

**KNOWLEDGE, ATTITUDE AND ACCEPTABILITY OF HUMAN BREAST  
MILK BANKING AMONG LACTATING MOTHERS AT PUMWANI  
MATERNITY HOSPITAL, NAIROBI CITY COUNTY, KENYA**

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NUTRITION AND DIETETICS) IN THE SCHOOL OF HEALTH SCIENCES OF  
KENYATTA UNIVERSITY**

**SEPTEMBER, 2023**

**DECLARATION**

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## **DEDICATION**

This work is dedicated to my mother, Karen C. Mati for her constant emotional, and financial support through the course of the conceptualization, and completion of this MSc. Thesis; and to my uncle, the late Benjamin Kinyua Njoka without whose reminders of what greatness looks like I would not have a reference point of the bliss of educational wealth.

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## OPERATIONAL DEFINITION OF TERMS

**Acceptability:** The willingness of the participating lactating mothers to use the donated human milk, or donate their human milk for use by other mothers to feed infants.

**Breast Milk:** milk produced by a human woman's breasts after childbirth as food for her child.

**Donor:** An individual who is giving away the breast milk for charity or out of goodwill.

**Breast Milk Banking:** Collection, screening, processing and dispensation of donated human breast milk on prescription.

**Donation:** The process of a woman giving out her breast milk, out to a breast milk bank for screening with the purpose of having it given to another child other than her own.

**Screening:** Testing donated human milk for antibodies, bacteria and other microorganisms that may be undesirable or detrimental to the recipient child.

**Probing:** The process of asking additional questions to motivate or encourage the participant to widen their description of opinion, so as to gather more in-depth information from their response.

**Key Informants:** The specific people who have an awareness and critical knowledge in breast milk banking, screening and donation processes as relates to the study.

**Use:** Taking the donated human milk from the milk bank for the purpose of using it to feed an infant.

**LIST OF SYNONYMS AND ABBREVIATIONS**

<b>AFASS</b>	Affordability, Feasibility, Accessibility, Safety and Sustainability
<b>AAP</b>	American Academy for Pediatrics
<b>APHRC</b>	African Populations and Health Research Committee
<b>AIDS</b>	Acquired Immuno-Deficiency Syndrome
<b>BMB</b>	Breast Milk Banks
<b>DM</b>	Diabetes Mellitus
<b>DHM</b>	Donor Human Milk
<b>EBF</b>	Exclusive Breastfeeding
<b>FAO</b>	Food and Agriculture Organization
<b>FGD</b>	Focus Group Discussion
<b>HBMB</b>	Human Breast Milk Banking
<b>HIV</b>	Human Immunodeficiency Virus
<b>KDHS</b>	Kenya Demographic and Health Survey
<b>KII</b>	Key Informant Interview
<b>MCH</b>	Mother and Child Healthcare
<b>MOH</b>	Ministry of Health
<b>SIDS</b>	Sudden Infant Death Syndrome

**SPSS** Statistical Package for Social Sciences

**WHO** World Health Organization

## ABSTRACT

Human breast milk is the most critical feeding option for newborns and infants. The World Health Organization recommends infant exclusive breast feeding for the initial six months of life. In the instance that breastfeeding cannot be seamlessly achieved or initiated; the WHO recommends the donation and use of human breast milk as the best of other replacement feeding options. In Kenya, the first human milk bank was started up in 2019 at Pumwani Maternity Hospital in Nairobi City County, with the aim of filling this gap in breastfeeding practices for the benefit of infants. The purpose of this study was to establish the knowledge, attitude and acceptability of human breast milk banking among lactating mothers at Pumwani Maternity Hospital, Nairobi City County, Kenya. A cross-sectional descriptive study design approach was utilized for the study, with systematic sampling and simple random sampling methods applied to gain 403 lactating mothers as the study respondents. A structured and consolidated, researcher-administered questionnaire, key informant interviews and focus group discussions were used to collect the data. The collected qualitative data was analyzed using the Statistical Package for Social Sciences (SPSS) version 21.0. Chi-Square tests were used to determine association and the Fisher's Exact test was applied to assess the null hypotheses for variables where the frequencies were less than five. Results with p-values less than 0.05 were said to be statistically significant. For qualitative data, content analysis was conducted. The results indicated that the mean age of lactating mothers visiting Pumwani Maternity Hospital was  $30.8 \pm 6.9$  years. A majority (51.7%) of the lactating mothers had adequate knowledge on human donor breast milk banking with 48% of them having a basic knowledge on the concept of human breast milk donation. A majority (57.1%) of the lactating mothers reported positive attitudes towards human breast milk donation and banking. However, human breast milk donation and banking was only acceptable to 36.4% of the lactating mothers, and was unacceptable to 24.8% of them. 32.7% of the participants were uncertain about their acceptability of donor human breast milk banking. A significant relationship ( $\chi^2=55.9671$ ;  $p\text{-value}<0.00001$ ) was found to exist between the lactating mothers' age and their acceptability of donor human breast milk banking. Their acceptability of donor human breast milk banking was also significantly associated with their marital status ( $\chi^2=43.3383$ ;  $df\ 2$ ); and their level of education ( $\chi^2=11.78$ ;  $df\ 2$ ;  $p\text{-value}=.019046$ ). However, it was found that there was no significant relationship between the lactating mothers' acceptability of donor human breast milk banking and their employment status or occupation ( $\chi^2=1.1567$ ,  $p=.5608$ ). The researcher concluded that knowledge and attitudes of lactating mothers are co-dependent in influencing their acceptability of human breast milk donation and banking. It is recommended that efforts to improve knowledge levels of lactating women on the concept and availability of human breast milk donation and banking facilities be employed within Pumwani Maternity Hospital and Nairobi City County. The findings of this study may therefore be useful to stakeholders within the Nairobi City County, and the Human Breast Milk Banking coordinators at Pumwani Maternity Hospital, in the effort of strengthening gaps in infant feeding.

## CHAPTER ONE: INTRODUCTION

### 1.1 Background to the Study

The importance of breastfeeding and especially exclusive breastfeeding to both the mother and the child cannot be overlooked. According to the World Health Organization (WHO) reports on global nutrition (2019), the global percentage for children that are exclusively breastfed before they achieve the age of seven months is 37%. Kenya Demographic and Health Survey (KDHS) reports on exclusive breastfeeding in (2014) found out that 67% of the children in Kenya are exclusively breastfed, for six months. Children receive high quality and superlative nutrition from human breast milk. According to Bhal et al. (2016), there is minimal incidence of auditory infections, faulty respiratory systems and diarrhea among children that are seamlessly exclusively breastfed for the first full six months of life. In the event that breast milk of the mother is not available or is inadequate, using donated breast milk is best recommended (WHO, 2017; Ergin & Uzun, 2018; Ozdemir et al., 2015).

Donation of human breast milk dates back to early 1900s in Vienna, Austria, where mothers with surplus breast milk production were screened for donation for the needs of specific individuals who had gaps in producing and availing human breast milk to their children. Donation of human breast milk is a plausible strategy for the mitigation and prevention of related infectious disease in infants, increasing the neurocognitive functionality and growth and promotion of feeding tolerance for infants (Jahan et al., 2017; Gelano et al., 2018; Iloh et al., 2018). This study was concerned with an investigation of breast milk donation and the banking of the same in Kenya.

Human milk banking involves the collection, screening and pasteurization of donor human breast milk for the use by health institutions or mothers when breastfeeding is not possible. Today, the concept of human breast milk banking has adopted in various across the developing world countries including Nigeria and South Africa (Gonzalez, 2017; Iloh et al., 2018). Pasteurized human donor breast milk is not the same as fresh human breast milk, as some of the original immunological and bioactive components may be lost during the pasteurization process (Gelano et al., 2018; Kimani-Murage et al., 2020). Long and short term benefits have been shown to exist when comparing the advantages of using donor human milk for infant feeding to the use of infant formula (Iloh et al., 2018; Kimani-Murage et al., 2019; Gonzalez, 2017). Furthermore, the World Health Organization indicates that in the instance that breastfeeding is impossible, donor human breast milk is the second best option.

A few studies have been conducted in Africa to investigate the acceptance by lactating women of donor human breast milk banking (Iloh et al., 2018; Gelano et al., 2018; Kimani-Murage et al., 2019). In the Kenyan context, fewer studies have been conducted on the knowledge, attitudes and acceptability of human donor breast milk banking in Nairobi, Baringo and Turkana counties. Among these, some of the most instrumental studies by the African Population & Health Research Center (APHRC) recommend further research, to establish the different association factors of donor human breast milk banking in Kenya. To establish the possible benefits of the existing human breast milk bank and the gaps that exist in the execution of its role for infant feeding, the researcher was prompted to conduct this study to determine the knowledge, attitude and



acceptability on human breast milk banking among lactating mothers at Pumwani Maternity Hospital, Nairobi City County, Kenya.

## **1.2 Statement of the Problem**

Today, there are numerous options for replacement feeding, which is the alternative to breast feeding. The AFASS criteria by the WHO are used to determine the most relevant product replacement feeding alternative (Yadav & Tiwari, 2016). Compared to other alternatives of breastfeeding such as infant formulas, existing evidence (Gelano et al., 2018; Iloh et al., 2018) shows that human breast milk, donated human breast milk, is more reliable and effective in according the children similar benefit to original breastfeeding. For instance, donated human breast milk, possessing similar components universally, has been proven to reduce the possible incidence of necrotizing enterocolitis in infants after birth (Iloh et al., 2018; Mohamed, Ocholla & Owino, 2020). A study by Iloh et al. (2018) in Nigeria found out that the practices of exclusive breastfeeding are higher in high-income, higher-educated cohorts of women in upper and lower middle income countries.

Despite its advantages, in the event of a mother's death during child delivery, multiple births to one mother, or breast complications following birth, some infants are unable to access the benefits of breast milk from birth (Mohammed, Ocholla & Owino, 2020). Additionally, some HIV positive mothers prefer not to initiate breastfeeding after birth, for fear of mother-to child transmission of the infection (Mohammed, Ocholla & Owino, 2020). According to PATH (2018) some mothers, especially new mothers, may have problems letting down breast milk right after birth due to psychological trauma which impairs the endocrine function of milk letdown. These problems could find a solution in

human breast milk donation and banking. Willing lactating mothers can donate breast milk for immediate use and banking. However, do lactating mothers have the knowledge on the concept of donation and banking of human breast milk? If they possess the knowledge, what attitudes do they have towards the practice, and how does it impact their likelihood to accept to donate and use the milk?

The World Health Organization, through the Nutrition WHO Global Data Bank on Infant and Young Child Feeding (2018) presents that three out of every five babies are not breastfed within the first hour of life. According to the guidelines of breastfeeding initiation, it is imperative that every newborn accesses human breast milk within the first thirty to sixty minutes of life, for associated health benefits, among them, the prevention of sudden infant Death syndrome. (National Nutrition Action Plan 2012-2017, 2018). Up to 36% of newborn children in Kenya fail to access breast milk options in the event that their mother cannot provide it (KDHS, 2014; UNICEF Annual Report, 2016).

The promotion of breastfeeding and the collection of donor human milk are interconnected. When mothers are given the correct information about the benefits of breastfeeding for their infants, they are more likely to breastfeed them (Arslanoglu et al., 2013; APHRC, 2019). Similarly, having a breast milk bank within a healthcare facility could work to help create awareness on breastfeeding, and improve lactating mothers' willingness to donate, or use donor human breast milk to feed their infants (Gelano et al., 2018). The availability of donor human milk is also important for mothers who are unable to breastfeed due to medical limitations such as being HIV positive, being under chemotherapy for cancer treatment, or having other viral conditions. To meet these needs,

it is imperative to have functional breast milk banks in healthcare institutions frequented by lactating mothers.

In 2019, Kenya's first DHM bank was set up at Pumwani Maternity Hospital in Nairobi. According to the Kenya Demographic Health Survey of 2014, the prevalence of breastfeeding in Kenya is 61.39%. From this, an average of 39% of the children in Kenya are not exclusively breastfed. In 2019, Kenya's first DHM bank was set up at Pumwani Maternity Hospital in Nairobi. However, even with the breast milk in operation, there are still gaps in the options for replacement feeding available for mothers, especially those that are living with HIV/AIDS and choose not to breastfeed their children (Okanda et al., 2018). Additionally, there are challenges in mothers with multiple children feeding their children satisfactorily, besides other challenges in availing breast milk such as chronic illnesses and post-partum depression among lactating mothers (Madeghe et al., 2016; Okanda et al., 2018). These problems in infant feeding options lead to the importance of human breast milk banking, which helps fill the gaps, hence reducing the prevalence of avoidable infant deaths related to inadequate replacement feeding. Despite its establishment, the researcher hypothesizes that there is a likelihood that the current breast milk banking initiative in Kenya is stalling, and is not reaching as wide a population of lactating mothers as it could, in the effort to improve infants' access to human breast milk.

