

**FACTORS INFLUENCING MIXED FEEDING PRACTICES AMONG INFANTS
BELOW 6 -MONTHS IN WAJIR COUNTY, KENYA**

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**A THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR THE
REQUIREMENT OF THE CONFERMENT OF THE MASTER'S DEGREE OF
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DECLARATION

I hereby declare that this thesis is my original work and has not been presented for any other academic award in any other university.

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DEDICATION

I dedicate this thesis to my family for the support they have provided so far and may God bless them.

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I have taken efforts in writing this research proposal. However, it would not have been possible without the kind support and help of my family, my supervisors; Dr. Beatrice Gisemba, Mr. Lawrence Mugambi, and my Head of Department Dr. Lily Masinde, I would like to extend my sincere thanks and express my gratitude to my entire colleagues, and friends who supported me throughout the process.

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ABSTRACT

In Wajir County, around 749 infants under six months die annually. The 2014 Kenya Demographic and Health Survey (KDHS) revealed that just 32% of babies in this age group are exclusively breastfed, while many mothers introduce supplementary foods prematurely. This study aimed to examine the factors influencing mixed feeding practices among babies under six months in Wajir County. The study systematically examined infant feeding practices, assessed socio-cultural influences, evaluated maternal skill, and studied economic factors affecting mixed feeding. The research employed the Theory of Planned Behavior, the Interactive Breastfeeding Theory, and the Theory of Reasoned Action (TRA). A descriptive cross-sectional design was utilized, focusing on a quantitative data collection approach. The study examined 802 mothers of infants under six months, utilizing a sample size of 260 individuals. Data was processed using SPSS version 26 for analysis. Data were analyzed using univariate analysis and this enabled the researcher to achieve descriptive statistics. The study found that 63.1% of mothers had low knowledge of mixed feeding practices, with a mean knowledge score of 6.8 (SD=1.7) out of 12. Significantly, 58.8% of mothers practicing mixed feeding were unemployed ($\chi^2=109.780$, $p<0.001$). 97% relied on market purchases for food, and 40.1% were moderately food insecure. Cultural factors played a role, with 81.3% reporting taboos affecting infant feeding ($\chi^2=17.431$, $p=0.001$). Despite recommendations, 79.8% introduced complementary foods at 6 months, while 20.2% introduced them earlier. Based on the findings, it can conclude that maternal knowledge of mixed feeding practices in Wajir County is generally low. Economic factors, particularly unemployment and food insecurity, significantly influence mixed feeding practices. Cultural beliefs and taboos play a substantial role in determining infant feeding choices. Despite health recommendations, a considerable proportion of mothers introduce complementary foods earlier than the recommended 6 months. These factors collectively contribute to suboptimal mixed feeding practices among infants below 6 months in the study area. The study therefore recommended that health authorities should intensify education programs to improve maternal knowledge of mixed feeding practices. Local governments need to launch economic empowerment initiatives to tackle unemployment and food insecurity. Community leaders should work together with health professionals to overcome cultural taboos affecting infant feeding. Healthcare providers ought to enhance counseling regarding the appropriate timing for introducing complementary foods. Policymakers should create targeted interventions that promote optimal mixed feeding practices, taking into account the unique socio-economic and cultural context of Wajir County.

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ABBREVIATIONS AND ACRONYMS

EBF	:	Exclusive Breast Feeding
ERC	:	Ethical Review Committee
IYCF	:	Inappropriate Infant and Young Child Feeding
MIYCN	:	Maternal, Infant, and Young Child Nutrition
SPSS	:	Statistical Package for Social Sciences
UNICEF	:	United Nations Children's Fund
WHO	:	World Health Organization
EBF	:	Exclusive Breastfeeding
BMI	:	Body mass index
IYCF	:	Infant and Young Child Feeding
ARIs	:	Acute Respiratory Infections
UDHS	:	Uganda Demographic and Health Surveys
CHWs	:	Community health workers
BFHI	:	Baby-friendly hospitals
BFCI	:	Baby Friendly Community Initiate
IIFAS	:	Iowa Infant Feeding Attitude Scale
TRA	:	Theory of Reasoned Action
TPB	:	The theory of planned behavior
APHRC	:	African Health Research Center
NACOSTI	:	National Commission for Science and Technology
SERC	:	Science and Ethical Review Committee

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Across the globe, breastfeeding is the universal method for feeding infants. According to Gitonga (2014) proper infant and young child nutrition, including breastfeeding and complementary feeding, can reduce child mortality by 19% more effectively than other interventions aimed at lowering infant deaths. Public health departments prioritize safeguarding, promoting, and empowering breastfeeding mothers to ensure exclusive breastfeeding, as emphasized by the Global Strategy for Infant and Young Child Feeding. Both the WHO and UNICEF recommend that mothers initiate breastfeeding within the first hour after birth and refrain from introducing any other foods to their infants before they reach six months old (Exclusive Breastfeeding, EBF). Additionally, breastfeeding should ideally continue until a child is at least two years old. In low- and middle-income countries, exclusive breastfeeding has been shown to prevent 90% of deaths in children under five (Ahoya et al., 2019).

Kamau-Mbuthia et al. (2023) found that when mothers discontinue exclusive breastfeeding within six months, childhood mortality and illness rates increase. The same series highlights that infants who are breastfed have significantly higher survival rates during their early months compared to those who are not exclusively breastfed, with the mortality rate being 14 times higher among the latter group. Breastfeeding from birth promotes better health outcomes, reducing the risk of death from acute respiratory infections and diarrhea.

In 2011, inadequate breastfeeding practices among children under five contributed to 804,000 deaths, accounting for 11.6% of all child deaths (Kimani-Murage et al., 2011). Poor infant and young child feeding practices, such as abandoning exclusive breastfeeding,

introducing complementary foods too early, and premature weaning, often lead to malnutrition, particularly in impoverished regions, and may result in death. Research shows that non-exclusive breastfeeding accounts for 13% of the global mortality rate in children under five, while inappropriate feeding practices contribute to 6% of child deaths. Exclusive breastfeeding could prevent 13% of these deaths worldwide (Kimiye & Chege, 2015).

Globally, suboptimal breastfeeding practices result in 1.4 million deaths annually among children under five. On average, only 38% of infants under six months are exclusively breastfed worldwide (World Health Organization [WHO], 2021). In developing nations, about 35% of infants under six months are continuously breastfed, and 35% of children between 20 and 23 months continue to benefit from breastfeeding (United Nations Children's Fund [UNICEF], 2013). Despite global improvements in breastfeeding, only 49% of infants under six months in developing countries are exclusively breastfed.

In 2010, exclusive breastfeeding (EBF) rates for infants under six months were 38% in developing countries, 47% in South Asia, 26% in West and Central Africa, and 45% in Eastern and Southern Africa. East Africa showed stronger EBF rates, with Rwanda at 82.9%, Burundi at 70.3%, Uganda at 63.2%, Kenya at 63%, and Tanzania at 52% (Ahoya et al., 2019).

Optimal complementary feeding is essential for child development as it enhances nutrient intake, promotes healthy growth, and improves survival rates, thereby reducing infant mortality. Complementary feeding refers to the introduction of other foods and supplements in addition to breastfeeding, typically starting at six months when breastfeeding alone is no longer sufficient to meet the child's nutritional needs.

To address this, the World Health Organization (WHO) provides guidance on infant and young child feeding (IYCF) for children aged 6–23 months. These guidelines recommend

the introduction of complementary foods, specify the variety of foods to offer, the frequency of feeding, the nutritional content of the diet, and the inclusion of iron-rich or iron-fortified foods. These aspects form part of the eight core indicators used to assess IYCF practices.

1.2 Statement of the problem

In Wajir County, previous research estimates that approximately 749 infant deaths occur annually due to suboptimal breastfeeding practices (Wade et al., 2020). According to the 2014 Kenya Demographic and Health Survey (KDHS), only 32% of infants under six months are exclusively breastfed. This low rate is largely due to the preference among Kenyan mothers for mixed feeding over exclusive breastfeeding, driven by various factors. As a result, the country incurs significant healthcare costs, estimated at KSh 76 billion, to treat preventable diseases linked to poor feeding practices, such as lower respiratory infections and gastrointestinal illnesses. These illnesses negatively affect infant growth, leading to malnutrition and long-term health problems.

Given this situation, it is vital to provide mothers with health education on the benefits of exclusive breastfeeding and the risks of poor feeding practices. Doing so can help reduce malnutrition, morbidity, and mortality, ultimately improving the overall health of infants. Failure to address this issue in a timely manner may hinder the achievement of Millennium Development Goal 4, which aims to reduce the mortality rate of children under five by two-thirds between 1990 and 2022.

There is limited scientific data available on the introduction of mixed feeding for infants under six months in Wajir County, a critical stage of growth. This highlights the need for improved mixed feeding practices in low-resource settings to support the healthy development of infants. Krebs et al. (2011) identified inadequate and inappropriate mixed feeding as major contributors to high rates of morbidity and mortality among young children

in such settings. They also emphasized the importance of animal-source foods in meeting essential micronutrient requirements. This study aimed to gather information that could guide effective interventions to reduce child malnutrition in Kenya, with a particular focus on Wajir County.

1.3 Purpose of the Study

The study sought to identify the factors affecting mixed feeding practices of infants below 6months in Wajir County, Kenya. The results and recommendations will assist in improving the care and welfare of the infants thus providing a platform for policy generation, which will be very important to policy makers and influencers.

1.4 Objectives of the Study

1.4.1 Broad Objective

To determine the factors influencing mixed feeding practices among infants below 6months in Wajir County, Kenya.

1.4.2 Specific Objectives

- i. To establish maternal knowledge influencing mixed feeding practices among infants below 6months in Wajir County
- ii. To assess the socio-cultural factors influencing mixed feeding practices in 6-months infants in Wajir County
- iii. To determine the feeding practices mothers, use in feeding infants below 6months in Wajir County.
- iv. To ascertain economic factors influencing mixed feeding practices among infants below 6months in Wajir County

1.5 Research Questions

- i. How do maternal knowledge and skills influence mixed feeding among infants below 6months in Wajir County?
- ii. How mixed feeding practices among infants below 6months are influenced by socio-cultural factors in Wajir County?
- iii. How do mothers feed infants below 6months in Wajir County?
- iv. How are mixed feeding practices among infants below 6 months influenced by economic factors in Wajir?

1.6 Justification of the Study

According to WHO (2021), mixed feeding practices differ between communities. This is mostly because these communities have different cultural practices, they are socially different, and also their belief that half premature deaths in children by the year 2015. This has not been the case in developing countries, since still mortality rate of children under five years due to preventable illnesses is estimated to be 5.9 Million. (UNICEF, 2013). These diseases can be reduced if mothers are encouraged to practice exclusive breastfeeding. From this study, there are more enlightenment and more knowledge will be attained on infant nourishment since the researcher in her research will try and understand the factors that determine mixed feeding of infants below 6months.

The information is also of importance to policy and decision-makers in action-taking practices to curb the menace. The information assists mothers since they are educated, by the Ministry of Health and other non-governmental organizations that provide programs associated with children's health and gives hope in the reduction of malnutrition-related

diseases. This can be achieved if mothers are encouraged to practice exclusive breastfeeding and are given the necessary support and education on the same.

1.7 Limitations of the Study

The study was descriptive, indicating its limitations in demonstrating causality between chosen factors and the beginning of mixed feeding in babies under six months. The utilization of a questionnaire constituted a constraint due to its susceptibility to social desirability bias, self-report bias, and the accuracy of respondents' recollection.

1.8 Delimitations of the Study

Many issues in Wajir County influence mixed-feeding introduction to infants below 6months by mothers. The area covers a big sample size and this may generalize the researcher's findings. The researcher ensured the questionnaires were both translated into Somali to ensure they were understood by respondents.

1.10 Significance of the Study

The findings of this study are important to various stakeholders. Information from this study is on the introduction of mixed feeding practices on issues and influences to infants below 6months. Some of the benefits from this study's findings are the Ministry of Health (MOH) at the county and National levels, the Kenya Bureau of Standards (KEBS), and other child health agencies. Researchers and academia benefit from this study since they gain some more knowledge on mixed feeding practices.

1.11 Assumptions of Study

The researcher while conducting this study assumed that participants were equipped with proper information on healthy foods and also, they would give appropriate and accurate information while filling in the questionnaires.

1.12 Operational Definition of Terms

Attitudes	This person's physiological behavior is achieved after the evaluation of certain characters with some favor and disfavor.
Infant	A child aged between 0-12 months. For this study, the reference will be a child not older than 12months in Wajir county.
Knowledge	This refers to the proper understanding of EBF, putting into practice the ability that pertains to the required information in this case on infants and mixed food practices.
Mixed feeding	Breastfeeding a child with an introduction to other solid foods and supplements to improve nutrition.
Socio-economic factors	These are daily activities that bring monetary gains to our livelihoods.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discussed factors influencing the introduction of mixed feeding practices to infants below 6 months.

2.2 Essential infant feeding for health, development, and nutritional status.

Malnutrition in children under five years recently is paramount. This is according to recent estimates of 178 million children who have stunted growth. 110 million represent underweight children and 57 are wasted. Cumulatively this amounts to 21% of deaths of children under the age of five years. Out of these two-thirds die out of malnutrition which causes direct mortality to these infants before they celebrate their first-year birthday age. Malnutrition largely affects these children disabling them to acquire their potential growth and development and this according to the causal matrix is due to under-nutrition which is mostly due to early care provided to children. Breastfeeding and complementary feeding is very key to a child's nutritional status (Leprince et al., 2020).

During a child's first 6 years of their life, Exclusive Breastfeeding (EBF) in accompaniment to optimal complementary feeding should be taken very seriously to improve health and ensure the good nutritional status of a child is maintained. This will significantly curb the mortality of these infants. For good and better growth of children, this care should be frequent and also since it can prevent 6% (600,000) child mortality rate. The management of a child's nutrition status in ensuring they are properly fed during the early years of birth is very important to prevent short-term and long-term problems that affect infants. (Barati et al., 2018).

2.3 Mixed Feeding

Mixed feeding is the introduction of solid foods and fluids while continuing to breastfeed feeding child. It is advisable for this which is also called weaning to be done when a child is 6 months old because if done earlier can be dangerous to these young ones and also be a causative reason for different infectious diseases that affect children because in a way these foods may replace the nutrition's mother milk (O'Brien et al., 2018). Vohra and Soni's (2016) study on breastfeeding and mixed feeding practices was done in Malawi to find out the best period, and the main reasons for re-introduced food during their first month, exclusive breastfeeding for 6 months was only done to only 4%. These children were fed mzuwala and dawale (herbal infusions), water, and porridge. A child's grandmother is the one who fed Mzuwalatoa child for disease protection while their mothers initiated the others' foods in the perception that the children were hungry. Dawale is given to children during early years due to anthropometric health status in comparison to Mzuwula which is given to children to prevent poor growth and is made up of boiled water which is usually given in very small quantities. Similarly, this porridge affected child health due to contamination since it was served in large quantities thus displacing breast milk.

