INFLUENCE OF MATERNAL INFANT FEEDING PRACTICES AND BELIEFS ON THE EXPRESSION OF FOOD NEOPHOBIA IN TODDLERS IN BARINGO COUNTY, KENYA

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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DEDICATION

To my loving family, your constant encouragement and belief on me fueled my determination throughout this journey.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

CHPs Community Health Volunteers

FNS: Food Neophobia Scale

GAM: Global Acute Malnutrition

IYCN: Infant and Young Child Nutrition

IUGR: Intra Uterine Growth Retardation

KNBS: Kenya National Bureau of Statistics

LBW: Low Birth Weight

MIYCN: Maternal, Infant and Young Child Nutrition

SPSS: Statistical Package for Social Sciences

UNACC: United Native American Cultural Center

OPERATIONAL DEFINITION OF TERMS

Beliefs: The existing ways of thinking and convictions pertaining to the provision of nourishment to toddlers

Food Neophobia: The fear of eating new or unfamiliar, particularly common in toddlers and young children.

Infant: This term has been used in the study to refer to young children between the ages of 1 month and 12 months

Maternal Feeding practices: various ways that a mother feeds

Restriction for weight: refers to the mother's concern on weight of the child and thus they provided foods that yields a desired weight of their toddlers.

Toddlers: This term has been used in the study to refer to young children between the ages of 12 months to 24 months.

Toddler Feeding practices: This term has been used in the study to refer to the various activities involved in the provision of nourishment to toddlers

ABSTRACT

Infant and young child feeding is critical for child health and survival. Poor infant feeding practices are a major contributor to morbidity and mortality among infants and young children in Kenya. Food neophobia is a trait characterized by the rejection of foods that are novel or unknown and potentially limits dietary variety, with lower intake and preference of some foods. Based on the current lack of comprehensive research data on the relationship between maternal infant feeding practices and food neophobia, the researcher intends to carry out this study geared towards finding out the maternal infant feeding practices, beliefs and the food neophobia in toddlers. A cross-sectional analytical study design was adopted for this study. The study was carried out in Mogotio Sub County, Baringo County targeting a sample of 422 under five children with the mothers being the respondents. Three wards were purposively selected while household was selected using systematic random sampling. Data collection was done by use of researcher administered questionnaire, focus group discussion guides and key informant interviews. Statistical Package for Social Sciences (SPSS) version 25 was used for analysis of the generated data for both inferential and descriptive techniques. Data was analyzed for relationships using Pearson and chi-square where applicable. The study established that food neophobia among infants in Mogotio Sub-County was associated with household income and capability to economically access diverse food options. The study established that 47.1% of the mothers had completed primary school, 53.9% of the mothers were formally unemployed, and earned a monthly income of less than Ksh. 10,000. Food neophobia was as a result of poor dietary habits, decreased dietary variety and poor diet quality and not necessarily on weight restrictions. Majority (70%) of the toddlers developed a disliking of certain foods. The expression of neophobia contributed to a high proportion of children under five who are wasted, stunted and underweight indicated by 19.2%, 25.7% and 23.3%, respectively. There is a relationship between parental food preferences and expression of neophobia. There was a relationship between food availability and dietary practices whereby it was noted that when parents can't afford certain foods, they make their toddlers believe that certain foods are not appropriate. Therefore, informed by the research findings, the researcher recommends the adoption of measures to include health and nutrition education on food neophobia among mothers and mothers in rural communities within Baringo County. There is also need for further researcher on the influence of maternal feeding practices on food neophobia among infants in other areas across Kenya.

CHAPTER ONE: INTRODUCTION

1.1 Background to the study

Food neophobia is a personal trait, associated with food preferences (Russell & Worsley, 2014), that has been defined as a reluctance to eat novel foods. Parents also report the rejection of known and previously accepted foods, but the rejection of a substantial amount of familiar food (as well novel) has been defined as picky eating, and tends to result in a diet with low variety (Dovey & Staples et al., 2014). Thus, food neophobia and Picky Eating are two related traits, but theoretical and behavioral distinct concepts, with different factors predicting their severity and expression (Dovey & Staples et al., 2014). Picky eating is differentiated from food neophobia through the novelty value of the food presented.

Food neophobia is thought to have an adaptive value; the predisposition to respond with a neophobic behavior to new foods is highly established when the transition from an exclusive milk diet to the omnivore's diet occurs. Food neophobia seems to ensure the ingestion of foods that are familiar, reducing the possibility of poisoning from unfamiliar, toxic and allergenic foods, thus having a protective function (Dovey & Staples et al., 2014). Rozin and colleagues have shown that distaste (dislike of the sensory characteristics of a food) appears to be the strongest driver of neophobia in young toddlers, followed by a potential fear of negative consequences of eating (Galloway & Lee, 2013). The neophobic tendencies affect the nutrition status of the infants.

Maternal, Infant and Young Child Nutrition (MIYCN) is critical for child health and survival. Appropriate feeding practices are of fundamental importance for health, nutrition, survival and development of infants and children. Maternal nutrition is critical to both mother and child. It lays the fundamental foundation for the successful outcome of pregnancy and lactation. Interventions to improve mothers' nutritional status should start long before pregnancy (Mustonen & Oerlemans, 2013). Poor nutritional status before and during pregnancy has been associated with intrauterine growth retardation (IUGR), low birth weight (LBW) and premature delivery conditions. The critical window for improving child nutrition is from pregnancy through the first 24 months of life. The deficits acquired at this age are difficult to reverse later (Haileslassie & Mulugeta, 2013).

Poor infant feeding practices are a major contributor to morbidity and mortality among infants and young children in Kenya. Children under five who are stunted, wasted and underweight in Baringo County are 21%, 14% and 20%, respectively. In addition, the infant mortality is 50 deaths per 1,000 live births (KDHS, 2022). One of the challenges affecting child nutrition is poor feeding practices and parental practices in regard to feeding (Muasya, 2019).

Initiation of breastfeeding within the first hour of birth which provides the best start in life only occurs among 58% of infants and only 32% infants are exclusively breastfed during the first six months (KNBS & ICF Macro, 2010). Data from the 2018 and 2022 Kenya Demographic and Health Survey, show that although breastfeeding is a common

practice in Kenya, mixed feeding rather than exclusive breastfeeding is practiced (Russell & Worsley, 2014).

Introduction to other foods and liquids start as early as the first month with 64% and 86% of infants being given complementary foods by 2-3 months and 4-5 months respectively. Unfortunately, these complementary foods which replace breast milk are low in energy and micronutrients. Only 39% of all children 6-23 months old are fed in accordance with optimal IYCN practices and only 54% have adequate diversity of more than 3 food groups in their diet to meet their nutritional needs (KNBS & ICF Macro, 2010). Malnutrition leads to death and/or disease which in turn reduce the country's productivity. In Kenya, malnutrition causes substantial losses in social capital related to diseases and death in children (Profiles, 2010).

The period from birth to 2 years of age is a "critical window" for the promotion of optimal growth, health and cognitive development (Vyas, 2021). Early years have been recognized as time for developing good dietary practices and important time for taking in nutrients for optimal growth and development (Vyas, 2021). Poor breastfeeding patterns, low nutrient density and poor quality of complementary feeds accounts for nutrient deficiency, illness and infections in children leading to malnutrition at an early age (Tuorila & Lahteenmaki, 2011). Malnutrition has a profound effect on a child's growth and development, as it can lead to permanent stunting, impaired brain and mortar development or excess weight gain, predisposing the child to obesity later in life (Dovey & Staples, 2014). Infant and young child feeding practices directly affect the nutritional

status of children under two years, impacting on child survival (Abduljalil & Furness, 2012).

1.2 Problem statement

Food neophobia is a trait characterized by the rejection of foods that are novel or unknown and potentially limits dietary variety, with lower intake and preference particularly for fruits and vegetables. Understanding non-genetic factors that may influence the expression of food neophobia is essential to improving children's consumption of fruits and vegetables and encouraging the adoption of healthier diets. As is evident, other than genetics, psychosocial factors are likely to increase a child's chances of developing food neophobia since young children carefully watch parental food preferences, and this may produce neophobic tendencies with regard to eating if parents tend to avoid some foods (Moyer, 2012). As a result, it is also likely that maternal infant feeding practices may also result in food neophobia. Based on the current lack of comprehensive research and scarce information on the relationship between maternal infant feeding practices and food neophobia, the researcher carried out this study in order to finding out the maternal infant feeding practices, beliefs and the food neophobia in toddlers.

1.3 Purpose of the study

The purpose of the study was to assess the maternal infant feeding practices and beliefs and expression of food neophobia among toddlers in Mogotio Sub County, Baringo County, Kenya.

1.4 Objectives of the study

1. To establish any restriction for weight and health for toddlers in Mogotio Sub-County, Baringo County.
2. To assess maternal dietary practices and maternal food preferences among toddlers in Mogotio Sub-County Baringo County.
3. To assess parental neophobic tendencies and parental food preferences on infant feeding in Mogotio Sub-County Baringo County.
4. To establish the expression of neophobia in toddlers in Mogotio Sub-County, Baringo County.
5. To determine nutrition status of toddlers in Mogotio Sub-County, Baringo County.
6. To establish the relationship between maternal infant feeding practices and beliefs and expression of neophobia in toddlers Mogotio Sub-County Baringo County

1.5 Research hypotheses

H_{o1}: There is no relationship between maternal infant feeding practices and beliefs on the expression of food neophobia in toddlers

H_{02}: There is no relationship between restriction for weight and health and expression of neophobia in toddlers

H_{03}: There is no relationship between parental food preferences and expression of neophobia in toddlers

H_{04}: There is no relationship between dietary practices and expression of neophobia in toddlers

H_{05}: There is no relationship between expression of neophobia and nutrition status of toddlers

1.6 Significance of the study

This study was projected to provide enough of the required information to enable the successful control and reduction of occurrence of food neophobia in toddlers. The mothers understand how to prevent the possibility to influence their toddlers to show signs of food neophobia. By conducting the study, the adoption of the proper feeding practices by women, with the aim of reducing the occurrence of food neophobia in toddlers would be ensured. There was also enough information on how the whole issue of food neophobia in toddlers can be handled and controlled. This enabled mothers to easily and successfully feed their toddlers without them showing resistance to certain food divisions.