Despite the wide knowledge on the importance of appropriate selections for replacement feeding, the role of breast milk donation and banking remains interestingly underexplored. Informed by the gaps in literature related to the donation and use of human breast milk in milk banks, the completed study aimed to investigate the

acceptability of this concept among lactating mothers of lactating age visiting the healthcare facility for lactation and infant nutrition follow-up and support. The attitude and knowledge of the same among the selected study population were also explored.

### **1.3 Purpose of the Study**

The purpose of this study was to assess the knowledge, attitude and acceptability of the concept of breast milk donation and banking among lactating mothers at Pumwani Maternity Hospital in Nairobi County, Kenya.

### **1.4 Research Objectives**

1. To determine the socio-demographic characteristics of lactating mothers' visiting Pumwani Maternity Hospital in Nairobi County, Kenya.
2. To determine the lactating mothers' knowledge regarding the concept of human breast milk donation and banking and the existence of donor human breast milk facilities at Pumwani Maternity Hospital in Nairobi City County, Kenya.
3. To establish the attitudes of lactating mothers towards the use of donor human breast milk at Pumwani Maternity Hospital in Nairobi City County, Kenya.
4. To determine the acceptability of donor human milk banking among lactating mothers at Pumwani Maternity Hospital in Nairobi City County, Kenya.
5. To determine the relationships between knowledge, attitude and acceptability of donor human breast milk banking at Pumwani Maternity Hospital in Nairobi City County, Nairobi.

### **1.5 Research Hypotheses**

H<sub>01</sub>: There is no significant relationship between the socio-demographic characteristics of lactating women and their knowledge of human breast milk donation and banking at Pumwani Maternity Hospital, Nairobi City County, Kenya.

H<sub>02</sub>: There is no significant relationship between the socio-demographic characteristics of lactating mothers and their attitudes towards donor human breast milk banking at Pumwani Maternity Hospital, Nairobi City County, Kenya.

H<sub>03</sub>: There is no significant relationship between lactating mothers' knowledge on donor human breast milk banking and their acceptability to practice donation or use of donor human breast milk at Pumwani Maternity Hospital, Nairobi City County, Kenya.

H<sub>04</sub>: There is no significant relationship between the attitude of lactating mothers and their acceptability of donor human breast milk at Pumwani Maternity Hospital, Nairobi City County, Kenya.

H<sub>05</sub>: There is no significant relationship between the knowledge of lactating mothers on donor human breast milk banking and their attitude towards donation and use of banked donor human breast milk at Pumwani Maternity Hospital, Nairobi City County, Kenya.

## **1.6 Significance of the Study**

This study comes at a time when Kenya's first human donor breast milk bank has been in full operation for about two years, having served the first cohort of children in 2020. The study, and the findings derived from it are therefore critical to understanding the perception of the targeted lactating mothers on the breast milk bank, and the concept of

human breast milk donation. As such, the findings of the study are now crucial to inform current, and future policies within Pumwani Maternity Hospital. The findings of this study will also provide useful reference points on the contexts of human breast milk donation, banking and use for health care practitioners hence helping the project of human breast milk donation and banking at Pumwani Maternity Hospital. Moreover, the findings of this study are also expected to add to the existing but interestingly shallow body of literature on human breast milk donation and banking and thus, promote academia and additionally providing more information to mothers and other women or reproductive age.

### **1.7 Assumptions of the Study**

Through the course of this study, it was assumed that the existing breast milk banking project at Pumwani Maternity Hospital has been well introduced to a percentage of the lactating mothers visiting the facility for various healthcare needs, and especially to those visiting the MCH clinic.

### **1.8 Delimitations of the Study**

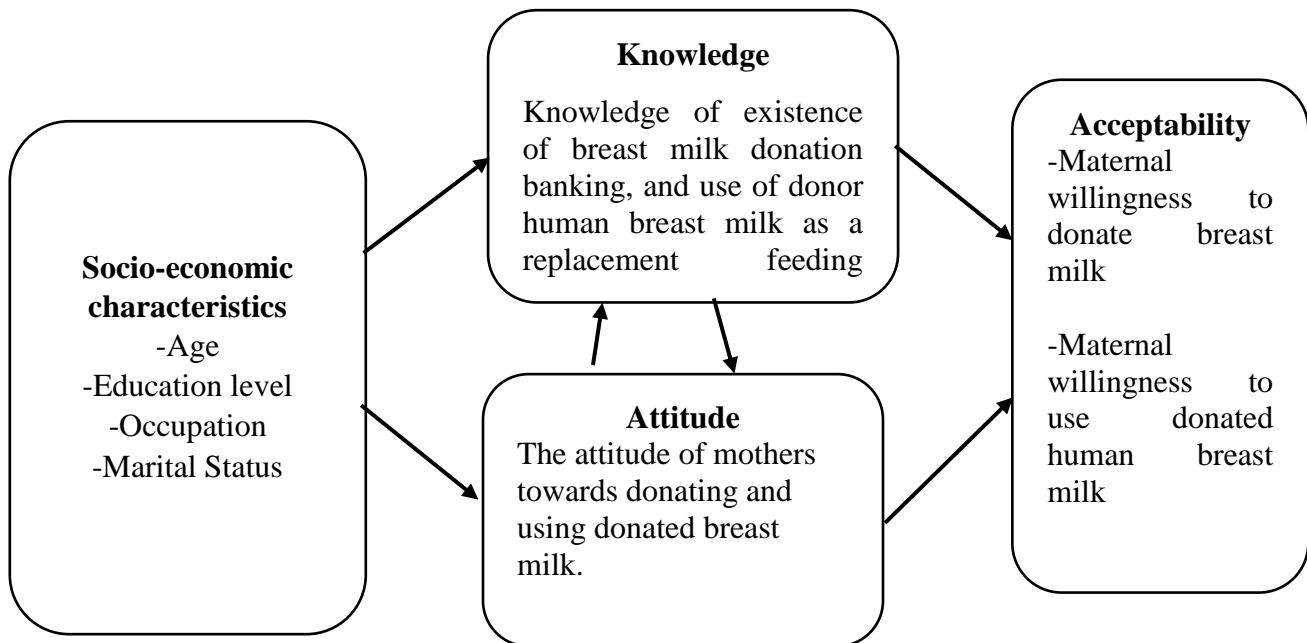
This study was delimited to lactating mothers aged between fifteen and forty-five years visiting Pumwani Maternity Hospital in Nairobi City County, Kenya. The findings herein, therefore, can only be generalized to similar populations of similar age in similar hospitals and facilities across the country.

### **1.9 Limitations of the Study**

The study was limited to women of reproductive age visiting Pumwani Maternity Hospital over the period of the study, and thus limits the participation of women of reproductive ages in other areas within Nairobi and Kenya. The data collected in the specified study area may not be fully representative of the Kenyan population as would be preferred, hence cannot be successfully inferred to other areas.

### **1.10 The Conceptual Framework**

According to Iloh et al. (2018), knowledge is capable of impacting on the attitude of individuals on concepts, ideas or practices. Knowledge is also a major determinant of people's attitude towards certain practices or concepts (Feto et al., 2017; Shaw, 2010). As such, since the concept of breast milk donation and banking is fairly new to the Kenyan population, it may impact their perceptions and attitude towards the concept of donating and using banked breast milk from these donations. Acceptability of a concept is highly dependent on the extent of information that exists on the said concept. The knowledge and attitude of the lactating mothers were the derived independent variables for this study. Both independent variables of the proposed study were modifiable, as they were dependent on factors such as acquisition of knowledge and modification of mindsets. However, the acceptability was a dependent variable, because it mostly relies on the independent variables to evaluate its extent. The socio-demographic characteristics of the lactating women were taken as an independent variable for the proposed study. The characteristics investigated in this study include age, educational level, occupation and marital status. These characteristics were defined to impact on the knowledge, and the attitude, and collectively, impact on the overall acceptability of the donation and banking of human breast milk.

**Figure 1.1 Conceptual Framework**



## CHAPTER TWO: LITERATURE REVIEW

### 2.1 Exclusive Breastfeeding

Exclusive breastfeeding is a concept of infant feeding which dictates that the infant only receives human breast milk as food for the first six full months of life (WHO, 2021). When children are in this age bracket, they are not to be fed any other food in liquid or solid form (water included). Should it be indicated due to infection, children who are being exclusively breastfed can receive oral rehydration solutions, vitamins in drops or syrups and other medicines or minerals (WHO, 2021). However, often, breastfeeding may be limited or impossible due to various factors. When such cases occur, the WHO recommends donor human milk (DHM) where exclusive breastfeeding directly is impossible or difficult to achieve. Even though almost forty percent of the Kenyan infant population is grappled with problems related to absence of the mother or inadequate nutrient supply, it is not uncommon for mothers to be opposed to some solutions to gaps in exclusive breastfeeding. According to Kimani, Samburu & Israel-Ballard (2016), DHM would go a long way in solving the problem of inadequate infant feeding following birth in Kenya. Additionally, presentations of Villanueva (2011) present similar findings in their response to the establishment of the first African breast milk bank.

Iloh et al. (2018) found out that the major hindrances to exclusive breastfeeding included inadequate milk production, death of a mother, inverted nipples and other breast complications following birth. Due to these complications, milk let down in the first weeks following birth is negatively impacted, and the foundation that the colostrum in mothers' milk is supposed to give to a child is lost (Kim et al., 2010; Kim & Unger,

2010). These cause a need for solutions to breastfeeding for infants in the first weeks of life, in which case donation of human milk becomes a possible solution in Kenya.

According to Talbert et al. (2020), exclusive breastfeeding was common for infants aged 0 to 6 months in rural Kenya. In a study conducted by these scholars utilizing a study population of twenty first time mothers, who were recruited to the study and observed through gestation for a period of six years. Their findings echoed those of Kim et al. (2010), who present that an absence of a mothers' breast milk for a child in the first six months of life exposes them to unending medical conditions and complications.

These findings are further supported by Ickes et al. (2021) who present that lactating mothers continue to face challenges to exclusive breastfeeding. In a study investigating the patterns of breastfeeding for working mothers in Kenya, Ickes et al. (2021) concluded that employed women are among those who face challenges meeting the recommended exclusive breastfeeding dictates due to professional requirements. The study by Ickes et al. (2021) introduced a new dimension to the current study, by providing an insight into another challenge faced by lactating mothers, and supporting another instance where donor human breast milk banking would ease the breastfeeding gap in Kenya. The CDC Breastfeeding Report Card of 2021 presents that exclusive breastfeeding rates in the past two years have changed immensely in healthcare outlets across the world in the wake of the Covid-19 pandemic. Such developing issues have played into the state of exclusive breastfeeding in Kenya as well, further introducing instances where the concept of donor human breast milk banking comes into play to help the current challenges to exclusive breastfeeding in the Kenyan context.

## **2.2 The Concept of Human Breast Milk Donation and Banking**

Human mothers are able to use breast milk from another mother in the instance that they are unable to produce breast milk or are unable to relay their milk to a child. Senol & Aslan (2017), conducted a study to investigate the opinions of women on human breast milk donation and banking of the same. Their study, which was cross-sectional and applied the descriptive research design found out that to half of the mothers within their study population were non-opposed to human breast milk banking and/or donation. In a study by Talbert et al. (2018), the findings on knowledge and attitude matched those of Senol & Aslan (2017). Senol & Aslan found out that 46.5% of the women were opposed to the idea of donating or using donated and banked human breast milk. The study by Talbert et al. (2017) on the other hand, found out that only 40% would agreeably participate in projects for donation and use of human breast milk. Most mothers are opposed to the idea of breast milk donation and banking due to the dictates of their culture and religion, among which 23.6% were opposed to the idea due to the risk of infectious diseases (Senol & Aslan, 2017; Talbert et al., 2018).

Most lactating mothers whose children were unable to access breast milk for one reason or another were found to have a more positive attitude towards using and donating breast milk that was banked (Alamirew et al., 2017). According to Louis (2017), perceived positive outcome is likely to influence positive attitude towards health care and health care approaches. The implication of being unable to breastfeed their children and being aware of the associated advantages may motivate women and mothers to accept donated human breast milk, and possibly informing results such as those achieved by Senol & Aslan (2017).