Melbye and Hansen (2015) in their study on breastfeeding practices assessment. They sampled 818 children of which 100% were ever breastfed. However, from the results only 15% were exclusively breastfed during their first four months of life, 85% were fed on water, and this increased gastrointestinal infections risks. The inclusion of water improves hydration and tea relieves pain and quenches thirst. These two are recommended by medical personnel specifically for these purposes.

2.4 Mixed Feeding in Africa

Traditionally, the African way of weaning is different among countries and communities. As time goes by, some of these practices are no longer practiced whereas some are still

practiced but minimally. According to Chan et al. (2018), in Swaziland, mothers feed their children immediately after birth with sugar and salt. They believe this will clear a child's stomach and also will satisfy their hunger in anticipation of a good flow of breast milk. A small number of mothers still feed their children with the traditional first feed (feed (a starchy gruel) in preparation for a good digestive system. Powdered milk and formulas are commonly used supplements. 2-4 months' infant should be fed on soft maize porridge, at 3-6 months old family food should be introduced and when they reach crawling age, they should join other children's common plate. It is not advisable to feed infants with sour milk since it causes heartburn and vomiting. In Botswana, traditionally fresh milk - cow's or goat's milk is the weaning food fed to children. This mostly depends on availability. Then the child is given adult foods which consist of locally made porridge from staple cereals. Milk, water, or sour milk are the main constituents of this porridge, depending on the parent's daily meal plan.

In banana rowing areas like Kibungo and Cyangugu in Rwanda, the main dish fed to children who had teeth and were one-year-old was ("umububi"). Those that can hold objects are fed with bananas. In Mozambique, fermented or non-fermented com flour porridge is usually the main weaning food for babies (Yamborisut et al., 2018). In Zimbabwe, sour porridge which is prepared and made enough to last 3 or 4 days is the weaning food given to babies. This is done to reduce mothers' workload and also save time. Sliced sweet potatoes dried and made into flour were added to the porridge. This practice has been overtaken by time and no longer being practiced (Adokiya et al., 2021).

In Ethiopia, the newborns are first breastfed and later butter is introduced to their diet. Also, a child is given water that is mixed with butter or water alone. Butter is given on the 151 days since they believed it helps "open up throat" or to "grease it" and to "also cleanse the child's stomach. When this is done breastfeeding starts.

Various nations start weaning at distinct specific dates. In rural locations, babies often commence the weaning process between 8 to 12 months of age, but in metropolitan settings, it begins at 5 months or even sooner. Gruel, porridge, "fetfet" (a blend of tef, sorghum, barley, maize, wheat, broad beans, chickpeas, field peas, and lentils), and "dabo" (a combination of sorghum, barley, wheat, maize, and emmer wheat) predominantly constitute the traditional meals consumed in numerous homes (Psychogios et al., 2019). Adokiya et al. (2021) indicate that in Uganda, infants during the supplementing phase are mostly provided with diluted cow's milk, porridge prepared from maize, millet, or sorghum flour, vegetable stews, and tea. The youngster is thereafter nourished with the family's food.

In Kenya, traditional weaning techniques have mostly ceased, but they vary amongst communities. Botelho et al. (2022) state that "tuutuu" was the inaugural solid meal administered to infants in Meru, derived from a distinct species of tiny, delicious bananas that were peeled and roasted in hot ashes. The bananas were peeled, and the mother chewed them, subsequently mixing them with saliva to render them soft and palatable, which she then administered to the kid using her finger. Similarly, yam paste is created in the same manner as banana paste. The Kiambu people likewise engaged in a comparable preparation of masticated bananas. In certain regions of the Kakamega area, millet porridge Children were provided a diet consisting of extremely thin plain sorghum shortly after birth. In many places, this was not the case, since porridge was fed to the kid at a later age when the youngster could crawl and grasp for food.

In Uasin Gishu, "mursik" is the additional meal provided to infants, consisting of fermented cow's milk. In Mbita, South Nyanza district, dehulled red sorghum is favored since it results in less gastrointestinal issues for children and promotes healthier weight gain compared to white sorghum. Contemporary moms favor the use of 'wimbi' (millet porridge) as it facilitates bowel movement. Raw hen's eggs may be included for nutritional benefits.

Sharma and Khadka (2019) indicate that women in Kikuyu territory typically see the introduction of food or weaning as appropriate at an early age. Specific meals, including "gitoero" (a stew of roots and tubers, such as Irish potatoes and green bananas), are initially provided, followed by "ucuru" (a light porridge) and beans, while "ngima" (a stiff porridge made from maize flour) accompanied by vegetables is served when a kid commemorates their first birthday. Kikuyus often choose beans and animal products as nourishment for young children. Animal goods, such as meat, are seldom provided to youngsters. The predominant legumes utilized are beans and spinach. Kale and cabbage are the most favored veggies.

2.5 Factors influencing the introduction of mixed feeding to infants below 6months

2.5.1 Socio-Cultural Factors

Complementary feeding for infants and the timing largely affect their nutritional uptake. This may escalate as the child grows. In the Netherlands, a study by Wang et al. (2019) explored factors influencing early complementary feeding (before 4 months) and the consumption of non-recommended foods, such as sugary beverages and snack foods, by infants. The research used cross-sectional data from the BeeBOFT study, involving 2,157 participants. Data were collected through questionnaires, and logistic regression models were applied to analyze the factors associated with complementary feeding and infant consumption of non-essential foods. The findings revealed that 21.4% of infants were introduced to complementary feeding at 6 months, while 20.2% started before 4 months, and 16.5% were fed sweet drinks and snacks daily.

Young mothers with limited maternal education were more likely to introduce non-essential foods to their infants. Additionally, parents' perceptions, such as "my child eats when they want" or observing other children eating, contributed to the early introduction of

inappropriate foods. Factors such as maternal pre-pregnancy BMI and infant weight at postnatal visits were also positively associated with the introduction of complementary foods.

In India, Bhandari et al. (2014) examined the factors affecting complementary feeding among infants and young children through a cross-sectional study involving 400 mothers of children aged 6-24 months. The results indicated that socio-cultural practices significantly influenced the complementary feeding of infants, with cereals being the most common food introduced. Only 19% of the children received a balanced diet, 50.8% consumed non-essential foods, and 41% were fed market-bought foods. These practices were significantly related to family type ($p=0.002$), maternal education ($p=0.000$), socioeconomic status ($p=0.000$), and IYCF knowledge obtained during immunization visits ($p=0.000$). As infants grow, their nutritional needs change, transitioning from breast milk and formula to a varied diet. Failure to introduce appropriate complementary foods can lead to malnutrition. Therefore, it is essential for mothers to introduce complementary feeding at the right time to ensure their infants receive adequate nutrition.

In Egypt, Ezzat (2017) studied complementary feeding practices in Alexandria by sampling 360 mothers with children aged 6-24 months attending a well-baby clinic. Data were gathered through structured interviews. The study found that 50-60% of mothers obtained complementary feeding information from friends and family, while 32.2% relied on healthcare professionals. Over 60% of infants were introduced to complementary foods before 4 months, with dairy products being the primary food (51.9%), followed by cereals (23.3%). Additionally, 45% of infants were fed three meals daily, while 21.9% received two meals. Regarding food preparation, 68.6% of mothers prepared meals daily, 25.3% once a day, and 6.1% every two days. Infants were generally not given spicy, fatty, or sweetened foods. The study highlighted that maternal factors such as education level, employment

status, and age affected mothers' knowledge of complementary feeding, the appropriate time to introduce foods, the type of foods to offer, and the frequency of feeding.

Cultural practices influence breastfeeding behaviors in different communities, dictating the initiation, frequency, and cessation of breastfeeding. Education plays a critical role in shaping these practices, but in some cases, cultural beliefs can negatively affect exclusive breastfeeding. For instance, in certain areas, traditional customs encourage the use of herbs and pre-lacteal feeds, which can be harmful to infants (Majumder et al., 2018).

Western societies tend to encourage early weaning, believing it fosters faster growth and independence in children. In North and Western Europe, public breastfeeding is often discouraged, and in the U.S., there is a strong cultural emphasis on raising independent children from an early age. This cultural norm leads many parents to introduce bottle feeding early, often resulting in separation between mother and child. Thumb-sucking is also viewed as a sign of independence, and parents typically move babies out of their bedrooms to reduce reliance on the mother.

In American culture, science significantly influences beliefs about infant feeding. Many Americans trust that scientifically produced infant formula is as good as, if not better than, natural breast milk. This belief prompts many mothers to use formula and introduce solid foods before the recommended 6 months (Mezgebo et al., 2021).

According to Awuuh et al. (2019) in a study done in India, culture made mothers introduce other foods to their babies before 6 months. From the study, it was agreed that mothers should not introduce other foods to their babies before they reach 6 months since it will endanger their health. They should exclusively provide breast milk

Similarly, Adokiya et al. (2021) assert that in Sri Lanka, this culture of exclusively breastfeeding infants up to 6 months is advocated for. Nevertheless, Botelho et al. (2022) in

a similar study done in Nias Indonesia on practices on infant feeding revealed that there was an assumption that when a mother breastfeeds a child for a longer period (6 months), the child's growth will be affected. Also, in the same study, it was revealed that pregnant mothers could not breastfeed their babies for the reason that the unborn fetus will be interfered with and its health and growth after birth will be in danger. Birth intervals in Sri Lanka were short and this was another factor that made mothers start weaning early. The children's grandmothers also and a say in the way mothers breastfed their babies and in most a negative influence on EBF. In rural Rajasthan district in India, a report by Singh (2010) established that 77% of its population was not in support of feeding their babies with colostrum.

In Nigeria, Adokiya et al. (2021) depicted that some ethnic communities positively upheld exclusive breastfeeding but still in some areas the practice was lowly practiced. Women could not breastfeed to appease their husbands with nice-looking breasts. They had a belief breastfeeding makes their breast flabby and thus would not make their husbands happy. From the Nigerian Demographic Health Survey 2008 exclusive breastfeeding for infants below 6 months amounted to 13% and 87% of infants receive complementary liquids or foods below six months. They associated jaundice with colostrum, so the yellow milk was not given to their babies.

Breastfeeding sustainability and initiation are very much affected by the timing of complementary feeding. Yoruba community believes that exclusive breastfeeding is essential to both mother and child. They commonly believe that, in a child, initiation of complementary foods enables easy uptake of other foods. Third World countries advocate for exclusive breastfeeding as it is the best nourishment 3-6 months infant receives. Nevertheless, women in East Africa introduce water, sugar, and other traditional beverages as mixed feeding to their infants because their culture dictates so (Chan et al., 2018).

In Uganda, 99% of mother's embrace breastfeeding. Exclusive breastfeeding rates are however not high. Weaning introduced to the children makes them more prone to infectious diseases and this may retard their growth. (Mohamad et al., 2018). As mothers wait for breast milk to flow, pre-lacteal feeds, water-based liquids commonly, are introduced to satisfy their hunger. They have a belief that this cleans their throat and acts as a pain reliever experienced during delivery. This is done sometimes from the advice mothers get from health staff and some follow their traditions (Jongsomjitt et al., 2021).

In Kenya many women mostly from the countryside and urban poor population follow their traditions that do not fully advocate for exclusive breastfeeding, so most of them avoid exclusive breastfeeding and introduce complementary foods to infants at a very young age. In some cultures, a mother quarrels with her husband, she is not supposed to breastfeed since they believe that the mother will convey 'bad blood' to the child. Some mothers are also prohibited from eating proteins since it is believed that if they eat, they will be overweight and also their babies will be obese (Boateng et al., 2019). Barati et al. (2018) in some cultures, mothers dilute breast milk and this is not healthy. This childcare practice is a threat to the infants' health since it exposes them to diarrhea and worm infestation thus not able to acquire all the required nutrients.

Previous studies have indicated that child morbidity in some instances is brought about by poor feeding practices. In Timor-Leste, Acute Respiratory Infections (ARIs) in children was caused by poor and non-essential diet given to infants by their mothers (Senarath et al., 2007). In a study done on morbidity and nutrition in Botswana, when complementary foods are introduced to babies who are below 4 months old, they are easily attacked by diseases like diarrhea unlike those who are fed complementary foods after 6 months (Prasad et al., 2016).

In Uganda, Zewdie et al. (2022) in his study identified factors in an infant caused by mixed-feeding in 2006 and 2011. The study made use of Trend analysis of Uganda Demographic and Health Surveys (UDHS) from 2006 and 2011. The study revealed that during this time of study, there was an increase of 3.1% in children fed with complementary food. Also, there was an increase noted in breastfeeding from 11 months to 12 months. Mothers who exceeded breastfeeding up two years decreased, from 55.2% to 46.5% In some instances, caregivers give appropriate diets to their children just because of factors like child age, elimination of intestinal worms, and because of receipt of measles and DPT3 vaccines so that they are strong enough to fight with the effects. In the said period, 2006 and 2011, all the children aged 6 to 8 months and 12 to 17months were fed with enough complementary foods. A large number of children aged 6 to 11months from the results used bottle feeding although no statistics were provided to indicate that those who were fed with the bottle had a fever or any acute respiratory (ARI) or diarrhea.

According to Mohamad et al. (2018), the birth-weight of a child affects the breast-feeding pattern. A child born with low birth-weight is less likely to breastfeed properly. This is because it is a challenge for a mother with a low birth-weight child to breastfeed that child. May be because of time, since there are time limitations and that child needs a lot of time and attention. Stress on the side of a mother can also pose a challenge and affect milk production. Small infants in some cases may require some additional supplements. This may be administered through bottle feeding since they might be too small to even the mother's nipple and suckle (Botelho et al., 2022).

Jongsomjitt et al. (2021) propose that an infant should learn to suckle during the infant's first days and this will enable successful breastfeeding. This is because, in some instances when a child is introduced to bottle feeding before learning to suckle, it is usually a challenge for

that infant to breastfeed properly. This may make a mother introduce weaning of that child earlier than expected.

The use of bottle feeding is most of the time the cause of breastfeeding termination. A child is given supplements and supplemental formula with the bottle. Regardless of the method used, bottle feeding is seen as the main cause of breastfeeding termination since a mother believes a child has learned and can easily be fed even in her absence.

Boateng et al. (2019) reported that fathers should be made aware of how breastfeeding is of importance to both the child and the mother. This in a way will help them encourage their wives to continue breastfeeding instead of introducing bottle-feeding to a child. In some instances, mothers are more supportive of breastfeeding in comparison to their partners. Bottle-feeding mothers support it although they have no ill thoughts about breast-feeding, maybe because of the status of life they are living in at that particular period. The study also revealed that both bottle-fed and breastfed father babies felt embarrassed when the partners fed their babies in public and front of non-family members.