The study is expected to be a source of reference to all health stakeholders especially those concerned with mother and child health when disseminating their services. The findings from the study are expected to be of great help to the government of Kenya as a whole because it forms the basis of knowing how to handle the problem of neophobia among toddlers.

1.7 Scope of the study

The study was conducted in Mogotio Sub County, Baringo County, Kenya and was mainly based on maternal infant feeding practices and beliefs on the expression of food neophobia in toddlers. The study employed a descriptive survey approach and targets a population of 20,000 individuals, mainly consisting of lactating women from the Sub County. Mogotio Sub County was selected due to its high prevalence of malnutrition in Baringo County. Another reason for choosing this sub County was due to the high number of lactating mothers. Being that the Constituency has a population consisting of most of the ethnic groups in the County, it was hoped that the study will be best positioned to collect data from the diverse cultural practices related to maternal infant feeding.

1.8 Limitations of the study

Limitations refer to hindrances or anticipated constraints or potential weaknesses of the study imposed by the methodology of the research. This study is limited to the accuracy responses form the respondents. To counter this, the researcher sensitized the respondents on the aims and the benefits of participating in the study and that the study was only intended for academic purposes and would not intrude on their personal lives.

1.9 Assumptions of the study

It was assumed that there are no other factors affect expression of neophobic apart from those investigated in this study. in the study.

1.10 Conceptual framework

The conceptual framework shows the interaction between the independent and dependent variables. The model combines maternal feeding practices factors and beliefs on expression of food neophobia in toddlers in Mogotio sub County. Thus, the theoretical integrity of the framework noted that determinants are conceptualized as the pathways through which maternal infant feeding practices and beliefs relate food neophobia in toddlers (Figure 1.1).

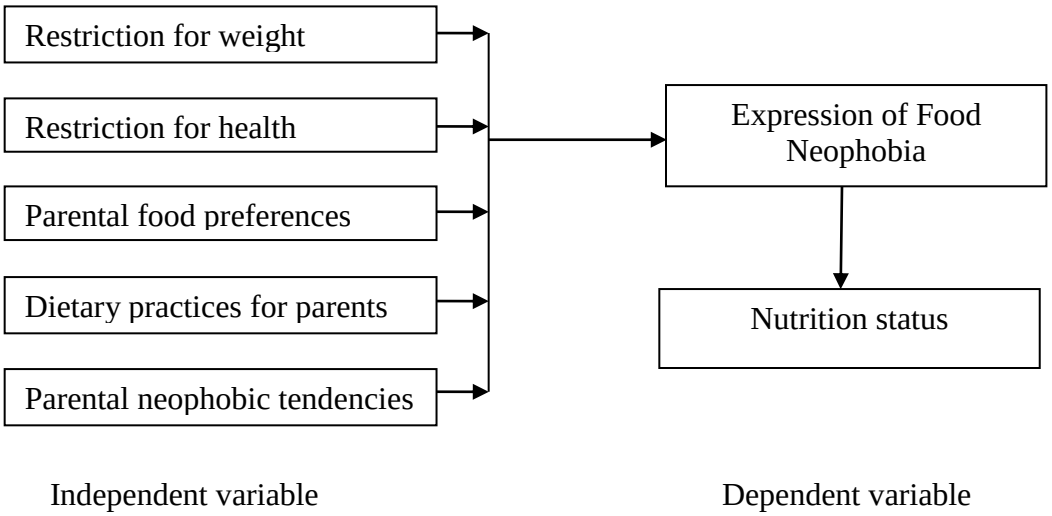

Figure 1.1: Conceptual framework on factors related to expression of food Neophobia

Source: Adapted and modified from Torres, Gomes and Mattos (2020).

CHAPTER TWO: LITERATURE REVIEW

2.1 Infant feeding practices and beliefs

Appropriate feeding practices play a crucial role in preventing mortality and in achieving optimal health outcomes for infants and young children. During the first 6 months of life, exclusive breastfeeding, followed by continued breastfeeding into the second year of life, prevents a large proportion of morbidity and mortality among infants and young children (World Health Organization, 2014).

Over the last several decades, great progress has been made in the promotion of breastfeeding and, more recently, in the duration of exclusive breastfeeding (World Health Organization, 2014). These include the extent to which maternity settings support successful initiation and establishment of breast feeding, regulations governing the marketing practices of the infant food industry, and counseling at the individual level. Current knowledge about the factors that constrain and facilitate breastfeeding has been obtained through various types of research, ranging from randomized controlled field trials to epidemiological and social science research.

Ethnographic, sociological and psychological studies have been particularly helpful for developing an understanding of infant feeding behavior in communities throughout the world. Prior to the demonstration of the value of exclusive breastfeeding there was little attention to the social factors involved in exclusive breastfeeding, as distinguished from any breastfeeding. More recently, attention has been directed to understanding the determinants of exclusive breastfeeding and, as the knowledge base about the social

dynamics of exclusive breastfeeding expands, a measure of exclusive breastfeeding was increasingly included in programs designed to improve early infant feeding.

For a long time, the risks of replacement feeding for child health and survival have been well documented (WHO, 2023; Lutter et al., 2021). Compared to replacement feeding, exclusive breastfeeding protects infants from infection, in part by limiting orally introduced pathogens, and in part because the anti-infective properties of breast milk inhibit bacterial and viral growth. To paraphrase the American Dietetic Association (Mustonen & Oerlemans, 2013), because exclusive breastfeeding delays menstruation through its inhibitory effect on ovulation, it serves as a "natural form of birth control." Pregnancies that are too closely spaced are deleterious for both the mother and the infant's health (Kramer & Bowen, 2013).

Timely provision of complementary foods is necessary at six months. Introduction to other foods and liquids start as early as the first month with 64% and 86% of infants being given complementary foods by 2-3 months and 4-5 months respectively (Lutter et al., 2021). Poor quality of complementary feeds accounts for nutrient deficiency, illness and infections in children leading to malnutrition at an early age (Tuorila & Lahteenmaki, 2011).

2.2 Factors influencing infant feeding behavior

2.2.1 Demographic and socioeconomic factors affect infant feeding practices.

Investigators have found a strong, positive correlation between maternal age and education level and breastfeeding initiation and duration. Specifically, older, and more educated women are the subgroup most likely to choose breastfeeding as their preferred infant feeding method, and generally they breastfeed their children longer than other groups (Russell & Worsley, 2014). Older women are more likely to breastfeed exclusively (Woldeamanuel, 2020). Generally, families in rural areas are less educated and are more likely to be living in poverty than their urban colleagues (Rahayuningrum, 2025).

Notwithstanding home and support networks, nursing mothers struggle with the difficulty of combining infant feeding with employment or work. Socialist feminism emphasizes how the social system of capitalist patriarchy limits options available to women economically and politically (Birch & McPhee, 1987). Infant feeding is a time-consuming behavior characteristic of the domestic arena. The primary empirical finding concerning working mothers and infant feeding is that the intention to return to a job does not hinder initiation of breastfeeding but does hinder duration of breastfeeding (Abekah-Nkrumah et al., 2020). A secondary finding is that the sooner a mother returns to work the less likely she is to maintain breastfeeding (Atchan & Foureur, 2011). Matriano et al. (2022). Factors that influence women's decision on infant feeding: Infant feeding methods are as much a function of structural conditions expanding or limiting women's options as they are a function of women's attitudes (Matriano, et al., 2022).

Infant feeding can be a difficult behavior to practice and, as such, is best practiced just as any other social behavior, in a supportive environment. Lack of social support, therefore, has emerged as a key constraining factor on infant choices. A link between social support and breastfeeding initiation and duration has been supported in multiple studies. Having friends who successfully breastfeed and seeing family and friends breastfeed increases the likelihood of a mother breastfeeding (Russel & Worsley, 2014). A similar study (Johnson et al., 2015) reported that adults with lower income and less educational attainment reported higher levels of food neophobia.

2.2.2 Restriction for weight and health

Weight restrictions has been shown to lead to the expression of food neophobia in infants. Perry et al. (2015), in a study indicated that food neophobia are a factor of weight restrictions. A study in Western Kenya by Krail et al. (2018) which showed that food neophobia was as a result of decreased dietary variety and poor diet quality. A study by Monneuse et al. (2011) indicated that weight restriction lead to expression of food neophobia making children adopt certain eating patterns.

2.2.3 Maternal dietary practices and maternal food preferences

Materanl dietary practices are influenced by food availability, affordability as well as food preferences (Hazley et al., 2022). Adaption to healthy and sustainable diets lead to expression of food neophobia Zickgraf et al. (2016). A study by Quick et al. (2014), suggest that increasing dietary variety contributes towards improved diet quality hence inversely influencing food neophobia. This study further showed that when parents can’t

afford certain foods, they make their children believe that certain foods are not appropriate. Findings suggested that parental food choices influence child's response to new foods (Mahmoodet al., 2021). The study showed that scarcity does contribute to the expression of neophobia in toddlers. A study by Kral (2018) suggested that decreased dietary variety and poor diet quality contributed to food neophobia.