### **2.3 Knowledge and Attitude towards Breast Milk Donation and Banking**

Iloh et al. (2018) sought to find out the perceptions of donor breast milk and associated determinants of acceptability of donor breast milk banking in a developing country, Nigeria. Their study, utilizing a multi-center study design found out that a considerable number (79%) of the respondents had an awareness of the concept of breast milk donation and banking. However, only 10% of the women as respondents had an adequate knowledge of the policies and concepts related to human milk donation and banking in the state and globally. Similar to the findings of Senol & Aslan (2017), a high percentage of the respondents (60%) indicated no objection to the idea of donation and using the donated human breast milk when the need arose. The conclusion of their study was that adequate knowledge of the concept, a greater preference of donated breast milk as opposed to infant formula and possibilities of financial remuneration were the major promoters and indicators of breast milk donation and banking acceptability. Even though the knowledge of donor human breast milk and the policies that govern it is minimally possessed by women in developing countries, there are higher prospects of the concept being accepted as a practice among this women (Iloh et al., 2018; Kimani-Murage et al., 2015).

As aforementioned, Iloh et al. (2018) found out that possession of knowledge on breast milk donation and banking possesses a great potential of influencing acceptability or lack thereof of donor breast milk banking. Similar presentations by Jahan et al. (2017) posit that it is possible that data and information regarding human breast milk donation and banking is minimal in developing states. Through their cross-sectional qualitative study, Jahan et al. (2017), the scholars investigated the various constructs of knowledge

possession and access including the impact of level of education on knowledge regarding human breast milk donation and banking. Their study findings guided to the completion that more dynamic and targeted research was necessary on the concept of human breast milk banking in order to widen the body of knowledge available on the concept, in developing countries. As opposed to the study by Iloh et al. (2018), Jahan et al. (2017) found out that the anticipated cost and knowledge benefits previously associated with knowledge on donor milk banking may not be realized without further knowledge develop for and within the target population. The findings of this particular study informed the current study, as developing countries have a higher incidence of gaps in knowledge related to human breast milk donation and banking.

In a study investigation the knowledge, attitude and perceptions of community members and healthcare workers on donation of human breast milk in South Africa, Govender (2020) concluded that five themes are the most common when it comes to the knowledge and attitudes of human breast milk banking. Misperceptions about HIV infection in donor human breast milk, acceptance of DHM, knowledge of HBMB, choices to feed infants and breastfeeding as the optimal infant option were stated as the common determinants of the attitudes and knowledge of parties on donor human breast milk banking. According to Chagwena et al. (2020), high levels of knowledge on donor human breast milk banking inform positive attitudes on the concept, and promote the likelihood of lactating mothers being accepting of the practice as an option for infant feeding for them. These findings further support those of Iloh et al. (2018), that knowledge and the attitudes of women, workers and other parties on a concept directly influence their likelihood of accepting to practice a concept.

## **2.4 Acceptability of Human Breast Milk Donation and Banking**

According to Pal, Noble & Hand (2018), attitude is a great determinant of acceptability of human breast milk donation and banking. In a study aimed at identifying the specific attitudes towards donor breast milk banking, and how they may result into barriers of acceptability, their study found out that; 62% of the mothers enrolled in the study were opposed to the idea of using donor breast milk. The study also found out that mothers would rather use infant formula if presented with both options. The findings of the study by Pal, Noble & Hand (2018) conflicted those of Iloh et al. (2018) and Kadioglu, Avciapar & Sahin (2019). Despite being carried out in developing states, and in cities of both states, these studies yielded different results in similar variable investigations. Although more people are becoming aware of the concept of donor breast milk banking with more enlightenment, it is evident that the application of the concept for most mothers is unacceptable (Demirel, Alan & Sema, 2015; Doshmangir, Naghshi & Khabiri, 2019). Negative attitude motivated by cultural opinion, level of education, awareness and availability of knowledge among other related factors impact on the acceptability of breast milk banks (Pal et al., 2019; Goodfellow et al., 2016).

Findings similar to those of Pal, Noble & Hand (2018) were yielded from a study by Gelano et al. (2018) in Eastern Ethiopia and by Coutsoudis, Petrites & Coutsoudis, 2011). The mixed method approach study found out that out of the respondent mothers included in the study, only 11% were willing to give out their breast milk to donation banks, while only 15.2% were willing to use the donated milk. The indication is that these mothers preferred to use other methods, even with the awareness of the importance of human

breast milk to the child. Attitude, whether impacted on by possession or lack thereof of knowledge, is a key player in the acceptability of donor breast milk banking and use in Ethiopia, a developing country (Gelano et al., 2018). Misconceptions are the highest determinants of attitude in such developing countries as Ethiopia (Gelano et al., 2018; Pal, Noble & Hand, 2018).

## **2.5 Lactating Mothers and Women of Reproductive Age**

Women of reproductive age continue to be a population of interest in reproductive and infant feeding studies, as they are the custodians of the practices around these scientific dictate. A study conducted by Kimani, Samburu & Israel-Ballard (2016) aimed to investigate the opinion of women of reproductive age on the donated human milk (DHM). Conducted in three different health centers in Nairobi, their study utilized a total of seventy six women of reproductive age for collection of their qualitative data. Their study found out that women of reproductive age were receptive to positive practices of breastfeeding. A similar study by Mantji, Makoma & Tebigo (2019) in South Africa presented that lactating mothers were highly receptive to exclusive breastfeeding, in comparison to general women of reproductive age who did not have children. The indication of this is that lactating mothers would most likely be more receptive to donating breast milk and using donated breast milk for their infants. Mantji, Makoma & Tebogo (2019) also found out that sixty percent of the women recruited for the study held that the idea was foreign, and that they would need to see more of its practice importance before they would consider taking it as a solution to problems in breastfeeding.

## **2.6 Summary of the Gaps in Literature**

Attitude and knowledge have ability to positively or inversely impact on acceptability of breast milk banking and donation in developing countries. This conclusion may be drawn from an evaluation of the presentations of the scholars and affiliated literature. The reviewed pieces of literature provide the proposed study with critical references regarding the association between attitude, knowledge and acceptability of donor breast milk banking in Kenya. While most of the studies investigate each of these variables independently on their impact on donor breast milk use and banking, they have failed to provide a linkage between all of these important variables and the outcome. Evidently, the association between knowledge, attitude and acceptability is compound, and thus, the importance of this framework in informing an outcome cannot be overlooked. The proposed study aims to fill this gap in literature, using presentations and findings of these studies and literature as a critical reference point for improvement.



## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Research Design**

The completed study was conducted in January and February 2022, and adopted a cross-sectional analytical study. According to Flick (2018), the descriptive study design allows researchers to derive valuable and possibly conclusive descriptions of variable characteristics for the studies being undertaken. This design was selected due to its ability to enable the researcher study, measure and uncover qualitative data, on the attitude and overall perceptions that will guide achievement of the study objectives.

### **3.2 Study Variables**

#### **3.2.1 Independent Variables**

The first independent variable for the study was the socio-demographic characteristics as determined by age, occupation, level of education and marital status. The second independent variable was the knowledge of the concept of donor human breast milk banking as determined by means knowledge scores of the lactating mothers using the cut-off points under the Blooms Method. Attitude was the third independent variable as related to maternal donation of and use of donated, banked human breast milk as determined by mean attitude scores of the lactating mothers on donor human milk banking using a 5-Point Likert Scale.

#### **3.2.2 Dependent Variable**

The dependent variable in the proposed study is the acceptability of donation and use of donor human breast milk as determined by the lactating mothers' willingness to accept

donor human breast milk banking as an option for infant feeding by donating their breast milk, or accepting to use banked donor human breast milk.

### **3.2.3 Intermediate Variable**

In the proposed study, attitude will also be treated and used as an intermediate variable as it may directly impact on acceptability, and may also be impacted on by knowledge.

### **3.3 Study Area**

Pumwani Maternity Hospital is one among the eighty public hospitals and health centers within Nairobi County (Appendix H). The admission to the labor ward at the hospital ranges from 1,900 and 2,200 people per month, with an average of sixty infant deliveries per day through both normal and caesarian methods. The MCH clinic at the hospital serves an average of 1,600 to 1,700 babies monthly. Out of every sixty births delivered at the hospital, ten to twelve are in need of donate human breast milk due to birth complications of mothers, maternal deaths and inability to breastfeed for some mothers. In order to achieve the objectives of the proposed study, it is imperative that the variables are tested in an environment where the targeted population is likely to be accessed without hitch. In Kenya, the first breast milk bank for donated human breast milk is located at the Pumwani Maternity Hospital. For these reasons, Pumwani Maternity Hospital served as a plausible study area for this research, and provided the relevant participants for the study: lactating mothers and key informants.

### **3.4 Target Population**

The primary target of the study included women above the age of fifteen up to forty-nine years of age who are currently breastfeeding. These age groups were selected by the

dictates of the universal reproductive age as per the World Health Organization. The first inclusion criteria for these women was therefore, their age, so that the selected respondents are well within the targeted age population.

### **3.4.1 Inclusion Criteria**

Lactating mothers, with children who were currently breastfeeding exclusively or with complementary feeding during the period of the study were recruited. Additionally, all women within this age within the two departments at Pumwani Maternity during the study period were included in the study.

### **3.4.2 Exclusion Criteria**

Lactating mothers visiting Pumwani Maternity Hospital but were not within the MCH or the maternity wing were excluded from the study.

### **3.5 Sample Size**

The Cochran Formula for determination of sample size as is adapted from Nargundkar (2003) was utilized to calculate the sample size for this study.

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where

e is the margin of error (the desired precision level). The researcher preferred a tolerance error of 0.05

p is the proportion (estimated) of the population with the attribute in question (prevalence). Where,

(EBF Prevalence in Kenya is 61% (KDHS, 2014. (0.61)

and

$q$  is  $1-p$

$z$  is the value found on the  $Z$  confidence distribution tables  $Z = Z$  value from the standard normal distribution for the confidence level as is desired by the researcher. For the proposed study, a confidence interval of 95% is preferred.

$Z$  Value is 1.96 as per the standard distribution tables.

With this formula, the researcher calculated for a sample size of 365.56, rolled over to the nearest whole number, 365.56 is approximated to 366.

Ten percent of the sample size (37 respondents) was added to cater for possible non-respondent sample size, hence the total sample size for the proposed study will be 403 respondents.

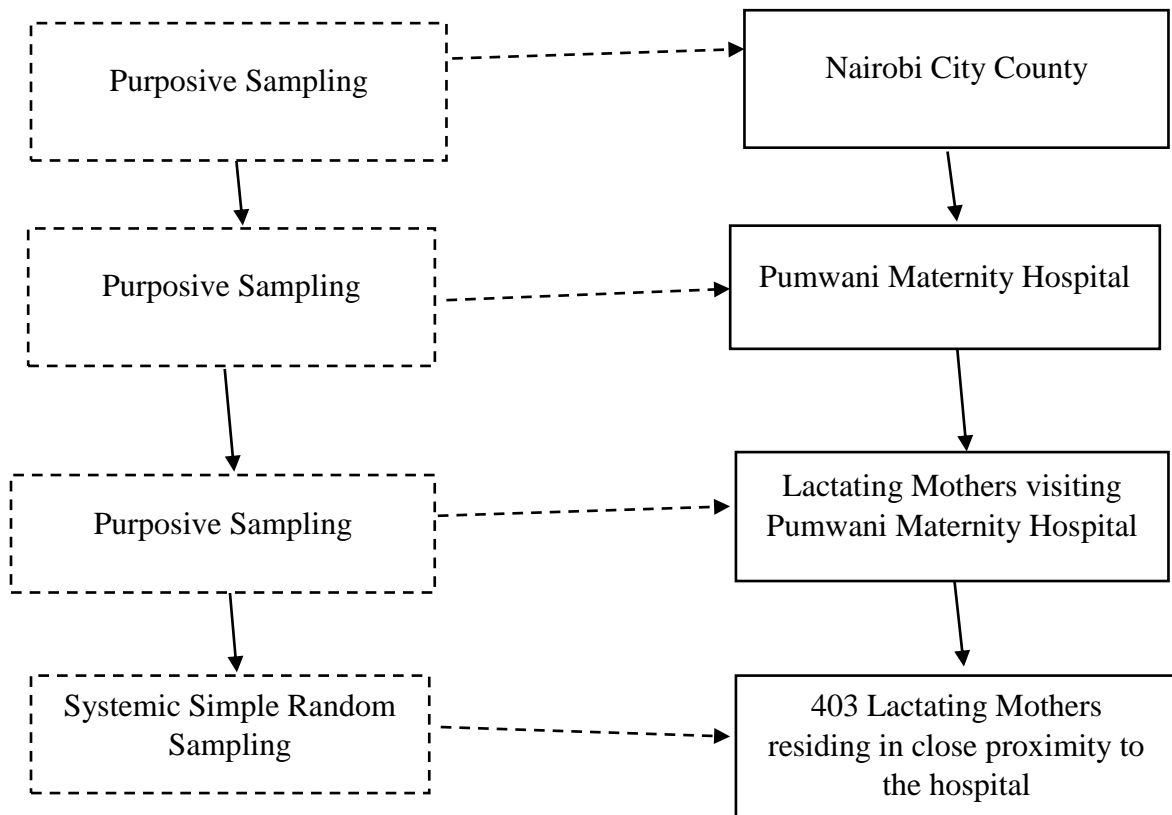
### **3.6 Sampling Technique**

According to Walliman (2017), the sample size determines the success or lack thereof of the study, depending on the procedures used to derive it. As such, it was important to the researcher that the most appropriate sample is achieved for the study.