2.5.2 Knowledge and Skills of Mothers on Mixed Feeding

Inadequate feeding methods and non-essential food consumption in the first year of life induce malnutrition in children. After giving birth, Afolabi et al. (2021) in Nigeria tested new moms' abilities to supplement their diet. The research used Fisher's formula to determine the sample size in order to get a simple percentage. The mothers were chosen using a multi-stage sampling procedure. The target population of 193 postpartum moms was studied using SPSS software version 22 at univariate, bivariate, and multivariate levels, with a significance threshold of $p < 0.05$.

A third of moms who gave birth did not give their babies complementary meals, according to the study. They relied solely on breastfeeding. Among the mothers who began

supplementing their infants' diets, 28.0% did so at three months of age, 36.3% did so between the fourth and fifth months, 32.1% did so gradually, 26.4% used small, age-appropriate portions, and 50.3% used a variety of foods, but very little overall. Supplemental feeding skills (OR=2.21; 95% CI: 1.31-3.73, $p=0.03$), tertiary education (OR=0.18; 95% CI: 0.05-0.59, $p=0.01$), and household food security (OR=0.49; 95% CI: 0.26-0.94, $p=0.03$) were significantly associated with meal frequency in the regression analysis. The information women had obtained in supplementary feeding (OR=2.67; 95% CI: 1.38-5.14, $p=0.003$) and highest educational level (OR=0.11; 95% CI: 0.02-0.71, $p=0.02$) were significantly associated with small amount and adequate food.

Research on eating habits in Rwandan children between the ages of 6 and 23 months was conducted by Umugwaneza et al. (2021). Mothers participated in the study using focus groups, which were qualitative and cross-sectional. Community health workers (CHWs), dads, and grandfathers all did things differently. The five districts of Rwanda were the sites of this in-depth conversation.

For the sake of trustworthiness and authenticity, the researcher videotaped the conversation. Atlas was used for data analysis. Parents and grandparents with children aged 6–23 months took part. The Department of Child Health's caregivers were also a part of it. Major facilitators of healthy baby health and growth were identified to include the caregiver's knowledge and abilities, their beliefs about breastfeeding, and the commencement of supplementary meals. Many parents and caregivers mistakenly think that babies should only be given liquids as their initial nourishment, rather than semi-solid meals. Their chosen methods of newborn feeding are coming under increasing pressure from this. Gathered together as a group, the moms were invited to a counseling session by the community health facilitator, who would then educate them on appropriate complementary therapies. It was difficult to implement ideal feeding practices due to the society's impoverished living

conditions. Caregivers should be taught on the health advantages of exclusive breastfeeding and supplemental feeding, according to the research.

Half of the mothers in a Nepalese study on infant feeding practices were able to breastfeed their babies exclusively for at least five months; forty percent began supplementing their babies' diets before the recommended age of six months; and thirty-two percent waited until their babies were six months old before starting a solid food diet. Breastfeeding is essential and provides newborns with essential nutrients, according to nearly all moms. A whopping 98% of parents think it's a great way to bond with their babies, 95% think it's a great way to give their babies good food, 86% think it is a great way to save money on supplements, and 80% think it's a great way to keep their babies healthy. But 38.0 percent of people polled had doubts about the usefulness of birth control during nursing.

The World Health Organization found that although 52% of moms knew when to give their babies supplemental meals, only 37% actually did it correctly. In their study on Chinese women residing in Ireland, Zhou et al. (2020) sought to understand the ways in which these moms come across and utilize complementary feeding methods, as well as their opinions towards it. According to the results, these moms were aware of the advantages of nursing. Contrary to the World Health Organization's advice that women nurse their infants for the first six months before giving them baby formula, prior research has shown that moms actually introduced formula before nursing. This occurred because they were unaware of the many health advantages and nutritional benefits that newborns reap from breast milk. This study offered scientific evidence in favor of the idea that breastfeeding should be more widely publicized in Ireland.

In addition, many mothers could not breastfeed their babies when they had a common cold believing that their babies also be sick. According to medical experts breastfeeding in itself

has a protective effect on the child even if the mother has a cold Ramachandran and Kalaivani (2023) cited a lack of clear and conclusive skills on the benefits of exclusive breastfeeding to postpartum mothers.

According to Mogre et al. (2016) in rural areas, lactating mothers have EBF knowledge in infants aged 0-6 months and their attitudes towards it. It was found that they have enough knowledge about EBF but some were notable problems identified. However, the biggest group of mother did not know the benefits EBF have for their infants.

Mohamed et al. (2018) in their comparative study of KAP on EBF compare between primiparous and multiparous mothers who visit Wajir County Hospital, Wajir County, Kenya, and also in an investigation on maternal knowledge and attitudes in association with EBF. Out of 10, primiparous mothers managed 7.93 ± 2.10 and 7.49 ± 2.20 for the multiparous mothers. This showed that mothers had proper and adequate knowledge of breastfeeding.

Primiparous mothers because of their score proved to have more knowledge in comparison to the multiparous mothers. Statistically, this difference was not significant. Government efforts in improving EBF rates by ensuring there are Baby friendly hospitals, (BFHI), Mother to Mother support groups, and a Baby friendly community Initiate (BFCl), might be a reason mothers have this knowledge.

Attitude is one behavior attained after performance evaluation (Mäntyselkä et al., 2019). A woman's attitude dictates how she practices breastfeeding and her relationship with significant reference people like family members, her partner, and friends as well. She will have a positive attitude towards breastfeeding if she believes it has benefits and is important to her baby. Darby-Carlberg (2010) conducted a study that studied the attitude young adults possess about breastfeeding in Clark County, Nevada. The study was in support of part of a

study by Marrone et al. (2008) which indicated that the Iowa Infant Feeding Attitude Scale (IIFAS) improves breastfeeding desire. One's attitudes favor breastfeeding since sometimes it creates a preference that breastfeeding is better than formula-feeders and it creates joy in motherhood. In some instance enable a mother to have a notion that in comparison, breast milk is less expensive than infant formula. This has been amongst Chinese mothers in Australia where 91% preferred breast feeding. Chinese culture on breastfeeding prompted this positivity. In a way, mothers believed that if they breastfed their babies, they would regain their weight faster and on the other hand fear that their breasts would sag and thus spoil their shapes.

Mitchell-Box et al. (2013) in their research investigated the attitude perceived by women who earned little together with their male partners. This was measured using Iowa Infant Feeding Attitude Scale (IIFAS). An investigation in the male partners investigated the reliability and validity measurement of mothers' perception and their main aim in breastfeeding their children. Both their scores were correlated and there was a significant in their breastfeeding aims and intentions.

Eftihia et al. (2009) explored beliefs and emotions adult women possess on breastfeeding in a Greek province. The study showed mothers in Greek provinces had a very high prevalence of breastfeeding despite that just a few reported having breastfed their infants for 6 months. From the target population 4 out of 5 mothers had breastfed their children.

A study by Mogre et al. (2016) accessed the level of knowledge of rural lactating mothers, and their emotions on breastfeeding of infants aged 0-6 months. There was a discrepancy noted in the period taken on breastfeeding and the quantity of breast milk given to the infants. Mothers had a strong belief in EBF and a big number were against the idea of expressing breast milk and giving their children later.

According to Zhou et al. (2010), Chinese mothers prefer breastfeeding their babies since they have an attitude that 'formula-feeders make them miss the joy of motherhood which is associated with breastfeeding. They strongly prefer breast milk because it is cheaper than infant formula. This is a positive attitude that they attribute to their Chinese culture.

In their study, Al Ketbi et al. (2018) assessed factors associated with breastfeeding in women living on Abu Dhabi's land. Their attitude and knowledge on breastfeeding were some of the factors identified to have a significant influence on exclusive breastfeeding

Al Khresheh (2020) in his study described how breast-feeding relates to skills, emotions, expectations, and networking capability, in university female students in Saudi Arabia. There was a clear indication that these students had a good attitude towards breastfeeding, they knew and their intention on breastfeeding was superb. There was a lot of respect for breast-feeding women at all levels be it social class or education level and they had a strong belief that they should breastfeed their babies. Muslim women are supposed to be guided by the Qur'an's rules and regulations on breastfeeding and infant weaning.

Westmar and Johansson (2013) investigated Thai mothers' confidence and attitudes and whether there were any disparities experienced in nuclear families and extended families regarding these practices respectively. Results showed that 11 percent had a neutral attitude towards breastfeeding and in 9 percent their attitude perception was positive. Regarding extended mothers and those living in nuclear families, there was no significance on how they viewed attitude affected breast-feeding. Chinese mothers in nuclear families were not on bottle-feeding support, their rating was low compared to mothers living in extended families for babies less than 4 months old.

Alsayed and West (2019) in their study of Saudi women in the National Guard Hospital in Jeddah examined how skills, emotions, practices, and perceived barriers affect breastfeeding

attitude. Primiparaos positively believe in breast-feeding. Knowledgeable participants have a better attitude toward breastfeeding

2.5.3 Economic Factors

According to Gitonga (2014) average education in mothers affects their tendency to introduce supplementary food to their babies very early before they are 6 months old. Another research study in Delhi portrayed the same that maternal and partner education levels influence when these parents introduce supplementary foods to their babies.

Wolde et al. (2021) study on working mothers in Addis Ababa, concluded that these mothers introduce mixed feeding before 6 months in comparison to staying-at-home mothers. Mothers aged 25 years and below introduced mixed feeding to their babies earlier compared to older mothers, this is according to a study by Walters et al. (2019) in Burkina Faso.

Kimani-Murage et al. (2011) in their assessment of urban child feeding practices in Nairobi informal settlements found that single mothers introduce mixed feeds to their babies at an early age before they reach 6 months unlike their counterparts (married mothers). The same assessment indicated that in the Viwandani slum, there was a lower risk of mixed feeding introduction compared to in Korogocho slums.

In Tanzania, Hussein's study concluded that middle-class and high-income earners mothers introduced mixed feeding, solid and semi-solid foods before their lower-income earners 'counterparts. A previous study which had been conducted in the same country was at par with the findings in that high-class women who are economically stable had little time to look after and care for their babies

Joshi et al. (2011) study conducted in Nepal, multivariate analysis showed that complementary feeding practices in young children aged 6–23 months for working and less educated mothers were fed with the appropriate nutritional status diet. There was no

deficiency noted in those infants. The same study depicted that children living in poor backgrounds do not get the appropriate nutritional diet and thus they incur deficiencies.

Similarly, a study in Iran by Olang et al. (2012), indicated that obese mothers and educated mothers both fed their children with the proper diet recommended and at the correct timing and frequency. In developing countries, there are a lot of women being supported to go to work so that they can give nutritional support to their families. This is because in these countries, men have neglected their families and, in some instances, men's jobs have become minimal. These situations force mothers to leave their babies, to go to work so that they can supplement family income.

2.6 Theoretical Framework

A logically developed and connected concept, their definitions, and existing theories used in a study. It connects and gives direction to a researcher on existing knowledge of a theory to be used in a study. Theoretical framework strengthens a study by giving explicit statements of theory assumptions and this makes a reader a critical evaluation. The study was guided by the Theory of Planned Behavior, reasoned action, and the interactive theory of breastfeeding.

2.6.1 Theory of Reasoned Action (TRA)

The theory was utilized in this study. The theory emphasizes more on mothers' emotions and beliefs on exclusive breastfeeding and breastfeeding. The theory also focuses on the influence mothers get from other people, family members, and their partners, health experts on the introduction of supplementary foods and other solid foods rather than breast milk. Water, juice, formula, and herbal drinks as examples.

The TRA depicts that what determines a behavior intention and what brings about the need for behavioral change is a person's emotion and belief in doing what she ought to do. A

mother's behavior intention will make her make decisions on the introduction of supplementary food to her child.

A person's behavioral belief affects her emotions and perceptions of the results of performance evaluation. If a person strongly believes that positive results are derived from positive behavior, she will have a positive view regarding that aspect of behavior. Similarly, if a person on the other hand believes that a strong negative outcome comes as the result of a negative emotion towards a behavior automatically he will achieve a negative result. (Glanz et al., 2008). According to this concept, mothers who breastfeed their children because they believe it is the healthy and nutritious way to feed their babies, will automatically possess a very positive attitude towards it.

Similarly, subjective norm informs a person's behavior just because she wants to adhere to what other people approve. Therefore, if the person inserts other people's norms in her mind and believes it's a positive subjective norm, she feels motivated by those people and performs the behavior (Glanz et al., 2008). Given that, those people who want to please their friends and family members will give their babies supplementary food other than breast milk, such as water, juice, and herbal drinks before that child is 6 months old just to comply with their decisions. The TRA is very effective in looking at behavior and normative beliefs that determine one's intention and behavior. (Hale et al., 2002).

2.6.1 Theory of Planned Behavior

The theory of planned behavior (TPB) is very successful in the theoretical framework. It assists in indicating in advance mothers breastfeeding behavior and it can predict behavior change. Several studies have shown a great connection between knowledge, attitude, subjective norms, and practice control and breastfeeding behavior (Tengku et al., 2016). However, different conclusions have been arrived at which depend on the population.

The theory of planned behavior is a good predictor in explaining exclusive breastfeeding. It focuses on cognitive factors that influence mother breastfeeding behavior. According to the theory, one intention is influenced by her attitude, her norms, and her ability to control that behavior. Altitude refers to behavior achieved after performance evaluation. Perceived norm is the ability to do something as a result of a person or group's influence that makes one decide whether to do something or not. This theory is mostly used in social behaviors and is becoming very popular in studies guiding breastfeeding. However, its ability to predict a continuous behavior in this case exclusive breastfeeding has been questioned.

Exclusive breastfeeding involves a start and maintenance of a particular behavior. Breastfeeding challenges and the support of postpartum after a mother begins breastfeeding improve exclusive breastfeeding prediction and its continuity. This study adopted the TPB theory to achieve exclusive breastfeeding predictors of an infant mother's behavior in Wajir County.

2.6.2 Interactive Theory of Breastfeeding

The Interactive Theory of Breastfeeding originally was initiated for nurses and other healthcare professionals to be used in protecting, creating awareness, and supporting breastfeeding (Primo & Brandão, 2017). Its creation was based on King's Conceptual System. This system gives an explanation and description of breastfeeding concerning health models. This theory acts as a breastfeeding solution in areas where they have an intact and common culture related to the ancestral land as in the case of Wajir County where this study will be undertaken. It is used in their study as a presentation of the breastfeeding process since it provides an open, interrelated, and interactive system concept. The purpose of this study is the provision of a descriptive, review concerning exclusive breastfeeding thus the researcher adopted the theory.

