to be associated with approximately 50% of deaths in children under five (Abitew et al., 2020; King et al., 2022; Yitayew et al., 2023). Inadequate knowledge, negative attitudes, and inappropriate feeding practices related to IYCF contribute significantly to this problem. Understanding the factors that influence maternal knowledge and attitudes towards IYCF is crucial, as optimal feeding practices could prevent up to 20% of under-five deaths. Poor IYCF practices not only lead to malnutrition but also result in long-term health consequences, impeding national development (Ara et al., 2023; Assefa et al., 2021; KNBS & ICF, 2023).

In Kenya, inadequate IYCF practices continue to be a significant public health issue, leading to poor nutritional outcomes for children under two years of age. Despite the adoption of the global IYCF strategy, the exclusive breastfeeding rate (EBR) has remained unchanged at 60%, while the proportion of children aged 6–23 months receiving a minimally acceptable diet (MAD) has decreased to 31%, down from 39% in 2002, according to the Kenya Demographic and Health Survey (KDHS). This highlights ongoing issues with complementary feeding practices. However, it should be noted that the aforementioned EBF rates from the KDHS were based on reports of feeding practices in infants aged 0–5 months during the previous day, rather than from birth to the time of assessment, thereby raising concerns about the reliability of the data. (KNBS & ICF, 2023).

The persistent malnutrition and undernutrition reported in the 6–23-month age group suggest significant gaps in maternal knowledge, attitudes, and practices (KAP) regarding IYCF. About one-fifth of children under five (18%) in Kenya are stunted, an indication of chronic malnutrition, 4.2% wasted, and 10% underweight, an indication of acute malnutrition. Kiambu had made modest gains in child nutrition, but challenges remain. Stunting in children under five decreased slightly to 14.9%, wasting dropped to 1.7%, and underweight prevalence stood at 4.3%, all slightly below national averages. (KNBS & ICF, 2023) However, these averages still represent thousands of children affected by preventable malnutrition.

Mortality indicators showed minor improvements: infant mortality in Kiambu stood at 32 deaths per 1,000 live births, compared to the national average of 35, while under-five mortality was at 41 per 1,000, nearly mirroring the national rate of 42 (KNBS & ICF, 2023). Despite being below national figures, the gap is narrow and far from reassuring. Kiambu County, one of six counties with a mix of rural, urban, and slum areas, benefits from better infrastructure in healthcare, education, and water, sanitation, and hygiene (WASH) compared to many other counties (CNAP, 2021). Additionally, there is a lack of sufficient literature on this topic in Kiambu County. Therefore, there is a need for further exploration and understanding of maternal knowledge, attitudes, and associated factors regarding IYCF in this context.

A comprehensive understanding of these gaps, as well as the socio-demographic, socio-economic, and socio-environmental factors influencing feeding behaviours, is essential for

developing targeted interventions to improve child nutrition outcomes and achieve the goals of the global IYCF strategy in Kenya.

Literature from various studies across Kenya indicates that complementary feeding practices are generally less effective than breastfeeding practices. Several studies have shown that maternal knowledge does not always translate into practice; however, this relationship appears to be context-dependent, raising questions about its applicability in Kiambu County (Mutuku et al., 2020; UNICEF et al., 2017, 2018; UNICEF & UNOPS, 2018).

This study aims to identify these knowledge gaps as well as the socio-demographic, socio-economic, and socio-environmental factors influencing feeding behaviours. In addition to assess the significance of maternal understanding of IYCF across urban, rural, and slum areas in Kiambu County. Addressing these gaps is crucial for developing targeted interventions that can effectively reduce malnutrition and improve child health outcomes.

1.3 Research Questions

1. How do knowledge levels, attitudes, and IYCF practices for children aged 6–23 months compare among mothers attending Child Welfare Clinics in rural, urban, and slum settings of Kiambu County (Wangige hospital and Kiandutu health facility)?
2. What variations exist in the nutritional status (stunting, wasting, underweight) of children aged 6–23 months across rural, urban, and slum settings in Kiambu County (Wangige hospital and Kiandutu health facility)?

3. Which sociodemographic, socioeconomic, or environmental factors are associated with differences in knowledge, attitudes, and practices about IYCF among mothers in rural, urban, and slum settings of Kiambu County, County (Wangige hospital and Kiandutu health facility)?
4. How are maternal knowledge, attitudes, and practices regarding IYCF interrelated with nutritional status, and how do these relationships differ across rural, urban, and slum settings in Kiambu County, (Wangige hospital and Kiandutu health facility)?

1.4 Objectives

1.4.1 General Objective

To assess the knowledge, attitudes, and practices of mothers regarding infant and young child feeding in Kiambu County, Kenya.

1.4.2 Specific Objectives

1. To assess the knowledge, attitudes, and practices (KAP) related to Infant and Young Child Feeding (IYCF) among mothers attending Child Welfare Clinics (CWCs) in rural, urban, and slum settings of Kiambu County (Kiandutu/Wangige)
2. To determine the nutritional status (stunting, wasting, underweight) of children aged 6–23 months attending CWCs in Kiambu County (Kiandutu/Wangige).

3. To examine the socio-demographic and socio-economic factors associated with maternal knowledge, attitudes, and practices regarding IYCF in Kiambu County (Kiandutu/Wangige).
4. To analyse the association between maternal KAP and the nutritional status of children aged 6–23 months across the rural, urban, and slum contexts in Kiambu County (Kiandutu/Wangige).

1.5 Hypotheses

This study tested the following hypotheses:

Null Hypothesis (H_0):

There is no significant difference in the knowledge, attitudes, and practices (KAP) regarding Infant and Young Child Feeding (IYCF) among mothers of children aged 6–23 months in urban, rural, and slum settings in Kiambu County (Kiandutu/Wangige).

Alternative Hypothesis (H_1):

There is a significant difference in the knowledge, attitudes, and practices (KAP) regarding Infant and Young Child Feeding (IYCF) among mothers of children aged 6–23 months in urban, rural, and slum settings in Kiambu County (Kiandutu/Wangige).

1.6 Justification

Both chronic and acute malnutrition remains a significant public health concern in Kenya, especially with among children under five years of age. The knowledge, attitudes, and practices of mothers regarding infant and young child feeding are essential determinants of child nutrition and can be improved through cost-effective interventions. Kiambu County

presents a complex setting that includes urban, rural, and informal settlement communities, each with distinct social and economic characteristics. Despite relatively well-developed infrastructure, challenges in achieving optimal infant and young child feeding practices persist.

This study is justified by the need to investigate these challenges within the specific context of Kiambu County. By assessing maternal knowledge, attitudes, and practices, this research will generate evidence to guide targeted and locally appropriate interventions. The findings will inform county-level health authorities and policy developers in identifying gaps, refining nutrition education strategies, and prioritising resource allocation. These efforts will directly contribute to improving child nutrition outcomes across diverse population groups in the county.

1.7 Significance of the Study

This study provides critical insights into maternal knowledge, attitudes, and practices (KAP) regarding infant and young child feeding (IYCF) across Kiambu County's rural, urban, and slum settings. By identifying context-specific gaps in IYCF practices, the findings will directly inform evidence-based interventions to reduce malnutrition and improve child health outcomes in a region with documented disparities in healthcare access and socioeconomic conditions.

The research offers three key contributions:

1. Policy Relevance: Findings will guide county-level policymakers in tailoring nutrition programmes to address geographical disparities, particularly in underserved slum and rural communities.

2. Programme Improvement: Community health workers and clinic staff can utilise the results to refine counselling approaches, targeting persistent misconceptions.
3. Academic Contribution: As one of the first studies to compare IYCF practices across Kiambu's socioeconomic strata, it fills a gap in Kenya's literature and provides a benchmark for future research.

Ultimately, this study aligns with Kenya's Big Four Agenda on food security and the County Integrated Development Plan (CIDP) for Kiambu, supporting scalable interventions to empower mothers and reduce childhood malnutrition. (CNAP, 2021)

1.8 Scope

This study will focus on the KAP of mothers regarding IYCF in Kiambu County, Kenya. It will involve mothers of children aged 6–23 months attending Maternal and Child Health Clinics (MCHCs) in urban, rural and slum areas within the county. The research will further evaluate the associated factors influencing IYCF practices, including socio-economic, socio-demographic, and socio-environmental factors.

By addressing the unique characteristics and challenges of various communities within Kiambu County, the research aims to provide a comprehensive understanding of IYCF practices. Data will be collected from MCHC sites in Kiambu County, utilising a quantitative cross-sectional study design over a period of a week.

1.9 Assumptions

The study is based on several key assumptions: First, it is presumed that significant gaps exist in maternal knowledge and attitudes concerning infant and young child feeding

(IYCF) practices, which require targeted intervention. Additionally, the research assumes that socio-demographic, socio-economic, and socio-environmental factors influence the knowledge, attitudes, and practices of mothers related to IYCF. Finally, it is believed that maternal knowledge, attitudes, and practices (KAP) regarding IYCF differ by context; hence, variations exist among mothers in urban, rural and slum areas of Kiambu County.

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CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This literature review aims to explore maternal knowledge, attitudes, and practices (KAP) regarding infant and young child feeding (IYCF) practices. It will examine existing studies on KAP related to IYCF, highlighting the critical role of maternal knowledge, attitudes, and beliefs in shaping feeding behaviours. Furthermore, the review will highlight the multifaceted nature of IYCF and its association with malnutrition and contributing factors. The associated factors to be explored include socio-demographic, socio-economic, and socio-environmental factors that influence IYCF practices.

By synthesising empirical evidence and theoretical frameworks, this review seeks to identify literature gaps in the current understanding of IYCF practices, thus highlighting areas for further research and potential interventions. Ultimately, this exploration aims to contribute to a comprehensive understanding of the key influencing factors and inform strategies to enhance IYCF practices.

2.2 Theoretical Framework

This study will utilise three frameworks, namely the UNICEF Conceptual Framework, the Knowledge, Attitude, and Practice (KAP) model, and the Theory of Planned Behaviour (TPB), to develop a conceptual model and guide the analysis of maternal KAP regarding IYCF.

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2.2.1 UNICEF Conceptual Framework

In this research study, the UNICEF Conceptual Framework will provide a structured lens through which to examine the complex interplay of factors affecting nutritional status.

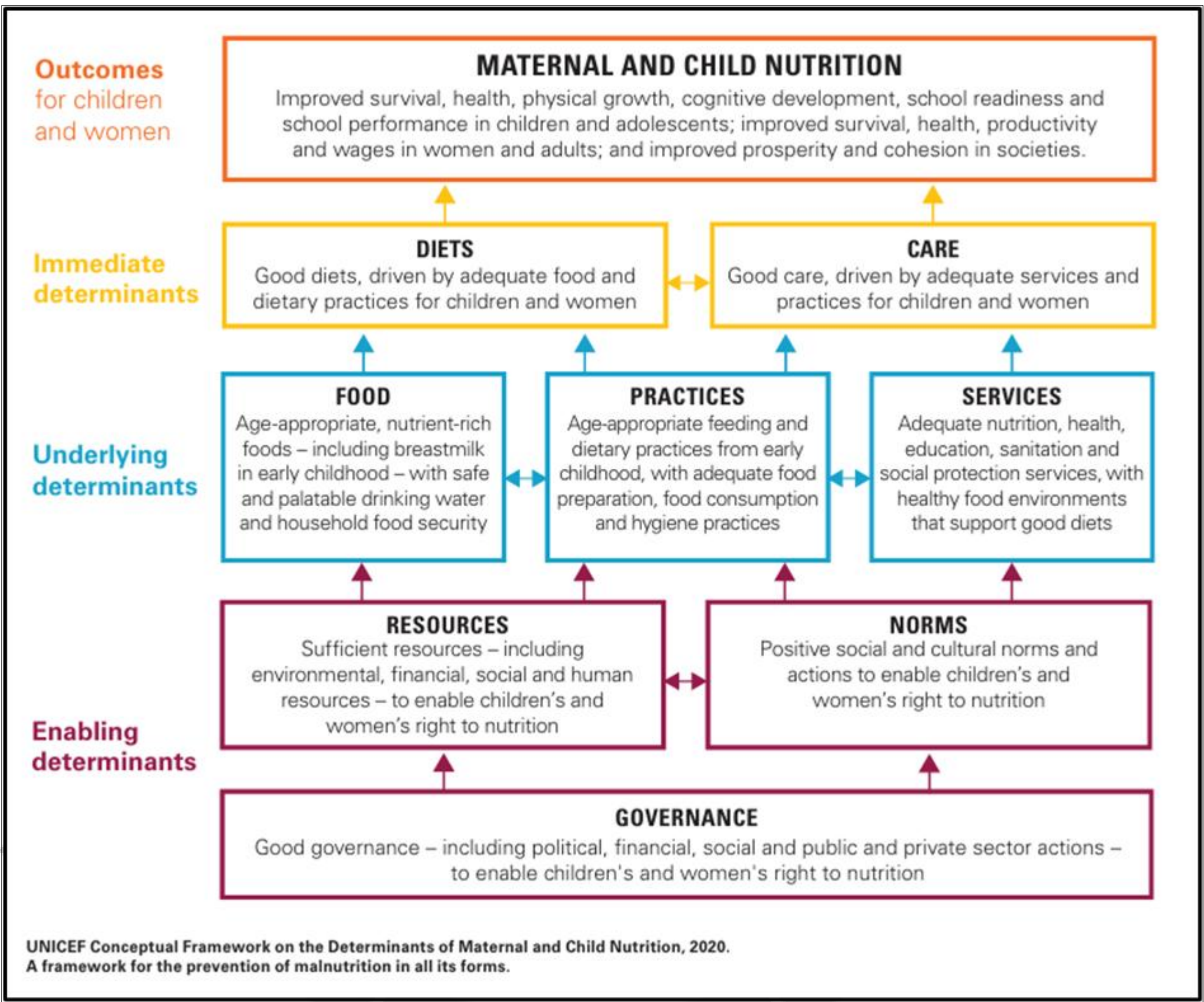

Figure 0.1 UNICEF Conceptual Framework on determinants of maternal and child malnutrition (UNICEF, 2021)

The causal factors of malnutrition are multifactorial. To better understand this complexity, UNICEF developed a conceptual framework (Figure 2.1). In this framework, there are

three levels of determinants: intermediate, underlying, and enabling. At the centre of these causes are “practices”, which primarily refer to maternal childcare behaviours, mainly associated with IYCF and its contributing factors. As demonstrated in this framework, the causal factor categorised as “practices” is bidirectionally linked to service provision, food access, and enabling determinants. Understanding the main causal factors contributing to child malnutrition and suboptimal IYCF practices is, therefore, inherently interconnected. Similarly, identifying the causal factors contributing to malnutrition and inadequate IYCF is context-specific; hence, the significance of each factor may vary depending on the setting. The UNICEF Conceptual Framework will be utilised to identify key associated factors that may influence IYCF practices (UNICEF, 2021).

2.2.2 Knowledge, Attitude, and Practices (KAP) Model

The Knowledge, Attitude, and Practices (KAP) model serves as a valuable theoretical framework for understanding the dynamics of maternal knowledge, attitudes, and practices concerning IYCF in Kiambu County. This model is instrumental in exploring how knowledge influences attitudes and subsequently shapes health-related practices. In the context of maternal and child health, particularly concerning IYCF, this framework facilitates a structured analysis of how mothers’ understanding and perceptions can influence their feeding behaviours (FAO, 2014; Qiquan & Hua, 2021).

Knowledge*:* Knowledge pertains to the information and understanding that mothers possess regarding IYCF practices, encompassing the benefits of breastfeeding, appropriate complementary feeding, and nutritional requirements for infants and young children. This

component is crucial, as an elevated level of knowledge can empower mothers to make informed decisions about feeding practices (FAO, 2014; Qiquan & Hua, 2021).

Attitude*:* Attitudes encompass the beliefs, feelings, and values that mothers hold concerning IYCF. Positive attitudes towards breastfeeding and proper nutrition can encourage adherence to recommended practices, whereas negative attitudes may impede them. Understanding the attitudes of mothers in Kiambu County can offer insights into the socio-environmental factors, including cultural and social influences, that affect their feeding practices (FAO, 2014; Qiquan & Hua, 2021).

Practices*:* Practices refer to the actual behaviours exhibited by mothers concerning IYCF. This encompasses the initiation of breastfeeding, the practice of exclusive breastfeeding, meal frequency, and the diversity of foods offered to children. Assessing practices provides a direct measure of how effectively mothers are translating their knowledge and attitudes into real-world actions.

Identifying gaps among knowledge, attitude, and practice can highlight areas where targeted interventions are necessary to enhance IYCF outcomes (FAO, 2014; Qiquan & Hua, 2021).

By integrating the KAP model with the UNICEF framework, the study can examine how immediate, underlying, and basic causes contribute to maternal behaviours.

This combined approach allows for a comprehensive assessment of the enablers and barriers to optimal IYCF practices in Kiambu County, highlighting the need for multi-level interventions.

2.2.3 Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour (TPB), proposed by Ajzen in 1991, asserts that an individual's actions are largely determined by their intentions, which are influenced by three core elements: their attitudes, the norms they perceive from others, and their sense of control over their behaviour. This theory is particularly relevant for understanding maternal KAP regarding IYCF in Kiambu County, as it provides a framework to explore the factors that influence maternal decision-making in feeding practices(Ajzen, 1991).

1. **Attitudes**: In the context of IYCF, maternal attitudes refer to the positive or negative evaluations mothers hold regarding specific feeding practices, such as exclusive breastfeeding or timely introduction of complementary foods. Positive attitudes can enhance a mother's intention to adopt healthy feeding practices, while negative attitudes may deter her. By assessing mothers' beliefs about the benefits and challenges of various IYCF practices, the study can identify key areas for intervention.

2. **Subjective Norms**: This component involves the perceived social pressure to engage in a behaviour. In the case of IYCF, mothers may be influenced by family, peers, healthcare providers, and community norms regarding acceptable feeding practices. Understanding these social influences can help identify barriers and facilitators to optimal IYCF practices. For instance, if community norms discourage exclusive breastfeeding beyond six months, mothers may feel pressured to conform, impacting their actual feeding practices.

3. **Perceived Behavioural Control**: This aspect reflects the degree to which individuals believe they have control over their behaviour. In the context of IYCF, perceived behavioural control may encompass factors such as access to resources (e.g., healthcare, nutrition education), knowledge about proper feeding practices, and support from family and community. Mothers who feel empowered and capable of implementing recommended IYCF practices are more likely to do so. Identifying perceived barriers can inform targeted interventions that enhance mothers' confidence in their feeding choices.

By applying the Theory of Planned Behaviour (TPB), this study aims to investigate the interplay between maternal knowledge, attitudes, and practices regarding IYCF. It will explore how these factors collectively influence mothers' intentions and actual feeding behaviours, providing insights for designing effective nutrition interventions.

2.4 Review of Related and Empirical Literature

2.4.1 Introduction to IYCF

The first two years of a child's life, often termed the "first 1000 days", including the period of pregnancy, are considered the most crucial. This is a period of optimal growth, nutritional status, health, development, and immune function, all of which have long-term repercussions. Therefore, the health and nutrition of both mother and infant are critical, especially during this period; suboptimal conditions may lead to increased susceptibility to stunting (Abebe et al., 2016; Assefa et al., 2021). It has also been noted that health and nutritional status during this period determines a country's level of development (Jemide et

al., 2016; Mutuku et al., 2020). Key questions surrounding IYCF include: when to feed, what to feed, how to feed, and why to feed (Harrison et al., 2017).

Hence, IYCF guidelines during this period are highly specific; although adapted globally, they convey similar core recommendations. The WHO guidelines, particularly for developing countries, advise initiating breastfeeding within the first hour after birth, providing exclusive breastfeeding for the first six months, continuing breastfeeding until the child is two years old, beginning complementary feeding at six months, and incorporating a variety of foods in the child's diet (WHO, 2021). Although seemingly straightforward, breastfeeding and the transition to complementary feeding can be challenging in certain contexts. These challenges are contextual and multifaceted; understanding them enables the design of better-targeted interventions to enhance IYCF and improve outcomes at both individual and societal levels.

The benefits of breastfeeding are well documented and include enhanced immunity, disease prevention and recovery, optimal growth and development, and protection of the infant's gut barrier. Additionally, breastfeeding offers maternal benefits, such as reducing the risk of cancer and promoting mother-infant bonding (WHO, 2021). At six months, breastfeeding should be complemented with solid foods, as it no longer suffices to meet the infant's complete nutritional requirements for optimal growth and development (WHO, 2021).

To assess appropriate complementary feeding, specific indicators are used, including Minimum Dietary Diversity (MDD), Minimum Meal Frequency (MMF), and Minimum Acceptable Diet (MAD). MAD combines MDD and MMF, indicating that meals are both

sufficiently diverse, covering at least four food groups per day, and provided at an age-appropriate frequency to meet the infant's daily needs (KNBS & ICF, 2023).

Globally, the EBF rate is estimated at 48%, with South Asia having the highest rate of 60% and North America the lowest at 26% (UNICEF, 2023). In Kenya, the rate is 61%, higher than the global average, but still below the WHO-recommended target of 90% (Dukuzumuremyi et al., 2020). However, it should be noted that the EBF rates reported by KDHS are based on feeding practices among infants aged 0 to 5 months within the preceding 24 hours, rather than from birth to the time of assessment (National Bureau of Statistics, Nairobi, 2023).

According to the 2023 UNICEF global database, the proportion of children aged 6 to 23 months receiving MAD is 21%, MMF is 51%, and MDD is 34% (UNICEF, 2022). In 2023, Kenya's MAD was 31%, showing a deterioration of 8% since 2002, with an MMF of 71% and MDD of 37% (Kamudoni et al., 2024). This underscores the difficulty in transitioning from breastfeeding to complementary feeding and in adopting appropriate complementary feeding practices.

Despite Kenya's commitment to scaling up maternal and child nutrition interventions through frameworks such as the National Nutrition Action Plan and Baby-Friendly Community Initiative (BFCI), major implementation gaps persist. A key challenge is the limited integration of IYCF services into routine healthcare, especially at the community level and in lower-tier health facilities (Maingi et al., 2020). Many healthcare providers lack adequate training on counselling and practical skills related to IYCF, resulting in poor service delivery and inconsistent guidance to mothers (UNICEF et al., 2018; Kimani-

Murage et al., 2011). In addition, cultural norms that discourage early initiation of breastfeeding or encourage the early introduction of fluids such as water and porridge continue to affect adherence to global feeding recommendations (Mutuku et al., 2020).

Furthermore, systemic barriers such as poverty, food insecurity, and maternal workload within the informal labour sector lead to early cessation of breastfeeding or poor dietary diversity during complementary feeding (Assefa et al., 2021). Urbanisation has created socioeconomic disparities where slum dwellers, despite geographic proximity to health services, face lower access to counselling and have poorer IYCF indicators compared to their rural counterparts (Kimani-Murage et al., 2015; Uusimäki et al., 2023a). These inequities reflect both structural and policy gaps in the implementation of WHO guidelines.

Kenya has also struggled to meet WHO targets because of limited monitoring, inconsistent data collection, and reliance on short-term indicators such as 24-hour recall surveys, which may not reflect long-term feeding practices (National Bureau of Statistics, Nairobi, 2023). Moreover, while national rates suggest moderate success, county-level disparities are stark, with areas like Mandera reporting MAD as low as 6.2% (UNICEF et al., 2018). Weak multi-sectoral collaboration, especially among health, agriculture, education, and WASH sectors, further undermines coordinated efforts to improve feeding outcomes (UNICEF & UNOPS, 2018).

In summary, Kenya's failure to meet WHO IYCF targets can be attributed to a complex interplay of health system limitations, socio-cultural beliefs, economic constraints, data quality issues, and fragmented policy execution. Addressing these challenges will require

not only policy refinement but also strengthened community engagement, sustainable resource allocation, and consistent frontline health worker training.

2.4.2 Malnutrition and its Connection with IYCF

Malnutrition is a broad term comprising both undernutrition and overnutrition, where undernutrition includes wasting, underweight status, and micronutrient deficiency. In 2022, the global prevalence of stunting was 22.3% and wasting was 6.8%, with Sub-Saharan Africa and Asia experiencing the highest burden (UNICEF & WHO, 2023). Kenya's prevalence during this period was comparable, with a stunting rate of 18% and a wasting rate of 5% (KNBS, 2023). Children in the East African and Sahel regions are even more vulnerable to malnutrition due to fragile contexts and erratic climate patterns (UNICEF & WHO, 2023).

Malnutrition remains a global health concern and requires a multi-pronged approach to effectively manage and reduce the burden. This is due to the multifactorial aetiology of malnutrition, with immediate causes including disease and inadequate dietary intake. Poor infant and young child feeding practices play an influential role in both these immediate causes and can result in malnutrition (UNICEF, 2021).

The repercussions and impact of malnutrition are detrimental not only to the individual's health but also to society as a whole. At an individual level, malnutrition can lead to immunosuppression and increased vulnerability to disease, poor cognitive development, reduced productivity at school, and chronic disease later in life. At a societal level,

malnutrition can lead to an increased burden on healthcare systems, decreased productivity, and a resultant decline in socio-economic status (Uusimäki et al., 2023).

Malnutrition has a high burden of morbidity and mortality amongst children under 5 years of age. It is estimated to be associated with approximately half of all deaths among children under five. In addition, children with severe acute malnutrition are 9 to 12 times more likely to die than their well-nourished counterparts (Abitew et al., 2020; King et al., 2022; Yitayew et al., 2023). The global under-5 mortality rate is estimated at 37 deaths per 1,000 live births, whereas Kenya reports a higher rate of 41 per 1,000 live births as of 2022. This remains approximately 64% above the target of 25 deaths per 1,000 live births (KNBS, 2023; UNICEF & WHO, 2023). It has been estimated that approximately 13% of under-5 mortalities could be averted through exclusive breastfeeding. Furthermore, approximately 20% of deaths could be averted through optimal infant and young child feeding (Ara et al., 2023; Assefa et al., 2021).

2.4.3 Associated Factors Influencing IYCF Practices

Many studies have explored the factors associated with poor IYCF and some similar themes are apparent; however, whether they increase or decrease the likelihood of optimal IYCF practices appears to be highly dependent on the context. A systematic review investigating the potential factors associated with exclusive breastfeeding (EBF) in Kenya categorised these into five groups. Firstly, socio-economic factors included employment status, maternal workload, disposable income, and educational attainment. Secondly, demographic factors included the age and sex of both mother and child, as well as marital status. Thirdly, maternal factors included knowledge and attitude, experience of

breastfeeding complications, pregnancy desirability, multiple births, and initiation of breastfeeding in the first hour. Fourthly, sociocultural factors included community influence, culture, beliefs, and practices. Fifthly, psychosocial factors and social support influence maternal mental health and shape mothers' perceptions (Mututho et al., 2017).