Pumwani Maternity Hospital was purposively selected. Purposive sampling was applied to selected Nairobi City County, and Pumwani Maternity Hospital as the study areas. By using simple random sampling, the researcher ensured that all the women included in the study were within the proximity of the donor breast milk bank, and thus, exposed to the possibility of being knowledgeable of its existence. The intention, as is proposed by Green & Thorogood (2018), was to enable the researcher select respondents who were perceived to possess the information being sought. By purposive sampling, lactating

mothers visiting the MCH or admitted in the Maternity clinics in Pumwani Maternity Hospital were selected. Of the women visiting the hospital in the two departments, systematic random sampling was done to select the participants for each data collection day, so as to reach the desired sample size (Figure 3.1). In this case, the total number of women expected to be in the clinics at the time of data collection was derived from the hospital records, and an average of forty per day were systematically but randomly selected.

**Figure 3.1 Sampling Procedure Flow Chart**



The Key Informant Interviews (KIIs) were aimed at healthcare professionals (nurses, physicians, and nutritionists) at Pumwani Maternity Hospital. The twenty professionals were purposively selected based on their role in the human milk bank at Pumwani

Maternity Hospital since they would provide insights on the perceptions of the lactating mothers on the concept. The Focus Group Discussions (FGDs) focused on lactating mothers visiting the MCH and within the maternity wing at Pumwani Maternity Hospital. Simple Random Sampling was used to select the fifty mothers who participated in the five groups for FGDs.

### **3.7 Research Instruments**

Three instruments were used to collect qualitative and quantitative data: a researcher-administered structured study questionnaire, a Key Informant Interviews (KIIs) guide and a Focus Group Discussion (FGDs) guide.

#### **3.7.1 Study Questionnaire**

A structured researcher-administered questionnaire (Appendix E) was used to collect information from lactating mothers on their socio-demographic characteristics, and their knowledge, and attitudes on the concept of donor human breast milk banking. The questionnaire had four sections. Section A elicited socio-demographic and bio data of the participating lactating mothers such as their age, gender, and highest level of education attained through four close-ended questions. Section B had five open and close-ended questions focused on eliciting information about lactating mothers' knowledge on the concept of donor breast milk donation and the presence of donor breast milk banking facilities. Section C of the questionnaire had four Likert Scale questions, focused on deriving information on the lactating mothers' attitudes towards donor human breast milk banking. Section D of the questionnaire had five questions focused on eliciting

information on the lactating mothers' acceptability and practices related to human breast milk donation and banking.

### **3.7.2 Key Informant Interview (KII) Guide**

The researcher conducted Key Informant Interviews (KIIs) within Pumwani Maternity Hospital with the health care professionals. The researcher utilized a KII Guide (Appendix G) to elicit information on the attitudes, and knowledge of lactating mothers on donor human breast milk banking, and how these are likely to influence their acceptability and practices of the concept.

### **3.7.3 Focus Group Discussions (FGD) Guide**

The researcher utilized an FGD Guide (Appendix F) to garner information on the lactating mothers' knowledge, attitudes and likelihood to accept and practice human breast milk donation and banking.

### **3.8 Pre-Testing**

A pre-testing of tools was done with a sample population similar to that of the study, with lactating women visiting the MCH clinic at St. Francis Hospital, Kasarani, Nairobi County. The hospital setting was selected so that it would provide an environment as closely similar to that of the actual study as possible. Ten percent of the sample size (forty mothers) visiting the select hospital were randomly selected for this purpose. St. Francis Hospital, Kasarani did not have a breast milk bank, but it has a maternity wing and a MCH clinic where lactating women were found, to be as used as the respondents

for pretesting who are similar to the study population of the proposed study. During this pretesting period, the research instruments were all tested for consistency, clarity, sensitivity and clarity. Following the pre-testing, the researcher added an additional question Section D of the questionnaire to determine the factors that influence the lactating mothers' decisions not to accept to practice the donation of or use of banked DHM.

### **3.9 Validity and Reliability of the Data Collection Tools**

#### **3.9.1 Validity**

The study questionnaire was pre-validated and was an adapted Knowledge, Attitude and Practices (KAP) questionnaire from previous studies on human breast milk donation and banking in Nairobi County (Kimani-Murage et al., 2018). The questionnaire was further supported for validity through the utilization of the Knowledge Assessment Matrix by the WHO (WHO, 2017). To further ensure validity of the study data collection material, the instruments were pre-tested. These factors are employed in order to ensure achievement and assurance of study validity. The Food, Nutrition and Dietetics Faculty at Kenyatta University, who are experts in the field of nutrition assessed and established that the content of, and the clarity of the information to be derived by the instruments was valid.

#### **3.9.2 Reliability**

The reliability is the level to which the questionnaires and other measurement tools and procedures used for a study gives the same results, even when repeated trials with the same process are used. To ensure the reliability of the study questionnaire, the researcher referred to previous research and the knowledge assessment matrix by the WHO to



assess knowledge and attitude (WHO, 2017). During the pretesting period, the researcher and the supervisors conducted a standardization of the data collection approaches to be used by the enumerators. The enumerators were trained on interviewing techniques, and how to record the responses from various respondents so that there was uniformity. Such efforts significantly reduced the chances of bias occurring. The consistency and precision of the research instruments was also determined from the responses of health workers during the pre-testing period, further ensuring reliability of the study.

### **3.10 The Recruitment and Training of the Research Assistants**

The data for the study was conducted by the researcher, alongside three research assistants/enumerators. To select the enumerators, specific minimum requirements had to be met. The minimum academic requirements were a Diploma in Nutrition and Dietetics training. The enumerators had to be residents of Nairobi City, and fluent in spoken and written English language. They were requirement to be coherent and clear communicators. The researcher provided an advantage of participation to assistants with an experience in survey enumeration.

The research assistant/enumerators were exposed to a five-day training on data collection methods, sampling and research data collection by the researcher. The training content was based on the dictates of research statistics and data collection, nutrition in infancy, exclusive breastfeeding and human breast milk donation and banking stipulated by the WHO. The training approaches included class discussions, lectures, role-plays and demonstrations. The training sessions also provided critical discussions and training on research ethics, interviewing and communication skills and interpersonal interactions.

### **3.11 Data Collection Procedures**

Before the study begun, the researcher made an appointment with the leadership of the department to be visited a day prior. The administrators at the MCH and the Maternity Wing of the hospital were given an orientation of the study purpose, and its significance before data collection commenced. Data collection techniques included the key informant interviews, focus group discussions, and face to face interviews guided by the structured researcher-administered questionnaire.

#### **3.11.1 Face to Face Interviews**

The study questionnaire, containing a combination of questions for collection of both qualitative and quantitative information, was administered face to face to the respondents by the researcher and the research assistants. Individual lactating mothers were the respondents, and the researcher-administered study questionnaire guided these interviews.

#### **3.11.2 Focus Group Discussions**

Five Focus Group Discussions were conducted with each group having ten participants at a time. These FGDs were facilitated by the researcher, with the assistance of a study assistant at a time. The research assistant to act as an observer was selected based on possessing the following attributes: good communication manner, empathy, respect, sensitivity to cultural and religion and ability to communicate fluently in English and Swahili. To promote homogeneity, several factors such as the age of the mothers, and their level of education were used to select the discussants in each group. All the group

discussions were to be guided by the primary themes of knowledge, attitude and acceptability of the concept of donor human breast milk banking.

Each FGD session started with a welcome remark from the researcher as the moderator, followed by individual introductions of the participants. A brief overview of the study followed, where the group were introduced to the study objectives, and the rules that would guide the discussion. The facilitator (researcher) sought consent from the study participants, and it was made clear that participation was voluntary. Participants gave their consent (Appendix D) to be part of single FGDs. A unique identifier code for a focus group discussant was given. For instance, the first lactating mother to speak would be identified as LM<sub>1</sub>, the second as LM<sub>2</sub> and the tenth as LM<sub>10</sub>. These denotations were to ensure that the researcher could determine who was speaking and what they said. An identifier was also given for every focus group discussion. The first group discussion was denoted as FGD<sub>1</sub>, the second as FGD<sub>2</sub>, the third as FGD<sub>3</sub>, the fourth as FGD<sub>4</sub>, and the fifth as FGD<sub>5</sub>. Since the discussions happened in 2021, the researcher indicated this as the year after each citing of the discussants' response. All the information derived was treated with confidentiality, and there were no 'wrong' or 'right' opinions. The researcher encouraged all the participants to contribute to the discussion, and the quiet laid-back participants were encouraged and promoted to speak through tactful targeting.

Each FGD lasted about thirty to sixty minutes. The discussion was recorded on tape, and was guided by the study FGD guide. The discussions were conducted at the Pumwani Maternity Hospital premises in the afternoon (2.00pm to 3.00pm; 3.00pm to 4.00pm). The venue was settled on as it was convenient and sentinel to the study focus. The facilitator summarized the conclusions and popular outcomes of each discussion at the

end, to promote easy interpretation and also allow the participants to stress their points, and provide new insights.

### **3.11.3 Key Informant Interviews**

The KIIs were done with nurses, nutritionists, physicians and administrators of the human milk bank at Pumwani Maternity Hospital. The interviews occurred in each professional's office, and in the administrator's office for the professionals who did not have an individual office. All twenty interviews were conducted within Pumwani Maternity Hospital. The KIIs were tape-recorded by the researcher, and were guided by the KII Guide.

A unique code was given for each discussant. Since all the key informers were health workers, they were denoted as Health Workers. Therefore, the first informer to be interviewed was coded as Health Worker 1 (HW<sub>1</sub>), the second as Health Worker 2 (HW<sub>2</sub>) and the last as Health Worker 20 (HW<sub>20</sub>). Each Key Informant Interview was also coded from number one to twenty. The first Key Informant Interview was thus denoted as KII<sub>1</sub>, the second as KII<sub>2</sub> and the twentieth as KII<sub>20</sub>.

## **3.12 Data Analysis and Presentation**

### **3.12.1 Quantitative Data Analysis**

The quantitative data was entered, coded and cleaned in Microsoft Office 2010's Excel Software; and was then exported for analysis into the IBM Statistical Package for Social Sciences (SPSS) Software version 21.0. Descriptive statistics such as percentages and frequencies were used to describe and report the data on socio-demographic characteristics of the lactating mothers, knowledge and attitude levels. Chi-Square was

applied to test for association between the categorical variables such as socio-demographic characteristics, attitude and knowledge levels and the acceptability of human donor breast milk banking among the lactating mothers. The Fischer's Exact Test was applied in cases where frequencies were less than 5. A statistical significance was set at  $p < 0.05$ .

A dichotomous scale was used to measure the lactating mothers' knowledge on human donor breast milk banking. Five questions were asked to the participants on knowledge, two of which required a 'Yes' or 'No' response. The answers were graded by giving one point for the correct (affirmative) response and a point of 0 was graded for the wrong (negative) responses. Each participant was given a score based on the number of correct answers they gave. The researcher adapted and modified the original Bloom's (1956) cut-offs from the KAP study conducted on breast milk perceptions of breast milk banking conducted in Nairobi in 2019 (Kimani-Murage et al., 2019). These cut-offs were used to classify the knowledge level into three categories: High level, moderate level and low level. The scores varied from 1 to 3 points; and were classified as follows: High knowledge level (100%) 3 points; moderate knowledge level (66.7%) 2 points; and low knowledge level (<66.7%) 0-1 point. Participants who scored 2 or 3 points were considered to have adequate knowledge while any participant who scored 0 or 1 point was considered to have inadequate knowledge.

Attitude was measured by guiding the participating lactating mothers to judge whether they were negatively or positively inclined towards human breast milk donation and banking. The levels of attitudes were scored upon a 5-Point Likert scale ranging from strongly agree (5 points), agree (4 points), uncertain (3 points), disagree (2 points) and

strongly disagree (1 point). The method was utilized to grade the integrity of the lactating mothers' attitudes. A dichotomous response scale was also applied to the attitude scores. Affirmative responses (agree and strongly agree) were merged to become positive attitudes, and the negative statements (disagree and strongly disagree) were merged into negative attitudes. The uncertain responses were not classified as either positive or negative attitudes.