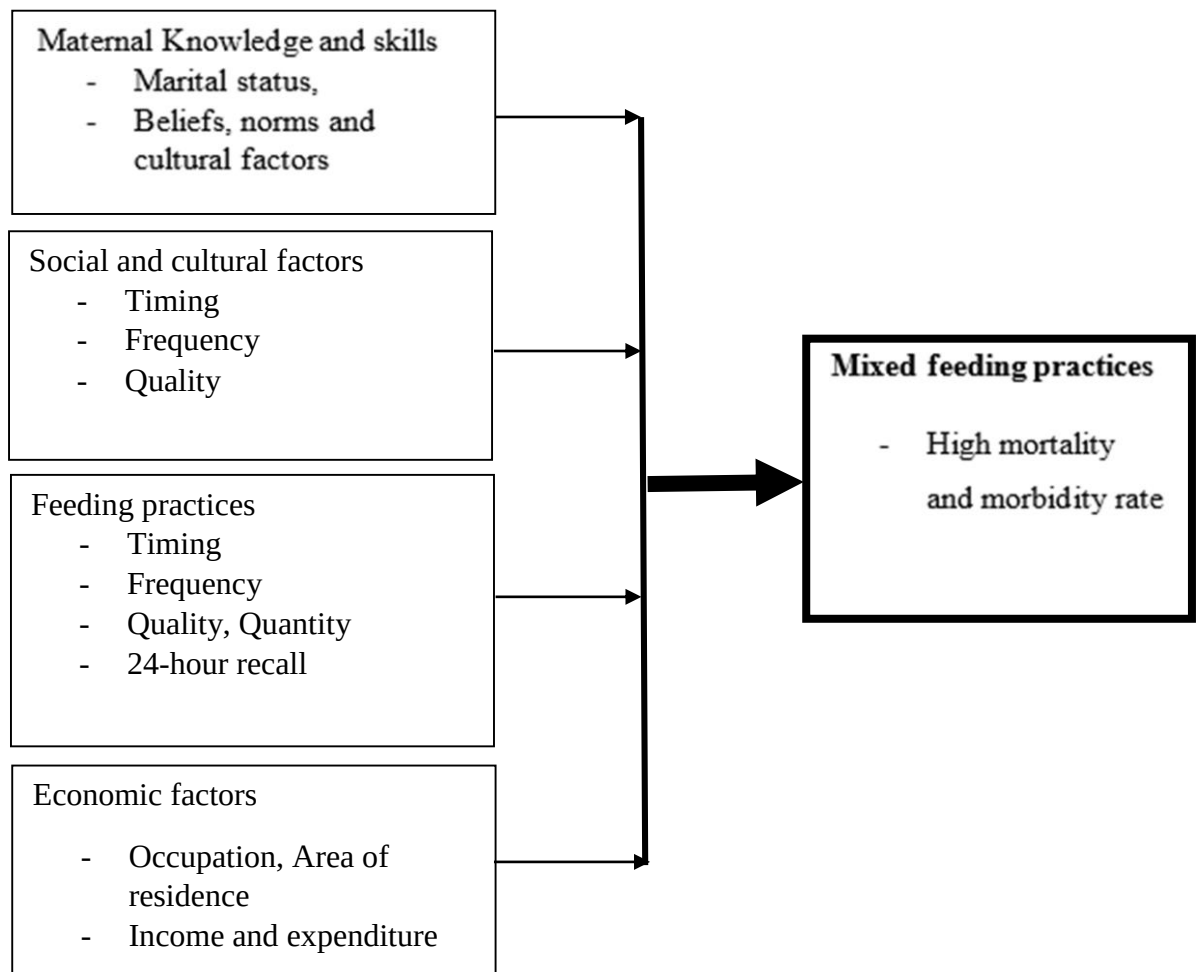
According to Eckhardt et al. (2014), breastfeeding is an interactive process that is initiated from the mother's breast and then flows to the child. The interactive theory of breastfeeding cites breastfeeding as a process that initiates an interaction between a mother and a child. A mother can learn the biological conditions of her child. This theory however highlighted an advantage that when a mother is stressed and does not have enough time, this interactive process is affected. Limited breastfeeding space, body image, family, and social factors also negatively affect this process.

2.7 Conceptualization

A conceptual framework is a guide and ballast to research that functionally integrates ecosystems helping researchers bring study aspects together. It is the center of an empirical study that brings out expectations that inform a researcher on the main things, concepts, or variables to be studied and their presumed relationship (Ravich & Riggan, 2016).

Figure 2. 1

Conceptual Framework



Independent Variables

Dependent variable

Source: Researcher, 2023

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Research methodology is the discussion of philosophical research design and procedures for conducting a study. This chapter outlined the research methodology and design, population, sampling techniques, sample size, procedures for data collection, data analysis procedures, and ethical procedures implored in the study.

3.2 Research design

Because it shows how the review occurs while taking the relevant variable into account, a descriptive study design was used. This study, provided information on the factors influencing mixed feeding practices on infants below 6months by mothers attending Wajir County, Kenya at that particular time.

3.3 Study Location

Participants were mothers and caregivers within the area who, due to their economic situation, attend public health facilities; the study was conducted at Wajir County Referral Hospital MCH, AliMaow, Barwaqo, and AIC health centers. Previous research indicates that in Kenya, residents who live in rural areas have poor health and they mostly feed on non-essential foods which worsens their nutrition status. The health center was chosen to investigate the factors influencing mixed feeding practices of infants below 6months by mothers in the study area.

3.4 Target population

The study focused on breastfeeding mothers with children aged 0-6 months who attended the MCH at Wajir County Referral Hospital, as well as Barwaqo, Alimaow, and AIC health centers. This group consisted of mothers visiting these facilities solely for immunization and

postnatal care. In total, the target population included 802 breastfeeding mothers and caregivers: 361 from Wajir County Referral Hospital MCH, 159 from Barwaqo, 161 from Alimaow, and 121 from AIC health centers. The details of the target population are presented in Table 3.1.

Table 3. 1

Target Population

Health Facility	Population
Wajir County Referral Hospital MCH	361
Barwaqo	159
Alimaow	161
AIC health centers	121
Total	802

Source: Specific Health Facilities

3.5 Inclusion and exclusion criteria

3.5.1 Inclusion criteria

Mothers whose infants were between the ages of 0 and 6 months old and who attended health centers affiliated with Wajir County Referral Hospital (MCH) Barwaqo, Alimaow, and AIC were the only ones included in the research. Of the 361 moms and caregivers surveyed, 161 went to Alimaow and 121 to AIC health clinics. This just comprised individuals whose attendance at the postnatal clinic was documented.

3.5.2 Exclusion criteria

Mothers with differently disabled infants and those that were chronically ill were not included in the study. This information was according to maternal self-reports and data from

health cards. Most of these children are under medication and special care and this influences their feeding habits.

3.6 Sample size and sampling technique

The study employed a cross-sectional research design to collect data from mothers seeking services at immunization clinics and postnatal units. The cross-sectional design was appropriate for this study as it allowed for the collection of data from a diverse group of respondents at a single point in time, providing insights into feeding practices and other relevant variables.

3.6.1 Sample size determination

The formula developed by Krejcie and Morgan in 1970 was employed to ascertain the suitable sample size for the investigation. It is usual practice to use this method for calculating sample sizes from big populations, especially when dealing with proportions and confidence intervals. To determine the sample size, the following formula was used:

$$S = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

S = sample size

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)

N = the population size.

P = the population proportion (assumed to be .50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

$$S = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

$$S = 3.841 \times 802 \times 0.5(1-0.5) \div 0.05^2 \times (802-1) + 3.841 \times 0.5(1-0.5)$$

$$S = 3.841 \times 802 \times 0.25 / 0.05^2 \times 801 + 3.841 \times 0.25$$

$$S = 260$$

This calculation yielded a sample size of 260 respondents. The sample size was manageable given the study's time, financial constraints, and the need to collect comprehensive data. The sample was distributed proportionally across four health facilities within Wajir County. The proportionate sampling ensured that each health facility was adequately represented according to its share of the total population of breastfeeding mothers seeking immunization and postnatal services.

Table 3. 2

Sample Size

Health Facility	Population (F)	Ratio (R) = n/F	Sample size (n) =F*R
Wajir County Referral Hospital MCH	361	260/802 = 0.324	117
Barwaqo Centers	159	260/802=0.324	52
Alimaow Centers	161	260/802=0.324	51
AIC Health Centers	121	260/802=0.324	40
Total	802	260/802=0.324	260

Source: Researcher (2023)

3.6.2 Sampling Technique

A systematic sampling technique was employed to select participants. This method involves picking every third mother/caregiver in the queue seeking services during the five weekdays (Monday to Friday), excluding weekends. The interval of three was chosen for its simplicity

and ease of implementation, ensuring that the process was cost-effective and feasible given the study's scope and resources. The choice of 260 respondents was guided by the need for a manageable yet statistically significant sample size. A justification based on power analysis would further strengthen this section by explaining that a sample of 260 respondents provides sufficient power to detect significant differences or relationships within the population, thereby ensuring reliable and generalizable results.

3.7 Instrumentation

The researcher prepared questionnaires to be used in collecting data. Questionnaires were used and self-administered because according to Orodho (2004), they act as measurement tools. The questionnaire was divided into various sections (see Appendix II).

3.7.1 Instrument Reliability

During pretesting, the research instruments' reliability was test-retested. The first test was done on mothers who visited the health center on Monday and the same was repeated on the mothers who visited the health center on Friday that same week. After re-examination of the pre-test responses and the coefficient, the researcher got the test-retest reliability. The cut-off point for the reliability co-efficiency was 0.7.

3.8 Data collection techniques

The researcher got a research permit from NACOSTI after the institution issued a letter for Research authorization. This permit enabled the researcher to seek permission from the county health administrative officer to carry out the study. The questionnaires were administered by trained five research assistants (undergraduate and diploma nutrition students) with technical support from the researcher after undergoing two days of training. Once consent was obtained from the mother, the researcher administered the pre-tested

questionnaire to the mothers. The demographic data on variables like age, sex, education level, occupation, and marital status were collected

3.9 Data Analysis and Presentation

Data was entered using SPSS version 26, with thorough cleaning performed to ensure consistency, completeness, and to avoid double counting. To analyze the relationships among maternal knowledge, socio-cultural influences, feeding practices, economic factors, and mixed feeding methods, a chi-square analysis was conducted. This analysis utilized the Statistical Package for Social Science (SPSS) version 26 for Windows. A confidence interval of 95% was applied, considering p-values of 0.05 or lower as indicative of significant links.

3.10 Ethical considerations

Ethical approval for the research was granted by the Science and Ethical Review Committee (SERC) at Kenya Methodist University. Participation in the study was entirely voluntary, and no financial incentives were provided. All participants gave informed consent after receiving a complete explanation of the study's purpose and nature. To protect confidentiality, participants were not asked to include their names on the questionnaires, and the data collected was solely for research purposes. Additionally, steps were taken to minimize any potential risks to participants.

CHAPTERFOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter provides a comprehensive overview of the study's results and discussion. It details the response rate, presents the socio-demographic characteristics of the respondents, and highlights the findings associated with the five key variables investigated throughout the research.

4.2 Response Rate

The study aimed to collect data from a total of 260 respondents regarding the factors affecting mixed feeding practices among infants under six months in Wajir County, Kenya. The targeted respondents included breastfeeding mothers with children aged 0-6 months who visited the MCH at Wajir County Referral Hospital, as well as Barwaqo, Alimaow, and AIC health centers. As indicated in Table 4.1, 233 of the targeted respondents participated, resulting in a response rate of 89.6%. This high rate was achieved through the researcher's additional physical visits to encourage respondents to complete and return the questionnaires.

Table 4. 1

Response Rate

Category	Frequency (n)	Percent (%)
No response	27	10.4
Actual response	233	89.6
Total	260	100.0

Source: Researcher, 2023

4.3 Demographic Characteristics of Respondents

The study analyzed several socio-demographic variables, including age, education level, marital status, household composition, occupation, and family size. The findings, summarized in Table 4.2, reveal that 96 respondents (41.0%) were aged between 36 and 45, while 41 (17.7%) fell into the 26 to 35 age range, and 18 to 25 represented a similar percentage. The median age of respondents was 20 years, indicating that most were between 15 and 45 years old. This age range correlates with the common life stage for marriage and childbirth in the study area, as reflected in the data.

Regarding marital status, 150 respondents (64.2%) were married, 76 (32.7%) were single, and 3 (1.4%) were widowed or divorced. Educational attainment showed that 105 participants (45%) had no formal education, 59 (25.4%) had completed primary education, and 69 (29.6%) had finished secondary school. Notably, 70.0% of the respondents did not pursue tertiary education, indicating a low level of educational attainment.

In terms of occupation, 91 mothers/caregivers (38.9%) were unemployed, 33 (14%) were pastoralists, 56 (23.9%) were temporary workers, and 54 (23.2%) were employed. The high unemployment rate and limited income among participants may be attributed to insufficient education, hindering access to better-paying jobs. As shown in Table 4.2, most households surveyed had between 4 and 6 members (117, or 50.2%), followed by 83 households (35.5%) with 1 to 3 members, and 33 households (14.2%) with more than 6 members. This indicates a prevalence of larger family sizes among the respondents.

Table 4. 2

Demographic Characteristics of the Respondents

Age of mother/caregiver	Frequency (n)	Percentage (%)
15-17	27	11.8
18-25	41	17.7
26-35	41	17.7
36-45	96	41
46-49	27	11.8
Marital status	Frequency (n)	Percentage (%)
Married	150	64.2
Single	76	32.7
Widow	3	1.4
Divorced	4	1.7%
Education level	Frequency (n)	Percentage (%)
No formal education	59	25.4
Primary	105	45.0
Secondary	69	29.6
Who does the mother Live with	Frequency (n)	Percentage (%)
Husband	140	60.0
Alone	42	18.2
Parents/relatives	51	21.8
Employment status	Frequency (n)	Percentage (%)
Unemployed	91	38.9
Pastoralist	33	14.0
Casual	56	23.9
Employed	54	23.2
Households	Frequency (n)	Percentage (%)
4-6	117	50.2
1-3	83	35.5
>6	33	14.2

N= 233

Source: Researcher, 2023

4.4 Feeding Practices Mothers Use in Feeding Infants of Below 6Months

4.4.1 Introduction of Complementary Food to infants below 6-Months

The research aimed to determine if infants under six months had begun receiving foods other than breast milk. The findings are presented in Table 4.3.

Table 4. 3

Introduction of other foods besides maternal breast milk

		N = 233	
		Frequency (F)	Percent (%)
Is the child introduced to foods?	Yes	137	58.8
	No	96	41.2
Reasons for not introducing the foods	Below 6 months	88	91.2
	Sick	12	10.0

Source: Researcher, 2023

Introducing complementary foods before 6 months, as reported by 58.8% of caregivers, can impact infant health outcomes positively if done appropriately. Early introduction of complementary foods may support better growth and development if the foods are nutritious and diverse. However, introducing such foods too early or inappropriately may risk gastrointestinal issues and nutritional imbalances, potentially affecting the infant's health negatively. The 41.2% who did not introduce complementary foods primarily due to the infant's age (91.2%) aligns with recommendations to wait until 6 months to avoid adverse effects on the infant's digestive system. Adhering to this practice is crucial as premature introduction can lead to issues like allergies or nutritional deficiencies, affecting overall health. The study highlights the importance of caregiver education on appropriate feeding practices to optimize infant health outcomes and ensure that complementary foods are introduced safely and beneficially.