2.2.4 Parental neophobic tendencies and parental food preferences

Familial factors have a profound impact on infant feeding practices (Mahmood et al., 2021). A mother who was breastfed as an infant or had sibling who were breastfed can practice the same to her children (MeMustonen & Oerlemans, 2013). Mothers are more likely to feed their infants in the same manner in which they themselves were fed (Buckland et al., 2022).

2.2.5 Influence by Health professionals

Hospital practices may also affect infant feeding practices, with regards to the initiation and duration of breastfeeding, and the introduction of infant formulas (Cooke & Fildes, 2011). The role of the healthcare professional can be very critical in providing women with the information they need to make the decision on how to feed their babies. Negative attitudes and lack of knowledge on the part of healthcare providers can be barriers to successful infant feeding practices (Aguiar & Silva, 2011).

2.3 Development of food neophobia among toddlers

Food neophobia is generally defined as the avoidance of or the reluctance to eat foods that are novel or unfamiliar (Dovey et al., 2014). Preschool age children tend to have a relative aversion to new foods while showing a preference for foods that are familiar, bland, and sweet (Cooke and Fildes, 2011). This behavior is very common in childhood, but may also continue into adulthood (Knaapila et al., 2011). Different children vary dramatically in their willingness to consume foods that are unknown to them, and that degree of neophobia impacts the variety of foods eaten by that child (Aguiar & Silva, 2011).

Young children are inherently reluctant to taste novel foods. Most children exhibit some caution when presented with unfamiliar foods, and up to 30% of children show significant levels of neophobia. However, variation in the degree of neophobia occurs between certain foods and between individual children. Different children also vary dramatically on the types and number of foods they dislike. Specific dislikes can occur even in foods that are widely accepted (Cooke & Fildes, 2011).

The term food neophobia was originally derived from the "omnivore's dilemma" and was described as an evolutionary behavioral strategy to help children avoid the consumption of poisonous substances. It has been suggested that this behavior is due to neurobiological mechanisms that are present at birth, and that can persist into adulthood (Dovey et al., 2014). This hypothesis suggests that children's food preferences are influenced by evolutionary adaptations which are no longer appropriate in the current food environment (Abduljalil & Furness, 2012).

The degree to which neophobia is present in preschool children may be determined by the combination of several factors. Personality traits, age, parental attitudes and feeding styles, tactile sensitivity, previous and current experiences with food, and overall willingness to try novel foods are all factors that may contribute to the development of food neophobia (Dovey& Staples, 2014).

Some research has characterized food neophobia as an inherent personality trait, which suggests that it is heritable (Dovey & Staples, 2014). Two recent studies investigating twins demonstrated a strong genetic influence on food neophobia. One study estimated heritability at 78% (Cooke et al., 2011), and the other demonstrating heritability for Finnish and British twins at 69% and 67% respectively (Cooke & Fildes, 2011). To assess food neophobia, the Food Neophobia Scale (FNS), a validated psychometric instrument specifically designed to assess this reluctance to consume new foods.

2.4 Nutrition status of toddlers

A study by Johnson et al. (2015) highlights that a child neophobia is associated with a meaningful child nutrition status. Further, a study by Galloway & Lee (2013) show that the neophobic tendencies affect the nutrition status of the infants. To ensure optimal nutrition status, interventions to improve mothers' nutritional status should start long before pregnancy (Mustonen & Oerlemans, 2013). One of the challenges noted to affect child nutrition is poor feeding practices and parental practices in regard to feeding (Muasya, 2019). This is further indicated in a study by Mbura et al. (2016) in Taita

Taveta and Nyakundi, Chege and Ogada (2019) in Kuria west stating that Nutrition status is affected by maternal influences.

2.5 Relationship between maternal infant feeding practices and beliefs and expression of neophobia in toddlers

This hypothesis is also supported by research showing that neophobia has been shown to be predicted by certain personality traits. Children who have higher levels of anxiety are more likely to have food aversions and higher food neophobia. Food neophobia is also especially likely to persist in children who are susceptible to anxiety. Higher food neophobia is also associated with the traits of shyness and emotionality (Galloway &Lee, 2013). However, some research suggests that an age-specific influence on food neophobia exists and therefore concludes that neophobia may not be a trait at all, but rather an age-dependent state (Dovey et al., 2014). There is evidence that food neophobic is "minimal in infancy, rises rapidly at around the age of two, and gradually decreases thereafter" (Aguiar & Silva, 2011). Food neophobia may decrease over time because as children age fewer foods are new to them. This suggests that during early childhood, when many foods are unfamiliar, food neophobia is the most detrimental to overall diet (Galloway & Lee, 2013).

Parental attitudes and feeding styles can also have a significant effect on the development of food neophobia in their children. While parental influence on intake maybe limited to childhood, it has the potential to define the magnitude and duration of food neophobia in their children's lives (Dovey & Staples, 2014). Neophobic mothers are more likely to

have neophobic daughters (Galloway & Lee, 2013). Also, children's willingness to taste unfamiliar foods decreases when parents offer the food without tasting it themselves (Donadini, Spigno, & Porretta, 2021)). Parents may even be able to influence their children to adopt food habits different from their own. If a child is encouraged to try novel foods through a non-pressured approach, children may learn to accept and even prefer foods that the parent does not like (Dovey & Staples, 2014).

2.6 Summary of literature review

Food neophobia is a reluctance to eat unfamiliar foods and is a personality trait that influences food choices and consequently food acceptance and consumption. The restriction for weight and health for toddlers is not well documented. Information on the influence on maternal dietary practices and maternal food preferences to the feeding of infants is also scarce. In addition, the expression of neophobia in toddlers and how it affects nutrition status is not documented. This scale is a self-administrated ten-item questionnaire which measures the occurrence of food neophobia and despite the existence of this measure of food neophobia, a gap has been identified of the need to find out the maternal infant feeding practices and beliefs on the expression of food neophobia.

CHAPTER THREE: MATERIALS AND METHODS

3.1 Research design

This study employed a descriptive study design approach due to a large area being involved in the study. Descriptive survey design uses sampled data of an investigation to document what exists, or the present status of existence or absence of what is being investigated. A cross sectional analytical design was appropriate so as to enable the researcher meet all the study objectives.

3.2 Study variables

3.2.1 Independent variable

In this study, maternal infant feeding practices was the independent variable which was measured by factors such as restriction for weight; restriction for health; maternal dietary practices, maternal food preferences; food availability; and parental neophobic tendencies.

3.2.2 Dependent variable

The dependent variable in this study was expression of food neophobia which was measured through frequency of avoidance or reluctance to eat new foods by infants and nutrition status.

3.3 Location of the study

The study was carried out in Mogotio Sub County, Baringo County in the Rift Valley Region of Kenya. This is one of the ASAL areas of Kenya. The proportion of children

under five who are stunted, wasted and underweight in Baringo County are 21%, 14% and 20%, respectively Mogotio sub County has three large wards namely; Emining, Kisanana and Mogotio. Larger part of the region is Arid and semi-arid lands. Residents practice mixed farming.

3.4 Target population

The study targeted a population of 20,000 individuals mainly comprised of toddlers (12 to 24 months) of lactating women drawn from Mogotio Sub County.

3.4.1 Inclusion criteria

The study included;

1. Lactating women aged 15 to 49
2. Lactating with a with toddler

3.4.2 Exclusion criteria

The study excluded;

1. Toddlers who were chronically ill as noted from health cards.

3.5 Sample size determination

The sample size was determined by the Fischer. The sample size used in a study was determined based on the expanse of data collection, and the need to have sufficient statistical power Saunders et al. (2009).

$$n = \frac{Z^2 P(1-P)}{I^2}$$

n = sample size where population > 10000

Z = normal deviation at 95% confidence interval which is 1.96

P = population proportion with the desired characteristic

Q = population proportion without desired characteristic

I^2 = degree of precision 10%. 50 % was used since the population is not known

$n = 1.96^2 \times 0.5 (1 - 0.5)/0.1^2 = 96$

n = 384

A proportion of 10% (38) was added to the sample size calculated to cater for any non-response forming a total sample of 422 mother child pair.

3.6 Sampling techniques

Baringo County and Mogotio Sub-County were selected purposively. The three wards from the sub-County were selected by simple random sampling. The calculated sample of 422 was divided into 3 wards to get 141. The desired sample of 141 in a ward was divided into the number of sub-locations in a ward. From each Sub-location in a ward, the households with under five children was listed y use of Community Health Volunteers (CHPs). Then systematic random sampling was adopted to get the desired sample. The number of listed households was divided by the desired sample per sub-location to get the nth term. The table of random numbers was used to identify the starting point. Then every nth term was picked until the desired sample was obtained.