Other studies differentiated between maternal and child-related factors. Maternal characteristics included socio-demographic and socio-economic factors such as age, education level, wealth status, marital status, religion, ethnicity, place of residence, and antenatal care (ANC) visits. Child-related factors included birth weight, age, place of delivery, sex, birth order, and mode of delivery (Assefa et al., 2021; Kimani-Murage et al., 2011; Kostecka et al., 2020).

Wealth status was also associated with a lower likelihood of EBF in some studies on account of the affordability of artificial formulae. Poverty, on the other hand, was sometimes associated with poor IYCF practices and other times with good IYCF practices. Facility-based births have been associated with educational support from healthcare professionals and a reduced risk of malnutrition. Therefore, limited literacy, lack of formal education, and home deliveries were linked to an increased risk of suboptimal IYCF and poor nutritional outcomes (Assefa et al., 2021).

Adequate service provision, including WASH (Water, Sanitation, and Hygiene), education, and healthcare, alongside positive societal norms and cultural practices and beliefs, is a key enabler of optimal breastfeeding practices. Complementary feeding enablers include additional factors such as service provision and societal influences, particularly within the context of the food environment and its focus on food security. Therefore, in the absence

of these enablers, adherence to optimal IYCF practices becomes challenging (Kamudoni et al., 2024).

2.4.4 Maternal Knowledge Regarding IYCF Practices

2.4.4.1 Sources and Determinants of Maternal IYCF Knowledge.

In general, knowledge serves as the initial step in the acquisition of information. This, in turn, informs perceptions, which are significantly shaped by context, experience, and culture. These perceptions then feed into our attitudes and beliefs, which ultimately influence what we do or practice (FAO, 2014; Qiquan & Hua, 2021).

Knowledge acquisition is influenced by educational attainment, literacy levels, and the source of information. The media are considered key sources of information on IYCF. This includes the internet, radio, mobile phones, and television, although some sources may require literacy. Additionally, information can be accessed through healthcare professionals, Community Health Workers (CHWs), Mother-to-Mother Support Groups (MTMSGs), and health education services provided during Antenatal Care (ANC), Postnatal Care (PNC), in hospitals, clinics, consultation rooms, and within the community. Lastly, social support from family members, including husbands, mothers, relatives, and friends, plays a role (Pizzatto et al., 2020).

A systematic review conducted in East Africa found that most maternal knowledge about breastfeeding was obtained from healthcare professionals, followed by mass media, husbands, and friends. This closely aligned with findings from a study conducted at Kenyatta National Hospital (Wafula & Rajula, 2016). However, KAP studies on Maternal,

Infant, and Young Child Nutrition (MIYCN), conducted in Marsabit and Mandera, indicated that the mother or mother-in-law, followed by healthcare workers, was the main source of information. (UNICEF et al., 2017, 2018). In contrast, in Tana River, healthcare workers, followed by the mother or mother-in-law, were identified as primary sources. In addition, these studies revealed that 50–70% of mothers had not received any information on IYCF (UNICEF et al., 2017, 2018; UNICEF & UNOPS, 2018).

2.4.4.2 Relationship Between Knowledge and Feeding Practices.

Education is recognised as having a significant influence on KAP towards IYCF practices. Lower education levels have been linked to poorer IYCF practices, in a study in Kenya's urban poor settlements (Kimani-Murage et al., 2015). Similarly, a study in a Tanzanian slum area found that higher education was associated with positive IYCF practices (Sichalwe, Ranjan Behera, et al., 2023). Maternal age, educational level, and nutrition knowledge were found to influence IYCF practices in Poland (Kostecka et al., 2020). Quasi-experimental studies were conducted in Indonesia, Nigeria, Pakistan, and Poland, where education was provided to mothers over various periods. The results indicated an improvement in knowledge; however, only two of the four studies reported a correlation between knowledge and practice (Majidah et al., 2021; Shirazi et al., 2023).

A 2015 study comparing maternal knowledge and practices in Nairobi's Ruaraka slum and the rural area of Machakos indicated minimal differences in outcomes between the two locations. Breastfeeding knowledge and practices were generally good; however, complementary feeding practices were poor, particularly regarding minimum dietary

diversity (MDD) and minimum acceptable diet (MAD) (Uusimäki et al., 2023). Compared to the other 32 studies conducted in Sub-Saharan Africa, similar outcomes were observed, with better overall practices in breastfeeding than in complementary feeding (Uusimäki et al., 2023a).

It might have been anticipated that the Ruaraka slum would exhibit poorer outcomes due to poverty, limited resources, and inadequate service availability; however, this was not the case. In contrast, a study conducted between 2006 and 2012 in Nairobi slums, Korogocho and Viwandani, reported an EBF rate of only 2%, compared to 87% in the Ruaraka slum (Kimani-Murage et al., 2011; Uusimäki et al., 2023a). Approximately 70% of participants reported that they knew complementary food should only be introduced at 6 months; however, almost half of them indicated that they introduced early complementary feeding between 2-3 months due to insufficient milk (Kimani-Murage et al., 2015). Similar findings were reported in other studies conducted in the region regarding early complementary feeding. Another cross-sectional study conducted at Kenyatta National Hospital reported that 22% of mothers started early complementary feeding due to insufficient breast milk, cultural perceptions, busy schedules, mother's health, or family advice (Wafula & Rajula, 2016). The disparity in findings between the two studies may be attributed to the timing of the study in relation to interventions, or to differences in methodology (Kimani-Murage et al., 2011).

2.4.4.3 Gaps in Knowledge and Understanding of Key Concepts.

The definition of EBF and the way the question is posed to the participants are important to avoid misunderstandings. Exclusive breastfeeding is defined as feeding an infant only breast milk, with no other foods or fluids, including water. However, the WHO/UNICEF indicator defines it as the "percentage of infants aged 0–5 months who were exclusively breastfed during the previous day." Although this may offer a more convenient method of assessing EBF, it is potentially unreliable, as it relies solely on recall from the previous day and assumes that the term "exclusive" is clearly understood (WHO & UNICEF, 2021).

Numerous studies have explored maternal knowledge, attitudes, and practices related to IYCF, including factors contributing to suboptimal outcomes. A study in Brazil found that less than 50% of participants had correctly defined EBF, and 11% believed that other fluids were permissible during EBF. In the same study, when participants were asked about the duration of EBF, 86% gave the correct answer. This underscores the necessity for clearer definitions and standardised questions regarding EBF Pizzatto et al., 2020.

What remains apparent among the studies on knowledge and practice related to IYCF is that there are disparities, with some studies indicating that good knowledge equates to good practice, while others do not (Ara et al., 2023; Harrison et al., 2017; Kimani-Murage et al., 2011; Pizzatto et al., 2020.; Uusimäki et al., 2023a).

2.4.5 Maternal Attitude Regarding IYCF Practices

In a qualitative systematic review by Harrison et al. (2017) on the integration of complementary feeds, several interesting themes emerged. The first theme relates to

perceptions associated with the infant and early feeding, which are linked to positive outcomes for the child and responsive feeding cues. The second theme focused on the mother, including her knowledge, abilities, and coping strategies, to meet both the infant's and her own needs. The third theme was related to community pressure and mixed advice.

Social norms, cultural beliefs, customs, religion, and experiences may either positively or negatively influence IYCF (Ara et al., 2023; Harrison et al., 2017; Pizzatto et al., 2020; Uusimäki et al., 2023a). Overarching knowledge ultimately appears to shape attitudes, encompassing beliefs, feelings, values, motivations, and perceptions toward IYCF, thereby determining whether practices are positive or negative (Gewa & Chepkemboi, 2016).

The outcomes of KAP studies showed mixed associations between good knowledge and positive attitudes toward IYCF and actual practices. A study in Wajir, Kenya, indicated that mothers with positive attitudes toward breastfeeding were more likely to practice exclusive breastfeeding (EBF) (Mohamed et al., 2018). A study in Assosa Woreda, Ethiopia, and Bobo Dioulasso, Burkina Faso, also supported the view that both good knowledge and a positive attitude toward IYCF are essential for achieving optimal practices (Assefa et al., 2021; Hien et al., 2020). A KAP study in Dhaka, Bangladesh, indicated a moderate relationship between attitudes and IYCF practices (Ara et al., 2023). Although approximately 72.5% of participants had a positive attitude toward IYCF, only 50% demonstrated good practices. (Ara et al., 2023)

Interestingly, a study in Kitui, Kenya, showed a weak correlation between maternal IYCF knowledge and attitudes (Kitiyo et al., 2020). Furthermore, a study in Belgaum, India,

showed an association between maternal attitudes toward IYCF and socio-economic status, parity, education level, and age (Kengalagutti et al., 2015).

2.4.6 Maternal Practices in IYCF

2.4.6.1 Overview of Maternal IYCF Practices Across Countries.

Based on a review of previous studies on maternal practices regarding IYCF, commonly measured practices varied by context, including socio-economic status, place of delivery, age, and parity. Furthermore, outcome indicators varied between breastfeeding and complementary feeding practices, with the latter generally being poorer. In western Ethiopia, 78% of IYCF practices were considered good, compared to 50% in Dhaka, Bangladesh, and only 14% in Belgaum, India (Ara et al., 2023; Assefa et al., 2021; Kengalagutti et al., 2015).

2.4.6.2 Trends and Challenges in Kenya's Maternal IYCF Practices.

Kenya also has several studies on maternal practices in IYCF, with the most recent broad survey including core IYCF indicators in the Kenya Demographic and Health Survey of 2022. This survey reported an EBR rate of 60%; however, this was based solely on a 24-hour recall period. Meeting MMF was reported at 71%; however, MDD was 37% and MAD was 31% (KNBS & ICF, 2023). On the other hand, MIYCN studies conducted during 2017 and 2018 in Marsabit, Mandera, and Tana River showed similar patterns in the differentiation between breastfeeding and complementary feeding practices. EBF rates were reported to be highest in Marsabit at 76% and lowest in Tana River at 50%. However, continued breastfeeding rates declined from one to two years of age in Marsabit and

Mandera, while remaining steady in Tana River at 98%. Pre-lacteal feeding in the first three days ranged from 8% in Mandera, 15% in Marsabit, and 25% in Tana River. The main reasons given for introducing other foods or liquids were insufficient breast milk and, secondly, excessive crying (Mutuku et al., 2020; UNICEF et al., 2017, 2018; UNICEF & UNOPS, 2018).

Complementary feeding practices in these counties were poor compared to the national level, with MAD ranging from 6.2% in Mandera to 15% in Marsabit and 24% in Tana River. MMF ranged from 14.9% in Mandera to 46% in Tana River and 49% in Marsabit. MDD ranged from 15% in Marsabit and Mandera to 41% in Tana River. Some of the reasons provided for poor complementary feeding practices from focus group discussions included poor market access, poverty, drought, pastoral lifestyle, large family size, cultural beliefs, and absence of a mother (UNICEF et al., 2017, 2018; UNICEF & UNOPS, 2018).

2.4.7 Variations in IYCF Outcomes Across Urban, Slum, and Rural Contexts

Recent studies across Kenya and beyond reveal substantial contextual variability in maternal Infant and Young Child Feeding (IYCF) practices. National-level data from the 2022 Kenya Demographic and Health Survey (KDHS) reported an exclusive breastfeeding rate (EBR) of 60%, based on a 24-hour recall. While minimum meal frequency (MMF) was met by 71% of children, only 37% achieved minimum dietary diversity (MDD), and 31% met the minimum acceptable diet (MAD) (KNBS & ICF, 2023).

Interestingly, some urban informal settlements have demonstrated relatively strong breastfeeding indicators. For instance, Nairobi's Ruaraka slum reported EBF rates of up to

87%, outperforming more affluent or rural areas in some respects (Uusimäki et al., 2023). By contrast, older studies in other Nairobi slums such as Korogocho and Viwandani found EBF rates as low as 2% (Kimani-Murage et al., 2011), indicating significant intra-urban disparities, potentially linked to interventions or health service availability.

A comparative study between Ruaraka and the rural area of Machakos found only marginal differences in breastfeeding and complementary feeding outcomes (Uusimäki et al., 2023), suggesting that geographical setting alone does not account for disparities. Rural arid counties such as Marsabit, Mandera, and Tana River offer further nuance. While Marsabit reported a high EBF rate of 76%, MAD levels were markedly low across all three counties, ranging from 6.2% in Mandera to 24% in Tana River, highlighting persistent challenges with complementary feeding (Mutuku et al., 2020; UNICEF et al., 2017; UNICEF & UNOPS, 2018).

2.4.8 Interventions and Strategies to address Malnutrition

Malnutrition remains a major public health concern in low- and middle-income countries, including Kenya. Over the decades, several interventions have been implemented to address malnutrition from both treatment and preventive perspectives. While treatment approaches are well documented, they often operate in isolation and are not sufficiently integrated with preventive, community-based, and policy-level strategies.

2.4.8.1 Health System–Based Strategies.

In Kenya, acute malnutrition is primarily managed through the Integrated Management of Acute Malnutrition (IMAM) programme, which is grounded in a community-based model

of care (Wambani, 2012). The IMAM programme aligns with the SPHERE standards, where a recovery rate exceeding 75% is considered indicative of effective treatment (Abitew et al., 2020). Despite this benchmark, relapse rates remain concerning. For example, relapse rates in Ethiopia have ranged from 10% in western regions to 72% in southern regions, raising questions about the sustainability and effectiveness of such treatment-based approaches (Abitew et al., 2020). High relapse rates suggest that while clinical management is necessary, it must be complemented by upstream interventions addressing the underlying social and economic determinants of malnutrition.

These health-system-based strategies often suffer from resource limitations, undertrained personnel, and fragmented referral pathways, particularly in rural and hard-to-reach areas (Mutuku et al., 2020). As a result, health facilities tend to focus more on curative services, with less emphasis on preventive or nutrition counselling services.

2.4.8.2 Educational Strategies.

Improving maternal knowledge on Infant and Young Child Feeding (IYCF) remains a cornerstone of preventive nutrition strategies. In Kenya, education-based interventions have been integrated into antenatal care (ANC) and postnatal care (PNC) services, alongside targeted health education campaigns. A randomised controlled trial conducted in Koibatek, Kenya demonstrated that participants in the Baby-Friendly Community Initiative (BFCI) arm were 26 times more likely to achieve higher maternal knowledge scores compared to controls (Maingi et al., 2020).

However, national data still show low levels of appropriate IYCF practices, suggesting a gap between knowledge and practice. This underscores the need for not only education, but also behaviour change communication (BCC) strategies tailored to the local context (KNBS & ICF, 2023; Assefa et al., 2021).

2.4.8.3 Community-Led Strategies.

Community engagement plays a pivotal role in strengthening nutrition outcomes, particularly through peer-to-peer approaches. Mother-to-Mother Support Groups (MTMSGs) have emerged as valuable platforms for sharing experiences and reinforcing good practices. These groups are supported under Kenya's Baby-Friendly Community Initiative (BFCI), which links households to trained Community Health Volunteers (CHVs) who provide nutrition counselling, monitor child growth, and conduct household visits (Maingi et al., 2020; UNICEF et al., 2018).

Despite their success, coverage and consistency of such community-led initiatives remain limited in marginalised areas such as Mandera, Marsabit, and Tana River, where pastoral lifestyles, drought, and poor infrastructure limit programme penetration (UNICEF & UNOPS, 2018). In these regions, locally adapted models using community health dialogues, engagement with religious and cultural leaders, and integration with cash-transfer programmes may improve uptake.

2.4.8.4 Policy-Level Strategies.

At the national level, Kenya has adopted several key frameworks aimed at improving child nutrition, including the National Nutrition Action Plan (2018–2022) and alignment with

the IYCF Global Strategy. These policies promote a multi-sectoral approach involving health, agriculture, education, and social protection sectors (Mutuku et al., 2020; UNICEF et al., 2017).

However, implementation challenges persist. These include inadequate budgetary allocations, limited accountability mechanisms at the county level, and insufficient monitoring and evaluation systems. Additionally, national surveys still show poor breastfeeding rates, and complementary feeding indicators such as MAD and MDD remain poor, pointing to gaps in operationalising these policies across all counties (KNBS & ICF, 2023).

County-level planning and context-specific nutrition policies, aligned with national goals, are essential for realising the SDG targets related to child nutrition.

Conclusion

Addressing malnutrition requires a coordinated blend of curative and preventive interventions, supported by strong systems for education, community engagement, and policy execution. While Kenya has made measurable progress in some areas, the persistence of regional disparities, poor complementary feeding indicators, and high relapse rates indicates that treatment efforts alone are insufficient. Strengthening the integration and sustainability of educational, community-led, and policy-level interventions is imperative to break the cycle of malnutrition and achieve long-term nutrition outcomes.

2.5 Identification of Knowledge Gap

A review of the above literature highlights that information regarding Infant and Young Child Feeding (IYCF) practices is highly contextual; therefore, interventions should be appropriately targeted. To date, no study has examined maternal knowledge, attitudes, and practices (KAP) regarding IYCF in Kiambu County, specifically comparing urban, rural and slum areas. Furthermore, no comprehensive investigation has explored the associated factors, such as socioeconomic, socio-environmental, and sociodemographic, that influence IYCF practices in urban, rural and slum settings within Kiambu County. Overall, the most significant gap appears to be understanding the barriers between knowledge and practice, particularly the factors that influence mothers' attitudes and beliefs regarding optimal IYCF practices.

The literature on malnutrition and Infant and Young Child Feeding (IYCF) practices presents a wealth of information about the prevalence, causes, and interventions associated with these critical public health issues. However, several significant knowledge gaps persist, particularly in the context of Kenya and similar settings. Firstly, while existing studies have explored the socio-economic, demographic, and maternal factors influencing IYCF practices, there remains a lack of comprehensive understanding regarding the interplay of these factors within specific cultural contexts. Existing research often categorises influences but fails to adequately explore how these categories interact or overlap in practical contexts, thereby limiting the effectiveness of interventions aimed at promoting optimal IYCF practices.

Moreover, while many studies highlight the importance of maternal knowledge and attitudes towards IYCF, the relationship between knowledge and actual feeding practices remains inadequately explored. Disparities exist in findings, with some studies suggesting that good knowledge does not always translate into good practice. This inconsistency indicates a need for more nuanced research that examines the cognitive, emotional, and situational factors that may hinder the application of knowledge in real-world settings. Understanding why well-informed mothers may still struggle to implement recommended IYCF practices is essential for developing targeted interventions that address these barriers.

Another gap pertains to the long-term sustainability and effectiveness of interventions aimed at improving IYCF practices. While programmes such as the Integrated Management of Acute Malnutrition (IMAM) and various community initiatives have been implemented, their success rates vary widely, and questions remain regarding their ability to address the root causes of malnutrition. Further investigation is needed to evaluate how these interventions can be adapted to better meet the unique challenges faced by different communities, particularly in resource-limited settings. Additionally, there is a scarcity of longitudinal studies that assess the impact of interventions over time, which is crucial for understanding the enduring effectiveness of strategies designed to combat malnutrition.

Lastly, the existing body of literature tends to focus predominantly on individual and household-level factors, often neglecting broader systemic issues such as healthcare infrastructure, policy frameworks, and the role of governmental and non-governmental organisations in shaping IYCF practices. Understanding the influence of these macro-level factors is essential for creating a holistic approach to tackling malnutrition and promoting

optimal IYCF practices. Addressing these knowledge gaps will be critical for advancing the field and informing future research and policy initiatives aimed at improving maternal and child health outcomes in Kenya and similar contexts.

2.6 Conceptual Framework

The conceptual framework presented in Figure 2-2 illustrates the hypothesised relationships between key variables influencing Infant and Young Child Feeding (IYCF) practices. This framework is adapted from the UNICEF Conceptual Framework on malnutrition and the Knowledge, Attitude, and Practice (KAP) model.

In this study, the outcome variable is IYCF Practices, measured as either positive or negative. These include early initiation of breastfeeding, exclusive breastfeeding, timely introduction of complementary feeding, dietary diversity, and continued breastfeeding. The nutritional status of the child is considered a secondary outcome, influenced by IYCF practices.

The independent variables include:

i. Maternal knowledge and attitudes regarding IYCF, which are shaped by exposure to health information and social norms.

ii. Sociodemographic and socioeconomic characteristics such as maternal age, education, marital status, employment, wealth index, and place of residence (urban, rural, slum).

These characteristics are treated as predictor variables in the study's analysis, as they directly influence both maternal knowledge/attitudes and IYCF practices. They are not

considered confounders, but rather key explanatory variables forming the basis of the research model.

Environmental factors, such as access to water, healthcare, IYCF information, and cultural beliefs, are treated as intervening variables, as they may either enable or hinder the translation of maternal knowledge and attitudes into practice.

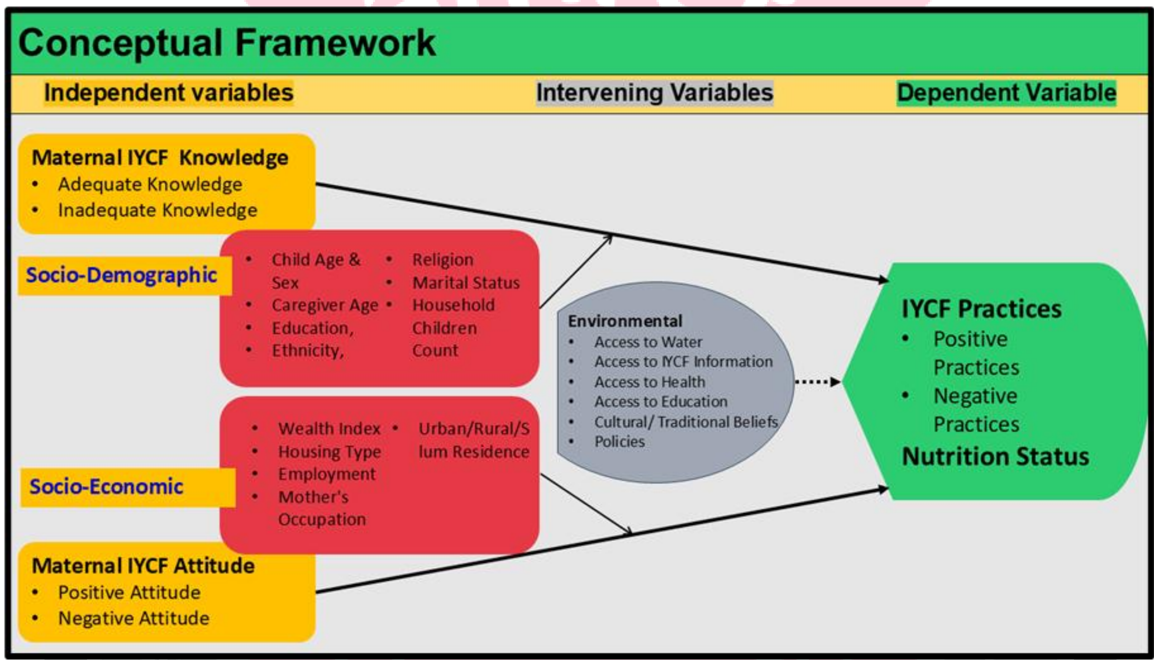

Figure 0.2 Framework illustrating maternal knowledge and associated factors influencing IYCF practices

“Source: Developed by the author based on literature (UNICEF, 2021; FAO, 2014; Qiquan & Hua, 2021).”

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter describes the methodology used in the study. Aspects described include the research design adopted, the location, and the population group in which the study was undertaken. Furthermore, the sampling techniques, research instruments, data collection, management, and analysis procedures are described alongside the ethical considerations.

3.2 Study Design

This facility-based, analytical cross-sectional study assessed maternal knowledge, attitudes, and practices (KAP) regarding infant and young child feeding (IYCF) among mothers of children aged 6–23 months attending two purposively selected Child Welfare Clinics (CWCs) in Kiambu County, Kenya. The study employed a comparative design to evaluate geographical and socioeconomic variations in IYCF practices across urban, peri-urban, and slum settings. This design enabled the simultaneous assessment of KAP and the identification of factors associated with feeding practices among mothers of infants aged 6–23 months at a single point in time.

Quantitative data were collected through a structured, interviewer-administered questionnaire, allowing for the measurement of KAP variables and comparison across different residential settings; urban, rural, and slum areas.

The study incorporated a comparative approach by selecting participants from two health facilities: Wangige Hospital and Kiandutu Health Center, which served populations with differing socioeconomic status. Kiandutu Health Center, located in a slum area, primarily

served the Kiandutu informal settlement community, surrounding informal settlements, and urban populations with lower socioeconomic status. In contrast, Wangige Hospital, situated in a peri-urban setting, served a more socioeconomically diverse population, including rural, urban, and a small proportion of slum residents. Thus, the study population represented a mixture of rural, urban, and slum communities, reflecting varying socioeconomic strata in Kiambu County. Additional socioeconomic indicator variables were included to facilitate direct comparisons of context-specific patterns, highlighting disparities in maternal behaviours and environmental influences on child feeding practices. This justified the classification of the study as comparative, as it examined inter-group differences in KAP across distinct residential and socioeconomic backgrounds.

Figure 0.1 Map of Kiambu sub counties (CNAP, 2021)

The cross-sectional design was appropriate for identifying statistical associations between independent variables (such as maternal education, age, and household income) and outcome variables (IYCF practices) without implying causality.

This approach facilitated efficient data collection within a relatively short timeframe and provided a snapshot of prevailing feeding behaviours, associated knowledge levels, and influencing attitudes. Furthermore, the comparative aspect allowed for inter-group analysis across different socioeconomic and geographical contexts, enabling the identification of disparities and context-specific trends in feeding practices.

The choice of this design was guided by its suitability for public health research exploring behavioural and contextual determinants in population subgroups. Additionally, it aligned with similar studies in Kenya and sub-Saharan Africa that employed cross-sectional designs to examine maternal feeding practices and associated factors.

3.3 Study Site/ Setting

This study was conducted in Kiambu County, which is one of 47 counties in Kenya and accounts for approximately 5% of the national population (around 2.4 million people). It is among the six counties that included urban, rural, and slum areas. The proportion of rural to urban is approximately 40% rural and 60% urban, with 5–10% of the urban population categorised as slums or informal settlements.

Administratively, the county is divided into 12 sub-counties and 60 wards, with a nearly equal gender distribution. The population includes approximately 1.23 million females and 1.19 million males. The county has relatively stable infrastructure in terms of education,

transport, water, sanitation and hygiene (WASH), and health services. Kiambu's proximity to Nairobi contributes to increasing urbanisation and improved access to health services. A significant proportion of the population belonged to the Kikuyu ethnic group, and Christianity was the predominant religion, both of which may have influenced cultural practices and infant and young child feeding (IYCF) Kiambu County Nutrition Action Plan (CNAP, 2021).

Kiambu County is reported to have 505 health facilities, of which 108 are public, 64 are faith-based, and 333 are private. Among the public facilities, there are three Level 5 hospitals located in Kiambu, Thika, and Gatundu South. In addition, there are eleven Level 4 hospitals and twenty-four health centres. This healthcare infrastructure played a crucial role in shaping maternal knowledge and practices related to IYCF.