4.4.2 Age of introduction of other foods to infants before 6 months of age

Additional research was carried out to identify the age at which infants were first introduced to complementary foods. The outcomes are displayed in Table 4.4.

Table 4. 4

Age of introduction of other foods to infants before 6 months of age

	Frequency(F)	Percent (%)	Chi-square (χ^2)
<4 Months	18	13.0	$\chi^2 = 30.517^a$
4-5 Months	46	33.3	df = 3
6 Months	73	53.6	p-value = 0.213

N = 137

Source: Researcher, 2023

Most respondents, totaling 73 (53.6%), reported that other foods were introduced before the age of six months. The findings indicate that mothers and caregivers tended to postpone the introduction of complementary foods. There was no significant difference in the distribution of study participants concerning the age of introduction of other foods to infants below 6 months ($\chi^2 = 30.517$; df = 2; p = 0.213).

4.4.3 Age of the First Introduction of Water, Cereals, and Meats among infants before 6 months of age

The study respondents were also asked when they first offered water to their infants. A high proportion of respondents, 81.3 percent, introduced their infants to water at the tender age of 6 months, compared to 24.9 percent at the ages of 4-5 months. Further 13.6 percent offered water to their infants between the ages of 1-3 months, with 2.8 percent doing so during the first week after birth. There was a significant difference in the distribution of research participants for the age of introduction of water to infants younger than 6 months (p = 0.027; $\chi^2 = 11.109^a$; df = 2).

A substantial proportion of individuals introduced cereals to their children at the age of 6 months, compared to 24.9 percent who introduced water at the ages of 4-5 months. Other 13.6 percent started their infants on cereal when they were 1-3 months old. The distribution of study participants differed significantly concerning the age of introduction of cereals to infants below 6months ($\chi^2 = 7.792^a$; df = 2; p = 0.012). A small portion of the participants 17.5% introduced their children to meat at the age of six months. There was a significant difference in the distribution of study participants concerning the age of introduction of meat to infants below 6months ($\chi^2 = 12.322^a$; df = 2; p = 0.042).

Table 4. 5

Age of the First Introduction of Water, Cereals, and Meats among Infants before 6 months of age

		Frequency (F)	Percent (%)	Chi-square (χ^2)
Water	At 1 week	3	2.2	$\chi^2 = 11.109^a$ df = 4 p-value = 0.027
	1-3 Months	19	13.6	
	4-5 Months	34	24.9	
	6 months	81	59.3	
Cereals	Less than 4 months	24	17.5	$\chi^2 = 7.792^a$ df = 2 p-value = 0.012
	4-5 Months	49	35.8	
	6 Months	62	45.2	
Meat	Less than 4 months	-	-	$\chi^2 = 12.322^a$ df = 2 p-value = 0.042
	4-5 Months	-	-	
	6 Months	24	17.5	

N = 137

Source: Researcher, 2023

4.4.4 Age of First Introduction of Vegetables and Fruits to Infants before 6 Months of Age

The study also inquired about when participants began introducing vegetables to their infants. It was found that 28 (20.4%) of the respondents introduced vegetables at six months of age. There was no notable difference in how participants varied regarding the timing of vegetable introduction for infants under six months ($\chi^2 = 24.229^a$; $df = 2$; $p = 0.567$).

A considerable number of participants, 90 (65.8%), reported that they began introducing fruits to their infants at six months of age. Additionally, 27 (19.6%) introduced fruits between 4 and 5 months, while 20 (14.6%) started giving fruits when their children were 1 to 3 months old. There was no significant variation in the timing of food introduction among the study participants for infants under six months ($\chi^2 = 25.829^a$; $df = 2$; $p = 0.113$).

Table 4. 6

Age of First Introduction of Vegetables and Fruits to Infants before 6 months of age

		N = 137		
		Frequency(F)	Percent (%)	Chi-square (χ^2)
Vegetables	< 4 months	3	2.2	$\chi^2 = 24.229^a$ $df = 2$ $p\text{-value} = 0.567$
	4-5 Months	8	5.8	
	6 Months	28	20.4	
Fruits	< 4 months	20	14.6	$\chi^2 = 25.829^a$ $df = 2$ $p\text{-value} = 0.113$
	4-5 Months	27	19.6	
	6 Months	90	65.8	

Source: Researcher, 2023

4.4.5 Dietary diversity of mixed feeding diet

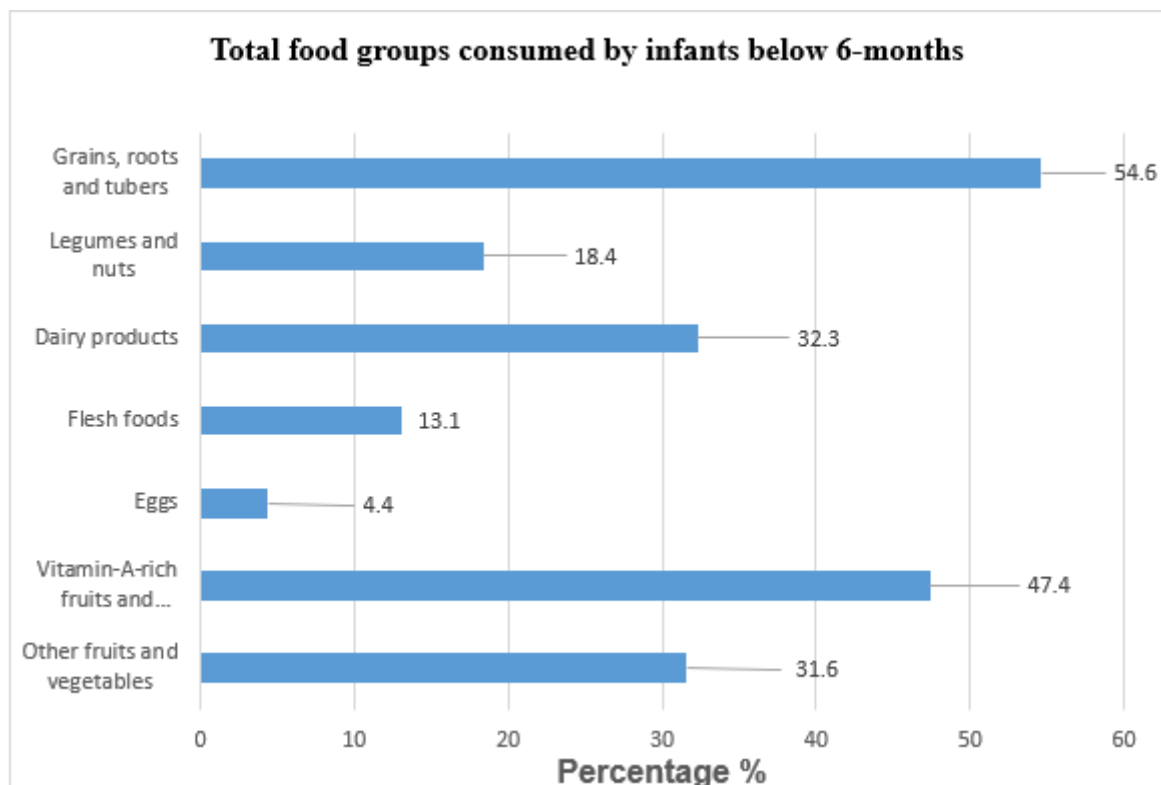
A 24-hour recall was used to ascertain dietary diversity. The caregivers and mothers were asked to provide information on what their infants ate the day before. The World Health Organization [WHO] and the UNICEF (2013) advocated seven food groups for diversity in diets, which include roots, grains and tubers; nuts and legumes; flesh foods (fish,

meat, poultry, and organ meats); dairy products; eggs; vitamin-A rich vegetables and fruits; and other vegetables and fruits. Except when a food item was simply used as a condiment, any amount of food from each food group was sufficient to count.

Almost all of the infants (54.6%) ate roots, grains and tubers. More than half of the children ate cereals, roots, and tubers. Vegetables and fruit that are high in vitamin A were eaten by 47.4% of children aged 6 months, milk and other dairy products by 32.3%, other vegetables and fruits by 31.6 percent, and nuts and legumes by 18.4%. Intake of animal-origin foods was low; just 4.4 percent of infants ate eggs, whereas milk and other dairy products and flesh items were eaten by 32.3 percent and 13.1% of the infants, respectfully (Figure 4.1).

Figure 4. 1

Dietary diversity



Source: Researcher, 2023

4.5 Maternal/caregivers ‘Knowledge of Mixed-Feeding Practices

4.5.1 Caregivers’ Knowledge of General Mixed Feeding

The data indicates that 53% of mothers were able to identify at least three benefits of breastfeeding, while 59% understood that a child should be breastfed for a minimum of 24 months to maintain adequate nutritional status. A significant majority of caregivers (78%) recognized that infants should be introduced to semi-solid, solid, and soft foods at six months of age. In terms of meal frequency, 24.2% of mothers and caregivers of children aged six to eight months understood that these infants should be fed at least twice daily. Additionally, 65.8% of caregivers acknowledged that toddlers aged 9 to 23 months require at least three meals a day. However, only 21% of caregivers were aware that frequent breastfeeding and the provision of nutrient-rich foods are important when a child is unwell (Table 4.7).

Table 4. 7***Caregiver's General Knowledge of Mixed Feeding***

	Frequency (F)	Percentage (%)
Breastfeeding:		
Caregiver pointed out at least three advantages of breastfeeding exclusively for the first 6 months.	123	53.0
If a child does not receive adequate breast milk, the mother ought to make sure the baby is properly positioned and attached, and she must improve the frequency of nursing.	37	16.0
A baby must breastfeed for at least two years.	137	59.0
Mixed Feeding		
Time of Introduction to Mixed Feeding		
A child needs to be introduced to mixed feeding at the age of six months.	182	78.0
Minimum Meal Frequency		
An infant aged five to six months needs to be fed no fewer than twice a day.	56	24.2
Minimum Dietary Diversity		
A 6-23-month-old child's diet ought to have animal-source meals.	103	44.0
Feeding vitamin, A-rich vegetables and fruits to a 6-month-old infant is beneficial.	37	16.0
Bottle feeding		
Mothers ought to stay away using a bottle with a teat when feeding children.	162	69.5
Feeding During Illness		
Breastfeeding should be encouraged, and children should be given more nutritional meals when they are sick.	49	21.0
Energy Density in Mixed Feeding		
To increase energy density, sugar and oil might be introduced to a child's diet during mixed feeding.	168	72.0

N = 137***Source: Researcher, 2023***

4.5.2 Maternal/caregivers 'Knowledge Score on Mixed-Feeding

Mothers and caregivers' understanding of mixed feeding was assessed using a binary scoring system, where correct responses received a score of "1" and incorrect responses received "0." Each participant had a maximum possible score of twelve. Their knowledge was categorized into three levels: low (scores of 1 to 6), average (7 to 9), and high (10 or above). The findings revealed that a significant portion (63.1%) of mothers had a limited understanding of mixed feeding practices, while nearly one-third (33.5%) demonstrated average knowledge, and a small percentage (3.4%) exhibited a high level of understanding. The overall average knowledge score among the mothers regarding mixed feeding was 6.8, with a standard deviation of 1.7, indicating scores ranged from three to ten (refer to Table 4.8).

Table 4. 8

Maternal Knowledge of Mixed-Feeding Practices

Maternal knowledge score	Frequency (F)	Percentage (%)
Score categories:		
Low knowledge [0-6]	147	63.1
Average knowledge [7-9]	8	3.4
High knowledge [10-12]	78	33.5
Mean knowledge score (SD) Range	6.47, (1.6), (3-10)	

N = 233

Source: Researcher, 2023

The average score for maternal knowledge regarding mixed feeding was 6.8, with a standard deviation of 1.7, out of a maximum of 12, and scores varied between three and ten (see Table 4.8). Focus group discussions with caregivers revealed that many mothers were unclear

about the recommended frequency for feeding infants, often relying on their instincts and the practices of older mothers for guidance. Additionally, some mothers expressed uncertainty about whether their children were fed adequately while in daycare, especially when they had to leave for work.

One caregiver shared, "I don't really know how often a child should be fed at this age, but I've been giving my child food based on my own preferences for portions and frequency" (Mother5. The researcher also evaluated caregivers' understanding of minimum dietary diversity (MDD). More than half (56.0%) of caregivers acknowledged that animal-source foods and legumes could be introduced to infants as early as six months. However, only 44% suggested incorporating animal proteins into their child's diet, and merely 16% were aware of the importance of providing vitamin A-rich foods. Interestingly, 72% of caregivers indicated that adding sugar and oil to a child's supplementary food could enhance energy density.

4.6 Economic Factors Affecting Child-Feeding Practices

The fourth objective of the study aimed to identify the economic factors that affect mixed feeding practices among infants under six months in Wajir County. To achieve this goal, the collected data were analyzed using descriptive statistics in this section.

4.6.1 Employment Status and Mixed Feeding Practices

Employment plays a vital role as it not only offers a source of income but also empowers women to make informed choices regarding mixed feeding practices for their infants. The responses from the participants are detailed in Table 4.9.

Table 4. 9***Economic Characteristics and the Mixed Feeding Practices***

Characteristics	Category	Mixed Feeding Practices	Chi-square (χ^2)
		F	%
Occupation	Employed	9	11.8
	Running a business	40	29.4
	Unemployed	80	58.8
	Pastoralism	8	5.8

*=Statistically significant

Source: Researcher, 2023

The results in Table 4.9 summarize the analysis of economic characteristics affecting the mixed feeding practices from this study. Most of the respondents practicing mixed feeding 80 (58.8%) were unemployed. A significant association was detected between the respondent's occupation and practicing mixed feeding ($\chi^2 = 109.780^a$; $df = 3$; $p = 0.000$). It was anticipated that the participants' work situation would have an impact on their practice of mixed feeding. This is because a working woman is considered to be financially in charge and hence capable of making the necessary decisions with minimum involvement from her partner.

4.6.2 Respondents' Monthly Income

The respondents were asked to indicate their monthly income, majority 80(58.4%) of the mothers/caregivers indicated they had no monthly income. There was a significant difference in the distribution of study participants concerning the respondents' monthly income and introduction of infants to mixed feeding ($\chi^2 = 24.123^a$; $df = 2$; $p = 0.012$).

Table 4. 10***Category of Income per Month***

	Frequency (F)	Percentage (%)	Chi-square (χ^2)
No income	80	58.4	$\chi^2 = 24.123^a$ df = 5 p-value = 0.012
Ksh less than 3000	11	8.0	
Ksh 3001-4000	9	6.6	
Ksh 4001-5000	16	11.7	
Ksh 5001-6000	7	5.1	
Ksh above 6001	14	10.2	
Total	137	100.0	

N = 137

*Source: Researcher, 2023***4.6.3 Household Head Employment Status and Mixed Feeding Practice**

Employment is vital since it offers a source of income as well as financial support for making decisions by household heads including whether to practice mixed feeding or not. The employment status of the respondent's household head is reported in Table 4.11.