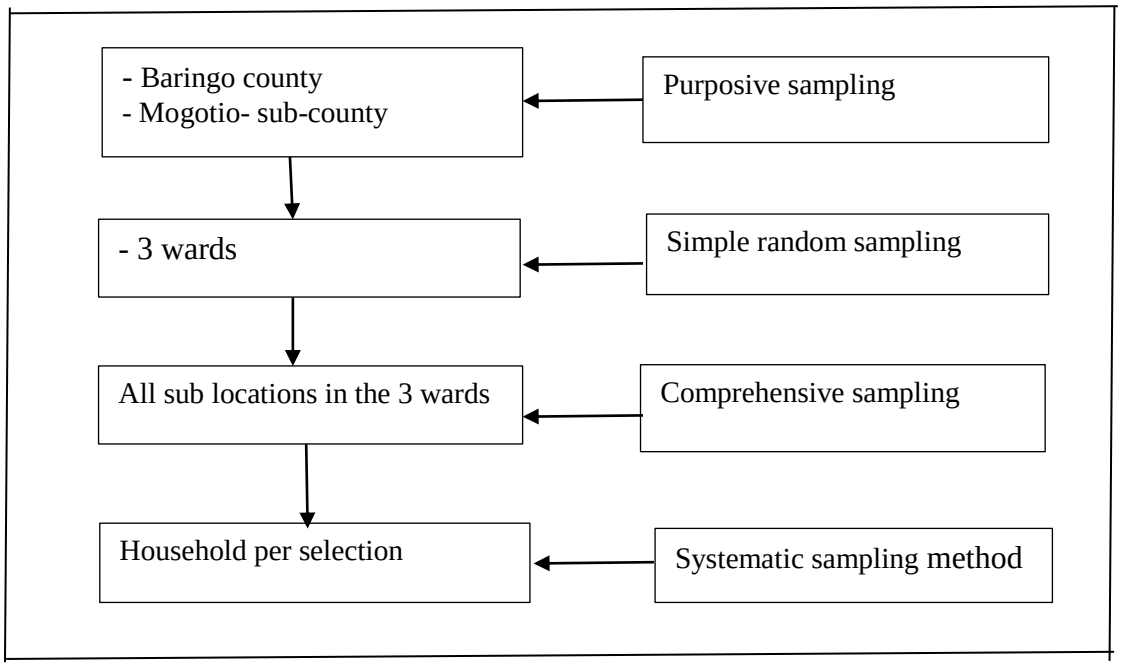

Figure 3.1 Sampling techniques

3.7 Research instruments

3.7.1 Researcher administered questionnaire

A researcher administered questionnaire comprising of questions relayed verbally to the respondents. The researcher used this tool in obtaining data on restriction for weight and health for toddlers, dietary practices, parental neophobic tendencies and parental food preferences on infant feeding in expression of neophobia in toddlers and nutrition status of toddlers in Mogotio sub-County, Baringo County.

3.7.2: Focus group discussion guide

A focus discussion group guide (FGD) was used to gather information on restriction for weight and health for toddlers, dietary practices, parental neophobic tendencies and

parental food preferences on infant feeding in expression of neophobia in toddlers. This was done among selected lactating mothers.

3.7.3: Key informant guide

Key informant interviews (KII) were used to solicit for information on infant feeding practices form key persons in the community. This included; Nutritionists form health facilities and community health volunteers.

3.8 Data collection procedure

Expression of neophobia in toddlers was assessed by checking on the understanding of the concept of food neophobia and whether the behavior is noticed among the children. Restriction for weight and health for toddlers was assessed by establishing the how weight restrictions lead to the expression of food neophobia in infants, children exposure to certain kinds of foods for which they later develop a disliking and restriction of children to some foods.

Parental neophobic tendencies and parental food preferences was established by assessing the relationship between parental food preferences and expression of neophobia in toddlers. Food availability and dietary practices and how they contribute to the expression of neophobia in toddlers as well as how parental neophobic tendencies influence the expression of neophobia in toddlers was assessed. Anthropometric measurements for the child was done by getting the age, gender, weight, length and MUAC. The weight was collected while the children had minimal clothing. Length was

taken suing a length board. MUAC was done using a MUAC tape on the left arm. To assess food neophobia, the Food Neophobia Scale (FNS), a validated psychometric instrument specifically designed to assess this reluctance to consume new foods.

3.9 Pre-testing of data collection tools

Pretesting was carried out before the main study was conducted. Questionnaires were pre-tested at a neighboring Marigat sub –County, Baringo County. A 10% of the sample size is used for pretesting which translated to 42 respondents.

The pre-testing was conducted to establish accuracy of questions and clarity and to determine the length of interviews. During pre-testing an effort was made to check for consistency in the interpretation of questions and to identify ambiguity of questions for adjustment.

3.9.1 Validity of data collection tools

The research used content validity which refers to the extent to which a measure represents all facets of a given social construct. The validity was checked through the use of experts. The researcher used experts to go through the questions in the questionnaire to check if the questions are valid.

3.9.2 Reliability of data collection tools

The reliability of data collection instruments was determined from a pretest in which the researcher administered the research instruments to a group of respondents other than the

actual targeted respondents. A minimum correlation of 0.8 was considered as a good measure of reliability (Zaki et al., 2013).

3.10 Data analysis and presentation

A computer software; Nutri survey was used to analyze the 24-hour recall data and generate the energy and quantity of selected nutrients consumed by the children. Analysis of the generated data was done by use of both inferential and descriptive techniques. Data on anthropometry was analyzed by use of ENA for SMART software to generate Z-score for wasting, stunting and underweight among children. The indices for Z-scores were interpreted as <-3.0 SD as severe, -2.99 to -2.0 SD as moderate, >-1.99 SD as normal, while for weight MUAC were interpreted as <11.4 cm as severe, 11.5 to 12.5 cm as moderate, > 12.5cm as normal.

During data analysis Statistical Package for Social Sciences (SPSS) version 25. Pearson product-moment correlation was used to determine relationship between non-categorical variables. Chi-square test was used to test associations between maternal infant feeding practices and beliefs and infant feeding practices as well as relationship between parental food preferences and expression of neophobia. Logistic regression was used done to determine the contribution of maternal infant feeding practices and beliefs to the expression of food neophobia in toddlers. KII and FGDs was transcribed, analyzed and categorized to establish emerging issues.

Table 3.1 Summary table of data analysis per objective

Objective	Variables	Data analysis method/technique
1. To establish any restriction for weight and health for toddlers	Restriction for weight and health	Frequency, percentages
2. To assess food maternal dietary practices and maternal food preferences	Maternal dietary practices and maternal food preferences	Frequency, percentages
3. To assess parental neophobic tendencies and parental food preferences on infant feeding	Parental neophobic tendencies and parental food preferences	Frequency, percentages
4. To establish the expression of neophobia in toddlers	expression of neophobia	Frequency, percentages
5. To determine nutrition status of toddlers	nutrition status	Frequency, percentages, mean
6. To find out the relationship between maternal infant feeding practices and beliefs and expression of neophobia	All	Chi-square, Pearson (r) Logistic regression

3.11 Logistical and ethical considerations

Ethical approval was sought from Kenyatta University Ethical Review Board while a permit from the National Commission for Science, Technology and Innovation (NACOSTI) before carrying out the study. Additional approval was sought from the County Government of Baringo.

The researcher complied with the following principles which aim at protecting the dignity and privacy of every individual respondent; An explanation was given to the respondents on the aims, methods, anticipated benefits and potential hazards of the research; their

right to abstain from participation in the research and their right to terminate at any time their participation; and the confidential nature of their replies. Further the researcher sought informed consent from the respondents to show that they are willing to participate. No pressure or inducement of any kind was applied to encourage an individual to become a subject of research. The identity of individuals from whom information was obtained in the course of the research was kept strictly confidential

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CHAPTER FOUR: RESULTS

4.1. Demographic and socio-economic characteristics

4.1.1 Demographic characteristics among mothers of toddlers in Mogotio Sub-County Baringo County

This section presents result as per the objectives. The response rate was 94.1%. Slightly less than half (44.1%) of the respondents were in the age group of 25-34 years. A third (30%) of the respondents were between 15-24 years of. Majority of the mothers (41.3%) were married, 29.2% were not married and 17.1% were being separated or divorced. A majority (62.5%) of the participating mothers came from a household with four or five members, while 15.3% of the participants were two members; with most of these being a single mother and their child. In addition, 22.2% of the participants were from families with six or more members (Table 4.1).

Table 4. 1 Demographic characteristics among mothers of toddlers in Mogotio Sub-County Baringo County

Variable	Description	N= 397	
		n	%
Age (in complete years)	15-24 years	119	30.0
	25-34 years	175	44.1
	Above 45 years	103	25.9
Duration of the stay in the area	Less than 2 years	133	33.5
	2-5 years	123	31.0
	5 and above years	141	35.5
Household size	2-3 Members	61	15.3
	4-5 Members	120	62.5
	6+ Members	88	22.2
Marital Status	Single	116	29.2
	Married	164	41.3
	Separated/Divorce	68	17.1
	Widow/Widower	49	12.3
Number of children	2-3	63	15.9
	4-5	263	66.2
	6+	71	17.9

About half (55.7%) of the toddlers were aged between twelve and twenty-four months. While 44.3% were infants aged between one month and twelve months. More than half (58.9%) of the toddlers targeted in the study were male while 41.6% were female (Table 4.2).

Table 4. 2 Characteristics of toddlers in Mogotio Sub-County Baringo County

		N= 397	
		n	**%**
Child's gender	Male	234	58.9
	Female	163	41.1
Child's age	1-12 months	176	44.3
	12-24 months	221	55.7

4.1.2 Socio-economic characteristics among mothers of toddlers in Mogotio Sub-County Baringo County

About half (47.1%) of the mothers had completed primary school education while 31.5% of the mothers had attained secondary education. It was noted that 15.1% of the respondents had no formal education with a further 6.3% of the respondents having post-secondary education. Farming was the main occupation of 37.5% mothers was (while 22.9% of the mothers were casual laborers; 21.2% were housewives. Further, less than a quarter (18.3%) of the mothers were employed (Table 4.3).

Table 4. 3 Socio-economic characteristics among mothers of toddlers in Mogotio Sub-County Baringo County

	Socio-economic characteristics	N=397	
		N	%
Highest education level achieved	None	60	15.1
	Primary	187	47.1
	Secondary	125	31.5
	College	23	5.8
	University	2	0.5
Occupation	Farming	149	37.5
	Business	51	12.8
	Employed	22	5.5
	Casual Labour	91	22.9
	Housewife	84	21.2

The income range of the participants was also investigated. Findings indicate that 53.9% of the mothers earned less than KES. 10,000. Another 31.7% earned between KES. 10,000-20,000 and 14.3% reported a monthly income of above KES. 20,000 (Table 4.2).