Five questions assessed the lactating mothers' acceptability practices relating to donor human breast milk banking. The questions included the use of banked donor human breast milk from a bank, selection of donor human breast milk over other options to infant feeding when breastfeeding is impossible, comfort when donating or using DHM, and likelihood to donate or use DHM. Lactating mothers were stated to be accepting of donor human breast milk banking when they rated positively on two to three of the 5-Point Likert Scale questions. They were considered to be unaccepting if they scored none or only one of the three questions. The acceptability levels were characterized as accepting (66.7% to 100%) 2-3 points or unaccepting (less than 66.7%) 0-1 point).

**Table 3.1: Data Analysis Matrix**

Objective	Type of Variable	Method of Data Collection	Statistical Test
Socio-demographic characteristics of lactating mothers' visiting Pumwani Maternity Hospital in Nairobi County, Kenya.	Continuous, Categorical	Questionnaire, Face to face interview	Descriptive: (Frequencies, SD and Percentages)
Knowledge on the concept of human breast milk donation and banking and the existence of donor human breast milk facilities at Pumwani Maternity Hospital.	Categorical, Continuous	Questionnaire & face to face interviews -KIIs -FGDs	Descriptive: (Frequencies, SD, Percentages )
The attitudes of lactating mothers on the use of donor human breast milk at Pumwani Maternity Hospital.	Continuous, Categorical	-KIIs -FGDs	Descriptive: (Frequencies, SD, and Percentages)
Acceptability of donor human breast milk banking among lactating mothers at Pumwani Maternity Hospital in Nairobi City County, Kenya.	Continuous, Categorical	-Questionnaire & face to face interviews -KIIs -FGDs	Descriptive: -Frequencies, SD and Percentages)

The relationships, if any, between knowledge of lactating women on donor human breast milk banking, their attitude on the concept and their acceptability of donor human breast milk banking.	Categorical, Continuous	Questionnaire, KIIs and FGDs	-Fischer's Exact test - Chi-square
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### 3.12.2 Qualitative Data Analysis

Analysis of qualitative data included a content analysis. The researcher utilized the study objectives to identify the themes, and new emerging themes were incorporated during the analysis of data. The research transcribed the FGDs and KII findings, coded them and summarized the findings based on the derived themes: the knowledge on breast milk donation and banking of the same, the attitudes towards the concept of banking donated human breast milk, the acceptability of the concept of breast milk donation and banking as an option to infant feeding, and the factors influencing the acceptability of donor human breast milk. These analyses were done for each FGD and KII. The researcher then analyzed and inferred information from the themes, from which triangulation of the quantitative findings was done with the questionnaires.

The researcher listened to the audio recording of each of the group discussions at least twice and transcribed the information carefully to ensure uniformity and accurate deconstruction of the data. The researcher then utilized the notes derived from the recordings to cross check the findings with the quantitative findings. Each research question on the guide was used to categorize the findings from the discussions. The



researcher noted and highlighted the key points that emerged, including the themes the participants were most intrigued by, or the points that kept recurring.

### **3.13 Ethical and Logistical Considerations**

The researcher sought permission to carry out the research process Kenya University's Graduate School (Appendix A). Clearance was also derived from the Kenya University Ethical Review Committee (Appendix A). Additionally, the researcher acquired a research permit from the National Commission for Science Technology and Innovation (NACOSTI) (Appendix B). Hospital management's approval (Appendix C) to carry out the study within the hospital was also acquired in order to have permitted access to patient records at Pumwani Maternity Hospital.

By conducting data coding, the researcher did not use any names, or require participants to provide their names at any juncture in the study, in order to ensure the privacy and confidentiality of their information. The researcher ensured that all the acquired information was kept in complete confidence, and was only utilized for the purpose of this study. Before inclusion as study participants, the lactating mothers' written and signed informed consent (Appendix D) was sought. Each participant retained a copy of the informed consent form they signed, and the researcher retained one copy. Study participation was voluntary, unwilling lactating mothers were not coerced, and those hesitant to participate were not included in the study.

## CHAPTER FOUR: RESULTS

### 4.1 Chapter Overview

The calculated sample size for the completed study was 403. A total of 403 lactating mothers were provided with the research questionnaire, and asked to fill it in. One hundred lactating mothers participated in focus group discussions. Of the 403 questionnaires administered, 371 were fully completed, analyzed and results used to derive inferences and conclusions for the study, translating to a 92% respondent rate, and 8% non-respondent rate. Twenty-one questionnaires were not filled at all as the respondents expressed their wish to stop participating following the beginning of the interview. Eleven questionnaires were partially filled, as these respondents expressed their unwillingness to continue at some point during their interviews. These questionnaires could thus, not be used in the study analysis and reporting. In this chapter, the results of the completed study are presented in the form of charts, tables and graphs. The demographic characteristics that influence the knowledge, attitudes and acceptability behavior on donation and use of human breast milk among lactating mothers are presented in the form of tables. The knowledge, attitude and acceptability of human breast milk donation and use scores for the lactating mothers at Pumwani Maternity Hospital, Nairobi are also presented in the form of bar graphs, pie charts and tables respectively. The information in this chapter includes the results from the questionnaire, twenty key informant interviews and five focus group discussions.

## **4.2 Socio-Demographic Attributes of the Lactating Women visiting Pumwani Maternity Hospital**

The mean age of the lactating women visiting Pumwani Maternity Hospital was  $30.8 \pm 6.9$  years. A majority (58.8%) of the participants were between the ages of twenty-six to thirty-five. Lactating women between the ages of 18-25 accounted for a little over a quarter (26.4%) of the participants, and those between the ages of thirty-six and forty-five accounted for 14.8% (Table 4.1). All the participants were women of reproductive age, who were currently lactating at the time of the study. Slightly more than one third of the participants were married (34.5%), 29.6% were single, 26.4% were separated, and 9.4% were divorced. A third of the participants (30.2%) of the study participants were holders of a Bachelor's degree (university being the highest level of education attained), slightly more than half (53.4%) attended college or a technical institute as the highest education level, while 9.7% of the participants had secondary school as the highest level of education attained. A relative minority (3.8%) of the participants were illiterate, 2.4% had primary school education while only 0.5% of the participants had 'postgraduate' listed as their highest level of education (Table 4.1).

**Table 4.1 Socio-Demographic Characteristics of Lactating Women**

Demographic Characteristics	N =371	
	n	%
<b>Age (Complete Years)</b>		
18-25	98	26.4
26-35	218	58.8
36-45	55	14.8
<b>Total</b>	<b>371</b>	<b>100</b>
<b>Marital Status</b>		
Single	110	29.6
Married	128	34.5
Separated	98	26.4
Divorced	35	9.5
<b>Total</b>	<b>371</b>	<b>100</b>
<b>Education (Highest level attained)</b>		
Illiterate	14	3.8
Primary level	9	2.4
Secondary level	36	9.7
Technical institute/College	198	53.4
University (Bachelor's)	112	30.2
University (Postgraduate)	2	0.5
<b>Total</b>	<b>371</b>	<b>100</b>
<b>Occupation</b>		
Unemployed	90	24.3
Formally employed (Civil service)	53	14.3
Formally employed (Private sector)	210	56.6
Self-employed	18	4.8
<b>Total</b>	<b>371</b>	<b>100</b>

### 4.3 Lactating Mother's Knowledge Level of Donor Human Breast Milk Banking

The researcher sought to investigate the awareness the participants had on the concept of human breast milk donation and banking. When asked if they have heard of human breast milk donation and banking, slightly less than half (48.2%) of the participants responded in the affirmative, while slightly more than half (51.8%) of the participants indicated no awareness of the concept. About half (50.1%) of the respondents indicated that they have

heard of the concept in their hospital clinics during pregnancy and post-natal Mother and Child Health clinics in the hospital. Less than a quarter (18.6%) of the participants presented that they had heard of breast milk donation and banking from their friends, social media and social gatherings such as women finance groups. Less than a quarter (15.1%) of the respondents had heard of the concept from the media. The rest of the respondents had heard of it from personal initiative and research and school material (Table 4.2).

When asked if they had further knowledge on the concept other than being aware of its existence, slightly less than half (49.1%) stated that they do. Slightly more than half (51%) of the respondents stated that they did not. The respondents were asked to provide the information they had on the concept in a short prose statement. Most of the respondents' replies indicated that they knew one could donate breast milk, it was screened before being given to users, and that the process would be free for some mothers in the Pumwani Maternity Hospital. Less than half (39.9%) of the respondents were aware that there existed a human breast milk bank in their locality, which is Nairobi County (Table 4.2).

**Table 4.2 Knowledge and Awareness on HBMB and Donation by Lactating Mothers**

<b>Knowledge and Awareness on Human Breast Milk Donation and Banking</b>	<b>N =371</b>	
	<b>n</b>	<b>%</b>
Mothers aware of breast milk donation and banking	179	48.2
Mothers not aware of breast milk donation and banking	192	51.8
<b>Total</b>	<b>371</b>	<b>100</b>
<b>Sources of the information</b>		
i. School material	32	8.6
ii. Media	56	15.1
iii. Personal research	28	7.6
iv. Hospital clinics	186	50.1
v. Others [Friends, social media, Social groups ('Chamas')]	69	18.6
<b>Total</b>	<b>371</b>	<b>100</b>
Lactating mothers with further/deeper knowledge on human breast milk donation and banking	182	49.1
Lactating mothers with simple awareness on human breast milk donation and banking	189	50.9
<b>Total</b>	<b>371</b>	<b>100</b>
Lactating mothers who know there is a human breast milk bank in locality (Nairobi)	148	39.9
Lactating mothers who did not know there is a human breast milk bank in locality (Nairobi)	223	60.1
<b>Total</b>	<b>371</b>	<b>100</b>

During the Focus Group Discussions (FGDs), several lactating mothers brought up the issue of the importance of the breast milk bank at the hospital, and why it existed. Some indicated that they do not understand the impact of the breast milk bank, if they have not heard of it despite having had delivered up to three children in the hospital in past years. As shown in the excerpt “*I have come to this hospital for maternity services since 2017,*

*and I have not once heard of human breast milk banking,”* (Focus Group Discussion 2 (FGD<sub>2</sub>), Lactating Mother 1 (LM<sub>1</sub>), 2021). In the same FGD, another lactating mother interjected, presenting that *‘I have been provided with milk from the bank when I could not produce milk after birth. I think it is only heard of if one has a problem with milk production for their baby,’* (FGD<sub>2</sub>, LM<sub>2</sub>, 2021). Another lactating mother in the fifth FGD presented that *‘she has donated breast milk to help a mother in need, even if this process was not being supervised by a nurse, neither was it at Pumwani Maternity Hospital.’*(FGD<sub>5</sub>, LM<sub>1</sub>, 2021). The position of this lactating mother was concurred by the positions of another mother in the first FGD, who stated that *‘Donating breast milk has been done by many mothers, even if they did not know that they were donating, and even if their donated milk was not kept at the milk bank.’* FGD<sub>1</sub>, LM<sub>1</sub>, 2021). These findings of the FGDs are in the tandem with the quantitative result where slightly more than half of the lactating mothers (51.8%) did not have knowledge of the concept of breast milk donation and banking. One lactating mother reported that *“I would not have known that breast milk can be donated and stored like blood for children.”* (FGD<sub>2</sub>, LM<sub>1</sub>, 2021). Another mother interjected with *“I would not have known about if I did not participate in this discussion.”* (FGD<sub>2</sub>, LM<sub>2</sub>, 2021).

The KIIs indicated that lactating mothers had a gap in their knowledge of the concept of donor breast milk banking. The interviews indicated that the gaps in knowledge are due to the minimal awareness that has been created on the concept as an option to breastfeeding. During one interview, one nurse indicated that *‘There is little awareness that is created to the mothers on donating breast milk, or using milk that is donated. Even when they are introduced to the concept, it is never in deep detail that allows them to*

*learn more about it.'* (KII<sub>2</sub>, HW<sub>1</sub>, 2021). These sentiments were echoed by another health worker in a subsequent KII where the following was derived: *'Mothers visiting the hospital already have their attitudes and opinions on breast milk donation. Therefore, most are not willing to learn about the practice, and are either already opposed to it, or claim to have enough knowledge about it already.'* (KII<sub>3</sub>, HW<sub>3</sub>, 2021). Further, it was indicated that *'knowledge on breast milk donation is not only scarce among lactating women visiting Pumwani. It is a subject that is not well-explored by mothers, healthcare professionals and other people across the country. We do need more knowledge to spread information on this.'* (KII<sub>1</sub>, HW<sub>4</sub>, 2021).