Table 4. 11***Household Head Employment Status and Mixed Feeding Practice***

Characteristics	Category	Mixed Feeding Practice		Chi-square (χ^2)
		Yes		
		N	%	
Household head employment	Employed in the public/private sector	16	11.8	$\chi^2 = 17.431^a$; df = 3; p-value = .001
	Self-employed	24	17.6	
	Pastoralists	84	71.1	
	Unemployed	13	29.4	

N = 137

Source: Researcher, 2023

The results show that 84 (71.1%) of the women/caregivers practicing mixed feeding indicated that their household heads were pastoralists, 24(17.6%) indicated self-employment, and 13(29.4%) indicated their heads of the family were unemployed. There was a significant difference in the distribution of the study participants concerning the employment status of the heads of the families ($\chi^2 = 17.431^a$; df = 1; p-value = 0.001).

4.6.4 Major Source of Food

Complementary foods should supply adequate levels of micro as well as macro nutrients to suit the child's nutritional needs when combined with breast milk, the major source of food according to the respondents is reported in Table 4.12.

Table 4. 12

Major Sources of Food and Mixed Feeding Practice

Characteristics	Category	Mixed Feeding Practice		Chi-square (χ^2)
		Yes N	%	
The major source of food	Handouts	16	11.7	$\chi^2 = 17.431^a$; df = 1; p-value = .001
	Market purchase	133	97.0	

N = 137

Source: Researcher, 2023

The results show that 133 (97.0%) of the women/caregivers practicing mixed feeding indicated that market purchase was the main source of food, and a few 16(11.7%) indicated handouts. There was a significant difference in the distribution of the study participants concerning the source of food ($\chi^2 = 17.431^a$; df = 1; p-value = 0.001).

4.6.4 Food Sustainability and Mixed Feeding Practice

Food security, according to the FAO, occurs when every individual have appropriate economic and physical access to enough nutritious, secure, and sufficient food at all times for meeting their nutritional requirements and food choices for a healthy and active existence. It is built on four cornerstones: access, availability, use, and the long-term viability of each of the three. Food insecurity, a situation which occurs when availability to food is restricted or unclear, forces families to employ a variety of coping techniques in order to survive. Participants were questioned whether or not they were food secure. The results are shown in Table 4.13.

Table 4.13

Food Sustainability and Mixed Feeding Practice

Characteristics	Category	Mixed Feeding Practice	Chi-square (χ^2)
		Yes	
		N	
Food security	Food secure access	27	19.8
	Mildly food-insecure access	11	8.2
	Moderately food-insecure access	55	40.1
	Severely food-insecure access	44	31.9

N = 137

Source: Researcher, 2023

The findings reveal that among the women and caregivers practicing mixed feeding, 55 (40.1%) reported moderate food insecurity, while 44 (31.9%) indicated severe food insecurity. Additionally, 27 (19.8%) reported being food secure, and a small group of 11 (8.2%) identified as mildly food insecure, according to the Household Food Insecurity

Access Scale (HFIAS). This scale, utilized in various countries, effectively distinguishes between food secure and insecure households across diverse cultural settings. A significant difference was observed in the distribution of participants based on their food source ($\chi^2 = 17.431a$; $df = 1$; $p\text{-value} = 0.001$).

4.6.5 Causes of food insecurity

The participants were asked to identify the factors contributing to food insecurity, and the results are presented in Table 4.14.

Table 4.14

Causes of Food insecurity

Characteristics	Category	Mixed Feeding Practice		Chi-square (χ^2)
		Yes		
		N	%	
Causes of Food insecurity	Low-food production	39	28.2	$\chi^2 = 17.431^a$; $df = 3$; $p\text{-value} = .001$
	Lack offertile land	50	36.7	
	Lack of labor	31	22.7	
	Poor weather conditions	17	12.3	

N = 137

Source: Researcher, 2023

The results in Table 4.14 show that 50 (36.7%) of the women/caregivers practicing mixed feeding cited low food production as the cause of food insecurity, 39(28.2%) indicated lack of fertile land, a 17(12.3%) indicated poor weather conditions. There was a significant difference in the distribution of the study participants concerning the causes of food insecurity ($\chi^2 = 17.431^a$; $df = 1$; $p\text{-value} = 0.001$).

4.6.6 Complimentary Foods Given

To investigate the common complementary foods infants below six months, receive in the villages, mothers/caregivers were asked what foods they had given to their children on the day before the interview and during the previous week. The results are shown in Table 4.15.

Table 4.15

Complimentary Foods Given

Characteristics	Category	Mixed Feeding Practice		Chi-square (χ^2)
		Yes		
		N	%	
Complementary food	Porridge	33	43.8	$\chi^2 = 17.431^a$; df = 3; p-value = .001
	Milk	18	24.4	
	Mashed foods	24	31.8	
	Mashed foods + Porridge + milk + Porridge	52	68.2	

N = 137

Source: Researcher, 2023

The results show that 52 (68.2%) of women/caregivers practicing mixed feeding provided their infants with a combination of mashed foods, porridge, and milk. Additionally, 33 (43.8%) indicated they gave porridge, 24 (31.8%) gave mashed foods, and 18 (24.4%) provided milk. There was a statistically significant difference in the types of complementary foods given by the participants ($\chi^2 = 17.431a$, df = 3, p = 0.001), indicating that the distribution of food types among the respondents was not random and likely associated with other factors such as availability or cultural preferences.

According to a key informant in the healthcare sector, the majority of mothers began supplemental feeding when they were as young as nine months of age. Regardless of

education about nutrition and awareness efforts at both the health institution and the level of the community, this remains the case. Dietary diversity was also observed to be lacking, with most of mothers feeding their children mostly milk and cereals like rice and maize. A not-for-profit organization's medical personnel stated: “While caregivers generally understand the right timing, methods, and types of food for their children, they frequently struggle to put this knowledge into practice. This area faces significant challenges regarding food availability and access, which I believe leads to poor feeding habits. As a leader of a women's group noted, "The lack of food is the main reason many caregivers are unable to provide proper nutrition for their children”.

4.7 Socio-Cultural Factors Affecting Mixed-Feeding Practices

4.7.1 Marital Status and Practicing Mixed Feeding

Marital status has been established to play a key role in determining the feeding practices of infants below 6 months. The study cross-tabulated the marital status of the participants against mixed feeding practices. The results are shown in Table 4.16.

Table 4.16

Number of Children and Age of the Participants

Marital status	Practiced Mixed Feeding	Chi-square (χ^2)
Married	95 (69.1%)	$\chi^2 = 379.933a$
Divorced/separated	42 (30.9%)	df = 137
		p-value = 0.365

Source: Researcher, 2023

The results show that 95 (69.1%) of respondents who practiced mixed feeding were married, while 42 (30.9%) were divorced or separated. However, there was no significant difference

in the distribution of mixed feeding practices based on marital status ($\chi^2 = 379.933a$, $df = 137$, $p = 0.365$). This indicates that marital status does not appear to significantly influence the decision to practice mixed feeding in this sample.

4.7.2 Household Number of live Number of Children and Age of the Mothers/caregivers practicing mixed feeding

The number of children in a household has been established to play a key role in determining the feeding practices of infants below 6months. The study cross-tabulated the age of the participants against the number of children they had. The results are shown in Table 4.17.

Table 4. 17

Number of Children and Age of the Participants

	1-3	4-6	More than 6	Chi-square (χ^2)
15-17	8 (5.8%)	0 (0.0%)	0 (0.0%)	$\chi^2 = 379.933a$ $df = 137$
18-25	8 (5.8%)	0 (0.0%)	0 (0.0%)	$p\text{-value} = 0.000$
26-35	8 (5.8%)	16 (11.8%)	0 (0.0%)	
36-45	8 (5.8%)	16 (11.8%)	8 (5.8%)	
46-49	0 (0.0%)	32 (23.5%)	16 (11.8%)	

Source: Researcher, 2023

The results in Table 4.17 show that 23.5% who were aged between 46and 49 had 4 to 6 children, 11.8 who were aged between 36 and 45 years had 4 to 6 children, and 5.8% had 1 to 3 children. There was no significant difference in the distribution of study participants concerning age ($\chi^2 = 379.933a$; $df = 12$; $p\text{-value} = 0.000$).

4.7.3 Adequacy of Mixed Feeding Practices

A health sector key informant noted that many mothers do not start supplemental feeding until their children are around nine months old, despite nutrition education and awareness programs being offered at both health facilities and within the community. The findings indicated that dietary diversity was lacking, with most mothers primarily serving their children meals based largely on milk and grains like maize and rice. According to health staff from a non-governmental organization, *“Caregivers know what, when, and how to feed their children, but they often do not put this knowledge into practice.” This area struggles with issues of food availability and access, which I believe contribute to poor feeding practices. A leader from a women's group remarked, “The lack of food is the main reason many caregivers are unable to provide sufficient nutrition for their children”.*

4.7.4 Age of the introduction of other foods to infants before 6 months of age

Additional investigations were conducted to ascertain the age at which meals were introduced. The findings are presented in Table 4.18.

Table 4.18

Age of introduction of other foods to infants before 6 months of age

Characteristics	Category	Mixed Feeding Practice		Chi-square (χ^2)
		Yes		
		N	%	
Complementary food	<4 Months	11	8.1	$\chi^2 = 17.431^a$; df = 2; p-value = .043
	4-5 Months	17	12.1	
	6 Months	109	79.8	

N = 137

Source: Researcher, 2023

A significant majority, 109 respondents (79.8%), reported having experience with alternative diets for infants under six months. *Focus group discussions revealed that many mothers and caregivers noted changes in mixed feeding practices driven by health and nutrition guidance from healthcare professionals. Additionally, cultural factors were identified as influencing children's feeding habits. Most discussions emphasized that mixed feeding should ideally begin at six months, as breast milk provides all the essential nutrients a child requires, including hydration. One mother in FGD 2 expressed, "We understand that complementary feeding should start when the child turns six months; however, it can be challenging because introducing solid foods at that age may lead to choking risks. Their digestive systems are still developing, and solid foods can be too heavy for them" (FGD 2;2).*

Another caregiver shared, "In our community, children are fed animal milk until they are about one-year-old, at which point they can start chewing solid foods. Infants under 12 months have small stomachs and primarily need breast milk and animal milk. We usually provide them only with liquid nourishment until they reach around 12 months" (FGD 1;8).

A nurse from a local health center noted that supplemental feeding is often delayed until children are around 9 to 12 months. Mothers tend to reveal their feeding practices only when bringing their malnourished children to the health center. For instance, one ten-month-old infant was solely fed cow's milk. While we advise them on proper child nutrition and they agree to our recommendations, many revert to their previous feeding methods once they leave the health facility.

4.7.5 Main Foods Given to Infants Below Six Months Old

Despite not being categorized as a supplementary food, cow's milk is often given to infants under six months. One participant remarked, “*We start giving animal milk to our children around six months, sometimes even earlier. By nine months, we begin introducing soft foods like mashed potatoes and light porridge*” (FGD 1;7). Another mother mentioned that her child was exclusively fed cow's milk until the age of nine months: “*I only gave my child cow's milk until she turned nine months. That was the only food I had access to. Finding solid or semi-solid foods can be difficult; they are often unavailable and, when they are, too expensive. Milk, however, is easily accessible and affordable in our area*” (FGD 2;4). Caregiver 7 from Focus Group Discussion 1 asserted that children have to start the consumption of soft foods upon reaching six months of age.

4.7.6 Cultural Beliefs and Taboos that Affect Mixed Feeding Practices

Table 4.19

Taboos and Mixed Feeding Practices

Characteristics	Category	Mixed Feeding Practice		Chi-square (χ^2)
		Yes		
		N	%	
Taboo	Yes	189	81.3	$\chi^2 = 17.431^a$; df = 3; p-value = .001
	No	27	11.8	
	Don't know	16	6.9	

N = 137

Source: Researcher, 2023

The results show that the majority 189(81.3%) of the women/caregivers indicated taboos were determining the type of food to feed their children, and 27(11.8%) indicated there were no taboos. There was a significant difference in the distribution of the study participants

concerning taboos affecting the feeding practices of infants below 6 months old in their community ($\chi^2 = 17.431^a$; $df = 1$; $p\text{-value} = 0.001$).

The FGD results indicate that mothers and caregivers assert that the culture predominantly permits the feeding of children with cow milk. *“Children consume solely milk, which constitutes their primary sustenance.” They are consistently observed carrying a cup of milk whenever it is accessible. Typically, we start the introduction of animal milk at around three months of age, and occasionally even earlier”* (FGD 2;5).

Milk is the sole necessity for an infant, particularly during the first year of life. It is rather uncommon to encounter women who engage in exclusive breastfeeding. Exclusive breastfeeding is insufficient for a child till the age of 6 months. From where will that milk originate? Breasts are unable of producing sufficient milk until the infant reaches six months of age, unless one intends to deprive the child of nourishment (FGD 1;3).

“We are advised against providing water to children under six months; however, this is often impractical.” The climate here is typically quite hot, necessitating water for human survival. *“If animals cannot survive without water, then our children similarly cannot survive without water”* (FGD1; 1).

In response to inquiries regarding the age at which water is introduced to children, one participant stated, *“We provide water at approximately three months, and upon reaching six months, we begin offering thin porridge made from maize flour, although milk remains the primary food”* (FGD 4; 8).

Mothers further said that they do not provide their children with eggs, poultry, and beans. *“Beans are dense, and the outer shell is indigestible for children under two years of age.” Beans induce constipation in young infants (FGD 1; 3). In our culture, the consumption of*

eggs is deemed inappropriate. They are prohibited due to their association with illnesses and diseases” (FGD2;2).

4.8 Discussion

4.8.1 Caregivers’ Knowledge of Mixed Feeding

The study reveals a generally low level of knowledge among caregivers about mixed feeding indicators, particularly regarding continued breastfeeding, minimum meal frequency, and dietary diversity. This finding aligns with the Health Belief Model (HBM), which suggests that a lack of knowledge can lead to suboptimal health behaviors. Despite caregivers’ high awareness of the importance of introducing mixed feeding and giving vitamin A-rich fruits, there remains a significant gap in their overall knowledge of mixed feeding practices.

This finding contrasts with the results from Kilifi MIYCN KAP survey, which also identified knowledge gaps in similar contexts. However, a study conducted in Samburu County found that, despite many caregivers lacking formal education, they demonstrated a high level of knowledge about complementary feeding. This discrepancy may be attributed to targeted interventions in Samburu, where external organizations focused heavily on MIYCN education through community health volunteers and local health workers.