3.4 Target Population/Study Population

The study focused on mothers of children aged 6 to 23 months in two selected Child welfare Clinics (CWCs) within Kiambu County. While IYCF practices cover the age group from 0 to 24 months, this study targeted 6–23 months to capture the crucial transition from exclusive breastfeeding to complementary feeding, as well as continued breastfeeding up to two years of age. The 0–6 months cohort was excluded from this study as the information obtained would be limited to breastfeeding alone. Information regarding feeding practices for children under 6 months was obtained retrospectively. Therefore, to account for this and ensure comprehensive information on breastfeeding, the transition to feeding, and complementary feeding, the 6 to 23 months age group was deemed most appropriate.

CWC's sites offering vaccination services were selected as study locations because infants and children attending these services were less likely to have acute illnesses compared to those visiting outpatient departments. This aligned with the inclusion criteria outlined in Section 3.4.1.

The target population comprised mothers of children aged 6 to 23 months who were responsible for daily feeding and care, and who were attending vaccination centres and MCHCs. These individuals served as key informants for understanding the knowledge, attitudes, and practices surrounding IYCF.

3.4.1 Inclusion criteria

Participants met the following inclusion criteria:

i. Mothers of children aged 6–23 months who were actively involved in feeding and caregiving.

ii. Children aged 6–23 months who were receiving breastfeeding, complementary feeding, or both.

iii. Mothers who had resided in the study area (urban, rural, or slum setting) for at least six months to ensure familiarity with local practices and access to services.

iv. Mothers who provided informed consent.

3.4.2 Exclusion criteria

Participants were excluded from the study if they met any of the following:

i. Children diagnosed with medical conditions likely to affect feeding behaviours or dietary intake (e.g., metabolic disorders, congenital anomalies, severe food allergies).

ii. Children attending Maternal and Child Health Clinics who were not accompanied by their primary caregiver responsible for daily feeding and nutrition-related decisions.

3.5 Sample and Sampling Procedures

3.5.1 Sample Size Determination

The sample size was calculated using Cochran's formula, which is widely applied in survey research for estimating proportions. The sample size was therefore calculated using the prevalence of Minimum Acceptable Diet (MAD) among Kenyan children aged 6–23 months (31%, KDHS 2022).

Cochran's Formula:

$$n_0 = \frac{Z^2 \times p \times (1-p)}{e^2}$$

Where:

(n_0) = Required sample size

(Z) = Z-value. For a 95% confidence level the Z-value is approximately 1.96.

(p) = 1 - p (i.e., complement of p), Estimated proportion of the population (prevalence rate) = 0.31

(E) = Margin of error (desired level of precision) =0.05

Substituting the above values into the formula:

$$n_0 = \frac{(1.96)^2 \times 0.31 \times (1-0.31)}{0.05^2}$$

$$n_0 = 329$$

A 10% non-response buffer was added to the base sample of 329 to account for potential participant dropouts

$$n_{adjusted} = 329 \times 1.10 = 362$$

The study enrolled 365 participants (187 from Kiandutu, 178 from Wangige).

This exceeds the adjusted sample size (362), which is good for statistical power and compensates for potential data loss or errors.

Wangige served as a proxy for rural and urban populations, while Kiandutu primarily captured slum and urban demographics. This stratified distribution preserved the comparative intent of the study.

The recruitment of participants from Kiandutu Health Centre and Wangige Sub-County Hospital is summarized in Figure 3.2.

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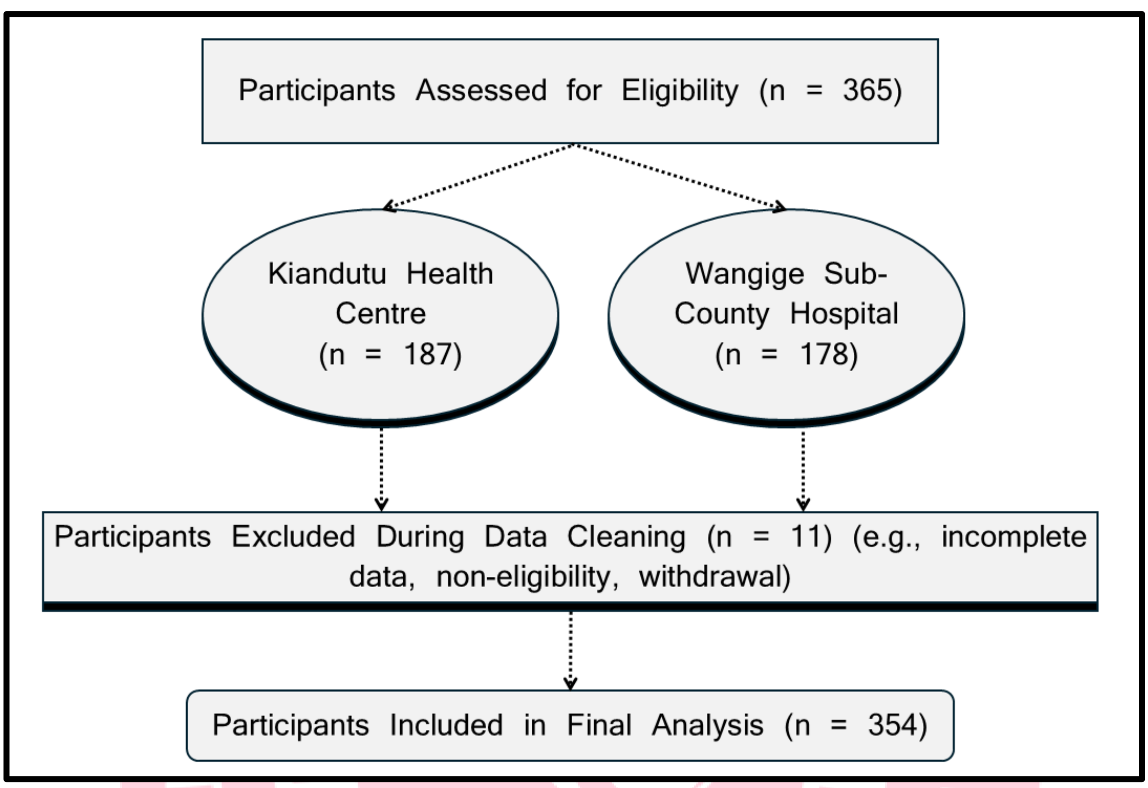

Figure 0.2 Enrolment flow diagram showing the number of participants recruited from Kiandutu Health Centre and Wangige Sub-County Hospital.

3.5.2 Sample and Sampling Procedures

A three-stage sampling approach was used:

Stage 1: Selection of County

Out of Kenya's 47 counties, Kiambu County was purposively selected for its unique composition of urban, rural, and slum settlements, as well as its proximity to Nairobi, which influences urbanisation trends and access to health services. Additionally, Kiambu remains under-researched on IYCF issues compared to counties like Nairobi and Mombasa.

Stage 2: Selection of Health Facilities

Instead of household sampling, which would have been logistically intensive and resource-heavy, the study was conducted at Maternal and Child Health Clinics (MCHCs) offering routine immunisation services. These settings allowed access to well. Children during scheduled visits, enabling efficient recruitment without introducing selection bias from illness-related visits.

The facilities were selected based on:

i. High immunisation volumes and facility attendance (DHIS2 data)
ii. Geographic and socioeconomic diversity
iii. Representativeness of peri-urban (Wangige) and slum (Kiandutu) contexts

Although health facilities were the unit of sampling, the underlying sampling frame was rooted in the diversity of the county's sub-regions, thus preserving the comparative study design.

Stage 3: Sample allocation and setting representation

To reflect the comparative design, the total sample was distributed proportionally across the selected facilities. Wangige Hospital reflected a more peri-urban profile, while Kiandutu Health Centre represented a high proportion of slum-based population. The sample distribution enabled cross setting comparison of KAP on IYCF, accounting for socioeconomic and infrastructural differences.

3.5.3 Sampling Frame and Participant Selection

The sampling frame comprised mothers of infants aged 6–23 months attending routine vaccination sessions during the study period. Lists were generated from daily immunisation registers, and consecutive sampling was employed at each facility due to:

i. Limited clinic hours (09:00 to 13:00)
ii. Staggered participant arrival
iii. Shared facility space limiting interview capacity

Eligibility was verified using:

i. The child's Road to Health Booklet
ii. Secondary confirmation via KoboCollect application

If a mother did not meet inclusion criteria, the next eligible participant was approached. Sampling continued until site-specific targets were met.

3.5.3 Sampling Technique and Selection of Participants

Participants were selected consecutively at each study site owing to three operational constraints: limited clinic attendance hours (09:00 to 13:00), staggered arrival times of eligible participants, and constrained physical space stemming from multiple departments sharing the facility.

The sampling process comprised four key phases. First, daily immunisation volumes were estimated using DHIS2 data and were subsequently verified against facility immunisation registers. Second, feasible daily interview targets (10–20 participants) were calculated

based on pilot-tested questionnaire completion times (10–30 minutes each). Third, waiting mothers were screened against the inclusion criteria, with eligibility verified through:

i. Inspection of the child's Road to Health Booklet was conducted
ii. Secondary confirmation was carried out via the KoboCollect mobile application

Where participants were deemed ineligible, the next consecutive eligible mother was approached. Trained enumerators implemented this protocol until they reached the predetermined sample size targets at each facility.

3.6 Data Collection Instruments

3.6.1 Structured Questionnaire

Quantitative data were collected using a pre-tested, structured questionnaire administered by trained interviewers via the KoboCollect mobile application. The tool was adapted from WHO/UNICEF IYCF indicators and prior validated surveys. It covered four core domains:

1. Socioeconomic and contextual factors influencing IYCF practices (e.g., maternal education, household income).
2. Maternal knowledge of IYCF, assessed through six standardized multiple-choice questions (e.g., timing of complementary feeding, benefits of exclusive breastfeeding).
3. Maternal attitudes toward IYCF (e.g., 5 Likert-scale items on perceived barriers/benefits).

4. Reported IYCF practices for children aged 6–23 months (e.g., breastfeeding frequency, food diversity).

All interviews were conducted in the language most comfortable for the participant (English, Kikuyu, Kiswahili, or local dialect), with translations provided where necessary to ensure accurate understanding and response.

3.6.2 24-hour Recall

A standardised 24-hour recall method assessed three WHO IYCF indicators:

1. Minimum Dietary Diversity (MDD): Child consumed foods from at least five of eight groups (using WHO's 8-food-group classification for MDD).
2. Minimum Meal Frequency (MMF): Age-appropriate feeding frequency.
3. Minimum Acceptable Diet (MAD): Met both MDD and MMF criteria.

Dietary diversity in this study was assessed based on the Food and Agriculture Organization (2010) guidelines and using IYCF tools developed for Kenya. Diversity was defined using eight essential food groups including grains, roots and tubers; legumes and nuts (including seeds); dairy products; flesh foods (meat, fish, poultry and organ meats); eggs; vitamin A-rich fruits and vegetables; other fruits and vegetables; and breast milk.

3.6.3 Nutrition Status

Nutritional status of children aged 6–23 months was assessed using anthropometric measurements (weight, height/length) recorded in Road to Health Cards (RTHC) by trained health facility staff. Data were converted to WHO Z-scores (WAZ, HAZ, WHZ) and classified as:

i. Stunting (HAZ < −2 SD)

ii. Wasting (WHZ < −2 SD)

iii. Underweight (WAZ < −2 SD)

3.7 Associated influencing factors on IYCF practices

The study examined three distinct categories of influencing factors: socio-demographic characteristics including age, education level and household size; socio-economic indicators such as occupation and income; and socio-environmental factors encompassing healthcare access, IYCF service availability and information sources. Maternal attitudes were assessed through eleven standardised questions evaluating perceptions of both breastfeeding and complementary feeding practices.

For documenting IYCF practices, the research team employed detailed questions capturing breastfeeding initiation and duration, precise timing of complementary food introduction, and dietary diversity assessed through 24-hour recall methodology. The questionnaire was adapted from an FAO-validated IYCF knowledge, attitudes and practices instrument, with modifications informed by contextual insights from prior studies in similar settings.

The data collection process utilised digital methods, with the structured interview schedule programmed into KoBoCollect software installed on enumerators' mobile devices. Before full deployment, the research instruments underwent rigorous pilot testing involving ten participants representative of Kiambu County's target population. This

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critical phase allowed refinement of question clarity, validation of response options and verification of procedural feasibility while maintaining the study's methodological rigour.

3.8 Validity and Reliability

This study aimed to explore maternal knowledge, attitudes, and practices (KAP) regarding infant and young child feeding (IYCF) for children aged 6 to 23 months. Several strategies were implemented to ensure validity and reliability throughout the research process.

Content validity was established by developing survey instruments based on FAO IYCF guidelines and previous literature. Subject matter experts, including nutritionists, provided input to ensure comprehensive coverage of key IYCF aspects relevant to the study population. This expert feedback helped confirm the instruments accurately measured their intended constructs.

Construct validity was addressed through pilot testing with a representative sample of 10 participants similar to the target population for the questionnaire and 3 for the interview schedule. The pilot test identified questions requiring clarification, allowing adjustments before full-scale data collection.

Internal validity was maintained through strict adherence to inclusion and exclusion criteria during participant selection. This approach minimised bias and ensured findings could be attributed to the variables of interest. Training was prioritised for data collectors to ensure consistency in procedures.

To enhance external validity, the sample was drawn from diverse geographic and socio-economic backgrounds using purposeful sampling. This diversity strengthened the generalisability of findings across different settings.

Training sessions were conducted for data collectors to standardise procedures and minimise variability. Regular checks and supervision were implemented to maintain consistency in data collection. Reliability was further ensured through double-checked data entry processes and appropriate statistical analysis methods.

3.9 Data Collection and Management Procedures

3.9.1 Pre-Health Facility Site Visit

Prior to data collection, each health facility was visited to ensure proper planning and implementation. During these preparatory visits, DHIS2 data were verified against facility registers to confirm the accuracy of sampling frameworks. Local contextual information was gathered, including characteristics of the target population and existing administrative protocols.

The research team conducted formal briefings with facility staff, including maternal and child health clinic (MCHC) personnel and community health workers (CHWs). These sessions outlined the study objectives, methodology, and operational procedures. Informal permission was obtained from facility managers to commence data collection activities.

3.9.2 Trained Enumerators

The principal investigator led a team of six trained enumerators in administering the questionnaires. Prior to data collection, a comprehensive three-day training session was conducted to familiarise enumerators with all study aspects, including research objectives, methodological approaches, and proper use of data collection instruments.

For fieldwork implementation, three enumerators were assigned to each of the two health facilities, with placements determined by geographical proximity to ensure operational efficiency. The principal investigator maintained direct supervision at both sites throughout the study duration to ensure protocol adherence and data quality control.

3.9.3 Community Engagement Plan within the Health Facility

The research team established collaborative relationships with health facility staff and patients to ensure voluntary, informed participation. Facility leadership teams – comprising managers, nurses, and healthcare professionals – received comprehensive briefings detailing the study's objectives, methodological approach, and anticipated outcomes. These engagements fostered institutional cooperation while clarifying staff roles in facilitating the research process.

Study information reached mothers through two primary channels: verbal announcements delivered at strategic intervals during data collection periods, supplemented by community health workers and facility staff who served as information conduits. This multi-pronged approach ensured widespread awareness while respecting facility routines.

During fieldwork, enumerators conducted personalised consultations with potential participants, thoroughly explaining the study's purpose and procedures before addressing individual questions or concerns. The team placed particular emphasis on the voluntary nature of participation during every interaction, with clear protocols for referring participants to either facility staff or the principal investigator should they require further clarification. This layered communication strategy maintained ethical transparency throughout the recruitment process.

3.9.4 Data Collection at the Site

Enumerators positioned themselves within the maternal and child health clinic (MCHC) during scheduled immunisation sessions. Following identification of eligible participants through consecutive sampling methodology, the research team implemented a rigorous consent procedure. Each potential participant received a thorough explanation of the informed consent document, with enumerators ensuring complete comprehension of the study’s purpose, participation requirements, and confidentiality protections.

The enumerators dedicated substantial time to addressing individual questions and concerns raised by participants, emphasising the voluntary nature of involvement throughout these discussions. Only after obtaining explicit consent did the team proceed with administering the standardised questionnaire, which had been pre-loaded onto mobile devices using the KoBo Collect platform for digital data capture. This systematic approach maintained both methodological consistency and ethical integrity during all fieldwork interactions.

3.9.5 Data Entry

All questions from the questionnaire were asked orally, and answers were entered into the mobile devices via KoBo Collect.

3.9.6 Data Storage and Retention

All participant responses were recorded directly into the KoBo Collect application, which maintained data within a secure, password-protected environment on the mobile devices. Following field data entry, the information was transferred to a centralised, password-protected cloud storage system. Access to this repository remained strictly limited to authorised research team members throughout the study period.

The research team preserved all collected data securely for a mandatory retention period of five years after study completion, in accordance with standard research governance frameworks. Upon expiration of this period, all datasets underwent secure deletion through certified data erasure protocols.

3.9.7 Data Interpretation and Scoring System for KAP

Independent variables related to socio-demographic, socio-economic, and socio-environmental factors were analysed directly based on their outcomes. Maternal KAP was interpreted using a scoring system.

3.9.7.1 IYCF Knowledge Score.

i. Correct answers received a score of 1.

ii. Incorrect or "I don't know" answers were assigned 0.

iii. The mean and median were used to determine thresholds for adequate and inadequate knowledge.

3.9.7.2 IYCF Attitude Score.

i. Strongly positive or negative responses (strongly agree/strongly disagree) were scored 2.

ii. Positive responses (agree/disagree) received 1.

iii. Neutral or negative responses were assigned 0.

iv. The mean and median were used to establish thresholds for good and poor attitude.

3.9.7.3 IYCF Practices Score.

i. Correct practices were assigned a score of 1, while incorrect practices received 0.

ii. The mean and median were used to determine thresholds distinguishing good from poor practices.

Results were categorised as follows:

i. Good/ Adequate: Above median/mean

ii. Poor/Inadequate: Below the median/mean

This scoring system enabled a more nuanced understanding of maternal knowledge, attitudes, and practices regarding IYCF.

3.10 Data Analysis and Presentation

Quantitative data analysis was performed using STATA version 14. The analytical process commenced with comprehensive data cleaning to ensure accuracy, involving systematic checks for missing values, outliers, and inconsistencies in the dataset.

Descriptive statistics were calculated to summarise key characteristics across four domains: sociodemographic, socioeconomic, socio-environmental, and IYCF practice variables. This approach facilitated thorough profiling of participant demographics and revealed preliminary patterns in maternal knowledge and attitudes related to IYCF, directly addressing Objectives 1 through 3 and 6.

For inferential analysis, the study employed two principal statistical techniques to examine variable relationships and setting comparisons (Objectives 4 and 5). Chi-square tests assessed associations between categorical variables, while logistic regression models evaluated predictive relationships between independent variables and outcomes. Population-level inferences were drawn from these analyses, with statistical significance determined at $p < 0.05$ (95% confidence level).

Results were presented in multiple formats, including detailed tables (numerical data), graphical visualisations (patterns and trends), and narrative explanations. Particular attention was given to ensuring that all presentations, maintained clarity and were easily interpretable by diverse audiences.

3.11 Ethical Considerations

Ethical approval was obtained from the Amref Ethics and Scientific Review Committee (Amref ESRC). The research team secured additional permissions from relevant authorities, including the National Commission for Science, Technology and Innovation (NACOSTI), Kiambu County Government, Wangige Sub-County Hospital, and Kiandutu Health Centre.

Throughout the study, ethical guidelines were strictly observed, and participants' rights were protected. Participation was entirely voluntary, with all participants providing signed informed consent prior to involvement. Confidentiality was maintained by excluding all personal identifiers, ensuring complete anonymity. Privacy during interactions was safeguarded through multiple protective measures.

3.11.1 Informed Consent

Written informed consent was obtained from all participants prior to study involvement. Participants received comprehensive explanations regarding:

i. The study's purpose and objectives
ii. All research procedures
iii. Potential risks and benefits
iv. Their unconditional right to withdraw without consequence

Participation remained strictly voluntary throughout the research process, with neither coercion nor undue influence exerted. Consent was formally documented using signed forms (Appendix A); illiterate participants confirmed consent via thumbprint following a comprehensive verbal explanation.

3.11.2 Confidentiality

All participant information was maintained under strict confidentiality. Data were stored securely in locked physical files and encrypted digital formats, with access limited exclusively to authorised research team members. Personally identifiable information was removed from all datasets prior to analysis to ensure complete anonymity. During

participant selection at MCHC sites using consecutive sampling techniques, unique identification codes were assigned to each participant.

Ethical Considerations for Vulnerable Populations: Special provisions were implemented to protect vulnerable participants, particularly those from low socio-economic backgrounds. While the study design minimised inherent risks, potential participation risks were explicitly acknowledged and addressed:

Confidentiality Risks: Despite anonymisation procedures, residual risks existed if participants voluntarily disclosed their responses to family members or other caregivers. To mitigate this, enumerators reinforced confidentiality protocols during interviews and ensured all collected data were fully anonymised.

Emotional Distress: Some participants experienced mild discomfort when discussing sensitive infant feeding topics. The research team addressed this by:

1. Reminding participants of their right to skip questions
2. Providing contact information for counselling services
3. Training enumerators to recognise and respond to distress

3.11.3 Right to Withdraw

Participants were informed of their unconditional right to withdraw from the study or request data removal at any stage prior to analysis commencement, without incurring negative consequences. These rights were explicitly outlined in the consent form (Appendix A) and were reiterated verbally by enumerators during recruitment.

Additionally, participants retained the right to decline answering any questions, ensuring full respect for personal autonomy and control over their level of involvement.

By rigorously upholding these ethical principles, the study safeguarded participants' rights and dignity, while simultaneously producing valuable insights into maternal knowledge, attitudes, and practices related to infant and young child feeding.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter presents the findings from interviews conducted with mothers attending child welfare clinics at two contrasting health facilities in Kiambu County: Wangige Sub-County Hospital, situated in a peri-urban area and serving a socioeconomically diverse population including rural, urban, and a small proportion of slum residents; and Kiandutu Health Centre, located in a slum area, primarily serving the Kiandutu slum community, surrounding informal settlements, and lower-income urban populations. The analysis follows the study's conceptual framework, examining first the socio-demographic characteristics of participants before exploring maternal knowledge, attitudes and practises regarding infant and young child feeding.

The presentation of results moves from descriptive analyses to more complex statistical examinations. Initial sections detail the basic characteristics of the study population, including how feeding practises varied between the two primary catchment areas and across rural, urban and slum residences. Subsequent sections investigate relationships between maternal factors and child nutritional outcomes, recognising that while the study design originally conceptualised three distinct socio-economic settings, in reality the health facilities served populations with some degree of overlap. This was particularly evident at Kiandutu Health Centre, which while primarily serving slum residents also attended to families from neighbouring urban areas, and at Wangige Hospital where most attendees came from peri-urban zones but some travelled from rural or slum communities.

This nuanced understanding of the study population's composition informs our interpretation of the results throughout the chapter. The analysis maintains focus on comparing the two main facility catchment areas while acknowledging where residential setting provides additional explanatory power regarding feeding practises and nutritional outcomes. By adopting this approach, the chapter provides both a clear overview of infant feeding patterns in the study locations and meaningful insights into how these relate to maternal factors across different socio-economic contexts in Kiambu County.

4.2 Sociodemographic and Socioeconomic Characteristics of Respondents

4.2.1 Sociodemographic Characteristics of Respondents

A total of 354 participants were included in the study, with an almost even distribution between Kiandutu Health Centre (n = 175) and Wangige Sub-County Hospital (n = 179). While 365 respondents were initially interviewed, 11 were excluded during data cleaning due to incomplete or inconsistent responses, resulting in a final response rate of approximately 97%.

The vast majority of respondents were biological mothers (98%), with only 2% being other primary caregivers. The mean age of respondents was approximately 28 years, with the majority falling within the 20–39 year age bracket.

Educational attainment was generally high, with 52.3% having completed secondary education, and nearly one-third attaining tertiary-level education. A significant proportion (85.3%) of respondents were married or cohabiting.