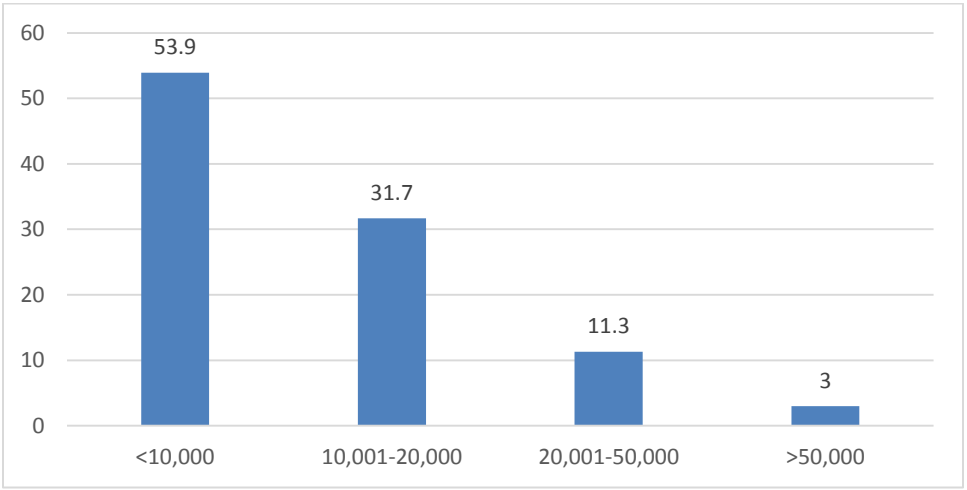

Figure 4.1: Household income where toddlers come from in Mogotio Sub-County Baringo County

4.2 Restriction for weight and health for toddlers in Mogotio Sub- County, Baringo County

The researcher provided prompts on the restriction of weight and health for the participating mothers to respond to. Findings found that 27.2% of the mothers disagreed with the statement that weight restrictions lead to the expression of food neophobia in infants. About a third (31.7%) of the care-givers strongly agreed that lack of certain food exposure makes the toddlers later develop a disliking of these kinds of foods (Table 4.4). Further, the study established that 27.0% of the mothers strongly agreed that restricting toddlers for weight purposes makes the toddlers detest some foods even long after this restriction. This also came from FGD, "M*others indicated that restricting certain food exposure makes the children to dislike the foods later. The children think that the children should not be consumed"* (FGD, 2023).

Table 4. 4 Restriction for weight and health for toddlers

		N=397	
		n	%
Weight restriction: Expression of food neophobia	Strongly agree	34	8.6
	Agree	73	18.4
	Undecided	91	22.9
	Disagree	108	27.2
	Strongly disagree	91	22.9
Lack of certain food exposure	Strongly agree	126	31.7
	Agree	78	19.6
	Undecided	56	14.1
	Disagree	78	19.6
	Strongly disagree	59	14.9
Restriction for weight purposes	Strongly agree	107	27.0
	Agree	86	21.7
	Undecided	71	17.9
	Disagree	69	17.4
	Strongly disagree	64	16.1

4.3 Maternal dietary practices among toddlers in Mogotio sub-County Baringo County

The researcher probed on food availability and dietary practices in order to determine the preferences or how toddlers responded to food intake. About 38.8% of the mothers strongly agreed that prolonged unavailability of certain foods leads to unfamiliarity with foods hence total neophobia. About 32.2% agreed that when parents cannot afford certain foods, they make their children believe that certain foods are not appropriate. Additionally, 36.8% of the respondents disagreed that scarcity does not contribute to toddler neophobia expression (Table 4.5). This was confirmed by FGD, "W*hen certain foods are not available in the community, the children are not familiar with those foods. On coming across these foods later in life, it leads to children detesting these foods"* (FGD, 2023).

Table 4.5 Maternal dietary practices among lacatating mothers

		N=397	
		n	**%**
Prolonged unavailability of certain foods leads to unfamiliarity with foods hence total neophobia	Strongly agree	154	38.8
	Agree	132	33.2
	Undecided	21	5.3
	Disagree	42	10.6
	Strongly disagree	48	12.1
Unaffordability of certain foods by parents makes children believe the foods are not appropriate.	Strongly agree	106	26.7
	Agree	128	32.2
	Undecided	57	14.4
	Disagree	67	16.9
	Strongly disagree	39	9.8
Scarcity does not contribute to the expression of neophobia	Strongly agree	53	13.4
	Agree	59	14.9
	Undecided	18	4.5
	Disagree	146	36.8
	Strongly disagree	121	30.5

4.4 Parental neophobic tendencies and parental food preferences on infant feeding in Mogotio sub-County Baringo County

The study was conducted to assess whether parental neophobic tendencies and food preferences had any impact on infant feeding. About 44.3% of the mothers agreed that parents who have neophobic tendencies inspire their children to have the same. Moreover, 38.0% of the participants agreed that parental neophobia results in reduced liking for food by their children. The findings of the study also revealed that 26.4% of the mothers disagreed that parents provide foods for toddlers and they don't provide foods which they themselves do not like (Table 4.6). This was confirmed by FGD, *"If any mother has any neophobic tendencies, they influence the children to adopt it. The children imitate on what the parent do in everything more so in matters related to feeding"* (FGD, 2023).

Table 4.6 Parental neophobic tendencies and parental food preferences on infant feeding

		N=397	
		n	**%**
Parental neophobic tendencies inspire children to have the same	Strongly agree	88	22.2
	Agree	176	44.3
	Undecided	34	8.6
	Disagree	63	15.9
	Strongly disagree	36	9.1
Parental neophobia results in reduced liking for food by children	Strongly agree	104	26.2
	Agree	151	38.0
	Undecided	52	13.1
	Disagree	49	12.3
	Strongly disagree	41	134
Parents provides foods but not those they don't like to their toddlers	Strongly agree	98	24.7
	Agree	87	21.9
	Undecided	54	13.6
	Disagree	105	26.4
	Strongly disagree	53	13.4

The study participants were asked if the children ate food based on their parents' preferences. The study established that 28.2% of the mothers agreed that children like food based on whether their parents like the same foods or not (Table 4.7). In addition, 31% strongly agreed that toddlers learn from their parents and therefore follow almost everything that their parents do including food preferences. This is similar from FGD, "*If any mother has any neophobic tendencies, they influence the children to adopt it. The children imitate on what the parent do in everything more so in matters related to feeding"* (FGD, 2023).

Table 4.7 Parental neophobic tendencies, preferences and expression of neophobia among toddlers in Mogotio sub-County, Baringo County

		N=397	
		n	**%**
Children likes foods based on likes and dislikes of parents	Strongly agree	82	20.7
	Agree	112	28.2
	Undecided	43	10.8
	Disagree	96	24.2
	Strongly disagree	64	16.1
Toddlers learn from parents including food preferences	Strongly agree	123	31.0
	Agree	115	29.0
	Undecided	43	10.8
	Disagree	64	16.1
	Strongly disagree	52	13.1

4.5 Expression of neophobia in toddlers in Mogotio sub-County, Baringo County.

Almost all 92.4% of the mothers understood what neophobia meant, by stating that it meant failure of a toddler to consume some certain foods. Majority (70%) of the toddlers developed a disliking of certain foods (Table 4.8).

Table 4.8 Expression of neophobia in toddlers in Mogotio sub-County, Baringo County

Expression of neophobia in toddlers	n (397)	%
Parental understanding the concept of food neophobia as failure of a toddler to consume some certain foods	367	92.4
Noticed neophobic behaviour among the toddlers	278	70.0

4.6 Nutrition status of toddlers in Mogotio sub-County, Baringo County

The nutrition status of the toddlers was essential to note as it revealed how the infants were feeding. This study collected data on nutrition status of the infants. With respect to global acute malnutrition (GAM) for Z scores, the proportion of children under five who are wasted, stunted and underweight in Baringo County are 19.2%, 25.7% and 23.3%, respectively (Figure 4.2). Data is presented by use of MUAC and weight for length indices. As per MUAC, 17.3% were normal (> 12.5cm), 62.8% moderately malnourished (11.5 to 12.5 cm) and 19.9% severely malnourished (<11.4 cm) (Figure 4.3).