Similarly, the 2018 MIYCN KAP Survey in Marsabit reported higher levels of knowledge about mixed feeding among caregivers, even though a significant proportion were illiterate. Marsabit, like Samburu, benefited from substantial donor support for health system strengthening and integrated health and nutrition outreach programs. This support provided caregivers with nutrition education in their local language and facilitated effective community-based interventions.

These differences in knowledge levels highlight the impact of local health interventions and educational support. The enhanced knowledge observed in Samburu and Marsabit counties

can be attributed to these focused efforts, suggesting that external support plays a crucial role in improving caregiver knowledge and practices.

4.8.2 Socio-Cultural Factors Affecting Mixed Feeding Practices

Socio-cultural factors play a critical role in shaping feeding practices. The study highlights that cultural taboos and negative perceptions about certain foods, such as eggs, significantly influence caregivers' feeding choices. This aligns with the Social Cognitive Theory (SCT), which emphasizes the role of social norms and observational learning in behavior. *A mother in one of the focus group discussions stated, "In our community, eggs are deemed inappropriate." They are disheartened due to their association with illnesses and diseases. They are furthermore linked to delayed speaking. Adults also refrain from consuming eggs as they are avian products, and we do not consume birds either. Nevertheless, circumstances are evolving, and several individuals have begun consuming eggs. We remain unconvinced that they are suitable for a child's health".* The taboos observed in this study mirror findings from other regions, where cultural beliefs dictate dietary practices (e.g., the KAPB survey in Marsabit). The SCT framework helps to explain why caregivers adhere to these norms despite potential nutritional benefits.

4.8.3 Economic Factors Affecting Mixed Feeding

Economic variables, including household income and food security, significantly influence eating patterns. The research corroborates the Resource-Based View (RBV) hypothesis, which posits that availability to resources, such as adequate food, is crucial for attaining optimal results, such as child nutrition. The results indicate that economic limitations, such as insufficient household income and elevated food prices, restrict caregivers' capacity to offer a variety of healthful diets. The influence of household size on food security

corresponds with the Resource-Based View hypothesis, demonstrating how constrained resources might affect feeding behaviors.

The KDHS 2008-09 data indicates that a mother's or caregiver's educational attainment is adversely correlated with child development. Children with moms possessing a minimum of secondary education often have fewer growth and developmental challenges. This suggests that first-time moms in this research with secondary education are more adept at caring for their children than those with only elementary education, who encounter greater risks of malnutrition.

Employment can augment household income, hence improving access to sustenance. In this poll, about 90% of first-time moms were either working, participating in casual labor, or self-employed, indicating their capacity to get food. Employment alone does not ensure improved nutritional outcomes for children, since working moms may have diminished time for childcare (Maundeni & Nnyepi, 2011). Inadequate income can exacerbate the capacity to offer appropriate alternative childcare.

The size of a household considerably influences food security. The study revealed that homes including less than three persons were less susceptible to food insecurity, but bigger households with four to six members had a higher likelihood of food-related issues. Research conducted in Malawi, Ethiopia, and Tanzania (Bogale & Shimelis, 2009) corroborates this, indicating that bigger households frequently experience heightened food insecurity due to reduced per capita consumption. Comparable results were noted in Botswana, where bigger households saw elevated poverty rates.

The availability of food influences children's survival, health, nutrition, and development. A household is deemed food secure if it can reliably fulfill the nutritional requirements of all its members. Food insecurity occurs when households are uncertain about their food

availability or are compelled to accept insufficient or nutritionally deficient foods. Recent study indicates that households in Vihiga County are apprehensive about food security, attributed to land scarcity, inadequate food production, and labor shortages, all reflective of poverty and leading to malnutrition.

The Vihiga County Integrated Development Plan 2013-2017 highlights diminishing agricultural output, aggravated by factors like reduced land sizes, inadequate access to affordable financing, elevated input prices, and climate change. These causes have resulted in diminished local food production, necessitating the county's dependence on adjacent areas to satisfy food requirements. As a result, first-time moms in this region are more susceptible to food anxiety, hence elevating the risk of malnutrition in their babies.

Insufficient food consumption and disease are key factors contributing to childhood malnutrition. UNICEF emphasizes that these difficulties are affected by several variables, including household food insecurity, healthcare access, environmental circumstances, and economic position. Dewey and Adu-Afarwuah (2008) assert that food instability directly and indirectly impacts both breastfed newborns and child-feeding behaviors, complicating the fulfillment of minimal nutritional guidelines, especially in impoverished areas of Sub-Saharan Africa.

Research conducted by Maundeni and Nnyepi (2011) in Botswana revealed that disadvantaged households allocate a substantial percentage of their income to essential food items, rendering them prone to food insecurity and diminished nutritional health. In Vihiga County, restricted food crop production compels most households to depend on purchased food, with many acquiring over half of their daily sustenance (Hotz et al., 2015). This reliance on acquired food, coupled with escalating expenses and restricted output, intensifies food poverty.

Expert consultations, as shown by Dewey and AduAfarwuah (2008), reveal that the advantages of exclusive breastfeeding surpass any potential negative consequences. The KDHS 2008-09 study verifies that breast milk delivers vital micronutrients that enhance child health and development. More than 50% of first-time moms in this survey acknowledged that nursing fosters mother-child connection and delivers protective antibodies. Breastfeeding is a cost-effective approach that can diminish both direct (hospital charges) and indirect (time and income missed due to illness) financial costs when compared to supplementary feeding (Weimer, 2001).

4.8.4 Mixed Feeding Practices

This study found that almost all of the children had been exclusively breastfed, which differs to Kenyan national data given in the KDHS as well as in the Nairobi slums of Kibera and Korogocho. This was also predicted considering that Africans traditionally nurse babies. Breastfeeding adds significantly to general intake of nutrients, satisfies the majority of energy requirements, and continues to be a vital source of vitamin A and vitamin C, in addition to fatty acids that are essential and may contribute to their entire energy requirements during mixed feeding for young children and infants aged six to twenty-three months. The mothers introduced mixed feeding foods to their infants at the proper period; a majority of infants aged six months or older had been started on solids, semi-solids, and soft meals. This conclusion contrasts with findings from the Korogocho slum in Nairobi where each child of this age group were exposed to supplemental feeding. At the tender age of six months old, an infant's requirement for nutrients and energy starts outgrowing what the mother's milk provides, necessitating the use of additional nourishment to meet energy as well as nutrient requirements and if supplementary foods are not introduced when a child has reached the age of six months, an infant's development can slow down.

Diversity in diet has been widely accepted as an important component of high-quality nutrition, and broadening the range of foods ingested is expected to provide appropriate intake of critical nutrients, promoting excellent health and nutrition. Nearly all of the children consumed porridge, ugali, grain, chapatti, potatoes, bread, cassava and yams, which were all made from cereal grains, root vegetables, and roots. This is similar to Kenyan national data recorded in the KDHS survey (KNBS and ICF Macro, 2008-09), as well as the results obtained in the Rift Valley of Kenya and Ekesa et al. (2011) in the Butembo-Democratic Republic of Congo. This can be attributed to the fact that when living in a community with low incomes, mothers prefer foods that are less costly such as grains/tubers/grains and their products, as well as the fact that grains are an essential meal in any society. Porridge was also consumed by nearly all of the youngsters in this study because it is a common supplemental food. Numerous studies have presented similar findings, including Mbagaya (2009)'s research in rural Kenya's western region.

Foods with high levels of iron (flesh meats) were rarely consumed. Foods of animal-based products are almost certainly out of reach for a large number of families in this resource-poor neighborhood. Consumption of protein was higher in dairy products, primarily milk, as reported by Hellen Keller International, in 2010 in the Batudu District of Nepal and Ekesa et al. (2011) in Gitega (Burundi) and Butembo (Democratic Republic of Congo). According to the mothers who participated in the focus group discussion, their reduced intake of legumes and decreased intake of flesh meats and eggs might have been due to budgetary restraints and cultural attitudes. According to mothers, eggs are not allowed for children since they impede with speech and mobility (egg eating causes youngsters to walk and speak slowly). A large number of families were unable to purchase expensive iron-rich foods such as eggs and flesh meats. During the focus groups, mothers shared this viewpoint.

The average variety of foods consumed was less than the prescribed four food groups (WHO, 2021), but it was greater than Kenya's national figure (59.4 percent) recorded in the Kenya Demographic Health Survey. In the current study, mothers' understanding of the need to supply an appropriate diet for the child they have was sufficient, and it is likely that their low socioeconomic status influenced their ability to provide a variety food to their children. Furthermore, mothers noted in the focus groups that cultural views affected the types of foods given to their children; for instance, some tribes did not offer children eggs since it was deemed taboo.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the research's findings summary and the conclusions. This is done in relation to the research's objectives. Recommendations for both practice and policy, and additionally research directions, are also provided.

5.2 Summary of the Findings

The study aimed to determine the factors influencing mixed feeding behaviors among babies under 6 months in Wajir County, Kenya. The study sought to determine mother knowledge, socio-cultural influences, feeding habits, and economic variables affecting mixed feeding patterns in babies under 6 months in Wajir County. A questionnaire was employed to gather data from a sample of 233 mothers and caregivers. The data were examined with descriptive and chi-square statistics.

The study found that most of the mothers/caregivers reported having introduced their infants to liquids, semi-solids, and solids. The majority were introduced to other feeds before the age of six months. A significant portion of the mothers/caregivers introduced their infants to water at the age of six months, a third of them introduced water at 4-5 months and a few introduced water at the age of 1-3 months to their infants, and another few introduced water to their infants during their first week of life. A considerable number of mothers/caregivers began cereal introduction for their infants at six months, whereas one-third initiated water introduction at 4-5 months. Some cereals were offered to newborns at the age of 1 to 3 months. A few of the participants introduced their children to meat at six months of age.

The study found that most of the mothers/caregivers practicing mixed feeding were unemployed, did not live in houses with finished floors, did not live in houses that were

connected to electricity, were not connected to piped water, lived in households without flush toilets, did not reside in an urban area. The majority of the mothers'/caregivers' household heads were pastoralists and the market purchase was the main source of food. The majority of the women/caregivers practicing mixed feeding indicated they were moderately food insecure and it was a result of low food production. Most of the women/caregivers practicing mixed feeding gave their infants' Mashed foods + Porridge + milk + Porridge, 33 (43.8%) indicated porridge, 24 (31.8%) indicated Mashed foods and 18 (24.4%) indicated milk.

The findings revealed that culture had an effect on how infants were fed. Mothers/caregivers in the county are encouraged to start mixed feeding when their child is six months of age old. This is due to the fact that breast-milk contains all of the essential nutrients that an infant need, including water. Infants are fed cow milk until they are around a year old and have the ability of chewing food. Some mothers/caregivers indicated that *they fed their infants* soft foods when they attained the age of 6 months and there were cultural taboos that determined the type of food to feed their children. Their culture prohibited mothers/caregivers from feeding their children on eggs, chicken, and beans.

5.3 Conclusion

5.3.1 Maternal knowledge influencing mixed feeding practices

The study concluded that maternal knowledge of mixed feeding practices in Wajir County was predominantly low. The majority of mothers had a deficient comprehension of mixed feeding methods, reflected in a poor average knowledge score. Numerous moms lacked awareness regarding appropriate meal frequency and the need of nutritional diversity for newborns. Approximately fifty percent of moms could identify at least three advantages of breastfeeding, but a minimal proportion comprehended the appropriate feeding frequency for infants aged 6 to 8 months. The lack of knowledge extended to the importance of vitamin

A-rich foods, with very few mothers aware of their benefits. This low level of maternal knowledge likely contributes to suboptimal mixed feeding practices, potentially impacting infant nutrition and health outcomes in the region.

5.3.2 Socio-cultural factors influencing mixed feeding practices

The study concluded that socio-cultural factors significantly influenced mixed feeding practices in Wajir County. A substantial majority of caregivers reported that cultural taboos determined the type of food given to their children, indicating a strong cultural influence on infant feeding decisions. Traditional practices encouraged the early introduction of animal milk and delayed the introduction of solid foods. There was a prevalent belief that breast milk alone was insufficient for infants up to 6 months, leading to early supplementation with animal milk. Cultural norms also discouraged the use of certain foods like eggs, chicken, and beans for young children due to perceived health risks. These deeply ingrained cultural beliefs and practices often contradicted recommended infant feeding guidelines, posing challenges for nutrition education efforts in the community.

5.3.3 Feeding practices mothers use in feeding infants below 6 months

The study concluded that feeding practices for infants below 6 months in Wajir County often diverged from recommended guidelines. Despite the recommendation to introduce complementary foods at 6 months, some mothers introduced them earlier. Animal milk was commonly given to infants as young as 3 months, with many caregivers considering it a primary food source. While the majority introduced complementary foods at 6 months, aligning with recommendations, there was a notable lack of dietary diversity in infant diets. Most mothers relied heavily on milk and cereal-based foods, particularly porridge. The use of vitamin A-rich fruits and vegetables was low, with few mothers aware of their importance.

These practices reflect a combination of cultural norms, economic constraints, and limited nutritional knowledge, potentially impacting the nutritional status of infants in the region.

5.3.4 Economic factors influencing mixed feeding practices

The study concluded that economic factors played a crucial role in shaping mixed feeding practices among infants below 6 months in Wajir County. A majority of respondents practicing mixed feeding were unemployed, limiting their financial capacity to make optimal feeding choices. Food insecurity was prevalent, with many caregivers reporting moderate to severe food insecurity. The primary source of food for most caregivers was market purchases, which affected food choices based on availability and affordability. Lack of fertile land and low food production were cited as major causes of food insecurity. These economic constraints not only influenced the types of foods given to infants but also the timing of introduction of complementary foods, often leading to early introduction of animal milk as a more accessible alternative to diverse complementary foods.

5.4 Recommendations

5.4.1 Recommendation for Policy

The County Government in Wajir needs to create revenue-generating ventures to assist mothers/caregivers with infants under the age of six months in areas with limited resources such as rural and urban low-income areas. This is due to the fact that the majority of mothers/caregivers had a poor economic status. The income of the mothers/caregivers would increase their ability to pay for a variety of foods for mixed feeding for their newborns, promoting their healthy growth and development. This can take the shape of assisting them in establishing business ventures, Voluntary Savings and Loaning Associations (VSLA), training in entrepreneurship and mentoring, assisting them in forming Self-help Groups for income production, or connecting them to opportunities for employment.

5.4.2 Recommendations for Practice

Wajir County health department, particularly the nutrition section, should scale up Social Behavior Change Communication (SBCC) on mixed feeding, with the goal of addressing caregivers of infants under the age of six months old with relevant MIYCN knowledge. The primary emphasis ought to concentrate on continued breast feeding, low meals frequency, and low diversity in diets. This agenda ought to be prioritized by the Ministry of Health in coordination with participating partners (PPs), so that all mothers/caregivers, especially those caring for infants who are undernourished, have access to and understand IYCF information.