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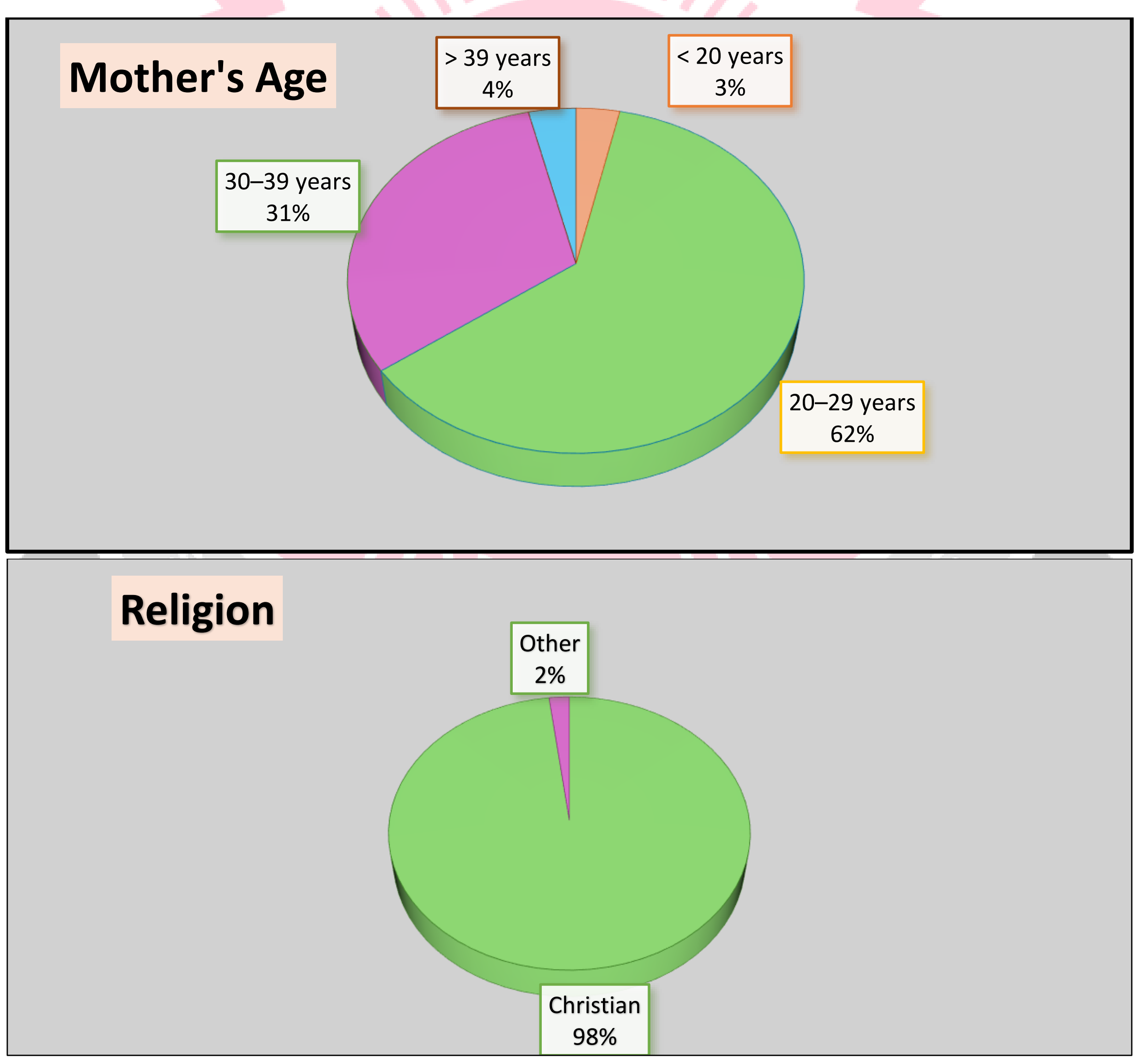
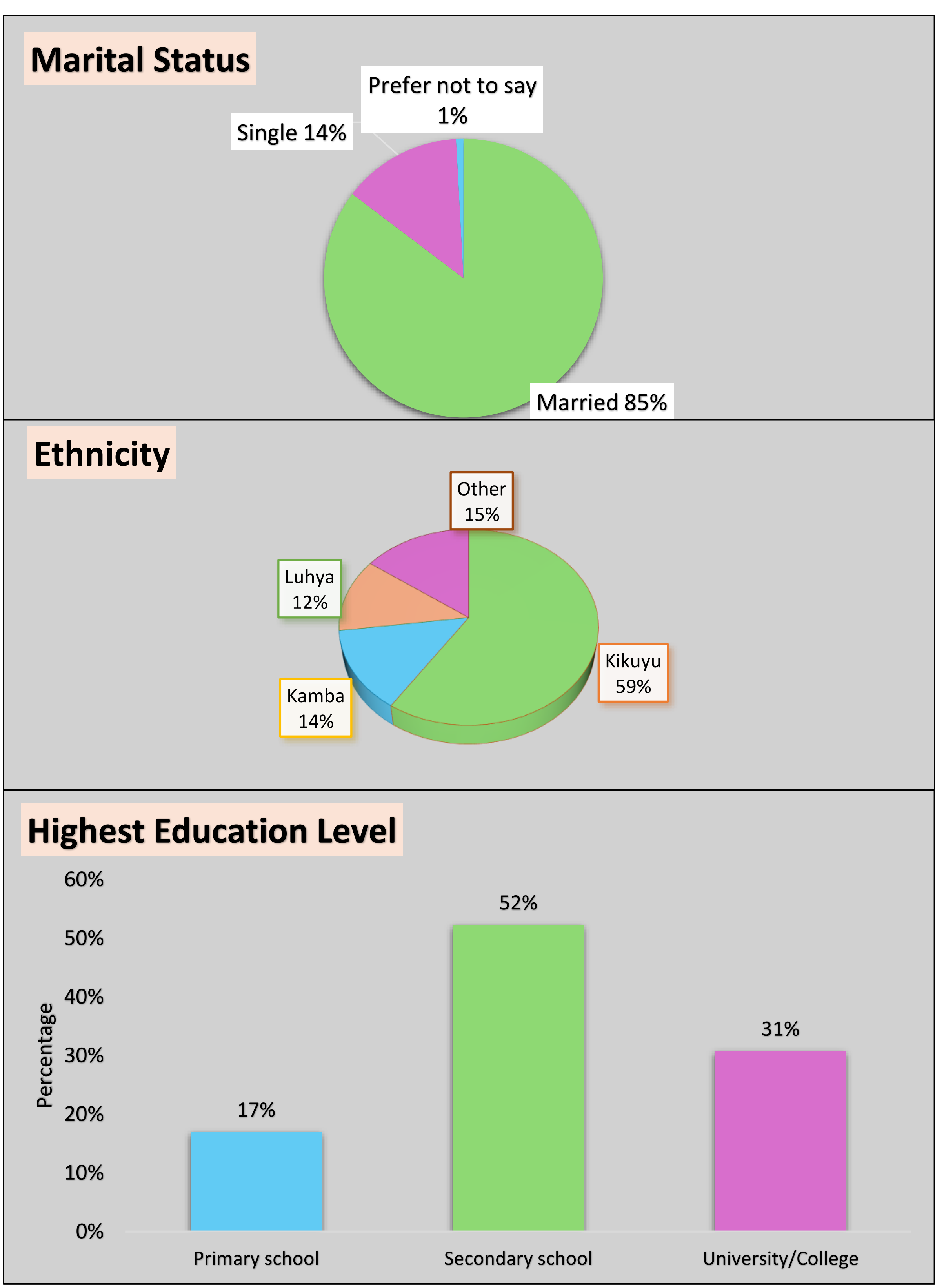
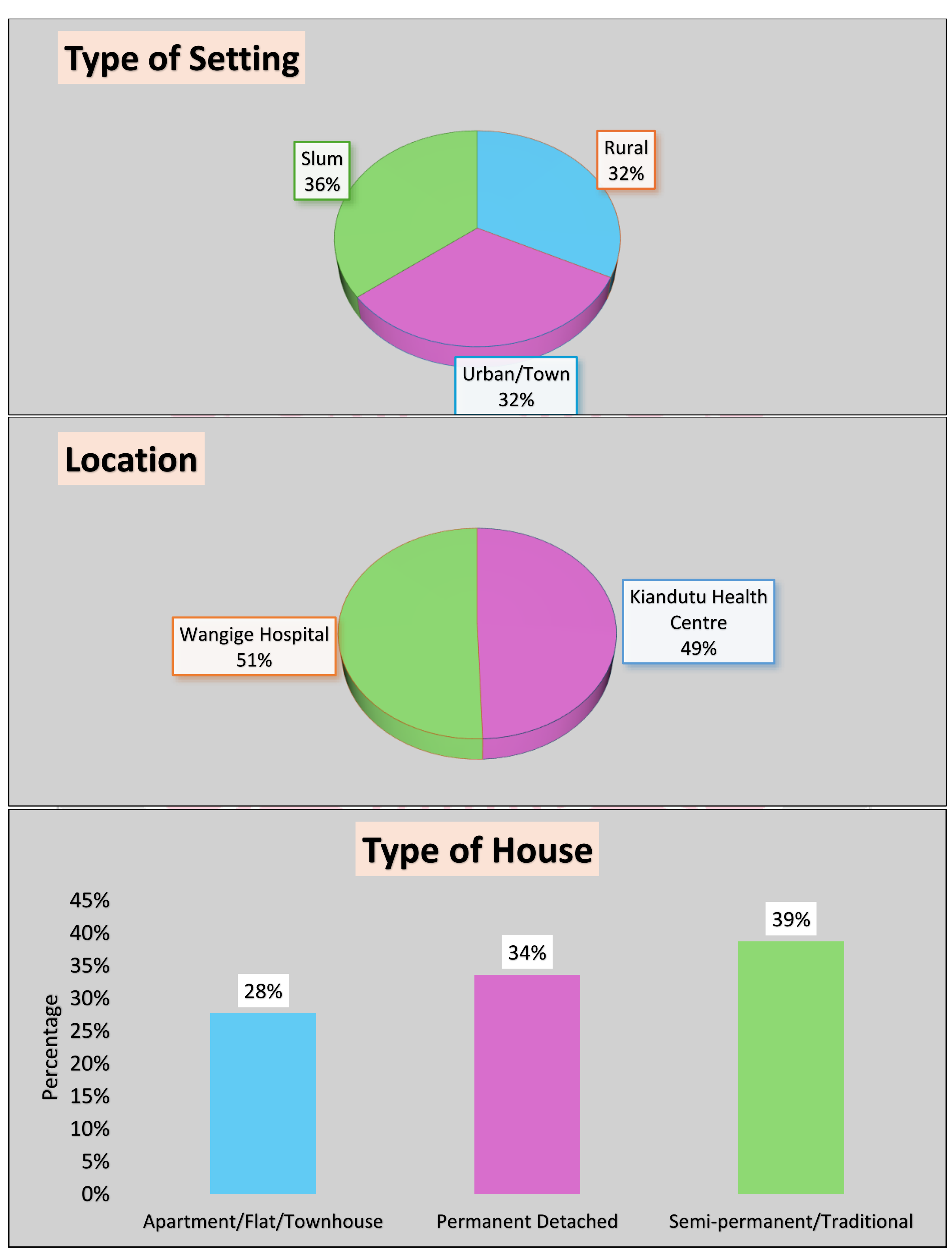
In terms of ethnicity and religion, the Kikuyu ethnic group was most represented (59.3%), and Christianity was the dominant religion (98%).

Housing conditions showed variation: about one-third of participants resided in permanent housing, while others lived in semi-permanent or traditional dwellings. Households were generally small, with most having one or two children aged 6–23 months. Detailed breakdowns are presented in Figure 4.1.




Marital Status
Prefer not to say 1%
Single 14%
Married 85%
Ethnicity
Other 15%
Luhya 12%
Kamba 14%
Kikuyu 59%
Highest Education Level
Percentage
60%
50%
40%
30%
20%
10%
0%
52%
31%
17%
Primary school
Secondary school
University/College


Type of Setting
Slum
36%
Rural
32%
Urban/Town
32%
Location
Wangige Hospital
51%
Kiandutu Health
Centre
49%
Type of House
Percentage
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
28%
34%
39%
Apartment/Flat/Townhouse
Permanent Detached
Semi-permanent/Traditional

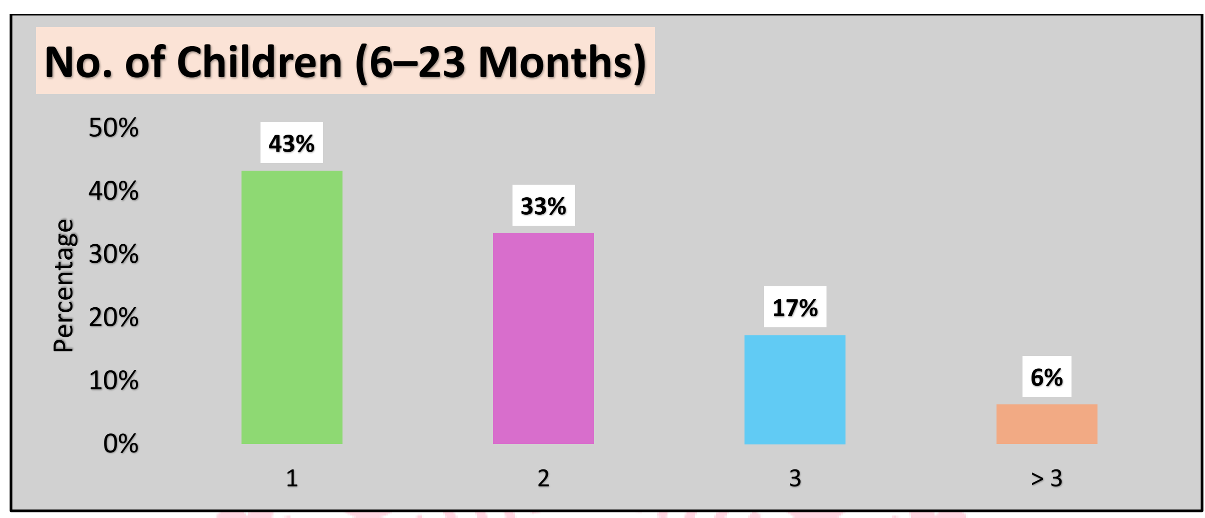


Figure 0.1 Sociodemographic Characteristics of Respondents Attending CWCs in Kiambu County

4.2.2 Comparison of Sociodemographic Characteristics by Setting and Facility Site

The analysis of sociodemographic characteristics revealed distinct patterns across settings and facilities. Significant differences emerged in education levels, with urban areas demonstrating higher rates of tertiary education compared to rural and slum areas (p=0.004). Housing type varied substantially, as slum areas were predominantly characterized by semi-permanent housing (p<0.001), while urban locations had more apartment-style dwellings. Though marital status distributions did not reach statistical significance across settings (p=0.152), slum areas showed a notable trend toward higher proportions of single or divorced mothers.

When comparing facilities, Kiandutu clinic served a significantly younger population, with eleven mothers under 20 years old compared to just one at Wangige (p<0.001). Marital status also differed between facilities, with Kiandutu having more unmarried mothers (p=0.015). However, other characteristics like education attainment, housing type,

ethnicity, and religion showed no significant variation between the two facilities. The Kikuyu ethnic group represented the majority across all settings and facilities, while Christian affiliation was nearly universal in the study population. These comparative distributions are detailed in Tables 4.1 (by setting) and 4.2 (by facility), which provide complete statistical testing results for each sociodemographic variable examined.

Table 0.1 Comparison of Sociodemographic Characteristics by Setting (rural, urban, slum)

Variable	Category	Rural (n = 114)	Urban (n = 114)	Slum (n = 125)	Total (n = 353)	Total %	Chi-square (χ^2)	p-value
Highest Education Level	Primary	18	15	27	60	16.9	**15.34**	**0.004**
	Secondary	64	49	71	184	51.97		
	College/University	32	50	27	108	30.50		
Housing Type	Apartment/Flat/Townhouse	34	52	12	98	27.68	**49.28**	**<0.001**
	Permanent Detached (Brick)	28	40	51	119	33.61		
	Semi-Permanent/Traditional (Mud/Wood)	52	22	62	136	38.41		
Marital Status	Married/Cohabiting	103	96	102	301	85.02	**6.70**	**0.152**
	Single/Divorced/Separated	10	16	23	49	13.84		
	Prefer not to say	1	2	0	3	0.84		
Ethnicity	Kikuyu	61	67	82	210	59.32	**11.19**	**0.083**
	Kamba	13	20	15	48	13.55		
	Luhya	21	8	13	42	11.86		
	Other	19	19	15	53	14.97		
Religion	Christian	112	110	124	346	97.74	**2.30**	**0.317**
	Other	2	4	1	7	1.97		
Maternal Age	< 20 years	2	4	6	12	3.38	**7.63**	**0.266**
	20–29 years	63	72	82	217	61.29		
	30–39 years	45	35	31	111	31.35		

	> 39 years	4	3	6	13	3.67	

Table 0.2 Comparison of Sociodemographic Characteristics by facility (Kiandutu/Wangige)

Variable	Category	Kiandutu (n = 175)	Wangige (n = 179)	Total (n = 354)	Total %	Chi-square (χ^2)	p-value
Highest Education Level	Primary	35	25	60	16.94	**2.29**	**0.318**
	Secondary	88	97	185	52.25		
	College/University	52	57	108	30.50		
Housing Type	Apartment/Flat/Townhouse	43	55	98	27.68	**1.84**	**0.398**
	Permanent Detached (Brick)	63	56	119	33.61		
	Semi-Permanent/Traditional (Mud/Wood)	69	68	137	38.70		
Marital Status	Married/Cohabiting	143	159	302	85.31	**8.40**	**0.015**
	Single/Divorced/Separated	32	17	49	13.84		
	Prefer not to say	0	3	3	0.84		
Ethnicity	Kikuyu	108	102	210	59.32	**2.52**	**0.471**
	Kamba	26	22	48	13.55		
	Luhya	18	25	43	12.14		
	Other	23	30	53	14.97		
Religion	Christian	173	174	347	98.02	**1.24**	**0.265**
	Other	2	5	7	1.97		
Maternal Age	< 20 years	11	1	12	3.38	**19.53**	**<0.001**
	20–29 years	115	103	218	61.58		

	30–39 years	40	71	111	31.35		
	> 39 years	9	4	13	3.67		

4.2.3 Socioeconomic Characteristics of Respondents

Table 4.3 presents the Socioeconomic characteristics of Mothers attending CWC's in Kiambu County. The socioeconomic profile highlighted significant disparities in employment and income levels. While almost all household heads were employed (94.9%), only about a third of mothers (35.9%) were engaged in paid work. Mothers predominantly worked in informal sectors such as small businesses or casual labour.

Household incomes varied widely, with the largest group earning between KES 11,000–50,000 per month. However, a substantial segment (26.9%) earned below KES 10,000, and 23.5% did not disclose their income. Notably, many households (56.2%) spent more than half of their monthly income on food, indicating economic vulnerability.

Table 0.3 Socioeconomic characteristics of Respondents attending CWC's in Kiambu County

Variable	Category	Frequency (n)	Percentage (%)
Household Monthly Income (KES)	Less than 1,000	36	10.2
	1,000 – 5,000	59	16.7
	5,000 – 10,000	80	22.6
	11,000 – 50,000	93	26.3
	51,000 – 100,000	3	0.9
	Prefer not to say	83	23.5
Income Spent on Food	Less than 25%	36	10.2
	25–50%	39	11.0
	50–75%	135	38.1
	More than 75%	64	18.1
	Not sure	80	22.6
Re-Categorised: Income Spent on Food	Less than 50%	75	21.2
	More than 50%	199	56.2
	Not sure	80	22.6
Head of Household Employment Status	Employed	336	94.9
	Not Employed	18	5.1
Head of Household Employment Type	Casual labour	105	31.3
	Formal employment	82	24.5
	Informal employment	62	18.5
	Own business	66	19.7
	Other	20	6.0
Maternal Employment Status	Employed	127	35.9
	Not Employed	227	64.1
Maternal Employment Type	Casual labour	34	26.8
	Formal employment	21	16.5
	Informal employment	15	11.8
	Own business	46	36.2
	Other	11	8.7

4.2.4 Comparison of Socioeconomic Characteristics by Setting and Health Facility

The analysis revealed significant socioeconomic disparities across settings and facilities. Slum areas had higher unemployment among household heads (10 unemployed versus 1 in rural, p=0.036) and mothers (86 unemployed versus 43 in urban, p=0.369). Income disparities were striking, with 25 slum households earning <1000 KES compared to 5 in rural and urban areas (p<0.001). Food expenditure burdens were most severe in slums, where 42 households spent >75% of income on food versus 15 in urban areas (p<0.001). Between facilities, Kiandutu had higher maternal unemployment (124 unemployed versus 103 at Wangige, p=0.009) and lower incomes (33 households earning <1000 KES versus 3 at Wangige, p<0.001). Food expenditure patterns mirrored this disparity, with 50 Kiandutu households spending >75% of income on food compared to 14 at Wangige (p<0.001). These patterns, detailed in Tables 4.4 and 4.5, demonstrate concentrated economic vulnerability in slum settings and Kiandutu facility.

Table 0.4 Comparison of Socioeconomic Characteristics by Setting (rural, urban, slum) in Kiambu County

Variable	Categories	Rural	Urban	Slum	Total	Chi²	p-value
Mother's Employment	Employed	45	43	39	127	**1.99**	**0.369**
	Unemployed	69	71	86	226		
HoH Employment	Employed	113	107	115	335	**6.63**	**0.036**
	Unemployed	1	7	10	18		
Income Level (KES)	<1000	5	5	25	35	**70.11**	$p <$ **0.001**
	1000–5000	12	4	43	59		
	5000–10,000	29	20	31	80		
	11,000–50,000	25	48	20	93		
	51,000–100,000	0	3	0	3		
% Income on Food	<25%	17	12	6	35	**27.34**	$p <$ **0.001**
	25–50%	12	13	14	39		
	50–75%	34	42	59	135		
	>75%	7	15	42	64		

***HoH**—Head of Household,*

Table 0.5 Comparison of Socioeconomic Characteristics by Facility (Kiandutu, and Wangige) in Kiambu County

Variable	Categories	Kiandutu	Wangige	Total	Chi²	p-value
Mother's Employment	Employed	51	76	127	**6.82**	**0.009**
	Unemployed	124	103	227		
HoH Employment	Employed	162	174	336	**3.94**	**0.047**
	Unemployed	13	5	18		
Income Level (KES)	<1000	33	3	36	**70.07**	$p <$ **0.001**
	1000–5000	50	9	59		
	5000–10,000	42	38	80		
	11,000–50,000	27	66	93		
	51,000–100,000	0	3	3		
% Income on Food	<25%	13	23	36	**19.86**	**$p < 0.001$**
	25–50%	21	18	39		
	50–75%	69	66	135		

	>75%	50	14	64	

4.2.5 Household Water Source

Access to water varied widely among households. While nearly 39% had piped water within the home, others relied on external sources such as shared boreholes (23%) or piped water fetched from outside (30.5%). A small percentage (7.6%) depended on alternative sources like refilled containers or bottled water. Figure 4.2 outlines the sources of household water.

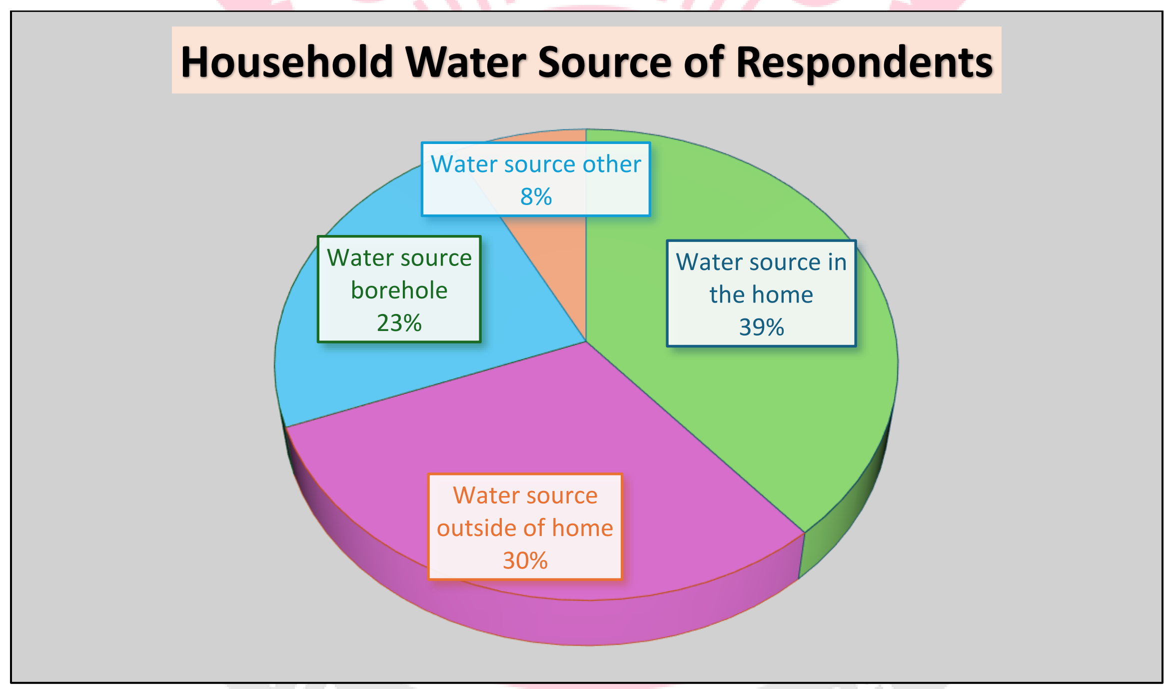


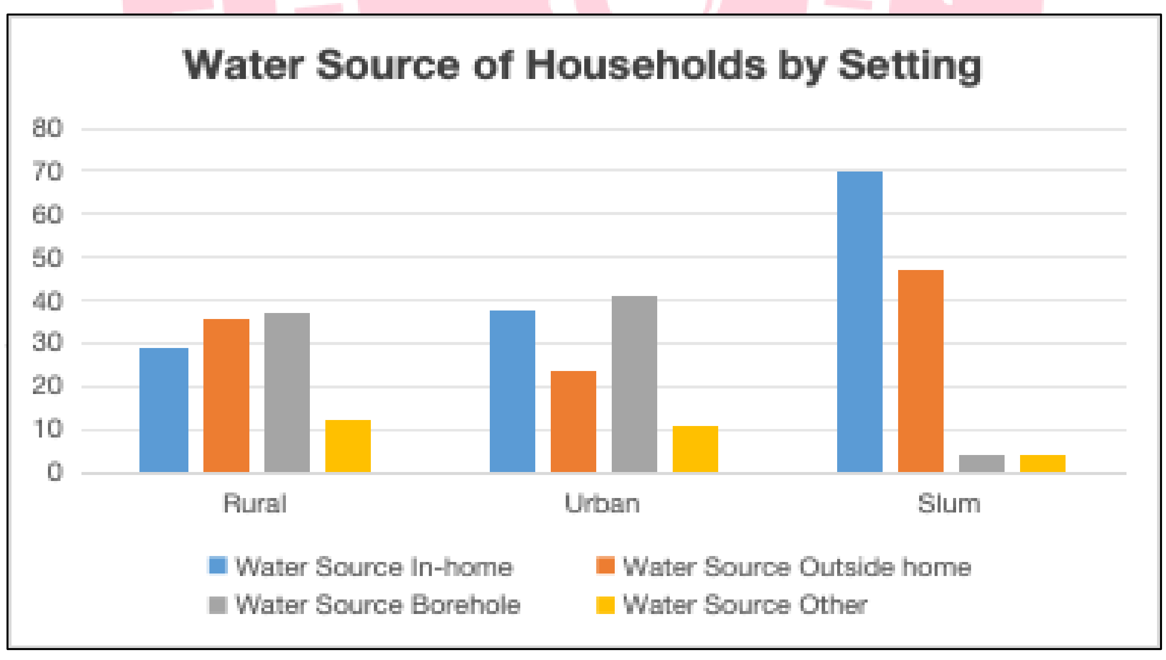
Figure 0-2 Household water source of Respondents attending CWC's in Kiambu County

4.2.6 Household Water Sources by Setting and Facility

The distribution of water sources showed statistically significant variation between locations (χ^2=119.29, $p<0.001$). At Kiandutu, 70.8% of households reported in-home piped water access, compared to 21.3% at Wangige. Conversely, borehole use was reported by

only 1.1% of Kiandutu households but 42.6% of Wangige households. Outside-home water sources were used by 41.5% of Kiandutu and 19.7% of Wangige households, with other sources accounting for 2.9% and 11.7% respectively.

The urban-rural differences were further evidenced when analysing by settlement type (χ^2=59.92, $p<0.001$). Slum areas showed 51.1% in-home water access, compared to 21.2% in rural and 27.7% in urban non-slum areas. Borehole use followed the opposite pattern, representing 2.9% in slums, 27.0% in urban areas and 30.7% in rural locations. Outside-home water sources were reported by 34.3% of slum, 17.5% of urban and 26.3% of rural households. Figure 4.3 compares household water sources by facility and setting, respectively.