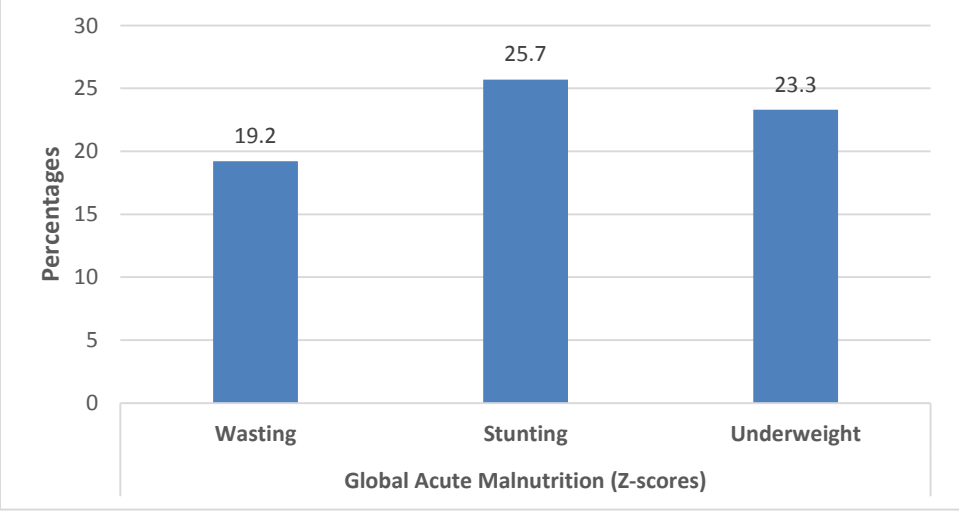

Figure 4.2: Nutrition status by Z- scores among toddlers in Mogotio Sub-County Baringo County

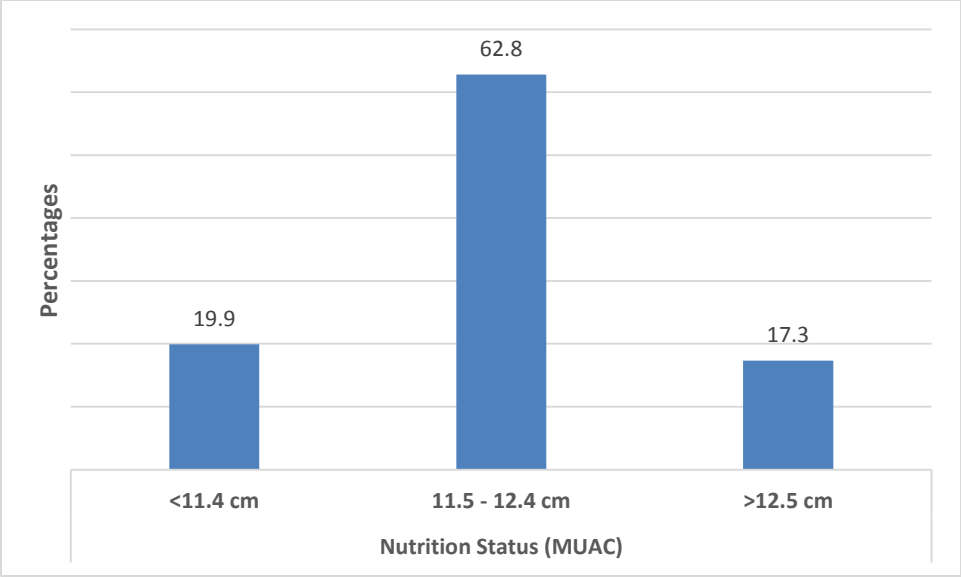

Figure 4.3: Nutrition status by MUAC among toddlers in Mogotio Sub-County Baringo County

4.7 Relationship between maternal infant feeding practices and beliefs

The study also aimed to determine if there were any relationship between maternal infant feeding practices and beliefs and infant feeding practices. The study shows significant relationship ($p< 0.05$) between expression of neophobia and restriction for weight and health for toddlers, maternal dietary practices, maternal food preferences and nutrition status. In addition, nutrition status significantly ($p< 0.05$) related to restriction for weight and health for toddlers, maternal dietary practices and maternal food preferences (Table 4.9).

Table 4.9 Relationship between restriction for weight and health for toddlers, maternal dietary practices, maternal food preferences, nutrition status and expression of neophobia

Dependent variable	Independent Variables	P value
Expression of neophobia	Restriction for weight and health for toddlers	0.016
	Maternal dietary practices	0.032
	Maternal food preferences	0.028
	Nutrition status	0.041
Nutrition status	Restriction for weight and health for toddlers	0.035
	Maternal dietary practices	0.031
	Maternal food preferences	0.017

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

This chapter presents the discussion of the study findings of maternal infant feeding practices and food neophobia among toddlers in Mogotio sub-County Baringo County. The discussion has been made in relation to the study objectives and how the results compare to other research findings.

5.1.1 Demographic and socio- economic characteristics

The study showed that the mean age of mothers/ mothers in Mogotio Sub-County was twenty-eight years which agreed with a study by Adongo, Shellduncan and Tuitoek (2012). Household size is a great determinant of dietary intake of the members of the household. The preference of food was also determined by availability, affordability and the feeding shift from quality and nutritious foods to getting something to feed the family (Arimond et al., 2010). Focusing on marital status of the mothers, majority of the mothers (41.3%) were married with 17.1% who were separated from their partners and 12.3% who were widowed.

The results showed that slightly less than half (47.1%) of the mothers had attained primary school education, and about a third (31.5%) had secondary education. The study established that a minimum (6.3%) of the study participants had post-secondary education. The study also established that less than a quarter (15.1%) of the participating mothers had no formal education. These findings on the education status of the participants that were in agreement with findings of a similar study by Mwongera (2013)

which showed that 60.8% of women in Samburu had not attended any formal education. The level of education in the study was shown to have a positive strong relation with the dietary practices of the mothers to their children. This is because the care-givers with a higher educational level were able to make better decisions pertaining to their diet and were able to understand food neophobia concept and notice the neophobia behavior in their infant feeding.

From the results of the study on the occupation, more than a third (37.5%) of the respondents were farmers. Further, less than a quarter (22.9%) of the mothers were casual laborer's while about a quarter (21.2%) were housewives. Due to their steady source of income this negatively affected their purchasing power for nutritious foods by limiting their diet in terms of diversity and nutrient content. Majority of the mothers were unemployed with slightly more than half (53.9%) earning less KES. 10,000 monthly.

5.1.2 Restriction for weight and health for toddlers in Mogotio Sub- County, Baringo County.

Weight has shown to have an association with food neophobia. It was therefore for this reason that weight restriction was investigated in this study. Slightly more than a quarter (27.2%) of the care-givers disagreed that weight restrictions lead to the expression of food neophobia in infants. These results are similar to those of a research study done by Perry et al. (2015), which stated that food neophobia was as a result of poorer dietary practices and not weight restrictions. This was also similar to a study in Western Kenya by Krail et al. (2018) which showed that food neophobia was as a result of decreased

dietary variety and poor diet quality. This however contradicts with the study by Monneuse et al. (2011) which showed that weight restriction lead to expression of food neophobia making children settle on current eating behavior.

About a third (31.7%) of the care- givers strongly agreed that lack of certain food exposure makes the children later develop a disliking of certain kinds of foods These results are similar to the findings by Mithamo et al. (2021) in a study in Nabongo dispensary Kakamega County that noted that a majority (70%) of children developed a disliking of certain foods due to lack of earlier exposure to these foods. This study was in agreement with a study by Lefraire et al. (2016) which showed that children's disliking of food was due to cognitive, social and environmental factors. This however contradicts a study in Uasin-Gishu County where (75%) consumed fewer familiar foods with continuous exposure with time (Konyole et al., 2012).

In this study, slightly more than a quarter (27%) of the mothers strongly agreed that restricting children for weight purposes makes the children detest some foods even long after this restriction. This was similar to a study by Monneuse et al. (2011) which stated that restricting food for weight purposes made most children mediate to new eating practices.

5.1.3 Maternal dietary practices food preferences among toddlers in Mogotio sub-County, Baringo County.

Dietary practices are influenced by a number of factors such as food availability, affordability as well as food preferences among others. Results from correlation in this study showed that prolonged unavailability of certain foods leads to unfamiliarity with foods hence total neophobia. This was contradicting with the study done by Hazley et al., 2022) which stated that food neophobia was not particularly important risk factor for poor nutrient status as adherence to certain dietary recommendations remained low within the targeted population. The study further indicated that food neophobia may further inhibit the adaption of healthy and sustainable diets. However, Quick et al. (2014) findings suggested that increasing dietary variety contributes towards improved diet quality hence inversely influencing food neophobia.

The findings of the study further showed that when parents can't afford certain foods, they make their children believe that certain foods are not appropriate. A similar study (Johnson et al., 2015) reported that adults with lower income and less educational attainment reported higher levels of food neophobia. Findings suggested that parental food choices influence child's response to new foods (Mahmoodet al., 2021). The study showed that scarcity does contribute to the expression of neophobia in toddlers. This was similar to a study by Johnson et al. (2015) whereby higher levels of child neophobia was associated with a meaningful child nutrition status such as lower fruit and vegetable consumption by child and limited food variety. A similar study by Kral (2018) suggested that decreased dietary variety and poor diet quality contributed to food neophobia.

5.1.4 Parental neophobic tendencies and parental food preferences on infant feeding in Mogotio sub-County Baringo County.

The study was conducted to find out if parental neophobic tendencies/ food preferences have any impact on infant feeding. The findings of the study showed that most parents who have neophobic tendencies inspire their children to have the same. These findings were similar to the study done by Tan et al. (2012) whereby most mothers who were food neophobic agreed not to make healthy foods available for their children. A study by Cassells 2014) suggested that lower awareness of infant hunger and satiety cues was associated with higher child food neophobia.

It was also noted that parental neophobia results in reduced liking for food by their children. This is similar to a study by Vollmer et al. (2019) which stated that parents influence child's eating habit and makes choices depending on their preferences. The study however showed that majority of the mothers (26.4%) disagreed that parents provide foods for toddlers and they don't provide foods which they themselves do not like. This contradicts with the study by Mahmood et al. (2021) which findings suggested that parental food choices influence child's response to new foods.

5.1.5 Expression of neophobia in toddlers in Mogotio sub-County, Baringo County.

The study was carried out to find out if there was any expression of neophobia in toddlers. The results revealed that slightly more than a quarter (28.2%) of the mothers agreed that children like food based on whether their parents like the same foods or not. The findings are in agreement with the study by Vollmer et al. (2019) which showed that

parents who allowed children to control their own eating, there was high demand that respond to child's need.

It was also notable that about a third (31%) of the mothers strongly agreed that toddlers learn from their parents and therefore follow almost everything that their parents do including food preferences. The findings are similar to a study by Vollmer et al. (2019) that showed that parents contributed much in food choices/preferences for their children. Further evidence suggested that parents provide food environment for their children early experience with food and eating (Ravikumar etal., 2022).