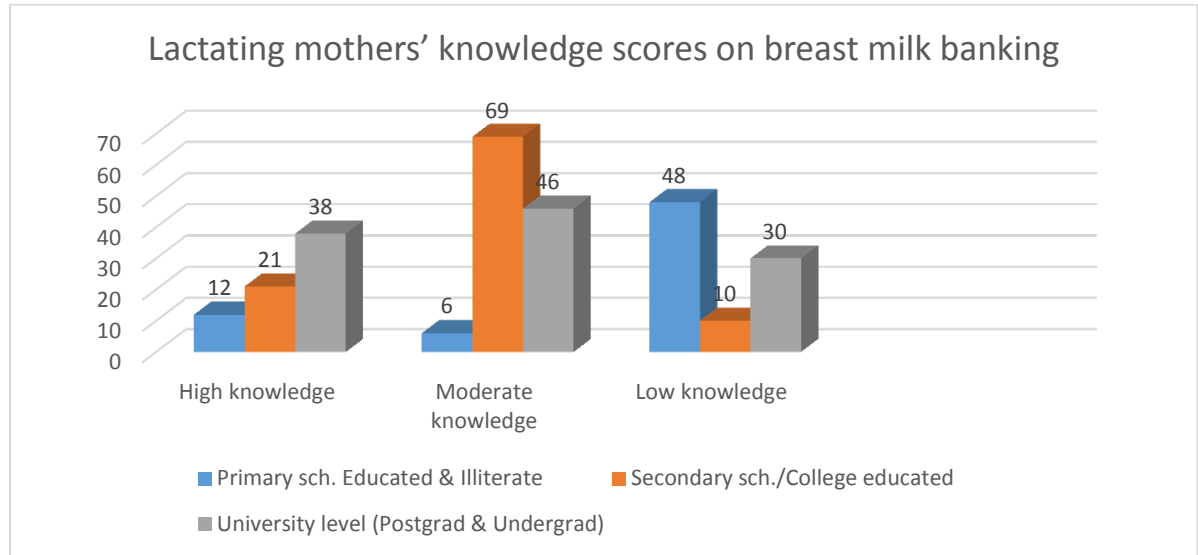
The findings of both the KIIs and the FGDs culminate in the agreement that breast milk donation and banking is still a foreign concept for most mothers attending Pumwani Maternity Hospital. This points to the need for awareness on the concept, and the presence of a breast milk bank that would facilitate gaps in infant nutrition. For instance, during one of the KIIs, one health care professional indicated that *"the project may fail because a lot of mothers do not know that these options exist, and that they are here for them to utilize."* (KII<sub>9</sub>, HW<sub>8</sub>, 2021).

#### **4.3.1 Lactating Mothers' Knowledge Scores on Breast Milk Banking**

A majority (51.7%) of the lactating mothers had adequate (high or moderate) knowledge on donor human breast milk banking. A majority of those who had high knowledge of the concept had attained a bachelor's degree as their highest education level. Less than half (48.2%) of the lactating mothers who participated in the study had low knowledge of breast milk banking as a concept in infant nutrition. Less than a third (27.2%) of the



mothers with low knowledge either had secondary school, or technical institute and college as their highest level of education attained (Figure 4.1).



**Figure 4.1 Lactating mothers' knowledge scores on HBMB**

#### **4.4 Lactating Mothers' Attitude towards Breast Milk Banking**

The attitude of the lactating mothers on breast milk donation and banking was also investigated. Of the 371 lactating mothers who participated in the study, less than a quarter (22.1%) strongly agreed that donating human breast milk is critical to the management of inconsistencies in breastfeeding. About a quarter (27.5%) of the lactating mothers who participated in the study agreed with this statement. Less than half (49.6%) of the study population concurred that human breast milk donation is crucial in managing the inconsistencies in breastfeeding (Table 4.3). More than half (59.3%) of the participating lactating women did not agree (disagreed or totally disagreed) to the prompt that they would donate breast milk for banking whether for good will or if it was in excess. It is critical to note that when the lactating women were asked if they would use donated breast milk from a breast milk bank if the need arose, more than a third (38.3%)

answered in the affirmative (agreed or strongly agreed), less than half (16.4%) were unsure, and the slightly less than half (45.3%) of the participating mothers answered in the negative (disagreed or strongly disagreed) (Table 4.3).

**Table 4.3 Lactating Mothers ‘Attitude towards Breast Milk Banking**

Attitude Aspects		N=371	
		N	%
Donating human breast milk is critical to the management of inconsistencies in breastfeeding	Strongly Agree	82	22.1
	Agree	102	27.5
	Not Sure	98	26.4
	Disagree	89	24
	Strongly Disagree	0	0.0
	<b>Total</b>	<b>371</b>	<b>100</b>
I would donate breast milk if it was in excess or for good will	Strongly Agree	8	2.2
	Agree	56	15.1
	Not Sure	87	23.5
	Disagree	44	11.8
	Strongly Disagree	176	47.4
	<b>Total</b>	<b>371</b>	<b>100</b>
I would use donated breast milk from a milk bank if the need arose	Strongly Agree	44	11.9
	Agree	98	26.5
	Not Sure	61	16.4
	Disagree	133	35.8
	Strongly Disagree	35	9.4
	<b>Total</b>	<b>371</b>	<b>100</b>

The quantitative findings on the attitude of lactating women towards human breast milk donation and banking concurred with the findings derived from the FGDs on this theme. A majority of the participants did not support that human breast milk donation is critical to the management of inconsistencies in breastfeeding during the FGDs. A discussant in one of the FGDs sessions presented that “*There are other options if a mother cannot provide milk for the child. They can use formula, or dilute cow’s milk,*” (FGD<sub>1</sub>, LM<sub>1</sub>,

2021). The discussant's position was supported by another participant in a different session: "*Cow milk is the best option of the mother has little or no milk production for the newborn.*" (FGD<sub>5</sub>, LM<sub>1</sub>, 2021). There was a uniformity in findings relating to the attitude of breast milk donation concept. Most lactating mothers seemed opposed to the idea of breast milk donation, and giving the same to a newborn. One discussant in the third FGD indicated that "*I would donate my milk for a relative, but I would not donate the same to a bank where it is being given to any person.*" (FGD<sub>3</sub>, LM<sub>1</sub>, 2021). Her position was supported by another discussant who posited that "*I would not be comfortable donating my breast milk to a bank. That is assuming I have enough for my baby in the first place, and I am in good health.*" (FGD<sub>3</sub>, LM<sub>2</sub>, 2021).

The response of this particular discussant tied in with the consensus that was arrived in the fourth FGD while discussing if donating breast milk if it was in excess, or just for goodwill is acceptable. "*Donating if it is in excess or for good will for a relative is possible. However, breast milk donation to a breast milk bank seems foreign, and there is not an assurance that the milk is healthy.*" FGD<sub>3</sub>, LM<sub>1</sub>, 2021). During the second FGD, some lactating mothers introduced that they were "*opposed to donating breast milk to a milk bank due to the possibilities of disease, and the challenges associated with finding and registering at a breast milk bank for donation.*" (FGD<sub>2</sub>, LM<sub>4</sub>, 2021). One mother added, "Donating breast milk for good will would be good if there were systems to promote it as an option to direct breastfeeding." (FGD<sub>5</sub>, LM<sub>2</sub>, 2021).

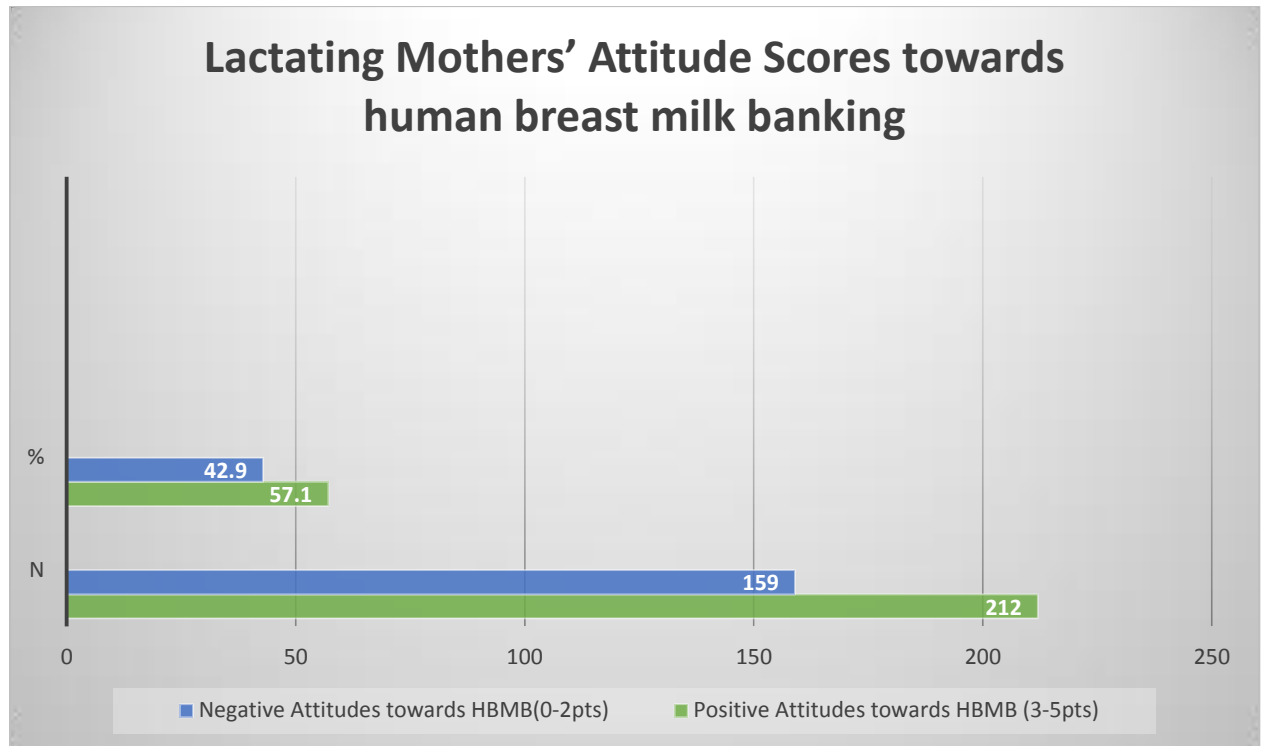
Information from the KII supported the quantitative finding that most mothers are hesitant with idea of human breast milk donation. One key informant said, "*The mothers are not open to using donated breast milk from the milk bank, even when it is the best*

*available option for replacement feeding when they cannot produce milk, or breastfeed their children for medical reasons.” (KII<sub>2</sub>, HW<sub>1</sub>, 2021). Another key informant informed that “Even when the opportunity to donate human breast milk is provided for mothers, most still opt to struggle and buy formula, even if the donated breast milk is provided freely on prescription.” (KII<sub>18</sub>, HW<sub>10</sub>, 2021). Human breast milk donation was determined by most key informants to be ‘a foreign subject for most mothers attending Pumwani Maternity Hospital.’ (KII<sub>12, 16, 18, 20</sub>, HW<sub>19, 17, 3</sub>, 2021).*

#### **4.4.1 Lactating Mothers’ Attitude Scores towards Human Breast Milk Banking**

The attitude of the lactating mothers towards human breast milk banking was measured against a 5-point Likert scale. Questions on attitude were scored from one to five, with 1 being the score for the negative extreme. The responses indicating the most positive attitude (strongly agree) were scored 5, agree was scored 4, unsure was scored 3, disagree was scored 2, and strongly disagree (the most negative response) was scored 1. All the attitude prompts were structured into positive statements. Agree and strongly agree (the strongest responses) were merged. Similarly, disagree and strongly disagree were also merged. The categories were divided into two extremes (negative and positive) with the uncertain scores being merged into the positive category. The attitude scores were then categorized using the Blooms (1956) cut-off reference. The results showed that more than half (57.14%) of the participating lactating mothers had a positive attitudes towards various aspects of breast milk donation. While a majority of the lactating mothers opined that breast milk donation and banking is critical to bridging the gaps in breastfeeding, a majority of them (69.4%) of them had negative attitudes towards donating the breast milk themselves. Overall, the general attitude scoring found that nearly two thirds (57.1%) had

positive attitudes towards breast milk banking, while less than half (42.9%) of the participating lactating women had collective negative attitudes towards human breast milk donation and banking as a concept (Figure 4.2).