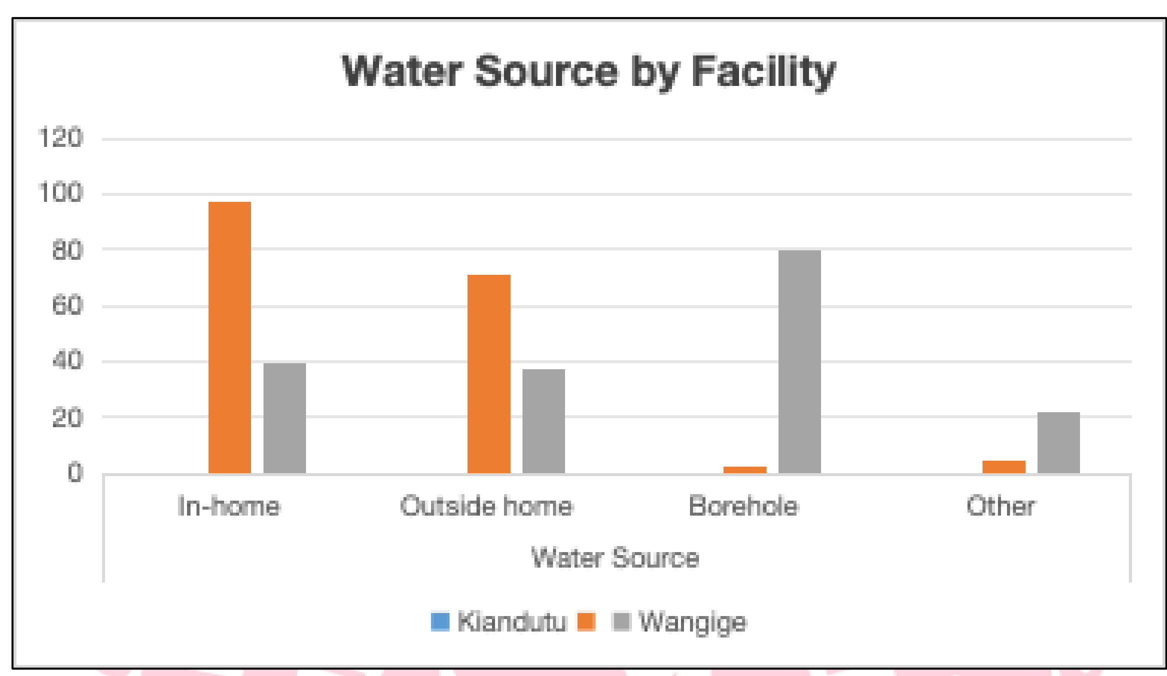


Figure 0-3 Comparison of Household water source by Setting (rural, urban, slum) and Facility (Kiandutu, Wangige) in Kiambu County

4.3 Child Characteristics and Nutrition Status

4.3.1 Age and Sex of Children

The average child age was 11 months, with most falling in the 6–11 months category. The gender distribution was balanced, with a slight female majority (52.3%). While the overall distribution of age was similar across settings, a statistically significant difference existed, with younger children more commonly seen in slum and urban settings. These findings are presented in Tables 4.6 and 4.7.

4.3.2 Nutrition Status of Children

The analysis of 354 children demonstrated that 11.30% (95% CI: 8.38-15.06) showed stunting (moderate: 8.48%, 95% CI: 5.98-11.88; severe: 2.83%, 95% CI: 1.52-5.18). For underweight status, 10.17% (95% CI: 7.41-13.80) were affected (moderate: 8.19%, 95%

CI: 5.74-11.56; severe: 1.98%, 95% CI: 0.94-4.10. Wasting prevalence reached 9.32% (95% CI: 6.69-12.84), comprising moderate cases at 7.91% (95% CI: 5.51-11.24) and severe cases at 1.41% (95% CI: 0.59-3.36). Prevalence of malnutrition indicators is summarised in Figure 4.4.

Table 0.6 Comparison of Child age and gender by Setting

Variable	Category	Rural (n = 114)	Urban (n = 114)	Slum (n = 125)	Total (n = 353)	Chi^2	p-value
Child Age (months)	6–11	69	73	72	214	**28.29**	**<0.001**
	12–17	41	27	22	90		
	18–23	4	14	31	49		
Child Gender	Male	58	57	53	168	**2.11**	**0.348**
	Female	56	57	72	185		

Table 0.7 Comparison of Child age and gender by Health Facility

Variable	Category	Kiandutu (n = 175)	Wangige (n = 179)	Total (n = 354)	Chi^2	p-value
Child Age (months)	6–11	107	108	215	**45.68**	**<0.001**
	12–17	25	65	90		
	18–23	43	6	49		
Child Gender	Male	77	92	169	**1.94**	**0.164**
	Female	98	87	185		

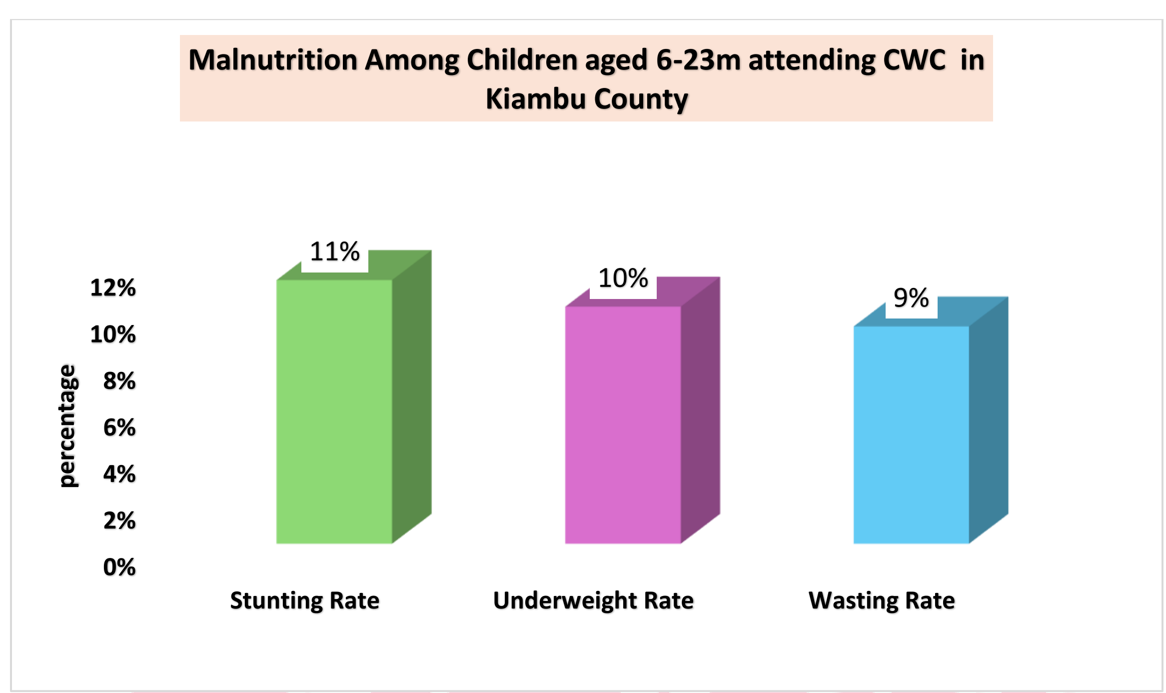


Figure 0-4 Malnutrition Among Children Aged 6–23 Months in Kiambu County

4.3.3 Comparison of Children's Characteristics and Nutrition Status by Setting and Health Facility

Although none of the differences reached statistical significance, some trends were noted. Stunting was slightly more common in rural areas, while underweight and wasting were marginally higher in slum settings. Variations in nutritional status across area of residence is shown in Tables 4.8.

Table 0.8 Child Nutritional Status by Area of Residence (6–23 Months, Kiambu County)

Indicator	Area	Normal n (%)	Under-Nourished n (%)	Total	Chi^2	p-value
Stunting	Rural	98 (85.96)	16 (14.04)	114	**1.26**	**0.533**
	Urban	103 (90.35)	11 (9.65)	114		
	Slum	112 (89.60)	13 (10.40)	125		
Underweight	Rural	105 (92.11)	9 (7.89)	114	**1.62**	**0.444**
	Urban	103 (90.35)	11 (9.65)	114		
	Slum	109 (87.20)	16 (12.80)	125		
Wasting	Rural	108 (94.74)	6 (5.26)	114	**3.47**	**0.177**
	Urban	102 (89.47)	12 (10.53)	114		
	Slum	110 (88.00)	15 (12.00)	125		

Comparing health facilities, Kiandutu had higher rates of wasting and stunting than Wangige, although the differences were not statistically conclusive. Variations in nutritional status across health facilities is shown in Tables 4.9.

Table 0.9 Child Nutritional Status by Health Facility (6–23 Months, Kiambu County)

Indicator	Facility	Normal n (%)	Under-nourished n (%)	Total	Chi^2	p-value
Stunting	Kiandutu	159 (90.86)	16 (9.14)	175	**1.61**	**0.205**
	Wangige	155 (86.59)	24 (13.41)	179		
Underweight	Kiandutu	155 (88.57)	20 (11.43)	175	**0.60**	**0.438**
	Wangige	163 (91.06)	16 (8.94)	179		
Wasting	Kiandutu	154 (88.00)	21 (12.00)	175	**2.94**	**0.087**
	Wangige	167 (93.30)	12 (6.70)	179		

4.4 Maternal Knowledge on Infant and Young Child Feeding (IYCF)

4.4.1 Mothers' Knowledge Level on IYCF

Overall, nearly 70% of mothers demonstrated adequate knowledge of recommended IYCF practices, based on a scoring system applied to six key questions. Mothers showed strong awareness of breastfeeding guidelines, including when to initiate and how long to continue breastfeeding, with over 90% answering correctly on these items.

However, notable gaps were identified in knowledge of complementary feeding. Less than 10% of mothers knew the correct number of daily meals for children or the full range of recommended food groups, pointing to a significant deficit in understanding of dietary diversity and meal frequency. Knowledge assessment results are displayed in Table 4.10.

Table 0.10 Respondents Knowledge Level of Key IYCF Practice

Knowledge variable	Adequate Knowledge (n%)	Inadequate Knowledge (n%)
Recommended start of breastfeeding	322 (90.96%)	32 (9.04%)
Exclusive breastfeeding	306 (86.44%)	48 (13.56%)
Length of time of breastfeeding	280 (79.10%)	74 (20.90%)
Recommended age to start complementary feeding	335 (94.63%)	19 (5.37%)
Recommended number of complementary feeds per day	28 (7.91%)	326 (92.09%)
Food group inclusion for children 6- 23months	32 (9.04%)	322 (90.96%)

4.4.2 Comprehension on Food Group Inclusion

The analysis revealed distinct patterns in mothers' awareness of developmentally important food groups (Figure 4.5). While the majority correctly identified basic staples such as grains, fruits and vegetables, knowledge of protein sources showed notable variation. Approximately only half of respondents recognised animal-based proteins, with 55.6% identifying meat and fish and 53.1% acknowledging eggs. Legumes were better recognised by 71% of mothers. Most strikingly, only 15% included nuts and seeds, despite their inclusion in FAO (2010) dietary diversity guidelines as one of the eight essential food groups. This pattern suggests particular gaps in knowledge about alternative protein sources and their role in complementary feeding practices.

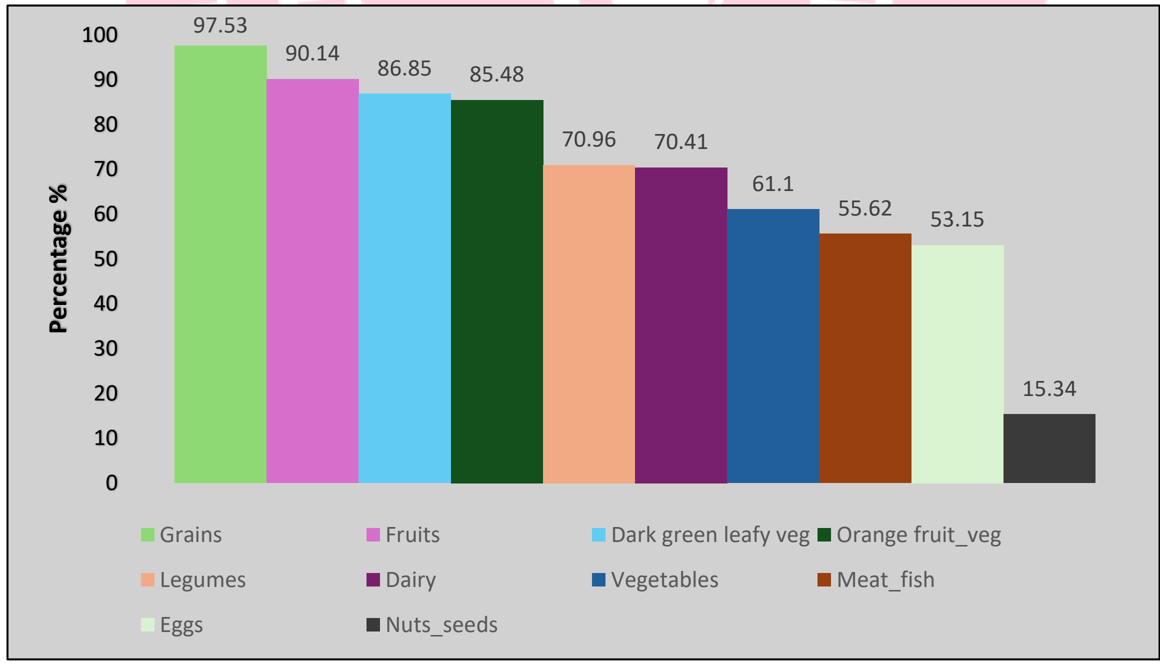
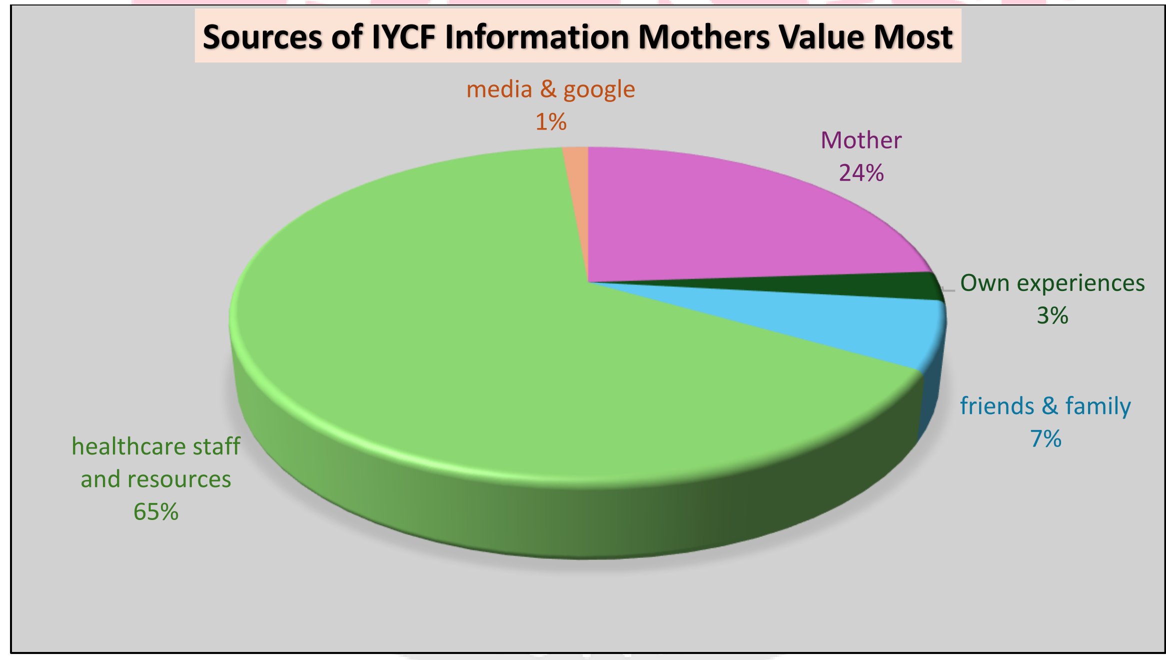


Figure 0.5 Respondents knowledge on food groups permitted for their children 6-23 months

4.4.3 Sources of Information on IYCF Practices

Healthcare providers (65%) were the most trusted and frequently cited source of IYCF information. Over half of the mothers attributed their IYCF knowledge to health facility staff. Family members, particularly the respondents' own mothers (24%), were also influential. Digital platforms and peers were mentioned less frequently.

Interestingly, statistical analysis showed no significant difference in knowledge levels based on information source, suggesting that while healthcare providers are central, family-based and informal learning also contribute meaningfully to IYCF understanding. Figure 4.6 presents sources of IYCF information reported by mothers.



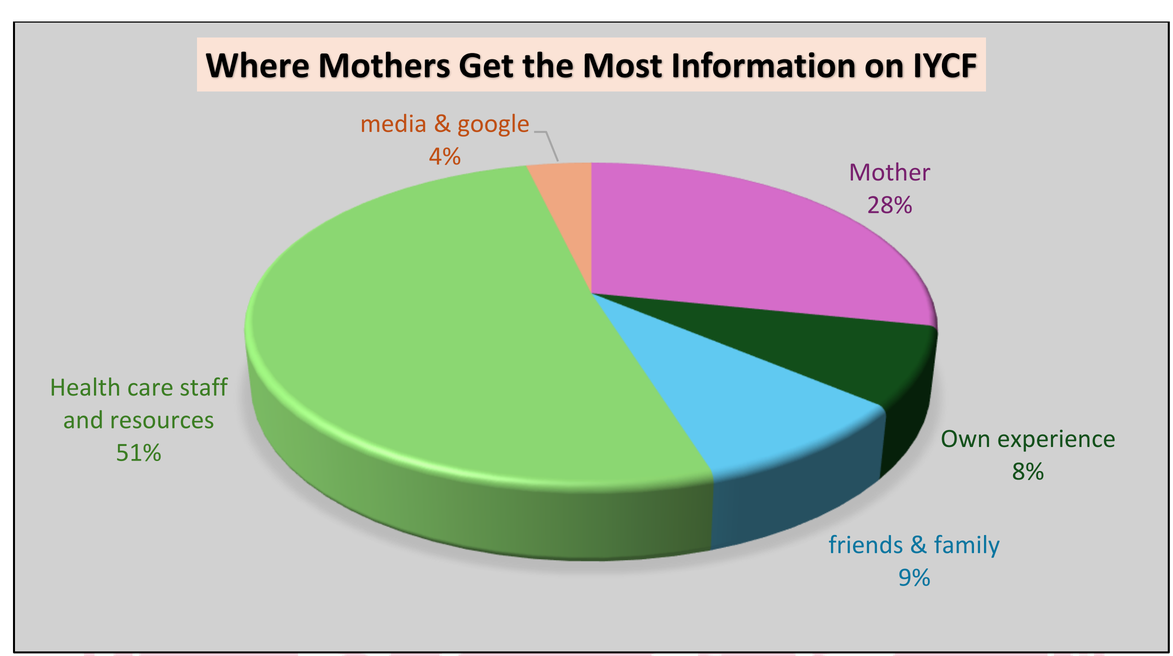


Figure 0.6 Mother Sources of information on IYCF in Kiambu County

4.4.4 Maternal Knowledge on IYCF by Setting and Health Facility

Adequate knowledge levels were relatively consistent across different settings and facilities, with urban mothers scoring slightly higher than rural and slum counterparts. However, the differences were not statistically significant. Similarly, knowledge scores at Wangige and Kiandutu were nearly identical, indicating equitable access to IYCF information across these facilities. Table 4.11 shows distribution of IYCF knowledge across settings and facilities.

Table 0.11 Maternal Knowledge by setting (rural, urban and slum) and facility (Wangige and Kiandutu)

Category	Good Knowledge n (%)	Poor Knowledge n (%)	Total (n)	Chi²	p-value
Setting					
—Rural	71 (62.3%)	43 (37.7%)	114	**2.41**	**0.300**
—Urban	82 (71.9%)	32 (28.1%)	114		
—Slum	84 (67.2%)	41 (32.8%)	125		
Health Facility					
—Kiandutu	117 (66.9%)	58 (33.1%)	175	**0.02**	**0.882**
—Wangige	121 (67.6%)	58 (32.4%)	179		

4.5 Maternal Attitude regarding Infant and Young Child Feeding (IYCF)

Using an 11-question 5-Likert-scale tool, almost all mothers (96.9%) displayed a positive attitude toward IYCF practices. Most respondents agreed with or strongly supported key breastfeeding principles, such as immediate initiation, exclusive breastfeeding for six months, and continued breastfeeding for up to two years.

That said, some harmful beliefs persisted. About 17% of mothers still considered colostrum harmful, and nearly 24% believed breast milk alone was insufficient. Additionally, over one-third of mothers incorrectly believed starchy foods alone could prevent malnutrition. Maternal attitudinal responses regarding IYCF are presented in Table 4.12.

Table 0.12 Maternal Attitude on IYCF Practices

Attitude/perception/belief	Strongly Agree	Agree	Neutral / Not Sure	Disagree	Strongly Disagree
Belief in the importance of initiating breastfeeding immediately after birth	251 (71.1%)	79 (22.38%)	9 (2.55%)	13 (3.68%)	1 (0.28%)
Perception of acceptable infant feeding practices before 6 months	14 (3.95%)	71 (20.06%)	5 (1.41%)	94 (26.55%)	170 (48.02%)
Belief in the introduction of complementary foods before 6 months	7 (2.52%)	27 (9.71%)	4 (1.44%)	78 (28.06%)	162 (58.27%)
Support for extended breastfeeding up to 2 years	228 (64.41%)	79 (22.32%)	14 (3.95%)	24 (6.78%)	9 (2.54%)
Perception of starchy foods as sufficient for preventing malnutrition	49 (13.84%)	77 (21.75%)	32 (9.04%)	94 (26.55%)	102 (28.81%)
Belief in pre-lacteal feeding (gripe water, sugar water, juice)	5 (1.41%)	3 (0.85%)	5 (1.41%)	46 (12.99%)	295 (83.33%)
Doubt about the adequacy of exclusive breastfeeding for the first six months	33 (9.32%)	46 (12.99%)	5 (1.41%)	115 (32.49%)	155 (43.79%)
Perception of colostrum as harmful or unclean	10 (2.82%)	4 (1.13%)	6 (1.69%)	49 (13.84%)	285 (80.51%)
Support for exclusive breastfeeding for the first six months	219 (67.38%)	92 (28.31%)	1 (0.31%)	7 (2.15%)	6 (1.85%)
Belief in the importance of dietary diversity for child growth and health	265 (74.86%)	80 (22.6%)	0 (0%)	7 (1.98%)	2 (0.56%)

Belief in appropriate timing of complementary feeding after six months	220 (62.15%)	115 (32.49%)	3 (0.85%)	14 (3.95%)	2 (0.56%)

4.5.1 Maternal Attitude on IYCF by Setting and Facility

Attitudes toward IYCF were overwhelmingly positive across all geographic and facility-based groups. Differences between rural, urban, and slum areas, as well as between Kiandutu and Wangige, were minimal and statistically insignificant. Comparative attitude scores are summarized in Table 4.13.

Table 0.13 Maternal Attitude Level by Setting (rural, urban, and slum) and Facility (Kiandutu and Wangige)

Category	Positive Attitude	Negative Attitude	Total	p-value
Setting				
—Rural	111 (97.4%)	3 (2.6%)	114	**0.634**
—Urban	109 (95.6%)	5 (4.4%)	114	
—Slum	122 (97.6%)	3 (2.4%)	125	
Facility				
—Kiandutu	170 (97.1%)	5 (2.9%)	175	**0.789**
—Wangige	173 (96.6%)	6 (3.4%)	179	

4.6 Infant and Young Child Feeding (IYCF) Practices

4.6.1 Infant and Young Child Feeding Practices among Mothers

More than 73% of mothers reported good IYCF practices, as assessed using five WHO indicators. Breastfeeding was consistently strong: over 94% of mothers maintained continued breastfeeding and adhered to recommended feeding frequency.

Complementary feeding was timely for most mothers, yet challenges persisted in meal quality. While 64% met minimum meal frequency (MMF), only 58% achieved Minimum

dietary diversity (MDD) standards. Just over half of the children received a minimum acceptable diet (MAD) indicating a significant gap in nutrient adequacy.

Notably, vitamin A-rich produce (43.8%) and animal-source foods (16.4%) showed substantially lower consumption, with legumes/nuts (35.3%) and dairy (48.2%) showing moderate consumption rates. Sugar-containing products were consumed by half the population (49.9%). Table 4.14 details the overall scores for key IYCF practices.

Table 0.14 Overall score for Key IYCF practices from mothers attending CWC's in Kiambu county

Practice Variable	Good Practice n (%)	Poor Practice n (%)
Continued breastfeeding	331 (94.57%)	19 (5.43%)
Recommended daily breastfeeding frequency	315 (95.17%)	16 (4.83%)
Recommended age of introduction of complementary feeding	326 (92.09%)	28 (7.91%)
Recommended complementary feeding frequency	227 (64.12%)	127 (35.88%)
Recommended number of food groups per day	204 (57.63%)	150 (42.37%)

4.6.2 IYCF Practice by Setting and Health Facility

Feeding practices were relatively uniform across rural, urban, and slum areas (p=0.343).. However, significant differences were observed between facilities. Mothers attending Wangige Health Centre demonstrated significantly better feeding practices compared to those at Kiandutu (p=0.030). Practice distributions across locations are shown in Table 4.15.

Table 0.15 Key IYCF practices from mothers attending CWC's in Kiambu county by facility (Wangige and Kiandutu) and Setting (rural, urban, and slum)

Category	Good Practice n (%)	Poor Practice n (%)	Total (n)	Chi²	p-value
Setting					
—Rural	89 (78.1%)	25 (21.9%)	114	**2.14**	**0.343**
—Urban	81 (71.1%)	33 (28.9%)	114		
—Slum	88 (70.4%)	37 (29.6%)	125		
Health Facility					
—Kiandutu	119 (68.0%)	56 (32.0%)	175	**4.70**	**0.030**
—Wangige	140 (78.2%)	39 (21.8%)	179		

4.7 Association Between Maternal Knowledge and IYCF Practices

The analysis revealed significant associations between maternal knowledge and infant feeding practices. Mothers with adequate IYCF knowledge demonstrated higher rates of appropriate feeding practices (79.6%) compared to those with inadequate knowledge (60.5%, $p<0.001$).

These associations varied substantially by location. The strongest relationships emerged in slum areas, where 80.0% of knowledgeable mothers practiced appropriate feeding versus 51.2% of less knowledgeable mothers ($p=0.002$). At Kiandutu Health Centre, 76.7% of knowledgeable mothers demonstrated good practices compared to 51.7% in the less knowledgeable group ($p=0.001$).

While Wangige showed a similar pattern (82.4% versus 68.9%), this difference did not reach statistical significance ($p = 0.057$). However, the result suggests a possible trend toward better practices among knowledgeable mothers, although the association was not statistically confirmed. Rural and urban settings showed no significant associations ($p=0.211$ and $p=0.076$ respectively). Complete results by setting are presented in Table 4.16.