5.1.6 Nutrition status of toddlers in Mogotio sub-County, Baringo County

From the findings it was evident that a large number of infants were moderately acute malnourished. The proportion of children under five who are stunted, wasted and underweight in Baringo County are 21%, 14% and 20%, respectively, which was slightly higher than the rates for Baringo County shown by19.2%, 25.7% and 23.3%, respectively. The nutrition status is similar to that derived by a study by Mbura et al. (2016) in Taita Taveta and Nyakundi, Chege and Ogada (2019) in Kuria west.

The study further revealed that most children aged between 6 months to 24 months were moderately malnourished. In reference to this study majority of the infants (62.8%) were moderately malnourished while less than a quarter (19.9%) of the infants were severely malnourished.

5.1.7 Relationship between maternal infant feeding practices and beliefs

This study was to find out if there was a relationship between maternal infant feeding practices and beliefs. Restriction for weight related significantly with expression of neophobia. The findings are in agreement with the study by Vollmer et al. (2019) which showed that parents who allowed children to control their own eating, there was high demand that respond to child's need. The results revealed that majority of the mothers agreed that parents who do not eat certain kinds of foods keep their children also from eating these foods. The findings are in agreement with a study by Torres et al. (2020) which stated that food neophobia in children is attributed by parental influence on child's eating habits. In relation to parental preferences, the results are in agreement with finding by Vaarno et al., 2016) which showed that parental preferences greatly attribute to eating practices of children. The nutrition status is related to expression of neophobia. This is in agreement with a study by Mbura et al. (2016).

5.2 Conclusions

For demographics, majority of mothers with toddlers were between the age of 25-34 years of age and were married (41.3%). There were more male infants 58.9% than female infants. With most (55.7%). children being between 12-24 months of age. Education level of the mothers was low as majority had only attained primary education while 15.1% had no formal education. However, main occupation of majority of the mothers was farming while 21.2% were housewives. Majority of the mothers were low-income earners with the main sources of income being sale of produce they got from their farms and a big number being unemployed.

In relation to restriction for weight and health for toddlers, restricting the diet of children for weight purposes makes the children detest some foods. This is prolonged even long after this restriction and that restricting food for weight purposes made most children mediate to new eating practices.

For dietary practices and maternal food preferences, decreased dietary variety and poor diet quality were noted as determinants of food neophobia. Therefore, increasing dietary variety contributes towards improved diet quality hence inversely influencing food neophobia. Lack of certain foods for a long time leads to unfamiliarity with foods hence total neophobia. There was a significant relationship between food availability and dietary practices whereby it was noted that when parents can't afford certain foods, they make their children believe that certain foods are not appropriate. There is a notable relationship between parental food preferences and expression of food neophobia among toddlers.

In reference to parental neophobic tendencies and parental food preferences, results indicate that toddlers learn and imitate their parents feeding practices and therefore adopt almost all their food preferences. Parents contributed much in food choices/preferences for their children. Parents who allowed children to control their own eating, there was high demand that does not respond to child's need.

For expression of neophobia in toddlers Almost all 92.4% of the mothers understood what neophobia meant, by stating that it meant failure of a toddler to consume some

certain foods. Majority (70.0%) of the toddlers were reported to have developed food neophobia. The expression of neophobia contributed to a high proportion of children under five who are wasted, stunted and underweight indicated by 19.2%, 25.7% and 23.3%, respectively. This is an indication that food neophobia is a contributing factor to malnutrition.

Conclusion on hypothesis

The hypothesis that **t**here is no relationship between maternal infant feeding practices and beliefs on the expression of food neophobia in toddlers is rejected. The hypothesis that **t**here is no relationship between restriction for weight and health and expression of neophobia in toddlers. The hypothesis that **t**here is no relationship between parental food preferences and expression of neophobia in toddlers. The hypothesis that **t**here is no relationship between dietary practices and expression of neophobia in toddlers. The hypothesis that **t**here is no relationship between expression of neophobia and nutrition status of toddlers

5.3 Recommendations

5.3.1 Recommendations for policy

The results have demonstrated that food restrictions, maternal dietary practices and neophobic tendencies has tendencies in expression of neophobia among toddlers. Based on these findings, policy makers in the Ministry of Health and Ministry of Education can use this information to develop policies of ensuring care givers/women adopt appropriate

dietary practices among themselves as they trickle down to children. Policies to improve knowledge, and dietary practices of infants related to food neophobia are recommended.

5.3.2 Recommendations for practice

It is recommended that comprehensive nutritional information be provided to all mothers by Ministry of Health. Not restrict any food to the children. This on good dietary practices among mothers. Selection of healthy diets. Understanding that their dietary practices trickle down to children. This is because the toddlers are likely to adopt them.

5.3.3 Recommendations for Further Research

The researcher recommends that a similar study be conducted on mothers of the same age group but in different regions with different levels of education and economic status to better explain the concept of food neophobia.

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APPENDICES

APPENDIX A: LETTER OF INTRODUCTION AND CONSENT

Dear Participant,

My name is **Esther Kiplagat**. I am a post graduate student at Kenyatta University pursuing a master of science in Food, Nutrition and dietetics. I, am undertaking a study on m**aternal infant feeding practices, beliefs and the food neophobia in toddlers in Baringo County, Kenya.** I would be glad if you could voluntarily spare some of your time and provide me with the information required. The information you give was treated with strict confidentiality and will only be used for the purpose of this study.

Process: In this exercise I was asking you a few questions on how to tell if your child has food neophobia.

Time length: The interview will take 15-20 minutes. You are free to ask any questions, refuse to answer questions that you are not comfortable with and to stop at any time during the interview.

Confidentiality: The information you provide was held in confidence and was used only for this study. All information was corded and your name and your child's will not appear anywhere.

Benefits: Although you may not benefit directly from participating in this study. The information you give will make a great contribution to help develop materials to educate other community members.

Dangers or discomfort: It is unlikely that you will face any risks by participating in this study. You may feel uncomfortable with some of the questions we may ask but we assure you the information shall not be disclosed to any other party.

Contact information

Please do contact me Esther Kiplagat on 0720965072 in case of any questions or clarifications you could also contact the KU Ethics and Research committee on kuerc.secretary@ku.ac.ke.

Participant consent

Your signature/thumbprint means that you understand the information provided and that you are willing to participate in the study.

I_____ agree/disagree to participate in the study above.

Date_____ Signature_____ thumbprint.

Name of interviewer_____ Date_____ Signature_____

APPENDIX B: QUESTIONNAIRE

Title: Maternal infant feeding practices, beliefs and the food neophobia in toddlers in Baringo County, Kenya

Questionnaire number _____ Date _____

Interviewer _____ Ward _____

Section 1: Background information

Maternal characteristics

1. What is your age bracket?
   1. 15-24years 2. 25-34 years 3. 35-44 years 4. Above 45 years

2. What is your highest level of education? _____
   1. None 2. Primary 3. Secondary
   4. College 5. University

3. What is your occupation? _____
   1 Framing 2. Business 3. Employed
   4. Casual labour 5. House wife

   2 For how long have you lived in this area? _____
   1. Less than 2 years 2. 2-5 years 3. 5 years and above

   3 What is your household size _____?

   4 What is your marital status _____?
   1. Single 2. Married 3. Separated/divorced 4. Widow/widower

   5 How many children do you have? _____

   6 How many children do you have below 2 years? _____

   7 What is the household income_____?
   1. <10,000 2. 10,001- 20,000 3. 20,001- 50,000 4. >50,001

Child characteristics

   8 What is the gender of the child? _____

1. Male 2. Female

9 What is the age of the child? _____

Section 2: Expression of neophobia in toddlers

10 Do you understand the concept of food neophobia?
1. Yes 2. No

11 If yes, what do you think food neophobia refers to? _____

_____

12 Have you noticed such behaviors in your child?
1. Yes 2. No

13 If yes, what have you noticed? _____
_____

Section 3: Restriction for weight and health for toddlers

i. To what extent do you agree with the following statements on the influence of restriction for weight on expression of neophobia in toddlers?

Strongly agree (SA) Agree (A) Undecided (UD) Disagree (D) Strongly disagree (SD)

Statements	SA	A	UD	D	SD
Weight restrictions lead to the expression of food neophobia in infants					
Children are not exposed to certain kinds of foods for which they later develop a disliking					
Restricting children for weight purposes makes the children to detest some foods even long after this restriction					

ii. What is the influence of restriction for health on expression of neophobia in toddlers?

……

……

Section 4: Parental neophobic tendencies and parental food preferences

To what extent do you agree with the following statements on the relationship between parental food preferences and expression of neophobia in toddlers?

Strongly agree (SA) Agree (A) Undecided (UD) Disagree (D) Strongly disagree (SD)

Statements	SA	A	UD	D	SD
Children like food based on whether their parents like the same foods or not					
Toddlers learn from their parents and therefore follow almost everything that their parents do including food preferences					
Parents who do not eat certain foods keep their children also from eating these foods					
There is no relationship between parental food preferences and expression of neophobia					

Section 5: Maternal dietary practices

How does food availability contribute to the expression of neophobia in toddlers?

Statements	SA	A	UD	D	SD
Prolonged unavailability of certain foods leads to unfamiliarity with these foods and hence total neophobia					
When parents can't afford certain foods, they make their children believe that those foods are not appropriate					
Scarcity doesn't contribute to the expression of neophobia in toddlers					

Section 6: Parental neophobic tendencies

To what extent do you agree with the following statements on how parental neophobic tendencies influence the expression of neophobia in toddlers?