**Figure 4.2 Lactating Mothers' Attitude Scores towards HBMB**

#### **4.5 Lactating Mothers' Reported Acceptability of Human Breast Milk Donation**

A majority (68.2%) of the participating lactating mothers reported that they have never used donor breast milk from a milk bank, on prescription. Less than half (44.2%) of the lactating women were uncertain if they would choose donor breast milk as an alternative to direct breastfeeding in the even their infant needs replacement feeding. More than a third (34.5%) of the lactating women reported that they would choose donor human breast milk over feeding formula and diluted animal milk, while less than a quarter (21.3%) reported that they would not pick donor human breast milk as their best

alternative for replacement feeding. Less than half (41.2%) of the lactating mothers were acceptable to the concept to the concept of human breast milk donation in that they reported to be comfortable (very comfortable or comfortable) donating human breast milk. Less than half (31.5%) of the participating lactating mothers indicated that they would not be comfortable (very uncomfortable or uncomfortable) donating their breast milk for banking. Less than a quarter (6.7%) of the lactating mothers indicated that the question was inapplicable as they would never consider donating human breast milk to a milk bank.

When asked how likely they were to donate human breast milk following the information and education provided by the researcher on the concept, less than half (43.1%) reported affirmatively (very likely to or likely to). Less than a quarter (24.8%) of the lactating mothers were still unsure, and more a third (32.1%) responded in the negative (unlikely to and very unlikely to) Table (4.7). Finally, the mothers were asked to select the factors that influenced their decision to or not to accept the concept of breast milk donation. Slightly more than half (56.6%) of the participants indicated that that they did not have enough knowledge about human breast milk donation to be accepting of its practice. Less than half (46.6%) of the mothers posited that they thought the donation of human breast milk was unsanitary, while less than a quarter (18.6%) of the respondents reported that human breast milk donation is considered taboo in their religion or culture (Table 4.4).

**Table 4.4 Lactating Mothers' Reported Acceptability of Human Breast Milk****Donation**

<b>Acceptability Factors</b>	<b>N=371</b>	
	<b>N</b>	<b>%</b>
Use of DHM on prescription		
Yes	118	31.8
No	253	68.2
	<b>Total</b>	<b>371      100</b>
Likelihood to pick DHM over other feeding options		
Most likely	128	34.5
Uncertain	164	44.2
Not at all	79	21.3
	<b>Total</b>	<b>371      100</b>
Level of comfort at donating BM		
Very comfortable or Comfortable	153	41.2
Uncertain	76	20.5
Uncomfortable or Very Uncomfortable	117	31.5
Unwilling to donate breast milk to a milk bank	25	6.7
	<b>Total</b>	<b>371      100</b>
Likelihood to donate or use DHM from a milk bank		
Very Likely or Likely	160	43.1
Uncertain	92	24.8
Unlikely or Very unlikely	119	32.1
	<b>Total</b>	<b>371      100</b>
Factors influencing decision not to donate or accept HBM		
Sanitation	173	46.6
Personal beliefs	24	6.5
Unacceptability	54	14.6
Inadequate knowledge	210	56.6
Culture/religion	69	18.6

During the KIIs, one interviewee indicated that mothers are likely to '*accept to donate breast milk if they are well-aware of the importance of its donation and banking to the*

*health of children'* (KII<sub>1</sub>, HW<sub>4</sub>,2021). Focus Group discussions established that most mothers would feel comfortable donating breast milk for people they are acquainted with; but would be hesitant to donate breast milk to a milk bank for public consumption. One discussant indicated *'I am not sure I would donate my breast milk and give it away. I would be comfortable donating to a facility so it can be screened and fed to a child of someone I know of.'* (FGD<sub>3</sub>, LM<sub>10</sub>, 2021). Of importance to note is that for a collective of all the FGDs, mothers were open to donating, and even using pasteurized and screened donated human breast milk, following lengthy discussions with the researcher on why is it the best option to infant feeding after a mother-to-child direct breastfeeding. A majority of the mothers were very likely to choose donated breast milk over others methods at the end of the third and fourth FGD.

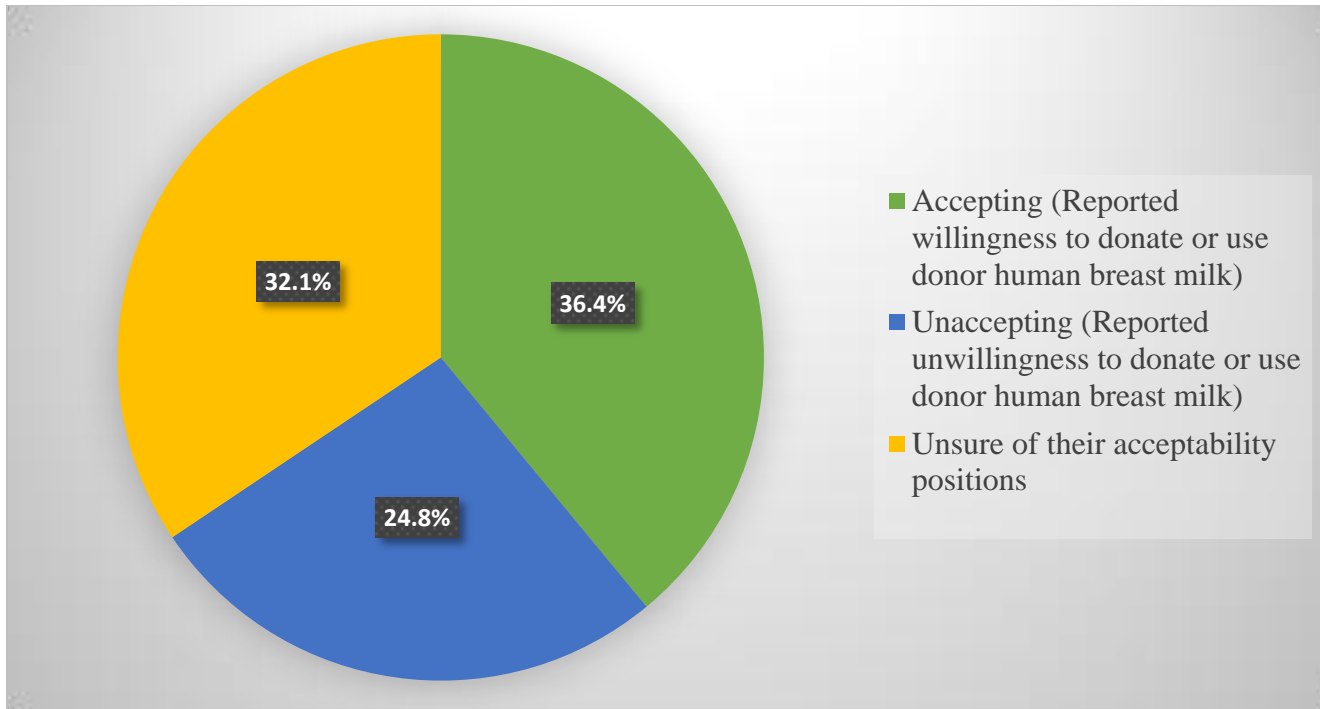
#### **4.5.1 Lactating Mothers' Acceptability Scores towards Human Breast Milk Banking**

The acceptability of lactating mothers of human donor breast milk banking was tested through an assessment of practices against a 5-point Likert scale. Possible answers to questions guiding the researcher's insight into the mothers' likelihood to accept the concept were scored from 0 to 5, with the score of 0 being given to practices that indicated the least possibility of acceptability. Of the five questions in the acceptability section of the study questionnaire, three were 5-point Likert Scale questions; whose results have been presented in this section. The questions were framed in a 'likely' and 'not-likely' to and 'comfortable' and 'not comfortable' formats. Very likely was scored 5, likely was scored 4, uncertain was scored 3, unlikely was scored 2, and very unlikely was scored 1. Very comfortable was scored 5, comfortable was scored 4, Uncertain was scored 3, uncomfortable was scored 2 and very uncomfortable was scored 1. On the third



question under this section, the lactating mothers were provided the option to selected 'Not Applicable' if they felt that human donor breast milk banking was a practice they would never consider. 'Not applicable' was scored 0.

The results indicating acceptability (all the positive responses) from each question were merged into 'acceptable', and those indicating unacceptability (negative responses) were merged under 'unacceptable'. These merged acceptability practices scores were categorized using the Blooms (1956) approach. For the current study, it was found that less than half (36.4%) of the participating lactating mothers were accepting of the concept of HBMB, slightly more than a third(32.1%) were uncertain of their positions in accepting the concept into their infant care processes, and less than a quarter (24.8%) of the mothers were unaccepting (Figure 4.3). These score categorizations did not include the less than a quarter (6.7%; n=25) of the lactating mothers who scored 0, with their response that breast milk donation and using donated human milk would not be considered an option for them ever give (Figure 4.3).



**Figure 4.3 Lactating Mothers' Acceptability and Practice Scores towards HBMB**

#### **4.6 Association between Lactating Mothers Socio-Demographic Characteristics and their Acceptability of Donor Human Breast Milk Banking**

The relationship between the socio-demographic characteristics (age, level of education, marital status and occupation) of the participating lactating women and their acceptability of the concept of donor human breast milk banking was tested using the Fishers Exact Test and Chi-Square. The acceptance of the lactating mothers of donor breast milk banking was measured from two variables: the mothers' willingness to donate breast milk and the mothers' willingness to use banked donor human breast milk. The lactating mothers were considered willing to donate if their responses to the prompt questions pointed towards willingness to donate human breast milk, or learn about the concept.

A significant relationship ( $\chi^2=55.9671$ ;  $p\text{-value}<0.00001$ ) was found to exist between the lactating mothers' age and their acceptability of donor human breast milk banking. Their acceptability of donor human breast milk banking was also significantly associated with their marital status ( $\chi^2=43.3383$ ) and their level of education ( $\chi^2=11.78$ ;  $p\text{-value}=.019046$ ). However, it was found that there was no significant relationship between the lactating mothers' acceptability of donor human breast milk banking and their employment status or occupation ( $\chi^2 =1.1567$ ). Therefore, at  $p<0.05$ , there is a significant statistical association between lactating mothers' age, level of education and marital status and their acceptability of donor human breast milk banking and no statistical significance between their employment status and their acceptability (Table 4.5).

**Table 4.5 Association between Lactating Mothers Socio-Demographic Characteristics and their Acceptability of Donor Human Breast Milk Banking**

Socio-demographic characteristics	Acceptability (N=371)			Fisher's Exact Test
	Willing to Donate /use n (%)	Unwilling to donate/use n (%)	Total n (%)	
<b>Age</b>				0.0011
18-25	62 (63.3)	36 (36.7)	98 (100)	
26-35	104 (47.7)	114 (52.3)	218 (100)	
36-45	42 (76.4)	13 (23.6)	55 (100)	
<b>Marital Status</b>				0.00001
Single	92 (83.6)	18 (16.4)	110 (100)	
Married	8 (6.3)	120 (93.7)	128 (100)	
Separated	76 (77.6)	22 (22.4)	98 (100)	
Divorced	3 (8.6)	32 (91.4)	35 (100)	
<b>Highest education attained</b>				0.00001
None (Illiterate)	3 (21.4)	11 (78.6)	14 (100)	
Primary school	0 (0)	9 (100)	9 (100)	
Secondary school	3 (8.3)	33 (91.7)	36 (100)	
College/Technical	91 (46)	107 (54)	198 (100)	
Undergraduate	99 (97)	3 (3)	102 (100)	
Postgraduate	2 (100)	0 (0)	2 (100)	
<b>Employment Status</b>				0.2599
Unemployed	76 (84.4)	14 (15.6)	90 (100)	
Public Sector	49 (92.5)	4 (7.5)	53 (100)	
Private Sector	194 (92.4)	16 (7.6)	210 (100)	
Self-employed	8 (44.4)	10 (55.6)	18 (100)	

\*Significant at  $p < 0.05$ .

#### **4.7 Association between Lactating Mothers' Knowledge on Donor Breast Milk Banking and their Acceptability of Donor Human Breast Milk Banking**

The findings revealed that there was a significant association between the lactating mothers' knowledge of the concept of donor breast milk banking and their acceptability of the practice as an option to infant feeding ( $\chi^2= 43.3849$ ;  $p<0.00001$ ) (Table 4.6). These statistical findings imply that at the 0.05 significance level, there is a significant association between the participating lactating mothers' knowledge levels on breast milk donation and banking and their acceptability of the concept that indicates a strong positive relationship.

On further analysis on the aspects of knowledge and their association with the acceptability of donor breast milk banking among lactating women, it was found that there were low odds of association between knowledge levels of breast milk banking and the acceptability of the same among lactating mothers participating in the study (OR: 0.3278; 95% CI; upper limit 0.4653, lower limit 0.2310;  $p<0.0001$ ) all significant at  $p=.05$ .