Table 0.16 Association between Maternal Knowledge and IYCF Practices by Setting

Setting/Location	Maternal Knowledge	Good IYCF Practice n (%)	Poor IYCF Practice n (%)	p-value
Kiandutu	Adequate Knowledge	92 (76.7%)	28 (23.3%)	**0.0014**
	Inadequate Knowledge	30 (51.7%)	28 (48.3%)	
Wangige	Adequate Knowledge	103 (82.4%)	22 (17.6%)	**0.0569**
	Inadequate Knowledge	42 (68.9%)	19 (31.1%)	
Rural	Adequate Knowledge	60 (82.2%)	13 (17.8%)	**0.2110**
	Inadequate Knowledge	31 (70.5%)	13 (29.5%)	
Urban	Adequate Knowledge	67 (77.0%)	20 (23.0%)	**0.0760**
	Inadequate Knowledge	20 (58.8%)	14 (41.2%)	
Slum	Adequate Knowledge	68 (80.0%)	17 (20.0%)	**0.0020**
	Inadequate Knowledge	21 (51.2%)	20 (48.8%)	

Overall	Adequate Knowledge	195 (79.6%)	50 (20.4%)	**<0.001**
	Inadequate Knowledge	72 (60.5%)	47 (39.5%)	

4.8 Association Between Maternal Attitude and IYCF Practices

Maternal attitudes showed no overall association with feeding practices, but significant context-specific relationships emerged. In rural areas, positive attitudes correlated with better practices (80.2% vs 66.7%, p=0.018). At Kiandutu Health Centre, all mothers with negative attitudes had poor practices versus 69.2% with positive attitudes (p=0.019). No significant associations were found in urban (p=0.171), slum (p=0.198), or Wangige settings (p=0.160), as detailed in Table 4.17. Sample sizes for negative attitude groups were notably small (2-12 cases across settings).

Table 0.17 Association between Maternal Attitude and IYCF practice by Setting and Health Facility

Setting/Health Center	Maternal Attitude	Positive Practice (Freq, %)	Negative Practice (Freq, %)	p-value
Rural	Positive	85 (80.2%)	6 (66.7%)	**0.0180**
	Negative	6 (66.7%)	3 (33.3%)	
Urban	Positive	80 (71.4%)	7 (87.5%)	**0.1710**
	Negative	7 (87.5%)	1 (12.5%)	
Slum	Positive	87 (70.7%)	2 (100.0%)	**0.1980**
	Negative	2 (100.0%)	0 (0.0%)	
Kiandutu	Positive	119 (69.2%)	3 (100.0%)	**0.0188**
	Negative	3 (100.0%)	0 (0.0%)	

Wangige Health Center	Positive	133 (78.7%)	12 (75.0%)	0.1595
	Negative	12 (75.0%)	4 (25.0%)	

4.9 Associations Between Maternal KAP on IYCF Practices and Nutrition Status

The analysis exploring links between maternal KAP (Knowledge, Attitudes, Practices) and child nutrition outcomes (stunting, underweight, wasting) revealed mostly weak or non-significant associations.

The slum areas demonstrated the most pronounced knowledge-practice linkage, where mothers with adequate knowledge showed 28.8 % higher rates of good feeding practices compared to their counterparts with inadequate knowledge, a statistically significant difference ($p=0.002$). Rural areas exhibited a distinct pattern, with maternal attitudes significantly associated with improved IYCF practices ($p=0.018$).

At Kiandutu Health Centre, maternal knowledge showed clear nutritional benefits, with 84.6% of children of knowledgeable mothers maintaining adequate nutrition compared to 69.0% among children of mothers with limited knowledge ($\chi^2=5.81$, $p=0.016$). Similarly, positive maternal attitudes at this facility correlated with better child nutritional outcomes, where 80.6% of children with mothers holding positive attitudes were adequately nourished versus 40.0% in cases of negative attitudes ($\chi^2=4.90$, $p=0.027$).

Associations between KAP and child nutritional status (stunting, wasting, underweight) are detailed in Tables 4.18–4.20.

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Table 0.18 Association between Maternal Knowledge, Attitude, and Practice and Stunting among Children Aged 6–23 Months in Rural, Urban/Town, and Slum Settings, Kiambu County

Area of Residence	Variable	Not Stunted n (%)	Stunted n (%)	Chi²	p-value
Rural (n = 114)	K*: Good	60 (84.5%)	11 (15.5%)	**0.33**	**0.565**
	K: Poor	38 (88.4%)	5 (11.6%)		
	A*: Positive	95 (85.6%)	16 (14.4%)	**0.50**	**0.478**
	A: Negative	3 (100.0%)	0 (0.0%)		
	P*: Good	78 (87.6%)	11 (12.4%)	**0.94**	**0.331**
	P: Poor	20 (80.0%)	5 (20.0%)		
Urban/Town (n = 114)	K: Good	75 (91.5%)	7 (8.5%)	**0.41**	**0.520**
	K: Poor	28 (87.5%)	4 (12.5%)		
	A: Positive	99 (90.8%)	10 (9.2%)	**0.64**	**0.423**
	A: Negative	4 (80.0%)	1 (20.0%)		
	P: Good	74 (91.4%)	7 (8.6%)	**0.33**	**0.568**
	P: Poor	29 (87.9%)	4 (12.1%)		
Slum (n = 125)	K: Good	77 (91.7%)	7 (8.3%)	**1.17**	**0.279**
	K: Poor	35 (85.4%)	6 (14.6%)		
	A: Positive	110 (90.2%)	12 (9.8%)	**1.73**	**0.188**
	A: Negative	2 (66.7%)	1 (33.3%)		
	P: Good	79 (89.8%)	9 (10.2%)	**0.01**	**0.922**
	P: Poor	33 (89.2%)	4 (10.8%)		

Key: ***K*** *—Knowledge,* ***A*** *—Attitude,* ***P*** *—Practice,*

Table 0.19 Association between Maternal Knowledge, Attitude, and Practice and Wasting among Children Aged 6–23 Months in Rural, Urban/Town, and Slum Settings, Kiambu County

Area of Residence	Variable	Not Wasted n (%)	Wasted n (%)	Chi²	p-value
Rural (n = 114)	K*: Good	67 (94.4%)	4 (5.6%)	**0.05**	**0.820**
	K: Poor	41 (95.3%)	2 (4.7%)		
	A*: Positive	105 (94.6%)	6 (5.4%)	**0.17**	**0.679**
	A: Negative	3 (100.0%)	0 (0.0%)		
	P*: Good	83 (93.3%)	6 (6.7%)	**1.78**	**0.182**
	P: Poor	25 (100.0%)	0 (0.0%)		
Urban/Town (n = 114)	K: Good	73 (89.0%)	9 (11.0%)	**0.06**	**0.802**
	K: Poor	29 (90.6%)	3 (9.4%)		
	A: Positive	98 (89.9%)	11 (10.1%)	**0.50**	**0.480**
	A: Negative	4 (80.0%)	1 (20.0%)		
	P: Good	71 (87.7%)	10 (12.3%)	**0.98**	**0.321**
	P: Poor	31 (93.9%)	2 (6.1%)		
Slum (n = 125)	K: Good	74 (88.1%)	10 (11.9%)	**0.002**	**0.963**
	K: Poor	36 (87.8%)	5 (12.2%)		
	A: Positive	108 (88.5%)	14 (11.5%)	**1.32**	**0.250**
	A: Negative	2 (66.7%)	1 (33.3%)		
	P: Good	75 (85.2%)	13 (14.8%)	**2.16**	**0.141**
	P: Poor	35 (94.6%)	2 (5.4%)		

Key: ***K***—*Knowledge,* ***A***—*Attitude,* ***P***—*Practice,*

Table 0.20 Association between Maternal Knowledge, Attitude, and Practice and underweight among Children Aged 6–23 Months in Rural, Urban/Town, and Slum Settings, Kiambu County

Area of Residence	Variable	Not Underweight n (%)	Underweight n (%)	Chi²	p-value
Rural (n = 114)	K*: Good	68 (95.77%)	3 (4.23%)	**3.49**	**0.062**
	K: Poor	37 (86.05%)	6 (13.95%)		
	A*: Positive	102 (91.89%)	9 (8.11%)	**0.26**	**0.607**
	A: Negative	3 (100.00%)	0 (0.00%)		
	P*: Good	84 (94.38%)	5 (5.62%)	**2.89**	**0.089**
	P: Poor	21 (84.00%)	4 (16.00%)		
Urban/Town (n = 114)	K: Good	74 (90.24%)	8 (9.76%)	**0.004**	**0.951**
	K: Poor	29 (90.63%)	3 (9.38%)		
	A: Positive	98 (89.91%)	11 (10.09%)	**0.56**	**0.455**
	A: Negative	5 (100.00%)	0 (0.00%)		
	P: Good	74 (91.36%)	7 (8.64%)	**0.33**	**0.568**
	P: Poor	29 (87.88%)	4 (12.12%)		
Slum (n = 125)	K: Good	76 (90.48%)	8 (9.52%)	**2.46**	**0.117**
	K: Poor	33 (80.49%)	8 (19.51%)		
	A: Positive	107 (87.70%)	15 (12.30%)	**1.16**	**0.281**
	A: Negative	2 (66.67%)	1 (33.33%)		
	P: Good	75 (85.23%)	13 (14.77%)	**1.04**	**0.309**
	P: Poor	34 (91.89%)	3 (8.11%)		

Key: ***K*** *—Knowledge,* ***A*** *—Attitude,* ***P*** *—Practice,*

4.10 Bivariate Analysis of Factors associated with Maternal KAP on IYCF

A bivariate analysis was conducted to assess the associations between selected socio-demographic variables and maternal knowledge, attitudes, and practices (KAP) regarding Infant and Young Child Feeding (IYCF) across rural, urban, and slum settings in Kiambu County. The key findings are presented below, with significant associations highlighted. The findings from statistical tests have been divided into three main categories: Maternal Practice, Maternal Knowledge, and Maternal Attitude.

Significant associations were observed between several sociodemographic and socioeconomic factors and maternal knowledge, attitudes, and practices (KAP) regarding Infant and Young Child Feeding (IYCF).

Maternal practice was significantly associated with location ($p = 0.03$), housing type ($p = 0.003$), education level ($p = 0.006$), mother's age category ($p = 0.052$), and child's age group ($p = 0.025$). Good practices were more common among mothers attending Wangige Hospital, those living in apartments, those with higher education levels, and among older mothers and those with children aged 12–17 months.

Maternal knowledge was significantly associated with location ($p = 0.03$) and education level ($p = 0.006$), with higher knowledge levels observed among mothers from Wangige and those with university or college education. Maternal attitude showed a significant association with a number of children in the household ($p = 0.04$) and mother's age category ($p = 0.007$), with more positive attitudes reported among older mothers and those with two or more children.

Other factors, including marital status, employment status, household income, water source, religion, and ethnicity, were not significantly associated with maternal KAP ($p > 0.05$).

In summary, maternal practices were significantly associated with education, housing type, and location, while maternal attitudes were shaped by age and family size. Maternal knowledge was influenced primarily by education and housing, with little impact from other socio-economic variables.

Variable	Category	Good Practice n (%)	Poor Practice n (%)	p-value	Adequate Knowledge n (%)	Inadequate Knowledge n (%)	p-value	Positive Attitude n (%)	Negative Attitude n (%)	p-value
Location type	Kiandutu	119 (68.0%)	56 (32.0%)	**0.03**	117 (66.9%)	58 (33.1%)	**0.882**	170 (97.1%)	5 (2.9%)	**0.789**
	Wangige	140 (78.2%)	39 (21.8%)		121 (67.6%)	58 (32.4%)		173 (96.6%)	6 (3.4%)	
Setting	Rural	89 (78.1%)	25 (21.9%)	**0.343**	71 (62.3%)	43 (37.7%)	**0.3**	111 (97.4%)	3 (2.6%)	**0.634**
	Urban	81 (71.1%)	33 (28.9%)		82 (71.9%)	32 (28.1%)		109 (95.6%)	5 (4.4%)	
	Slum	88 (70.4%)	37 (29.6%)		84 (67.2%)	41 (32.8%)		122 (97.6%)	3 (2.4%)	

Table 0.21 Association of Location and Setting with Maternal KAP and IYCF

Table 0.22(a): Association of Socio-demographic factors with Maternal KAP and IYCF

Variable	Categories	Good Practice n (%)	Poor Practice n (%)	p-value	Adequate Knowledge n (%)	Inadequate Knowledge n (%)	p-value	Positive Attitude n (%)	Negative Attitude n (%)	p-value
Ethnicity	Kikuyu	158 (75.2%)	52 (24.8%)	**0.448**	140 (66.7%)	70 (33.3%)	**0.971**	204 (97.1%)	6 (2.9%)	**0.943**
	Kamba	31 (64.6%)	17 (35.4%)		33 (68.8%)	15 (31.3%)		46 (95.8%)	2 (4.2%)	
	Luhya	30 (69.8%)	13 (30.2%)		30 (69.8%)	13 (30.2%)		42 (97.7%)	1 (2.3%)	
	Other	40 (75.5%)	13 (24.5%)		35 (66.0%)	18 (34.0%)		51 (96.2%)	2 (3.8%)	
Religion	Christian	254 (73.2%)	93 (26.8%)	**0.917**	231 (66.6%)	116 (33.4%)	**0.062**	336 (96.8%)	11 (3.2%)	**0.632**
	Other	5 (71.4%)	2 (28.6%)		7 (100%)	0 (0.0%)		7 (100%)	0 (0.0%)	
Education	Primary	36 (60.0%)	24 (40.0%)	**0.006**	39 (65.0%)	21 (35.0%)	**0.098**	58 (96.7%)	2 (3.3%)	**0.645**
	Secondary	133 (71.9%)	52 (28.1%)		117 (63.2%)	68 (36.8%)		178 (96.2%)	7 (3.8%)	
	University /College	90 (82.6%)	19 (17.4%)		82 (75.2%)	27 (24.8%)		107 (98.2%)	2 (1.8%)	
Marital status	Married/ cohabiting	226 (74.8%)	76 (25.2%)	**0.23**	202 (66.9%)	100 (33.1%)	**0.942**	295 (97.7%)	7 (2.3%)	**0.087**
	Single/ divorced/ separated	31 (63.3%)	18 (36.7%)		34 (69.4%)	15 (30.6%)		45 (91.8%)	4 (8.2%)	
	Prefer not to say	2 (66.7%)	1 (33.3%)		2 (66.7%)	1 (33.3%)		3 (100%)	0 (0.0%)	

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Table 4.22(b): Association of Socio-demographic factors with Maternal KAP and IYCF

Variable	Categories	Good Practice n (%)	Poor Practice n (%)	p-value	Adequate Knowledge n (%)	Inadequate Knowledge n (%)	p-value	Positive Attitude n (%)	Negative Attitude n (%)	p-value
House type	Apartment/ Flat/	80 (81.6%)	18 (18.4%)	**0.003**	70 (71.4%)	28 (28.6%)	**0.106**	93 (94.9%)	5 (5.1%)	**0.177**
	Permanent Detached	74 (62.2%)	45 (37.8%)		85 (71.4%)	34 (28.6%)		118 (99.2%)	1 (0.8%)	
	Semi-Permanent / Traditional/ Mabati	105 (76.6%)	32 (23.4%)		83 (60.6%)	54 (39.4%)		132 (96.4%)	5 (3.6%)	
Children in household	1	108 (70.6%)	45 (29.4%)	**0.775**	97 (63.4%)	56 (36.6%)	**0.283**	144 (94.1%)	9 (5.9%)	**0.04**
	2	88 (74.6%)	30 (25.4%)		82 (69.5%)	36 (30.5%)		118 (100%)	0 (0.0%)	
	3	47 (77.0%)	14 (23.0%)		46 (75.4%)	15 (24.6%)		60 (98.4%)	1 (1.6%)	
	>3	16 (72.7%)	6 (27.3%)		13 (59.1%)	9 (40.9%)		21 (95.5%)	1 (4.5%)	

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Table 4.22©: Association of Socio-demographic factors with Maternal KAP and IYCF

Variable	Categories	Good Practice n (%)	Poor Practice n (%)	p-value	Adequate Knowledge n (%)	Inadequate Knowledge n (%)	p-value	Positive Attitude n (%)	Negative Attitude n (%)	p-value
Mother's age category	<20	7 (58.33%)	5 (41.67%)	**0.052**	6 (50.00%)	6 (50.00%)	**0.16**	10 (83.33%)	2 (16.67%)	**0.007**
	20–29	159 (72.94%)	59 (27.06%)		143 (65.60%)	75 (34.40%)		209 (95.87%)	9 (4.13%)	
	30–39	87 (78.38%)	24 (21.62%)		82 (73.87%)	29 (26.13%)		111 (100.00%)	0 (0.00%)	
	>39	6 (46.15%)	7 (53.85%)		7 (53.85%)	6 (46.15%)		13 (100.00%)	0 (0.00%)	
Child's age category	6–11 months	147 (68.37%)	68 (31.63%)	**0.025**	150 (69.77%)	65 (30.23%)	**0.34**	208 (96.74%)	7 (3.26%)	**0.817**
	12–17 months	75 (83.33%)	15 (16.67%)		55 (61.11%)	35 (38.89%)		88 (97.78%)	2 (2.22%)	
	18–23 months	37 (75.51%)	12 (24.49%)		33 (67.35%)	16 (32.65%)		47 (95.92%)	2 (4.08%)	

Table 0.23 Association of socio-economic factors associated with Maternal KAP on IYCF

Variable	Category	Good Practice n (%)	Poor Practice n (%)	p-value	Adequate Knowledge n (%)	Inadequate Knowledge n (%)	p-value	Positive Attitude n (%)	Negative Attitude n (%)	p-value
Employment (partner)	Yes	249 (74.1%)	87 (25.9%)	**0.084**	225 (67.0%)	111 (33.0%)	**0.643**	326 (97.0%)	10 (3.0%)	**0.539**
	No	10 (55.6%)	8 (44.4%)		13 (72.2%)	5 (27.8%)		17 (94.4%)	1 (5.6%)	
Employment (mother)	Yes	94 (74.0%)	33 (26.0%)	**0.787**	81 (63.8%)	46 (36.2%)	**0.301**	121 (95.3%)	6 (4.7%)	**0.19**
	No	165 (72.7%)	62 (27.3%)		157 (69.2%)	70 (30.8%)		222 (97.8%)	5 (2.2%)	
Income	1000-5000	42 (71.2%)	17 (28.8%)	**0.075**	41 (69.5%)	18 (30.5%)	**0.313**	3 (5.1%)	56 (94.9%)	**0.862**
	11000-50000	77 (82.8%)	16 (17.2%)		66 (71.0%)	27 (29.0%)		2 (2.2%)	91 (97.8%)	
	5000-10000	57 (71.3%)	23 (28.8%)		57 (71.3%)	23 (28.8%)		2 (2.5%)	78 (97.5%)	
	51000-100000	3 (100.0%)	0 (0.0%)		3 (100.0%)	0 (0.0%)		0 (0.0%)	3 (100.0%)	
	<1000	22 (61.1%)	14 (38.9%)		20 (55.6%)	16 (44.4%)		1 (2.8%)	35 (97.2%)	
Income spent on food	<25%	25 (69.4%)	11 (30.6%)	**0.854**	19 (52.8%)	17 (47.2%)	**0.195**	33 (91.7%)	3 (8.3%)	**0.23**
	25–50%	30 (76.9%)	9 (23.1%)		25 (64.1%)	14 (35.9%)		38 (97.4%)	1 (2.6%)	
	50–75%	102 (75.6%)	33 (24.4%)		99 (73.3%)	36 (26.7%)		130 (96.3%)	5 (3.7%)	
	>75%	45 (70.3%)	19 (29.7%)		43 (67.2%)	21 (32.8%)		64 (100%)	0 (0.0%)	
	Not Sure	57 (71.3%)	23 (28.7%)		52 (65.0%)	28 (35.0%)		78 (97.5%)	2 (2.5%)	

Table 0.24 Association of water source with Maternal KAP and IYCF

Variable	Category	Good Practice n (%)	Poor Practice n (%)	p-value	Adequate Knowledge n (%)	Inadequate Knowledge n (%)	p-value	Positive Attitude n (%)	Negative Attitude n (%)	p-value
Main Water Source	**In-home**	91 (66.4%)	46 (33.6%)	**0.118**	96 (70.1%)	41 (29.9%)	**0.365**	134 (97.8%)	3 (2.2%)	**0.316**
	Outside home	81 (75.0%)	27 (25.0%)		69 (63.9%)	39 (36.1%)		102 (94.4%)	6 (5.6%)	
	Borehole	65 (79.3%)	17 (20.7%)		58 (70.7%)	24 (29.3%)		81 (98.8%)	1 (1.2%)	
	Other	22 (81.5%)	5 (18.5%)		15 (55.6%)	12 (44.4%)		26 (96.3%)	1 (3.7%)	

4.11 Multivariate Analysis of Factors Associated with Maternal KAP on IYCF

Multivariate logistic regression analysis (adjusted for variables with p<0.20 in bivariate analysis) revealed distinct predictors across knowledge, attitude, and practice domains (Table 4.26). Regarding maternal knowledge, no sociodemographic factors reached statistical significance, though mothers of underweight children demonstrated substantially reduced odds of adequate knowledge (AOR 0.18, 95% CI: 0.05-0.66, p=0.010).

For maternal attitudes, two strong predictors emerged: older maternal age (30-39 years vs <20 years: AOR 3.43, 95% CI: 1.99-5.92, p<0.001) and having two children versus one (AOR 5.57, 95% CI: 3.67-8.46, p<0.001). Notably, mothers of wasted children showed markedly higher odds of positive attitudes (AOR 5.37, 95% CI: 1.46-19.71, p=0.011).

The practice model identified educational attainment as significant, with college-educated mothers demonstrating threefold higher odds of appropriate feeding practices than primary-educated counterparts (AOR 3.15, 95% CI: 1.45-6.84, p=0.004). Child age also predicted practices, with mothers of 12-17-month-olds showing nearly double the odds of good practices versus those with 6-11 month-olds (AOR 1.95, 95% CI: 1.02-3.73, p=0.045). The consistent positive association between child wasting status and both attitudes (AOR 5.37) and practices (AOR 5.37) warrants particular attention.

No other examined variables – including employment status, income level, marital status, housing type, or residential setting – achieved statistical significance in the final adjusted models.

Table 0.25(a): Logistic Regression Analysis of Sociodemographic Factors influencing Knowledge, Attitudes, and Practices regarding IYCF

Variable	Knowledge AOR (95% CI)	p-value	Attitude AOR (95% CI)	p-value	Practice AOR (95% CI)	p-value
Education						
—Primary	Ref	–			Ref	–
—Secondary School	0.64 (0.28–1.44)	**0.278**	_	_	1.77 (0.91–3.45)	**0.093**
—University/College	1.03 (0.41–2.59)	**0.944**			3.15 (1.45–6.84)	**0.004**
Mother's Age						
—<20	Ref	–	Ref	–	Ref	–
—20–29	1.61 (0.39–6.56)	**0.508**	3.66 (0.27–49.50)	**0.327**	1.31 (0.38–4.49)	**0.671**
—30–39	1.85 (0.43–7.92)	**0.409**	3.43 (1.99–5.92)	**<0.001**	1.89 (0.51–7.09)	**0.342**
—>39	1.85 (0.26–13.05)	**0.539**	1.15 (2.69–4.96)	**<0.001**	0.66 (0.13–3.46)	**0.621**
Marital Status						
—Married	Ref	–	Ref	–	_	–

—Single/divorced/separated	–		0.47 (0.07–2.94)	**0.417**		

Table 4.25(b): Logistic Regression Analysis of Sociodemographic Factors influencing Knowledge, Attitudes, and Practices

Variable	Knowledge AOR (95% CI)	p-value	Attitude AOR (95% CI)	p-value	Practice AOR (95% CI)	p-value
House Type						
—Temporary	Ref	–	Ref	–		
—Permanent Detached	0.98 (0.45–2.15)	**0.967**	4.97 (0.00–6.21)	**0.917**	–	–
—Semi-permanent/Traditional	0.74 (0.34–1.60)	**0.448**	1.18 (0.18–7.64)	**0.859**		
Area of Residence						
—Rural	Ref	–				
—Urban/Town	1.15 (0.53–2.53)	**0.719**			–	
—Slum	1.15 (0.54–2.46)	**0.709**	–	–		–
Location						
—Kiandutu Hospital	–	–			Ref	
—Wangige Hospital					1.51 (0.88–2.59)	**0.130**
Children in the Home						
—1 child			Ref	–		
—2 children	–	–	5.57 (3.67–8.46)	**<0.001**	–	–
—3 children			1.33 (0.00–2.54)	**0.986**		

—>3 children			0.24 (0.00–3.95)	**0.935**		
Child Age						
—6–11 months	–	–	–	–	Ref	–
—12–17 months					1.95 (1.02–3.73)	**0.045**
—18–23 months					1.88 (0.88–4.06)	**0.105**

Table 0.26 Logistic Regression Analysis for Socioeconomic factors influencing Knowledge, Attitudes, and Practices

Variable	Knowledge AOR (95% CI)	p-value	Attitude AOR (95% CI)	p-value	Practice AOR (95% CI)	p-value
Income Category						
1000-5000	Ref	–	–	–	–	–
<1000	0.66 (0.26–1.69)	**0.392**				
5000–10000	0.91 (0.40–2.09)	**0.832**				
11000–50000	0.86 (0.36–2.06)	**0.740**				
Employment Status						
No	Ref	–	Ref	–	Ref	–
Yes	–		0.34 (0.05–2.18)	**0.256**	0.91 (0.54–1.53)	**0.714**
Income Spent on Food			–	–	–	–

25–50%	Ref	–				
<25%	0.74 (0.26–2.05)	**0.558**				
50–75%	1.38 (0.63–3.03)	**0.424**				
>75%	1.08 (0.43–2.70)	**0.870**				

Table 0.27 Logistic Regression Analysis for Nutrition Status influencing Knowledge, Attitudes, and Practices

Variable	Knowledge AOR (95% CI)	p-value	Attitude AOR (95% CI)	p-value	Practice AOR (95% CI)	p-value
Nutrition Variables						
Stunted	–	–	–	–		–
No	Ref		Ref		Ref	
Yes	1.41 (0.47-4.23	**0.543**	0.82 (0.34-1.99)	**0.663**	0.82 (0.34-1.99)	**0.663**
Wasted					-	**-**
No			Ref		Ref	
Yes	2.92 (0.83-10.21)	**0.094**	5.37 (1.46-19.71)	**0.011**	5.37 (1.46-19.71)	**0.011**

Underweight	-	**-**			-	**-**
No	Ref		Ref		Ref	
Yes	0.18 (0.05-0.66)	**0.01**	0.41 (0.14-1.23)	**0.111**	0.41 (0.14-1.23)	**0.111**

Table 0.28 Significant Associations between Maternal KAP on IYCF and Nutrition Status

Association	Location/Facility	Key Comparison	Statistical Evidence
Knowledge → Practices	Overall	Higher practice rates	p < **0.001**
Knowledge → Practices	Slum	+28.8% good practices	p = **0.002**
Knowledge → Nutrition	Kiandutu HC	84.6% vs 69.0% adequate nutrition	p = **0.016**
Attitude → Nutrition	Kiandutu HC	80.6% vs 40.0% adequate nutrition	p = **0.027**
Attitude → Practices	Rural	Positive association	p = **0.018**

Table 0.29 Summary of factors association analysis on maternal KAP regarding IYCF Practices

Domain	Factor	Bivariate Association	Multivariate Association
Knowledge	Location (Wangige)	OR=**1.82** (p=**0.03**)	NS (p>0.05)
	Higher education	OR=**2.41** (p=**0.006**)	NS (p>0.05)
Attitudes	Maternal age (30-39y)	OR=**2.95** (p=**0.007**)	AOR=**3.43** (1.99-5.92), p<**0.001**
	≥2 children	OR=**1.78** (p=**0.04**)	NS (p=**0.417**)
Practices	Higher education	OR=**2.87** (p=**0.006**)	AOR=**3.15** (1.45-6.84), p=**0.004**
	Child age (12-17mo)	OR=**1.92** (p=**0.025**)	AOR=**1.95** (1.02-3.73), p=**0.045**
	Location (Wangige)	OR=**1.85** (p=**0.03**)	NS (p>0.05)

Domain	Factor	Bivariate Association	Multivariate Association
	Housing type	OR=**2.15** (p=**0.003**)	NS (p>0.05)

4.12 Summary of Key Findings

Objective 1: Assessing Maternal Knowledge, Attitudes, and Practices (KAP) Across Settings

Significant disparities were observed across Kiambu's rural, urban, and slum areas. Urban mothers exhibited the highest levels of tertiary education (43.9%) compared to those in slum settings (21.6%; $\chi^2 = 17.74$, $p = 0.007$). In the multivariate analysis, higher maternal education emerged as a significant predictor of good feeding practices, with mothers who had tertiary education being over three times more likely to practice appropriate IYCF (AOR = 3.15, 95% CI: 1.45–6.84, $p = 0.004$).