Statements	SA	A	UD	D	SD
Parents who have neophobic tendencies inspire their children to have the same					
Parental neophobia results in reduced liking for food by their children					
Parents provide food for toddlers and they don't provide foods which they themselves do not like					

Section 7: Anthropometrical measurements

Anthropometric measurements for the child

Age _____

Gender _____

Weight _____

Length _____

MUAC _____

APPENDIX C: FOCUS GROUP DISCUSION GUIDES

Title: Maternal infant feeding practices, beliefs and the food neophobia in toddlers in Baringo County, Kenya

Interviewer _____ Date _____

1. Is there any restriction for weight and health for toddlers in Mogotio Sub-county, Baringo county?
2. How does food availability and dietary practices (maternal food preferences) among toddlers in Mogotio sub-county Baringo county?
3. How does parental neophobic tendencies and parental food preferences on infant feeding in Mogotio sub-county Baringo county.
4. How do toddlers express neophobia in Mogotio sub-county, Baringo county.

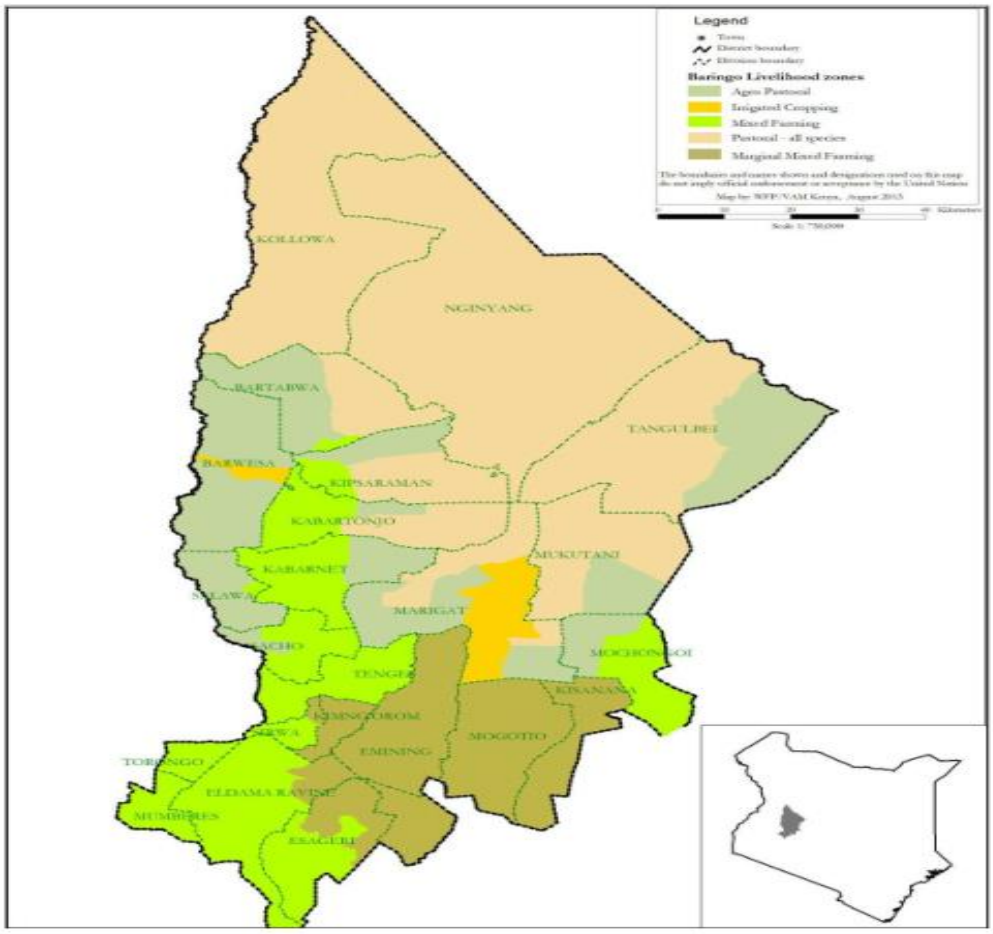
APPENDIX D: KEY INFROMANT INTERVIEWS

Title: Maternal infant feeding practices, beliefs and the food neophobia in toddlers in Baringo County, Kenya

Interviewer _____ Date _____

1. Are there any restriction for weight and health for toddlers in Mogotio Sub-county, Baringo County.
2. How does food availability and dietary practices (maternal food preferences) among toddlers in Mogotio sub-county Baringo county?
3. How does parental neophobic tendencies and parental food preferences on infant feeding in Mogotio sub-county Baringo county.
4. How do toddlers express neophobia in Mogotio sub-county, Baringo county.

APPENDIX E: MAP OF BARINGO COUNTY



APPENDIX F: APROVAL BY GRADUATE SCHOOL

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Internal Memo

FROM: Dean, Graduate School

DATE: 10th June, 2022

TO: Ms. Kiplagat Esther
C/o Department of Food, Nutrition & Dietetics

REF: H60/CE/23719/2013

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that Graduate School Board, at its meeting on **25th May, 2022** approved your Research Proposal for the M.Sc. Degree entitled, **"The Influence of Maternal Infant Feeding Practices and Beliefs on the Expression of Food Neophopia in Toddlers in Baringo County Kenya."**

You may now proceed with your Data collection, subject to clearance with the Director General, National Commission for Science, Technology & Innovation and Ethics Review Committee, Kenyatta University.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking and Progress Report Forms per semester. The Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

KENYATTA UNIVERSITY OFFICE OF DEAN 16 JUN 2022 GRADUATE SCHOOL P.O. Box 43844-00100, NAIROBI

DR. HARRIET ISABOKE
FOR: DEAN, GRADUATE SCHOOL

CC. Chairman, Food, Nutrition & Dietetics Department

Supervisors:

1. Prof. Judith Kimiywe
   C/o Department of Food, Nutrition & Dietetics
   Kenyatta University

2. Dr. Peter Chege
   C/o Department of Food, Nutrition & Dietetics
   Kenyatta University

APPENDIX G: ETHICAL REVIEW APPROVAL

KENYATTA UNIVERSITY
CENTRE FOR RESEARCH ETHICS AND SAFETY

Fax: 8711242/8711575
Email: chairman.kuerc@ku.ac.ke
Nairobi, 00100

P. O. Box 43844,

Tel: 8710901/12

Website: www.ku.ac.ke
Our Ref: **KU/ERC/APPROVAL/VOL.1**

Date: 27th /07/2022

Esther Kiplagat
P.O Box 43844, 00100
Nairobi.

Dear Ms. Kiplagat,

APPLICATION NUMBER: PKU/2555/I1681 - THE INFLUENCE OF MATERNAL INFANT FEEDING PRACTICES AND BELIEFS ON THE EXPRESSION OF FOOD NEOPHOPIA IN TODDLERS IN BARINGO COUNTY, KENYA

This is to inform you that ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** has reviewed and approved your above research proposal. Your application approval number is **PKU/2555/I1681.** The approval period is **27th/07/2022 to 27th/07/2023**

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 ***KENYATTA UNIVERSITY ETHICS 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 ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** 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 ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** 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 ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE***

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

To serve you better, researchers are kindly requested to access and complete a customer feedback form and sent it back online as you continue with research and upon completion of data collection found on the following website link; ;(https://docs.google.com/forms/d/1ytWefDwvyz5h1oz_VIn0xbxg3uGdlDzMXFWNDsMrRPQ/edit?usp=sharing

Yours sincerely

KENYATTA UNIVERSITY
OFFICE OF THE CHAIRMAN
27 JUL 2022
ETHICS REVIEW COMMITTEE
P.O. BOX 43844 - 00100 NAIROBI

Prof. Judith Kimiywe

Director: Centre for Research Ethics and Safety

APPENDIX H: NATIONAL COUNCIL OF SCIENCE AND TECHNOLOGY PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **285695**

Date of Issue: **21/August/2022**

RESEARCH LICENSE

This is to Certify that Ms.. ESTHER KIPLAGAT of Kenyatta University, has been licensed to conduct research in Baringo on the topic: THE INFLUENCE OF MATERNAL INFANT FEEDING PRACTICES AND BELIEFS ON THE EXPRESSION OF FOOD NEOPHOPIA IN TODDLERS IN BARINGO COUNTY KENYA for the period ending : 21/August/2023.

License No: **NACOSTI/P/22/19494**

285695

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

APPENDIX I: RESEARCH AUTHORIZATION BY BARINGO COUNTY GOVERNMENT

REPUBLIC OF KENYA

BARINGO COUNTY GOVERNMENT

Tel. 0722741648
Email:cdhbaringo@gmail.com

County Director,
Preventive and Promotive
P.O. BOX 393-30400,
KABARNET

DEPARTMENT OF HEALTH SERVICES

REF.NO:BCG/HS/RES/VOL.1/08/2022 **DATE**: 31st August,2022

Esther Kiplagat
Tel: 0720965072/0780909800
Email: estherkiplagat@gmail.com
P.O. Box 43844,00100

RE: RESEARCH AUTHORIZATION

Following your request for authority to carry out a study on ***"The influence of Maternal Infant Feeding Practices and Beliefs on the Expression of Food Neophopia in toddlers in Baringo County, Kenya".*** I am pleased to inform you that you have been authorized to conduct your research as mentioned in your request.

By the copy of this letter, the Medical officer of Health, Baringo South and Mogotio Sub Counties are asked to accord you necessary assistance.

Kindly note you shall submit a copy of your final research report to The County Director of Health Baringo County and a soft copy to be submitted through online research information system as this applies to any applicant who has been licensed by NACOSTI act 2013.

Thank you

Dr. Patrick Boruett
Director Preventive and Promotive Health
BARINGO COUNTY

cc. –Medical officer of health
Baringo south Sub County
- Medical officer of health
Mogotio Sub County