Nutrition programs ought to tackle food taboos and cultural beliefs that impede appropriate IYCF practices, as well as those that promote healthy mixed feeding. Shifting cultural habits and opinions is a process, thus nutrition and health implementers at the county level ought to begin it by discouraging detrimental cultural practices and encouraging favorable ones.

5.5 Recommendation for Further Research

Further research could focus on exploring alternative methods of mixed feeding, particularly considering the widespread practice among mothers. A comprehensive comparative study should be undertaken by the Wajir County Nutrition Unit to examine the socio-economic factors, caregivers' or mothers' knowledge, socio-cultural influences, and the specific feeding practices employed by mothers or caregivers of children admitted to OTP (Outpatient Therapeutic Program) centers. This study should also include mothers whose infants are well-nourished.

The research could help establish the differences in factors influencing mixed feeding between women whose infants are malnourished and those whose infants are well-nourished. The results of such a study would provide valuable insights into the barriers and

facilitators of effective mixed feeding among these two groups of mothers or caregivers. Identifying these factors could help inform targeted interventions aimed at improving the nutritional status of infants under six months of age.

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APPENDICES

Appendix I: Consent Form

My name is Khadija Mohammed. This questionnaire aims to investigate data that will facilitate the achievement of the study objective seeking to investigate the factors influencing mixed feeding of infants below 6months by mothers attending Wajir County Referral Hospital, AliMaow, Barwaqo and AIC health centers within Wajir County, Kenya. This is part of the requirement from Kenya Methodist University for the award of the Master's Degree in Human Nutrition and Dietetics. I wish to request your voluntary and honest opinion regarding this study topic.

Procedure to be followed

Participation in this study will require that I ask you some questions and also access all the hospital's departments to address the six pillars of the health system. I will record the information from you in a questionnaire checklist. You have the right to refuse participation in this study. You will not be penalized nor victimized for not joining the study and your decision will not be used against you nor affect you at your place of employment.

Please remember that participation in the study is voluntary. You may ask questions related to the study at any time. You may refuse to respond to any questions and you may stop an interview at any time. You may also stop being in the study at any time without any consequences to the services you are rendering.

Discomforts and risks

Some of the questions you will be asked are on intimate subjects and may be embarrassing or make you uncomfortable. If this happens; you may refuse to answer if you choose. You may also stop the interview at any time. The interview may take about 40 minutes to complete.

Benefits

If you participate in this study you will help us to strengthen the health systems in Kenya and other Low-income countries in Africa. As a result, countries, communities, and individuals will benefit from improved quality of healthcare services. This field attachment is critical to strengthening the health systems as it will generate new knowledge in this area that will inform decision-makers to make research-based decisions.

Rewards

There is no reward for anyone who chooses to participate in the study.

Confidentiality

The interviews will be conducted in a private setting within the hospital. Your name will not be recorded on the questionnaire and the questionnaires will be kept in a safe place at the University.

Contact Information

If you have any questions you may contact the following supervisors: Dr. Lilly Masinde. Head of Public Health Human Nutrition and Dietetics, School of Medicine and Health Sciences, **Kenya Methodist University**, Kenya lily.masinde@kemu.ac.ke- 0708740408

Participant's Statement

The above statement regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time. I understand that I will not be victimized at my place of work whether I decide to leave the study or not and my decision will not affect the way I am treated at my workplace.

Investigator's Statement

I, the undersigned, have explained to the volunteer in a language she/he understands the procedures to be followed in the study and the risks and benefits involved.

Name: Interviewer.....Date.....

Interviewer Signature.....

Participant's sign..... Date.....

Principal researcher's sign..... Date.....

Appendix II: Questionnaire

ADMINISTRATIVE DETAILS

Date: / / 2022 <i>Day Month</i>	Household Number
Questionnaire identity number	Team leader
Team number	Questionnaire checked by
Village name	

Background

[Make every effort to speak with the mother. If she is not available, speak with the primary caregiver responsible for the feeding of the child.]

Are there any children in the household who are below 6 months and less than 24 months of age? If YES, identify the mother/primary caregiver and continue:

SECTION A: HOUSEHOLD DEMOGRAPHIC AND SOCIO-ECONOMIC DATA

NB: The word ‘mother’ refers to the biological mother of the child or the primary caregiver of the child

[INSTRUCTIONS ON HOW TO RECORD ANSWERS: Circle the number corresponding to the response that a mother gives. Record the appropriate response in areas where choices have not been given. All ‘Any other’ responses should be specified]

NO	Question	Response	
SECTION: Demographic information			
1.	Name		
2.	Age of mother	15-25	[1]
		26-35	[2]
		36-45	[3]
		46-55	[4]
		Above 56	[5]
3.	Age of child		
4.	Gender of child	Male	[1]
		Female	[2]
5.	Marital status	Married	[3]
		Single	[4]
		Widow	[5]
		Divorced	[6]
6.	Education level	Primary	[1]
		Secondary	[2]
		Tertiary	[3]
7.	Employment status	Self-employed	[1]
		Farmer	[2]
		Casual	[3]
		Employed	[4]
8.	Whodoyou live with?	Husband	[1]
		Alone	[2]

		Parents/relatives	[3]
		Parents-in-law	[4]
		Alone	[5]
9.	What is the size of your household	1-3	[1]
		3-6	[2]
		6andabove	[3]
SECTION:ECONOMICFACTORS			
10.	What is your major source of food?	Farming	[1]
		Market purchase	[2]
		Handouts	[3]
11.	How long does this source sustain you?	1-2 months	[1]
		1-6months	[2]
		1year	[3]
12.	Where do you get food after your major source runs out?	Market	[1]
		Neighbors	[2]
		Well-wishers	[3]
13.	Which of the following factors contribute to insecurity in your house?	Low-food production	[1]
		Lack of land	[2]
		Lack of labor	[3]
		Poor weather conditions	[4]
		No	[2]
15.	Mention the benefits of exclusive breastfeeding that you know.		
SECTIONS:SOCIALFACTORS			

23.	Who decides what food the baby eats?	Mother/Father	[1]
		Grandmother	[2]
24.	Who is responsible for taking care of the baby?	Mother/Father	[1]
		Grandmother	[2]
25.	What role does your husband play in caring for the baby?		
26.	What role does your mother-in-law play in caring for the baby?		
27.	What are your social networks?	Friends/peers	[1]
		Older mothers	[2]
		Women-groups	[3]
		Health providers	[4]
28.	Are these networks sufficient in solving your issues and passing information about child feeding?		
29.	Do household chores affect child-feeding?	Yes	[1]
		No	[2]
30.	If yes,how?		
SECTIOND:CULTURALFACTORS			
31.	What cultural beliefs and practices influence child-feeding in your community?		
32.	Are there taboos that are related to the food that you give to your child?	No	[1]
		Yes	[2]
		I don't know	[3]

33.	If Yes, Explain		
34.	Which foods aren't culturally acceptable for children and why?		
35.	Where do you get information about child-feeding from?	Clinic	[1]
		Mother-in-law	[2]
		Partner	[3]
		Media	[4]
		Social gatherings	[5]
		No	[2]

1. Please describe the feeding practices in this community in terms of:
 - a) Giving of pre-lacteals
 - b) Age at introduction of mixed feeding
 - c) Main types of foods given to infants below 6months old.
2. What are the most common foods fed to infants below 6months old in this community?
3. Are there cultural beliefs and practices that influence mixed feeding in this community? If yes, how do they influence mixed feeding practices?

SECTION G: MATERNAL KNOWLEDGE OF COMPLEMENTARY FEEDING PRACTICES

38. What is the importance of breastfeeding to a child?

.....

.....

.....

.....

1. Do you believe that a baby can survive on breast milk alone without even water?

i. If YES, for how long? (Indicate in months)

.....

ii. If, NO, Why?

.....

.....

.....

.....

39. At what age in months should semi-solid, solid, and soft foods be introduced to a child?

.....

.....

.....

40. Why should they be introduced at this time?

.....

.....

.....

.....

41. What are the risks of starting complementary feeding too late?

.....

.....

.....

.....

42. How many times should a mother breastfeed a child after 6 months?

.....

.....

43. For how long should a mother breastfeed a child before stopping?

.....

.....

44. Is it essential for a child to consume a diverse diet? If yes, why? And how many varieties of food a child should consume every day? *[Let the mother list the varieties]*

.....

.....

45. How many times should you feed your child on complementary food each day?

.....

.....

46. Why is it critical to ensure high standards of hygiene when preparing complementary feeds?

.....

.....

47.

48. Is it important to enrich or make your child's food more energy and nutrient-dense?
(If YES or NO why?)

.....
.....

49. How do you prepare flour before you cook porridge for your child? (Probe on the importance of fermenting flour or germinating grain and the dangers of mixing different types of flour)

.....
.....

50. What is your opinion about the inclusion of animal-source food in a child's diet?

.....
.....

SECTION H: FEEDING PRACTICESCHILD FEEDING HISTORY

Please describe everything that [Name] ate yesterday during the day or night, whether at home or outside the home.

[Keep probing 'Anything else?' until the respondent says 'nothing else.']

[If the respondent mentions mixed dishes like a sauce or stew, probe: What ingredients were in that [MIXED DISH]? Probe: 'Anything else?' Until the respondent says 'nothing else']

[If foods are used in small amounts for seasoning or as a condiment, include them under the condiments food group.]

[If a food recalled by the respondent is not listed in any of the food groups below, write the food in the box labeled 'other foods' at the end of this section.]

INSTRUCTIONS FOR RECORDING RESPONSES

As the respondent recalls each food, underline the food in the food group below.

Once the respondent tells you everything s/he remembers the child eating yesterday during the day or at night, look at each food group. If one or more foods in a food group are underlined, circle 'Y' in the column to the right.

Now return to the list of foods. Are there any food groups with no 'Y' circled? Read the entire list of food items in that line to the respondent. If s/he indicates that one or more of the foods has been given to the child, underline that food and circle 'Y.' If none of the foods has been given to the child, circle 'N.' If the mother does not remember or does not know, circle 'DNK.'

NB: Every line must have a code.

No	Question and filters	Coding categories (circle as applicable)			
			Yes	No	DNK
A.	Porridge, bread, rice, noodles, or other foods made from grains	A...	1	2	3
B.	Pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside	B...	1	2	3
C.	White potatoes, white yams, cassava, or any other foods made from roots	C...	1	2	3
D.	Any dark green leafy vegetables	D...	1	2	3
E.	Ripe mangoes, ripe papayas, or (insert other local vitamin A-rich fruits)	E...	1	2	3
F.	Any other fruits or vegetables	F...	1	2	3
G.	Liver, kidney, heart, or other organ meats	G...	1	2	3

H.	Any meat, such as beef, pork, lamb, goat, chicken, or duck	H...	1	2	3
I.	Eggs	I...	1	2	3
J.	Fresh or dried fish, shellfish, or seafood	J...	1	2	3
K.	Any foods made from beans, peas, lentils, nuts, or seeds	K...	1	2	3
L.	Cheese, yogurt, or other milk products	L...	1	2	3
M.	Any oil, fats, butter, or foods made with any of these	M...	1	2	3
N.	Any sugary foods such as chocolates, sweets, candies, pastries, cakes, or biscuits	N...	1	2	3
O.	Condiments for flavor, such as chilies, spices, herbs, or fish powder	O...	1	2	3
P.	Insects e.g termites	P...	1	2	3
Q.	Foods made with red palm oil, red palm nut, or red palm nut pulp sauce	Q...	1	2	3
R.	Other food				

	Question	Responses	Choices
	How many times did <i>[Name]</i> eat solid, semi-solid, or soft foods other than liquids yesterday during the day or at night? <i>[Small snacks and small feeds such as one or two bites of mother's or sibling's food should not be counted]</i>	[If caregiver answers 7 or more times, record 7]	 times
		[If caregiver doesn't-know, record 88]	DNK 88
	Did <i>[Name]</i> drink anything from a bottle with a nipple yesterday or last night?	Yes	1
		No	2
		DNK	3

Appendix III: Authorization letter from the University



KENYA METHODIST UNIVERSITY

P. O. BOX 267 MERU - 60200, KENYA
TEL: 254-064-30301/31229/30367/31171

FAX: 254-64-30162
EMAIL: INFO@KEMU.AC.KE

February 1, 2023

KeMU/ISERC/HND/03/2023

KHADIJA MOHAMED IBRAHIM
HND-3-0490-1/2020

Dear Khadija,

**SUBJECT: FACTORS INFLUENCING MIXED FEEDING PRACTICES AMONG INFANTS
BELOW 6-MONTHS IN WAJIR COUNTY, KENYA**

This is to inform you that Kenya Methodist University Scientific Ethics and Review Committee has reviewed and approved your research proposal. Your application approval number is KeMU/ISERC/HND/03/2023. The approval period is 1st February, 2023 – 1st February, 2024.

This approval is subject to compliance with the following requirements:-

- I. Only approved documents including (informed consents, study instruments, MTA) will be used.
- II. All changes including (amendments, deviations, and violations) are submitted for review and approval by Kenya Methodist University Scientific Ethics and Review committee.
- III. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KeMU SERC within 72 hours of notification.
- IV. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KeMU SERC within 72 hours.

- V. Clearance for export of biological specimens must be obtained from relevant institutions.
- VI. 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.
- VII. Submission of an executive summary report within 90 days upon completion of the study to KeMU SERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://oris.nacosti.go.ke> and also obtain other clearances needed.



Appendix IV: Wajir County Approval Letter

COUNTY GOVERNMENT OF WAJIR
DEPARTMENT OF MEDICAL SERVICES, PUBLIC HEALTH
AND SANITATION

When replying, please
QUOTE



OFFICE OF THE COUNTY
HEALTH ADMINISTRATOR

23rd MARCH, 2023

TO WHOM IT MAY CONCERN

RE: APPROVAL TO CONDUCT RESEARCH BY KHADIJA MOHAMED
IBRAHIM STUDENT NO. HND-3-0490-1/2020

The above-named person is our staff and is hereby authorized to conduct research on factors influencing mixed feeding practices among infants below six (6) months in Wajir East Sub-County, Wajir. Her NACOSTI approval license is **Ref no. 618246**

I therefore request you to accord her all the necessary support during the research period.

Yours Faithfully

ARTHA MOHAMED
COUNTY HEALTH ADMINISTRATOR
WAJIR COUNTY



Appendix V: Letter from NACOSTI

 REPUBLIC OF KENYA	
Ref No: 618246	NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
RESEARCH LICENSE	
	
This is to Certify that Ms. Khadija Mohamed Ibrahim of Kenya Methodist University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Wajir on the topic: FACTORS INFLUENCING MIXED FEEDING PRACTICES AMONG INFANTS BELOW 6 -MONTHS IN WAJIR COUNTY KENYA for the period ending : 14/March/2024.	
License No: NACOSTI/P/23/24081	Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Applicant Identification Number	Verification QR Code
618246	
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