Despite lower formal education levels, slum-based mothers demonstrated a stronger alignment between knowledge and actual IYCF practices, with a 28.8% higher rate of good practices among knowledgeable mothers ($p = 0.002$). In rural settings, a positive association between attitudes and practices was noted ($p = 0.018$.

Additionally, maternal age (30–39 years) was significantly associated with positive attitudes (AOR = 3.43, 95% CI: 1.99–5.92, $p < 0.001$).

Objective 2: Nutritional Status of Children Aged 6–23 Months

Slum areas recorded the highest levels of malnutrition, with wasting (12.0%) and underweight (12.8%) rates significantly exceeding those in rural and urban contexts. Wasting prevalence in slums was more than double that of rural areas ($p = 0.034$), while

stunting rates were comparable across zones (21.4% in slums vs 14.2% in rural areas, $p = 0.15$).

Children's nutritional outcomes were positively associated with maternal KAP. For instance, at Kiandutu Health Centre, mothers with adequate IYCF knowledge had children with better nutritional status (84.6% vs 69.0%, $p = 0.016$), and those with positive attitudes were significantly more likely to have well-nourished children (80.6% vs 40.0%, $p = 0.027$).

Objective 3: Sociodemographic and Socioeconomic Factors Influencing KAP

Multivariate analysis highlighted two key predictors of maternal KAP. First, maternal age (30–39 years) was significantly associated with more positive attitudes toward IYCF (AOR = 3.43, 95% CI: 1.99–5.92, $p < 0.001$). Second, higher educational attainment significantly increased the odds of practicing appropriate IYCF behaviours (AOR = 3.15, 95% CI: 1.45–6.84, $p = 0.004$).

Interestingly, while location (e.g., urban vs rural) showed significant associations in bivariate analysis, these associations became statistically insignificant in multivariate models, suggesting that the effects of geographic location were largely mediated by maternal education and age.

Despite lower income and educational attainment, slum households demonstrated relatively high levels of good IYCF practices.

Objective 4: Association Between Maternal KAP and Child Nutrition

Clear associations were observed between maternal KAP and child nutrition status. In particular, mothers of underweight children were significantly less likely to possess adequate IYCF knowledge (AOR = 0.18, 95% CI: 0.05–0.66, p = 0.010). Conversely, mothers of wasted children were significantly more likely to exhibit strong IYCF attitudes and practices (AOR = 5.37, 95% CI: 1.46–19.71, p = 0.011).

CHAPTER 5: DISCUSSIONS

5.1 Introduction

This chapter interprets and contextualises the findings of this study by examining their alignment with the stated research questions and objectives. The discussion is structured thematically around maternal Knowledge, Attitudes, and Practices (KAP) regarding Infant and Young Child Feeding (IYCF), while integrating comparisons with existing literature and highlighting the implications for rural, urban, and informal settlement (slum) settings in Kiambu County, Kenya.

5.2 Sociodemographic and Socio-Economic Characteristics in Relation to IYCF

The socio-demographic profile of mothers; including age, education, marital status, and employment demonstrated a measurable impact on IYCF outcomes. Mothers residing in slum areas tended to have lower formal education levels and household income yet exhibited a stronger association between IYCF knowledge and actual practices ($p = 0.002$).

This trend mirrors recent findings from Ethiopia and Bangladesh, (Assefa et al., 202; Ara et al., 2023), which underscore the importance of education as a determinant of maternal KAP, while also recognising that education alone does not always predict behaviour. In urban contexts, higher levels of maternal education were significantly associated with better IYCF practices ($AOR = 3.15$, $p = 0.004$), highlighting education as a key enabler of appropriate feeding behaviours. However, competing work and domestic demands may still pose challenges for consistent practice, as noted in other studies (Kamudoni et al., 2024).Conversely, in rural areas, maternal practices correlated more significantly with

attitudinal factors ($p = 0.018$), suggesting that cultural norms, traditions, and beliefs may be more influential in shaping IYCF behaviours than educational attainment. Similar dynamics were reported by Uusimäki et al. (2023), who emphasised the role of sociocultural influences and peer expectations in determining feeding practices.

Economic disparities also played a key role in shaping dietary diversity. While urban households often had greater physical access to a variety of foods, this did not necessarily translate to improved IYCF practices. Interestingly, some slum households demonstrated better adherence to IYCF recommendations.

These findings reinforce the necessity for context-sensitive interventions that go beyond education to address environmental, occupational, and cultural constraints. Customised strategies are vital to ensure interventions reflect both the capacities and challenges of each setting.

5.3 Maternal Knowledge on IYCF

This study found that 67.2% of mothers demonstrated adequate knowledge of Infant and Young Child Feeding (IYCF) practices. Comparisons with other Kenyan studies are challenging due to differences in methodology (Kitiyo et al., 2020; Mutuku et al., 2020; Uusimäki et al., 2023a).

A clear disparity was evident between knowledge of breastfeeding and complementary feeding. While 64% of mothers correctly answered all breastfeeding questions, only 1.7% achieved full marks on complementary feeding questions. This reflects national findings reported by the Kenya Demographic and Health Survey (KDHS) 2022, which noted strong

breastfeeding awareness but continued confusion around complementary feeding practices (KNBS & ICF, 2023).

Similar trends have been observed across sub-Saharan Africa, including Uganda and Tanzania, where breastfeeding knowledge is comparatively high but understanding of complementary feeding, especially regarding dietary diversity and feeding frequency is limited (Shirazi et al., 2023; Sichalwe et al., 2023).

The greatest knowledge gaps related to dietary diversity, with 91% of mothers incorrectly answering questions on this topic. Nearly half excluded protein-rich foods such as eggs, meat and fish from their children's diets, reflecting similar patterns seen in Nairobi slums and rural Machakos (Uusimäki et al., 2023a). Cultural beliefs and misconceptions about these foods likely contribute to this gap.

Importantly, knowledge scores did not differ significantly between rural, urban, and slum settings. However, mothers in slum areas, despite having lower education levels and household incomes, showed a stronger link between IYCF knowledge and actual feeding practices ($p = 0.002$).

Healthcare professionals and health facilities were the main sources of IYCF information (64.7%), followed by maternal relatives (23.7%), friends and family (6.5%), personal experience (2.8%), and media or internet sources (2.3%). This distribution is consistent with findings from East Africa (Mututho et al., 2017; UNICEF & UNOPS, 2018). However, the source of information was not a significant predictor of knowledge level,

indicating that access to information does not always ensure understanding (Kostecka et al., 2020; Pizzatto et al., 2020).

Overall, while breastfeeding education appears relatively strong across Kiambu County, complementary feeding knowledge, especially regarding dietary diversity and feeding frequency, requires urgent improvement. Culturally appropriate and community-tailored nutrition education efforts within health facilities and through local groups are essential to address these deficits.

5.4 Maternal Attitudes Towards IYCF

This study observed that a substantial majority (96.9%) of mothers in Kiambu County expressed positive attitudes towards infant and young child feeding (IYCF), aligning with previous findings from Ghana and Ethiopia, where similarly high levels of favourable attitudes have been reported (Assefa et al., 2021; Hien et al., 2020). However, these positive sentiments did not always translate into optimal practices, suggesting a disconnect between attitude and behaviour that warrants further exploration.

Specifically, 17% of respondents rejected colostrum, while 23% endorsed early fluid supplementation, despite reporting overall positive views towards IYCF. This apparent contradiction reflects the attitudinal-behavioural gap commonly described in the Theory of Planned Behaviour (Ajzen, 1991), where intentions, though shaped by attitudes, are often moderated by subjective norms and perceived behavioural control. In the present study, traditional beliefs and sociocultural norms, particularly prevalent in rural and slum settings

appear to reinforce non-recommended practices, thereby weakening the influence of positive individual attitudes.

The findings are consistent with research conducted in Kitui and Kenyatta National Hospital (Kitiyo et al., 2020; Wafula & Rajula, 2016), where favourable maternal attitudes were similarly reported but did not guarantee adherence to exclusive breastfeeding (EBF) or appropriate complementary feeding timelines. This underscores the broader regional trend in sub-Saharan Africa, where positive attitudes coexist with deeply ingrained misconceptions and practices.

Furthermore, maternal perceptions of breast milk insufficiency emerged as a recurring barrier among mothers who introduced fluids or solids prematurely. This belief, which has been widely documented in Kenya and South Asia, often leads to the early introduction of porridge, cow's milk, or herbal concoctions (Wafula & Rajula, 2016; Jemide et al., 2016). Such misconceptions not only reflect gaps in knowledge but also highlight the influence of familial and community pressures.

In terms of geographical and socioeconomic variations, this study found no statistically significant differences in attitudes across rural, urban, and slum settings ($p = 0.634$), nor between Kiandutu and Wangige health facilities ($p = 0.789$). This uniformity suggests that core IYCF attitudes may be broadly consistent across Kiambu County's diverse socioeconomic zones. However, the persistence of culturally specific misconceptions, such as the belief held by 35.6% of mothers that starchy foods alone can prevent malnutrition, indicates a need for context-specific intervention strategies.

To bridge the gap between positive attitudes and actual behaviours, future interventions in Kiambu County should extend beyond knowledge dissemination. There is a need for culturally sensitive messaging, community-based dialogue forums, and family-inclusive education programmes that directly confront social norms and empower mothers with practical skills. Enhancing maternal self-efficacy and reshaping collective beliefs may be particularly effective in enabling sustained IYCF behaviour change.

5.5 Maternal Practices Towards IYCF

This study found that 73.2% of mothers demonstrated good infant and young child feeding (IYCF) practices, aligning with findings from Wajir, Kenya (71%) and Ethiopia (78%) (Assefa et al., 2021; Mohamed et al., 2018). However, when feeding behaviours were disaggregated, important gaps emerged, particularly in complementary feeding. Only 57.6% of children achieved Minimum Dietary Diversity (MDD), and a mere 16.4% had consumed meat or fish within the previous 24 hours, indicating suboptimal inclusion of protein-rich and micronutrient-dense foods. The limited intake of animal protein may be attributed to economic hardship, intra-household food distribution norms, socio-cultural beliefs, and a lack of knowledge on appropriate complementary feeding. Factors that interact to compromise dietary quality even where knowledge and attitudes are otherwise positive.

This pattern mirrored findings from urban-slum/rural study comparisons in Kenya, where breastfeeding practices reached 92%, while complementary feeding indicators varied substantially: Minimum Meal Frequency (MMF) at 80%, MDD at 24.3%, and Minimum Acceptable Diet (MAD) at just 20% (Uusimäki et al., 2023a). In the current study, MMF

remained similarly high (86%), while MDD (58%) and MAD (54%) more than doubled the slum–rural comparison figures. These outcomes also surpassed national KDHS 2023 data (MMF: 71%; MDD: 37%; MAD: 31%), and aligned with broader maternal, infant, and young child nutrition (MIYCN) studies in Kenya that highlight regional variability from critically low MDD in Marsabit and Mandera (15%) to more moderate levels in Tana River (41%). Focus group discussions and existing literature attributed poor complementary feeding practices to multidimensional barriers, including market access limitations, poverty, drought conditions, pastoralist lifestyles, large family sizes, entrenched cultural beliefs, and maternal absenteeism (UNICEF et al., 2017, 2018; UNICEF & UNOPS, 2018).

Dietary composition data further illustrated prevailing nutritional imbalances. While grains and tubers were consumed by the vast majority of children (93.4%), legume/nut consumption nearly doubled compared to previous slum–rural studies (35.3% vs 16%), and sugar-containing products were consumed by half of all children (Uusimäki et al., 2023a). In contrast, meat/fish intake remained low (16.4%), as did dairy intake (48.2%). These consumption patterns reflect broader sub-Saharan African trends reported in Burkina Faso and Ghana, where child diets are heavily grain-based and protein sources account for less than 30% of food consumed (Bimpong et al., 2020; Hien et al., 2020). The persistent 'protein gap' in child diets appears to stem less from unavailability and more from lack of preparation knowledge, affordability, and cultural taboos, particularly around animal-source foods.

The study also found that only 7.9% of mothers initiated complementary feeding inappropriately, a proportion significantly lower than figures reported in Marsabit (21%), Kenyatta National Hospital (21.5%), Burkina Faso (24%), Ghana (28%), Nigeria (45.8%), and Ethiopia (50.6%) (Bimpong et al., 2020; Hien et al., 2020; Jemide et al., 2016; Mutuku et al., 2020; Wafula & Rajula, 2016). A Nairobi-based study reported a particularly high early initiation rate of 75% (En et al., 2010). With respect to pre-lacteal feeding, 23% of mothers reported giving fluids such as water or glucose solutions before six months, a figure comparable to Burkina Faso (16.7%) but significantly lower than in Tanzania, where early supplementation with both liquids (64.5%) and solids (58.8%) was highly prevalent (Hien et al., 2020; Sichalwe, Ranjan Behera et al., 2023). These variations raise the possibility of reporting bias or cultural relativism in interpretation, but they also underscore the disconnect between awareness and entrenched traditional practices.

Furthermore, the study revealed notable variation in IYCF practices between the two health facilities. Mothers attending Wangige Sub-County Hospital demonstrated approximately 10% higher adherence to recommended feeding practices than those at Kiandutu Health Centre, which serves a lower-income, informal settlement. This disparity may be attributed to greater resource availability, higher staff-to-client ratios, and more structured nutrition counselling observed at Wangige. It may also reflect underlying socioeconomic differences, as maternal education and income are consistently linked to better feeding practices (KDHS, 2022; Mututho et al., 2017). These findings reinforce the role of the health system and local context in shaping maternal behaviours and highlight the need for

inclusive and needs-based intervention planning within Kiambu County, with targeted investment in under-resourced urban slum facilities such as Kiandutu.

5.6 Child Nutritional Status in Kiambu County

The study reported moderate levels of undernutrition, with higher prevalence of stunting and wasting in slum areas compared to rural and urban zones. These patterns align with 2022 KDHS reports, which highlight that urban slums in Kenya often suffer disproportionately high rates of child undernutrition, despite geographic proximity to well-resourced areas.

The association between maternal KAP and nutritional outcomes was particularly strong in slum households. For instance, the slum setting recorded a +28.8% increase in appropriate IYCF practices where mothers had adequate knowledge, suggesting that targeted interventions in such high-risk areas can yield significant returns.

However, nutritional status is not solely determined by maternal behaviour. Structural determinants including water, sanitation, and hygiene (WASH), household food security, and access to healthcare, were also identified as significant predictors, consistent with the UNICEF conceptual framework on malnutrition determinants (UNICEF, 2021).

To meaningfully reduce undernutrition in Kiambu, future programmes must operate at multiple levels: empowering mothers with actionable knowledge and improving access to clean water, diversified diets, and timely medical care.

5.7 Associations Between Maternal Knowledge, Attitudes, and Practices (KAP)

One of the key objectives of this study was to examine how maternal knowledge, attitudes, and practices (KAP) relate to IYCF outcomes. The findings demonstrate a strong positive correlation between maternal knowledge and feeding practice, especially in slum settings. In these areas, improved knowledge was associated with a +28.8% increase in appropriate feeding behaviours, reinforcing findings from Shirazi et al. (2023) and Majidah et al. (2021), which indicate that targeted health education can significantly alter behaviour in marginalised communities.

However, in urban and rural contexts, this relationship was less pronounced. In urban areas, maternal time constraints and reliance on domestic support or childcare reduced the practical application of IYCF knowledge. In contrast, in rural settings, attitudes emerged as stronger predictors of practice ($p = 0.018$), consistent with the Theory of Planned Behaviour (Ajzen, 1991), which underlines the role of subjective norms and perceived behavioural control. A study in Kisumu similarly showed that maternal beliefs strongly predicted exclusive breastfeeding practices (Gewa & Chepkemboi, 2016). Whilst some international studies corroborate the knowledge–practice link (Assefa et al., 2021; Sichalwe et al., 2023), others from Bangladesh (Ara et al., 2023) and Nigeria (Jemide et al., 2016) did not, revealing a contextual nuance in KAP dynamics.

This divergence suggests that knowledge alone is necessary but not sufficient factors such as cultural norms, economic constraints, emotional intention, and confidence importantly shape practices. Notably, despite generally positive attitudes, a proportion of mothers were unable to translate attitude into action, indicating a discord between knowing the optimal

practice and the capacity to implement it. Consequently, behaviour change strategies must address informational deficits as well as emotional, normative, and logistic barriers.

5.8 Geographical and Contextual Variations in Maternal KAP and IYCF Outcomes

This study aimed to assess how maternal knowledge, attitudes, and practices (KAP) related to Infant and Young Child Feeding (IYCF) vary across rural, urban, and slum settings within Kiambu County. The findings highlight important geographical and contextual differences that shape feeding behaviours and child nutrition outcomes.

5.8.1 Maternal Knowledge and Practices

A key observation was the strong positive correlation between maternal knowledge and feeding practices, particularly pronounced in slum areas. Here, enhanced knowledge was associated with a 28.8% increase in appropriate feeding behaviours, confirming that targeted health education can effectively influence practices within marginalised communities (Shirazi et al., 2023; Majidah et al., 2021). Interestingly, although mothers in slum settings generally had lower formal education and income levels, the link between knowledge and practice was stronger than in rural or urban areas, suggesting that knowledge gains in these contexts may be more transformative.

Conversely, in urban contexts, higher maternal education correlated with better IYCF practices (AOR = 3.15, $p = 0.004$). In rural settings, maternal attitudes and sociocultural norms were more influential than knowledge alone in shaping feeding practices ($p = 0.018$). This aligns with the Theory of Planned Behaviour (Ajzen, 1991), which posits that subjective norms and perceived behavioural control significantly influence intentions and behaviours. Comparable research from Kisumu (Gewa & Chepkemboi, 2016) also found

that maternal beliefs were critical predictors of exclusive breastfeeding practices. The persistence of traditional beliefs and community expectations in rural areas highlights the need for culturally sensitive interventions that engage social norms alongside knowledge enhancement.

5.8.2 Maternal Attitudes and Behavioural Gaps

While positive attitudes toward IYCF were uniformly high across rural, urban, and slum settings (96.9%), these favourable sentiments did not consistently translate into optimal practices. For example, 17% of mothers rejected colostrum and 23% endorsed early fluid supplementation practices often reinforced by deep-rooted cultural beliefs, especially in rural and slum areas. This attitudinal-behavioural gap underscores the limitations of attitude-focused messaging and points to the necessity of addressing entrenched social norms and misconceptions through community dialogue and family-inclusive education.

5.8.3 Socio-Economic and Facility-Level Differences

The study also uncovered disparities between the two health facilities studied. Mothers attending Wangige Sub-County Hospital, located in a more resourced urban area, demonstrated approximately 10% higher adherence to recommended feeding practices compared to those at Kiandutu Health Centre, which serves a lower-income informal settlement. This difference may reflect variations in resource availability, health system capacity, and maternal socio-economic status, reaffirming that local context and health service infrastructure play vital roles in shaping feeding behaviours.

5.8.4 Child Nutritional Status and Contextual Patterns

Nutritional outcomes also varied by setting. Rural children exhibited higher stunting rates, possibly due to limited dietary diversity and cultural reliance on traditional weaning foods, while urban and slum children had higher rates of wasting and underweight, likely reflecting environmental stressors and food insecurity common in informal settlements. Although these differences were not statistically significant, they align with broader evidence from Kenya showing peri-urban dynamics that blur typical rural–urban distinctions (KNBS & ICF, 2023).

5.8.5 Implications for Intervention

The varied influence of knowledge, attitudes, socio-economic factors, and service availability across settings highlights the critical need for context-specific, multisectoral strategies. Interventions must go beyond knowledge dissemination to tackle cultural norms, economic constraints, and caregiving realities unique to each setting. For instance, in slum areas, reinforcing knowledge through targeted health education can yield substantial behavioural improvements, while rural programmes might prioritise culturally respectful engagement with traditional beliefs. Urban strategies should consider maternal time poverty and support mechanisms for childcare.

Furthermore, improving facility capacity and tailored counselling, especially in under-resourced informal settlements like Kiandutu, is essential to bridge disparities in feeding practices and child nutritional status. Overall, these findings reinforce that effective IYCF promotion in peri-urban counties like Kiambu requires integrated approaches addressing both individual behaviours and the broader social determinants of health.

5.9 Study Limitations

While the findings of this study offer meaningful insights, several limitations must be acknowledged:

1. **Cross-sectional design**: The temporal association between KAP and nutritional status cannot confirm causality. Longitudinal studies would offer stronger evidence on the directionality of these relationships.
2. **Recall bias**: Much of the data, including feeding practices and ANC attendance, relied on maternal recall. This may have introduced inaccuracies, particularly in estimating dietary frequency.
3. **Social desirability bias**: Mothers may have over-reported positive behaviours such as exclusive breastfeeding or meal frequency to align with perceived expectations.
4. **Facility-Based Sampling Bias**: The exclusive reliance on Child Welfare Clinics (CWC's) attendees for recruitment may have introduced selection bias, as the study potentially excluded mothers with limited healthcare access or those relying on traditional care systems. Such populations often demonstrate systematically different infant and young child feeding (IYCF) knowledge, attitudes, and practices, particularly in rural and informal settlement areas where health service utilization is lowest. Consequently, while findings are highly representative of clinic-engaged mothers, their generalisability to Kiambu County's broader population requires cautious interpretation.

Despite these limitations, the findings remain robust and relevant, particularly due to the use of stratified sampling and validated data collection tools.

CHAPTER 6: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 Summary and Conclusions

This study aimed to assess maternal Knowledge, Attitudes, and Practices (KAP) regarding Infant and Young Child Feeding (IYCF), alongside child nutritional status and the influence of socio-demographic and socio-economic factors in the diverse contexts of urban, rural, and slum settings in Kiambu County, Kenya. The study compared outcomes across two facilities, Wangige Hospital, which served a peri urban and socioeconomically diverse population including rural, urban, and a small proportion of slum residents, and Kiandutu Health Centre, which primarily served the Kiandutu slum community, surrounding informal settlements, and lower socioeconomic urban residents.

6.1.1 Summary of Findings Aligned with Study Objectives

This study reveals four significant patterns regarding IYCF practices and child nutrition across Kiambu County's geographic settings:

The study revealed four core insights:

1. Socioeconomic Mediation of Geographic Effects
   While initial analyses suggested urban-rural differences in IYCF practices, these disparities became statistically insignificant after adjusting for maternal education and age. This underscores the greater influence of individual-level characteristics over geographic location.
2. Urban–Slum Educational Gradient
   Urban mothers reported significantly higher levels of tertiary education (43.9%)

compared to slum counterparts (21.6%; χ^2=17.74, p=0.007). Interestingly, slum mothers demonstrated the strongest alignment between knowledge and practice (+28.8%, p=0.002), suggesting that knowledge translation is possible despite lower formal education levels.

3. Slum-Specific Nutritional Burden
   Slum areas faced the highest rates of malnutrition, notably with wasting prevalence twice as high as in rural areas (12.0% vs. ~6%, p=0.034), even where IYCF practices were relatively strong—highlighting a structural vulnerability.
4. Context-Dependent KAP Effectiveness
   Maternal knowledge was associated with better child nutrition outcomes at Kiandutu (84.6% vs. 69.0% well-nourished, p=0.016), but this relationship was inconsistent across different settings, indicating that contextual factors mediate the effectiveness of KAP.

6.1.2 Contributions to the Public Health

This study offers several contributions to the understanding of IYCF in resource-limited and diverse local contexts:

1. Education – Context Interplay
   The findings affirm the importance of maternal education (AOR = 3.15) but also illustrate how slum communities can bridge educational gaps through informal mechanisms implying a role for community level social capital in compensating for formal education deficits.

2. Rethinking Geographic Determinism
   The attenuation of geographic disparities after adjusting for individual characteristics challenges assumptions about place-based determinants, urging a shift towards people-centred nutrition interventions.

3. Limits of KAP in Structural Constraints
   The “slum paradox”where good feeding practices coexist with high malnutrition demonstrates that knowledge and practice alone are insufficient. Structural issues such as food insecurity and environmental conditions must be addressed alongside behavioural interventions.

6.1.3 Conclusions

This study confirms that maternal knowledge and attitudes, while essential, are not sufficient on their own to ensure optimal IYCF practices. Contextual constraints such as food insecurity, caregiving burdens, and facility-level service quality strongly influence whether knowledge translates into practice. Key conclusions include:

i. Education Enables but Doesn't Ensure Practices; While tertiary education tripled odds of good practices, slum outcomes demonstrate additional community supports are needed.
ii. Interventions Require Geographic Nuance; Urban (education-focused), slum (peer-network), and rural (attitude-transformation) settings demand distinct approaches.
iii. Service Quality Mediates Success; Facility characteristics significantly influenced practice quality, independent of individual KAP.

iv. Nutritional status is affected by broader environmental and systemic conditions and cannot be resolved solely through maternal education.
v. Effective IYCF interventions must be multi-layered, addressing individual competencies, social support systems, and health infrastructure.

Importantly, this study demonstrates that effective IYCF improvement in Kiambu County requires a multi-level strategy involving:

i. Individual-level interventions (e.g. maternal education and attitude transformation),
ii. Community-level mechanisms (e.g. peer support networks and informal knowledge-sharing), and
iii. Structural-level reforms (e.g. enhanced food security, improved facility quality, and strengthened service delivery).

Future efforts should adopt this layered, integrated approach to achieve sustainable nutrition gains.

This research contributes meaningfully to current understanding by offering context-specific insights into the complex interplay between maternal KAP and systemic enablers of feeding behaviour. By examining local variation across settings, the study provides a practical foundation for designing responsive and targeted IYCF interventions. Ultimately, improving child nutrition outcomes in Kiambu County and similar contexts requires simultaneous investment in maternal capacity, community support systems, and health infrastructure.

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6.2 Recommendations

6.2.1 Design Context Specific, Community-Led Interventions

Implement geographically tailored approaches:

i. Urban settings: Capitalise on higher education levels via media and digital education campaigns.

ii. Slum settings: Build on existing knowledge–practice alignment through peer education and community mobilisation.

iii. Rural areas: Target attitude change initiatives, given the significant attitude–practice correlation ($p=0.018$). Address the slum-specific malnutrition paradox through integrated nutrition-security programs

Additionally, slum-specific nutrition-security programmes are essential to address the structural challenges underlying poor child nutritional outcomes.

6.2.2 Transform IYCF Education into Competency-Based Training

i. Move beyond passive knowledge dissemination to practical demonstration-based learning, especially for complementary feeding techniques.

ii. Integrate cooking demonstrations, food group identification activities, and peer-led feeding sessions at Maternal and Child Health Clinics (MCHCs).

iii. Develop simplified job aids for community health workers (CHWs) and nurses to reinforce hands-on counselling during ANC/PNC visits.

6.2.3 Strengthen Facility-Level Service Quality and Health Worker Mentorship

i. Address facility-level disparities by establishing targeted support supervision and on-the-job training programmes.

ii. Prioritise facilities with high workloads (e.g. Wangige Hospital) for task-shifting initiatives, such as CHW-led nutrition sessions.

iii. Mandate IYCF competency certification for all MCH staff

iv. Institutionalise routine IYCF performance audits within MCHCs, focusing on counselling quality and follow-up.

6.2.4 For Policymakers

i. Prioritise interventions targeting younger mothers and those with limited formal education.

ii. Develop slum-specific strategies that integrate existing behavioural strengths with broader nutrition-support systems.

6.2.5 Research Priorities

i. Conduct household-level studies to mitigate facility-based selection bias and capture underserved populations.

ii. Undertake comparative studies across geographic and socio-economic strata to identify scalable practices.

iii. Use mixed methods to explore cultural norms and perceptions shaping IYCF behaviours.

iv. Implement longitudinal designs to assess the impact of mobility and life transitions on feeding practices.

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APPENDICES

Appendix I: Informed Consent Form 1

Principle Investigator: Tasneem Ahmed

Contact number: 0793517434

Title of Research Project: The Effect of Mothers Knowledge and Attitudes on Practices Regarding Infant and Young Child Feeding: A Cross-Sectional Analysis at Child Welfare Clinics in Kiambu County, Kenya

Why have you been approached?

You have been asked to participate in this research project entirely voluntarily because you meet the criteria of mothers of children between 6 months and 1 year old that we are looking for. I am now going to explain what this research is about and what it includes and might mean to you. Please feel free to ask any questions at any point.

What is this research about?

This research aims to find out what mothers' knowledge, attitude and practice is towards infant and young child feeding in Kiambu county. We intend to conduct this research at this clinic and two other clinics in Kiambu county.

What would be required of you as a participant?

We only require you to answer questions asked about feeding your child and how you feel about feeding. So, we will as what you feed, why you feed, when you feed and how you feed your child. We will also ask general background information about you and where you get information for feeding your child from. So, we would greatly appreciate your time for about 30minutes to reply to these questions?

What will happen with the information you provide?

The information will be collected and analysed, and recommendations will be provided to local authorities aimed on how to improve services provided on infant and young child feeding.

Are there any risks involved for you?

No there is no foreseeable risks for you and all the information you provide will be kept confidential, and your identity as well as your child will not be known to anyone

By signing or approving this consent indicated that you understand what will be expected of you and you are willing to participate in the survey.

Is there any compensation?

Unfortunately, there are no monetary benefits that you will receive by agreeing to participate in the research study.

Refusal to Participate or Withdrawal from the Study

Please note that your participation in this study is entirely voluntary. You have absolute right to decline to join the study after the research assistant has introduced the study to you. You also have a right to stop or decline to answer any question asked to you in the midst of the interview. You therefore have a right to withdraw from the study at any moment without self-explanation or any penalty.

How will we protect your information provided?

Your information provided will remain anonymous, and your identity coded. All information will be kept confidential throughout the study.

What will happen to the information you provide?

The information will be analysed and feedback share with Kiambu County Department of Health. Furthermore, the information will be shared with Amref International University and findings will be published in a relevant research article to disseminate the knowledge.

Who can I contact?

You may contact anyone from the team, including the principal investigator (details above) and the Research Officer details below:

The Research Officer
Amref Health Africa in Kenya
Wilson Airport, Lang'ata Road
Office Tel: +254 20 6994000
Mobile No: 0795746777
Fax: +254 20 606340
P.O Box 30125-00100
Nairobi, Kenya

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Certificate of Consent

This confirms that the above information has been read to you, or you have read information, and you have had the opportunity to ask any questions.

I consent voluntarily to participate in this study.

Name of Respondent …………………………………………………………

Signature/ Thumbprint of Respondent ……………………………………….

Date………………………………………………………………………….

Name of Interviewer ……………………………………………………….

Signature/ Thumbprint of Interviewer ……………………………………….

Date………………………………………………………………………….

(Thumbprint to be used if visually impaired, physically impaired, mentally impaired or illiterate)

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Appendix II: Informed Consent Form 2

Principle Investigator: Tasneem Ahmed

Contact number: 0793517434

Title of Research Project: The Effect of Mothers Knowledge and Attitudes on Practices Regarding Infant and Young Child Feeding: A Cross-Sectional Analysis at Child Welfare Clinics in Kiambu County, Kenya

Why have you been approached?

You have been asked to participate in this research project entirely voluntarily because you meet the criteria of a health care professional who closely works with mothers of children between 6 months and 1 year old a. I am now going to explain what this research is about and what it includes and might mean to you. Please feel free to ask any questions at any point.

What is this research about?

This research aims to find out what mothers' knowledge, attitude and practice is towards infant and young child feeding in Kiambu county. We intend to conduct this research at this clinic and two other clinics in Kiambu county.

What would be required of you as a participant?

You will be asked open questions related to the following topics on IYCF:

Section 1: Maternal Knowledge and Misperceptions about IYCF

Section 2: Maternal Attitudes and Beliefs

Section 3: Cultural and Traditional Practices

Section 4: Challenges and Support Needs / Barriers & Enablers to optimal IYCF Practices

The information provided above will be recorded collected and analysed, and recommendations will be provided to local authorities aimed on how to improve services provided on infant and young child feeding.

Are there any risks involved for you?

No there is no foreseeable risks for you and all the information you provide will be kept confidential, and your identity will not be known to anyone

By signing or approving this consent indicated that you understand what will be expected of you and you are willing to participate in the survey.

Is there any compensation?

Unfortunately, there are no monetary benefits that you will receive by agreeing to participate in the research study.

Refusal to Participate or Withdrawal from the Study

Please note that your participation in this study is entirely voluntary. You have absolute right to decline to join the study after the research assistant has introduced the study to you. You also have a right to stop or decline to answer any question asked to you in the midst of the interview. You therefore have a right to withdraw from the study at any moment without self-explanation or any penalty.

How will we protect your information provided?

Your information provided will remain anonymous, and your identity coded. All information will be kept confidential throughout the study.

What will happen to the information you provide?

The information will be analyzed and feedback share with Kiambu County Department of Health. Furthermore, the information will be shared with Amref International University and findings will be published in a relevant research article to disseminate the knowledge.

Who can I contact?

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Certificate of Consent

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Name of Respondent ……………………………………………………

Signature/ Thumbprint of Respondent ……………………………………

Date………………………………………………………………………

Name of Interviewer ……………………………………………………

Signature/ Thumbprint of Interviewer ……………………………………

Date………………………………………………………………………

(Thumbprint to be used if visually impaired, physically impaired, mentally impaired or illiterate)

Appendix III: Socio Demographic factors associated with IYCF Practices.

Socio Demographic factors	
What is your Marital status?	☐ Married ☐ Cohabiting ☐ Separated ☐ Widowed ☐ Divorced ☐ Single/never Married
Have you ever been to school?	☐ Yes ☐ No
What is your Highest Level of Education?	☐ Less than Primary ☐ Primary ☐ Secondary ☐ College ☐ Post-graduate
What is your Religion?	☐ Christian ☐ Muslim ☐ Traditional ☐ Protestant ☐ Other
Mother age **What is your Age?**	☐ <20 ☐ 20-30 ☐ 30-40 ☐ >40
What is your Ethnicity?	☐ Kikuyu ☐ Luhayo ☐ Luo ☐ Kalenjin ☐ Kamba ☐ Other

Appendix IV: Socio Economic factors associated with IYCF Practices.

Socio Economic factors	
What is your Employment Status?	☐ Working – full time ☐ Working- part time ☐ Not working
What is your Occupation?	☐ Formal Employment ☐ Informal Employment ☐ Casual Labour ☐ Own Business ☐ Petty trading/hawking ☐ Farming ☐ Pastoralist ☐ Dependents ☐ Housewife
Residence Location	☐ Location address:
What type of housing do you live in?	☐ Mabati ☐ Apartment ☐ House ☐ Thatch ☐ Other
What was the total household income in the last month?	☐ < 10000 ☐ 10000-50000 ☐ 50000-100000 ☐ >100000
How much salary is contributed to food?	☐ <25% ☐ 25-50% ☐ 50-75% ☐ >75% ☐ Not Sure

Appendix V: Child factors associated with IYCF Practices.

Child characteristics		
What is your child's gender?	☐ Male ☐ Female	
What is your Child's age	☐ 6month ☐ 7 months ☐ 8 months ☐ 9 months ☐ 10 months ☐ 11 months ☐ 12 months ☐ 13 months ☐ 14months	☐ 15months ☐ 16 months ☐ 17 months ☐ 18months ☐ 19months ☐ 20months ☐ 21months ☐ 22 months ☐ 23 months
Where did you deliver the child	☐ At home ☐ At clinic ☐ At Hospital ☐ At TBA Home	
Environmental factors		
How many children live in the household	☐ 1 ☐ 2 ☐ 3 ☐ >3	

Appendix VI: Sources of information and environmental factors associated with IYCF Practices.

Sources of IYCF information	
Where have you obtained the most knowledge from regarding infant and young child feeding practices?	
Mother/ Mother-in-law/ Grandmother	☐
Other family member or friend	☐
Community health worker	☐
Media	☐ TV ☐ Radio ☐ Phone ☐ Internet
Health care professional/ Health center	☐
Other	☐
Which source of info do you value the most?	☐ Mother / mother-in-law / grandmother ☐ Other family member or friend ☐ Community Health Worker ☐ Media ☐ Health Care professional/ Health Center ☐ Other

Appendix VII: Maternal IYCF Practices.

Maternal Practice on IYCF			
Was your child ever breastfed?		☐ Yes ☐ No	
	If no	Why was he/ she never breastfed?	☐ Baby was ill ☐ Baby was unable to suck ☐ Baby refused ☐ Mother Refused ☐ Father Refused ☐ Mom was sick ☐ Mom died ☐ Advised by health care professional ☐ Advised by friend/ family
	If yes	Is your child still breastfeeding	☐ Yes ☐ No
	If yes	Was your child breastfeeding yesterday?	☐ Yes ☐ No
		How often was your child breastfed?	
		For how long he/ she breastfed?	☐ 1-3 months ☐ 4- 6 months ☐ 7-9 months ☐ 10-12 months
		Why did he/she stop breastfeeding	☐ Baby was ill ☐ Baby was unable to suck ☐ Baby refused ☐ Mother Refused ☐ Father Refused ☐ Mom was sick ☐ Mom died ☐ Advised by health care professional

			☐ Advised by friend/ family
In the first six months after delivery did you introduce any drink or food including water to your baby?		☐ Yes ☐ No	
	If yes what food/drink did you introduce?		☐ Porridge ☐ Water ☐ Infant formula ☐ Milk powder ☐ Cow milk ☐ Other
Have you introduced your child to other foods/liquids in addition to breastfeeding?		☐ Yes ☐ No	
At what age was he/she introduced to foods?			☐ < 1month ☐ 1month- 6 months ☐ 6 months ☐ 6 month- 12 months
Who mainly decides what child should/ should not eat			☐ Baby mom ☐ Baby dad ☐ Other family member ☐ Caretaker ☐ Other
How many times per day do you feed your baby?			☐ 2-3 times ☐ 3-4 times ☐ Other ☐ Don't know
Now I would like to ask you about liquids or foods that your child drank/ate yesterday during the day or at night.			Perform a 24hr Recall (Based on food group

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Appendix VIII: Maternal Knowledge on IYCF Practices.

MATERNAL Knowledge on IYCF Test	
When should you breastfeeding be started after you give birth?	☐ Within 1 hour ☐ Don't know ☐ After a day ☐ Other
What does EBF mean?	☐ Ask for answer?
For how long a baby should be on EBF	☐ 1 month ☐ 3-4 month ☐ Birth to 6 months ☐ other
For how long it is recommended to breastfeed a child	☐ 24 months ☐ 12 months ☐ 6 months ☐ other
At what age should you start complementary feeding	☐ 3-4 month ☐ 6 months ☐ other
How often should baby be fed?	☐ 2-3times ☐ 3-4 times ☐ Other

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Appendix IX: Maternal Attitudes on IYCF Practices.

Statement	Response
Breastfeeding should start immediately after delivery	☐ **Disagree** ☐ **Not sure** ☐ **Agree**
Babies shouldn't be given anything except BF ≤ 6 months	
A child can be given butter, sugar, and water ≤ 6 months	
Complementary feeding should be started after 6 months	
BF should continue up to 2 years	
Serving only starchy food prevent malnutrition	
Some people believe that certain foods are taboo and should not be fed to a pregnant woman	
Some people believe that a new born baby should be given other liquids/Semi-solids before initiating breastfeeding	
Some people believe that a baby cannot survive on exclusive breastfeeding for six months	
Some people believe that COLOSTRUM (that breast milk that comes out in the first 3 days after delivery) is dirty and should not be fed to new born babies	

Appendix X: Maternal KAP towards IYCF questionnaire base

This questionnaire that will be contextually adapted to test Maternal KAP is based on the FAO standardised questionnaire.

The reference for this questionnaire is as follows

FAO. (2014). *Guidelines for assessing nutrition-related Knowledge, Attitudes and Practices manual*. www.fao.org/publications

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Appendix XI: Procedures and guideline to adopt when conducting a KAP survey

The guidelines that will be followed to conduct the KAP survey will be based on YUMPU guidance:

YUMPU. (2015) The KAP survey model (Knowledge, Attitude and amp; Practices. https://www.yumpu.com/en/document/view/40215008/the-kap-survey-model-knowledge-attitude-practices

Appendix XII: Interview Schedule for Health Care Professionals on Maternal Knowledge, Attitudes, and Practices regarding IYCF

Introduction:

- Thank the healthcare professional for participating.
- Explain the purpose of the interview: to gain insights into maternal attitudes, beliefs, cultural practices, and common misperceptions regarding IYCF, as observed in their professional experience.
- Assure them of confidentiality and that their responses will be used only for research purposes.
- Sign- Informed Consent form.

Section 1: Maternal Knowledge and Misperceptions about IYCF

In your experience, how well-informed are mothers in this area about recommended IYCF practices?

- Probe: Are there specific gaps in knowledge that you have observed?

What common misperceptions or incorrect beliefs about child feeding do you encounter among mothers?

- Probe: Are there misunderstandings about breastfeeding, introducing solid foods, or balanced nutrition for young children?

Section 2: Maternal Attitudes and Beliefs.

How would you describe the general attitude of mothers toward IYCF guidelines provided at the facility?

- Probe: Are mothers generally receptive, resistant, or indifferent to guidance?

What factors do you think shape mothers' attitudes towards IYCF?

- Probe: How influential are family members, community opinions, or personal beliefs?

Have you noticed any maternal attitudes that positively or negatively impact their adherence to recommended IYCF practices?

- Probe: Are there attitudes of fear, mistrust, or reliance on traditional knowledge?

Section 3: Cultural and Traditional Practices

What cultural or traditional feeding practices are common among mothers in this area?

- Probe: Are there specific foods or feeding methods that are culturally favored or avoided?

How do these cultural practices align or conflict with the recommended IYCF guidelines?

- Probe: Have you seen instances where traditional practices enhance or hinder child nutrition?

Section 4: Challenges and Support Needs / Barriers & Enablers to optimal IYCF Practices

What challenges/barriers do you think mothers face in following the recommended IYCF practices? –

- Probe: Are there economic, social, or logistical barriers that you've observed?

What support or resources or enablers do you think mothers need to improve IYCF practices?

- Probe: Would additional education, community programs, or family counseling be beneficial?

Conclusion:

Is there anything else you would like to add regarding maternal attitudes, beliefs, or practices related to IYCF?

- Thank the healthcare professional for their time and insights.

Appendix XIII: Inclusion and Exclusion criteria from Kiambu Target Population

TARGET POPULATION	
Inclusion Criteria	**Exclusion Criteria**
Children 6 months to 23 months of age	Children with chronic diseases affecting feeding practices
Children who are brought in by mother of child responsible for feeding of the child	Children with caretaker who is not the primary caregiver of the child
Infant and mother should reside in Kiambu county	Infant and mother who do not reside in Kiambu county
Infant should be healthy and have appetite	Children with acute disease affecting appetite at time of study

Appendix XIV: Summary of data collection instruments

Data Category	Data Type	Data Collection	Data Tool
IYCF Influence Associated Factors	Socio -Demographic, Socio-Economic Socio - Environment	Structured Questionnaire. (Mobile device-based questionnaire	Interview by Kobo collect
IYCF Knowledge score	Maternal Knowledge	Written or Oral Test (based on literacy level and comfortability of participant)	Oral test by Kobo collects or written test by hardcopy
IYCF Attitude Score	Maternal Attitude	Structured Questionnaire. (Mobile device-based questionnaire Interview Schedule for key Informants	Interview by Kobo collect Interview recorded and transcribed verbatim
IYCF Practice Score	Maternal Practice,	Structured Questionnaire	Adapted 24-hour dietary recall of infant feeding

Appendix XV: Summary of KAP Studies on IYCF Practices

This appendix summarizes the findings of key KAP studies on IYCF practices, including those conducted by Ara et al. (2023), Assefa et al. (2021), Kengalagutti et al. (2015), and Kitiyo et al. (2020).

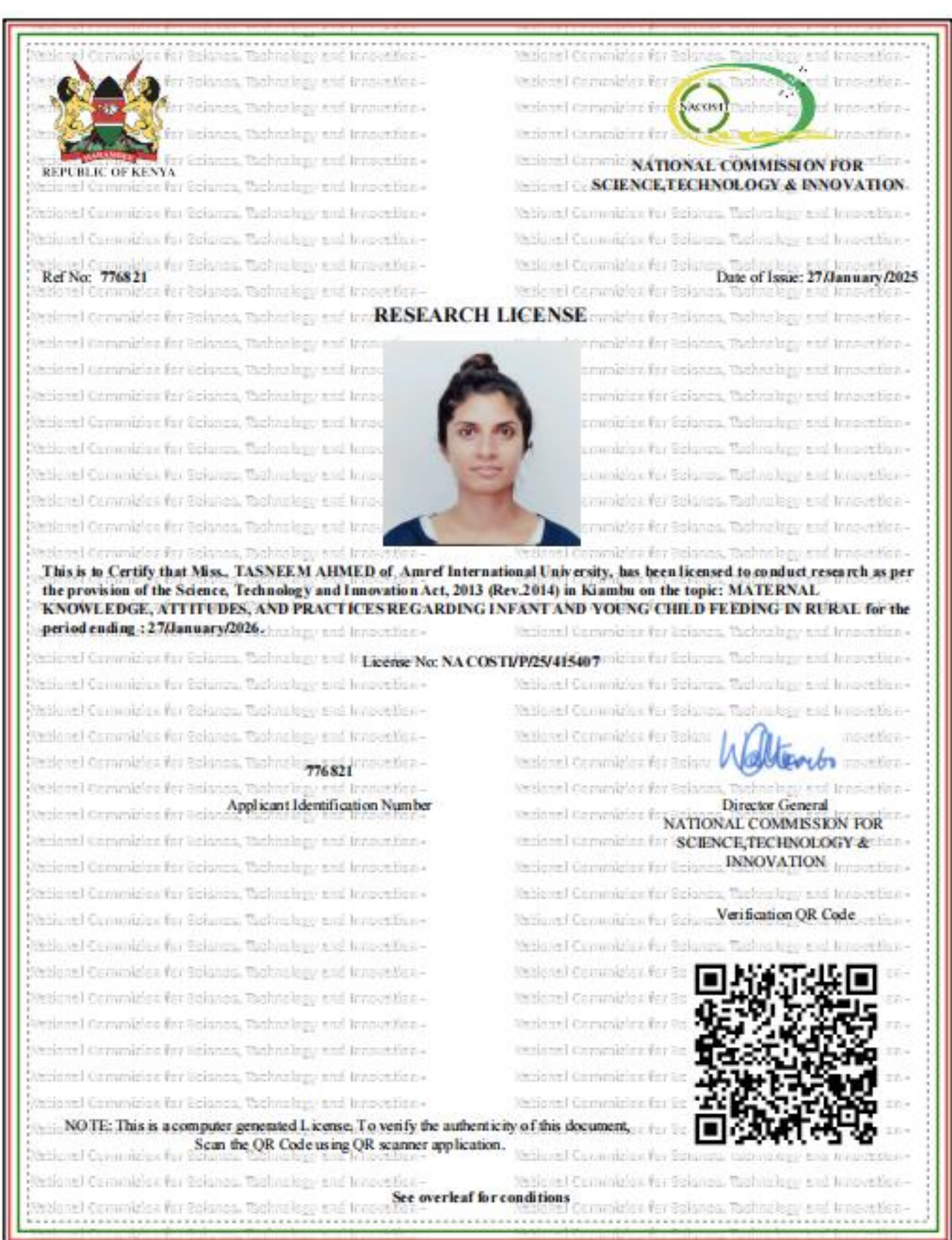
Study	Location	Knowledge	Attitude	Practice	Reference
Cross Sectional	West Ethiopia (Assaso)	94% Good Knowledge	89% Positive Attitude	78% good practice	(Assefa et al., 2021)
Community based Cross sectional	Belgaum (India)	9% Good Knowledge 79% Average Knowledge	22% Positive Attitude 60% Average Attitude	13.97% Good Practice 78.3% Average Practice	(Kengalagutti et al., 2015)
Cross sectional	Kitui (Kenya)	78% Good Knowledge	98.% Positive Attitude		(Kitiyo et al., 2020)
Cross Sectional Analytical	Wajir (Kenya)	77% Good Knowledge	72% Positive Attitude	71% Good practice (Average score)	(Mohamed et al., 2018)
Cross Sectional	Dhaka	84% Good Knowledge	73% Positive Attitude	50% Good Practice	(Ara et al., 2023)
Descriptive Cross sectional	Kenyattah National Hospital (Kenya)	Good Knowledge on Complementary feeding	Good Attitude on Complementary feeding		(Wafula & Rajula, 2016)
Cross Sectional Community	Burkino Fasso	Adequate Knowledge on Breastfeeding Inadequate Knowledge on Complementary feeding		Adequate Practice on Breastfeeding Inadequate Practice on Compementory feeding	(Hien et al., 2020)

Cross sectional	Kpandai district Ghana	52% high level knowledge (mean score 58%)	94% positive attitude		(Bimpong et al., 2020)
Cross sectional interview	Nairobi, Machakos (Kenya)	Good Knowledge on breastfeedign 70% average in Nairobi 66% average in Machakos Poor knowledge on Complemetory feeding 54% average in Nairobi 51% average in Machakos		Good Practice on breastfeedign 94% average in Nairobi 90% average in Machakos Poor practice on Complemetory feeding 27% with MAD in Nairobi 13% MAD in Machakos	(Uusimäki et al., 2023)

Appendix XVI: Table of Independent and Dependent variables utilised for the Conceptual Framework

Associated Factors			**Maternal Knowledge Attitude and Practices**		
Socio - Demographic	Socio - Environmental	Socio-Economic	Maternal Knowledge	Maternal Attitude	Maternal Practice
-Infant/child age -Mother/caregiver age -Infant/child sex -Mother/cargiver Educational level -Mother ethnicity -Mother religion -Marital status -Number of children in HH	-Acess to HCS -Acess to IYCF Information -Place of delivery -Access to safe water -Acess to diversified foods	-Wealth index -Type of housing -Employment status -Mother occupation -Residence location	-EBF- 6 months -BF early initiation -BF continuation-2years -Age Introduction of food -MMF -MDD -MAD	-EBF- 6 months -BF early initiation -BF continuation-2years -Age Introduction of food -Culutral belief	-EBF- 6 months -BF early initiation -BF continuation-2years -Age Introduction of food -MMF -MDD -MAD

Appendix XVII: NACOSTI Approval



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Date of Issue: 27/January/2025

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Appendix XVIII: ESRC APPROVAL

Amref Health Africa in Kenya

REF: AMREF – ESRC P1818/2024

January 17, 2025

Tasneem Ahmed
Amref International University
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Dear Tasneem Ahmed,

RESEARCH PROTOCOL: MATERNAL KNOWLEDGE, ATTITUDES, AND PRACTICES REGARDING INFANT AND YOUNG CHILD FEEDING IN PERI-URBAN AND SLUM SETTINGS IN KIAMBU COUNTY, KENYA

Thank you for submitting your protocol to the Amref Ethics and Scientific Review Committee (ESRC).

This is to inform you that the ESRC has reviewed and approved your protocol. Your application approval number is ESRC P1818/2024. The approval period is from January 17, 2025, to January 16, 2026, and is subject to compliance with the following requirements:

a) Only approved documents (including informed consents, study instruments, advertising materials, material transfer agreements, etc.) will be used.
b) All changes including (amendments, deviations, violations, etc.) are submitted for review and approval by Amref ESRC before implementation.
c) Death and life-threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the Amref ESRC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to Amref ESRC within 72 hours.
e) Clearance for export of biological specimen must be obtained from the relevant government authorities for each batch of shipment/export.
f) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
g) In case of late renewal, the Amref ESRC shall not be held responsible for any serious adverse events (SAEs) that may occur as a result of research activities that were carried out after the expiry of approval.
h) Submission of an executive summary report within 90 days upon completion of the study to the Amref ESRC.
i) All government regulations for prevention and control of the spread of COVID-19 including social distancing, provision of personal protective equipment for participants and research assistants should be adhered to during data collection. All research assistants should be monitored for COVID 19 symptoms and referred for testing in case they present with symptoms.

Appendix XIX: Plagiarism Check (Similarity Report)

Tasneem Ahmed

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MPH Proposals

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