**Table 4.6 The relationship between lactation mothers' knowledge scores on donor breast milk banking and their acceptability of the concept of human breast milk donation and banking**

Knowledge levels	Acceptability trends on donor human breast milk banking (N = 371)			$\chi^2$	df	p-value
	Accepting n (%)	Not-accepting n (%)	Total n (%)			
<b>High knowledge level</b>	54 (76.1)	17 (24)	71 (100)	43.38	2	0.00001*
<b>Moderate knowledge level</b>	98 (81)	23 (19)	121 (100)			
<b>Low knowledge level</b>	83 (46.4)	96 (53.6)	179 (100)			

\*Significant at  $p < 0.05$

#### **4.8 Association between Lactating Mothers' Attitudes towards Human Breast Milk Donation and Banking and their Acceptability of Donor Human Breast Milk Banking**

A Chi-square test of independence was conducted to determine the association between the attitudes of lactating mothers and their acceptability of the practice of human breast milk donation and banking. The results confirmed that there is a statistically significant relationship between attitudes and acceptability of lactating mothers on human breast milk donation and banking ( $\chi^2 = 4.44$ ;  $p = 0.000019$ ). (Table 4.7) Lactating mothers with positive attitudes towards human breast milk donation and banking are more likely to be accepting of the concept of donor human breast milk banking. The result was statistically significant at  $p < 0.05$  (Table 4.7).

**Table 4.7 Association between lactating mothers' attitudes and acceptability of human breast milk donation and banking**

Attitude Aspects	Acceptability						Row Totals
	n=288			n=288			
	Accepting		Non Accepting				
	n	%	$\chi^2$	n	%	$\chi^2$	
<b>Positive Attitudes</b>	92	(73.89)	[4.44]	60	(78.11)	[4.20]	152
<b>Negative Attitudes</b>	48	(66.11)	[4.96]	88	(69.89)	[4.69]	136
<b>Column Totals</b>	<b>140</b>			<b>148</b>			<b>288 (Grand Total)</b>

\*Significant at  $p < 0.05$

#### **4.9 Association between Lactating Mothers Knowledge on Human Breast Milk Donation and Banking and their Attitudes on the Banking of Donor Human Breast Milk**

A Chi-Square test of independence was applied to determine if any statistically relevant relationship existed between knowledge and attitudes of lactating mothers on donor human breast milk banking. The knowledge of the lactating mothers was found to be significantly associated with the attitudes they held on the concept of breast milk donation and banking ( $\chi^2 = 65.70$ ;  $p$  value = 0.00001) (Table 4.8) at a  $p = 0.05$  significance level (Table 4.8).

**Table 4.8 Association between Lactating Mothers Knowledge and their Attitudes on the Banking of Donor Human Breast Milk**

Attitude Aspects	Knowledge on DHM Banking (N = 371)			$\chi^2$	df	p-value
	High Knowledge level	Moderate knowledge level	Low Knowledge level			
				65.7	2	0.00001

	n (%)	n (%)	n (%)
<b>Positive Attitude</b>	98(46.2)	88 (41.5)	26 (12.3)
<b>Negative Attitude</b>	48 (30.2)	31 (19.5)	80 (50.3)

\*Significant at  $p < 0.05$

## CHAPTER FIVE: DISCUSSION OF FINDINGS

### 5.1 Introduction

This chapter includes the discussion of the findings of the study in relation to other studies relating to the knowledge, attitude and acceptability of human breast milk banking among lactating mothers. This chapter will include discussions on social-demographic attributes of the participating lactating mothers, their knowledge on, and their attitudes on human breast milk donation and banking, and the acceptability practices they are likely to exhibit in relation to donor human breast milk banking. The relationships between these variables (attitudes, knowledge, acceptability and practices) are also discussed within this chapter.

### 5.2 The Socio-Demographic Characteristics of the Lactating Women

The results of the completed study found that a majority (58.8%) of the lactating mothers visiting Pumwani Maternity Hospital are between the ages of twenty-six and thirty-five years. According to Kimani-Murage et al. (2018), the mean age of women in Nairobi's urban areas was  $38 \pm 4$ ; indicating that they were aged between thirty-four and forty-two years of age. In this study, a majority of the mothers were aged between twenty-six and thirty-four years; with a mean age of  $28 \pm 4$  years. Slightly over a third (34.5%) of the lactating women were married, while most (53.4%) were educated up to the college or



technical institute level of education. These findings are consistent with those of Iloh et al. (2018), where a majority of the lactating mothers enrolled into a study on breast milk donation and banking in Nigeria were between the ages of twenty nine and thirty nine years. The socioeconomic characteristics of the participants of this study match the social economic attributes of lactating mothers reported by the African Population and Health Research Center (APHRC) in 2016. Their study interviewed lactating mothers visiting the labor and maternity wards, pediatric care units, and the Maternal and Child Health (MCH) clinic in various health centers within Nairobi. The characteristics of the women, including the age, marital and economic status and the highest level of education attained may be attributed to the location of the hospital, and the demographics of the population to which it is accessible. A study by the APHRC (2017), investigating the effectiveness of home-based counseling among informal settlement dwellers, found that 15.5% (n=156) of the children included in the study were delivered at Pumwani Maternity Hospital (Kimani-Murage et al., 2019). These findings were explained as being indicative of Pumwani maternity hospital being economically and physically accessible for women in urban informal settlements in Nairobi, where most urban residents reside. Further, these characteristics may be explained by the economic aspect, as most residents in Nairobi's urban informal settlements are low and middle income earners (APHRC, 2017; Kimani-Murage et al., 2019). Pumwani is a public hospital with relatively affordable services, as evidenced by the hospital's service charter (Appendix I), and the findings by Imbaya, Odhiambo-Otieno, & Okello-Agina (2015), who found that the estimated mean monthly expenditure for women visiting Pumwani maternity hospital to be Ksh. 10, 200;

meaning that the women accessing the services at Pumwani Maternity Hospital were low to middle income earners.

The economic status, age and marital status attributes of the respondents in this study are similar to those of is also consistent with that of Chagwena et al. (2020) in another third-world country, who found that the demographics of the women visiting maternity and MCH clinic in hospitals in urban settings in Zimbabwe had the mean age of twenty-eight years, were not formally employed, and were married. The urban settings investigated in Zimbabwe shared similar characteristics in the demographic they held as the urban settlements in Kenya forming the primary demographic of the clientele for Pumwani Maternity Hospital. These attributes could also be a reflection of the belief that specific hospitals and healthcare outlets are likely to appeal more to people of a specific demographic (Chagwena et al., 2020; Kimani-Murage, 2015). The demographic characteristics of the population served by different health care outlets is different, due to the quality, cost and diversity of services available to the targeted population (Govender, 2020; Iloh et al., 2018; Coutsooudis, Petrites & Coutsooudis, 2011). Findings from a study by Njeri (2020), investigating the utilization of antenatal and nutrition services at Pumwani Maternity Hospital indicated that 29.9% of the respondents had tertiary education as their highest level of education attained. Thus, these findings indicated that a majority (70.1%) of the women seeking services from Pumwani maternity hospital had a significantly low level of education (technical institute, illiterate, primary education and vocational institute) as the highest level of education attained.

### **5.3 Lactating Mother's Knowledge Level of Donor Human Breast Milk Banking**

Slightly more than half of the participating mothers (51.8%) were not aware to the slightest level of the concept, and had not heard of it before (Table 4.2). These study findings are in line with those of Sharumathy, Vetrisevi & Adhisivan (2019) who found that among postnatal mothers visiting a child and maternal hospital, only 19% had adequate knowledge on the concept of breast milk donation and banking. The study by Sharumathy, Vetrisevi & Adhisivan (2019) was aimed at investigating the knowledge and perceptions of postnatal hospital, providing maternity and child care services. The findings are further supported by those of Iloh et al. (2018) who found that only 7% of a study population derived from a South-East Nigeria had adequate knowledge on donor human breast milk banking. Relating to the Kenyan context, these findings were in tandem with those of Kimani-Murage et al. (2019) who found that of the women they enrolled in their study, only 23% have awareness of donor human breast milk banking.

According to Amundson et. al. (2017), awareness increases with knowledge and education, which these findings could be attributed to. In this study, it was established that a further 49% of those who had basic knowledge on donor human breast milk banking had a further-developed knowledge level of the concept, derived from MCH clinic visits (50.1%), friends, social media and social gatherings (18.6%), and the hospital and mainstream media (15.1%). Even with the extensive knowledge on the concept the participants had, only a few (39.9%) of the lactating mothers' who were enrolled into the study had knowledge of the existence of a human donor breast milk bank at Pumwani Maternity Hospital.

During the qualitative interviews, it was established the creation of awareness on the concept of human milk banking and the presence of a human breast milk bank was not

done with the critical target being the lactating women. Instead, the campaigns on human breast milk banking within the hospital target the healthcare professionals, especially the nurses and nutritionists. For instance, in the sixth FGD, one mother presented that *“I have not known that you can donate milk. We have never been told about it by the doctors here. Even when I had problems producing milk with my second child, I was not informed that I could have donated breast milk as an option”* (FGD<sub>6</sub>, LM<sub>5</sub>, 2021). According to the UNICEF report of 2019 on human breast milk donation and banking, the key targets of information dissemination should be the mothers who are likely to use or donate human breast milk (UNICEF, 2019).

Since it was established that a majority of the women did not know of the existence of a human donor breast milk bank at Pumwani Maternity Hospital, one KII respondent, a nurse, indicated that there is a gap in knowledge on breast milk banking and donation among medical officers, and nursing aids, yet they are expected to disseminate the said information to the mothers' who are the targeted beneficiaries and promoters of the project. The exclusive breastfeeding coverage rate in Kenya as of 2019 is 61% as reported by the 2019 Global Breastfeeding Scorecard by WHO and UNICEF (WHO & UNICEF, 2019). While this rate is relatively high, it is still a way off from the WHO worldwide recommended exclusive breastfeeding coverage target of 90% for all nations (WHO, 2022). Human breast milk donation and banking is one of the ways to bridge this gap, and ensure that more infants in Kenya have an access to the irrefutable benefits of human breast milk (WHO, 2022; Iloh et al., 2018; Kim & Unger, 2010). Yet, the findings of the current study show that gaps exist in the knowledge, attitude and acceptability of lactating mothers about human breast milk donation and banking. The study found out

during the qualitative FDGs that mothers did not know of the possibility of donating their breast milk, until they attended the study's FDGs. These findings echo those of Govender (2020), and Coutsooudis, Petrites & Coutsooudis (2011) who established that, in both their studies in KwaZulu-Natal in South Africa, there are inadequate sources of information on HBM donation and banking for lactating mothers and a majority of mothers are not interested in gaining knowledge on human breast milk donation and banking due to the fear of the unknown respectively.

There were inconsistencies recorded during the current study relating to the knowledge of the presence of breast milk donation and banking services in Nairobi County, and specifically at Pumwani Maternity Hospital. While some mothers reported that they have used donated human breast milk from the bank at least once, others reported that they did not understand the impact of the presence of a breast milk bank, and have not yet heard of it despite being frequent recipients of services at the hospital. The findings of the completed study align with those of Alemu (2016), who conducted a similar study investigating the knowledge and attitudes of lactating mothers and health professionals on pasteurized human breast milk banking in Addis Ababa Ethiopia. Alemu (2016) found that a majority (95%) of the participating lactating mothers in Addis Ababa did not have any prior knowledge of the existence of human breast milk donation and banking as an option to infant feeding. Further, the findings indicated that of the 5% that had heard of the concept, most had not derived their knowledge from being education by professionals in the healthcare profession. These findings further support the findings of the current study that point to the existence of a gap in the dissemination of knowledge relating to

human breast milk donation and banking for lactating mothers at Pumwani Maternity Hospital in Kenya, which is within the same African continent as Addis Ababa.

The collective findings on the state of the knowledge of lactating mothers on donor breast milk banking indicate a gap in the availability of knowledge and educational information on HBMB in developing continents, such as Africa. While a majority of the studies indicating these findings were published over five years past, they are an indication that the efforts of improve knowledge on this concept among lactating mothers are lagging, or non-existent. Per the completed study, 43.1% of the participating lactating women would be open to donating human breast milk following a session where a health worker imparted knowledge on the practice on them. This suggested the importance of imparting knowledge on lactating mothers on the option of HBMB as an option for infant feeding, when breast milk production is limited, or impossible. The creation of material to impart knowledge acceptably, and disseminate the knowledge to lactating mothers in developing countries is not easy, as evidenced by study findings from Nigeria (Iloh et al., 2018), Ethiopia (Alemu, 2016), and Kenya (Kimani-Murage et al., 2019). The ease of imparting knowledge and disseminating information on human breast milk banking in developing countries is challenged by factors such as religious constraints, and traditional beliefs; which impact the likelihood of lactating mothers to accommodate the donation of human breast milk (Govender, 2020). The same is the case for industrialized countries in developing continents, such as South Africa (Govender, 2020). Through the course of visiting the hospital for continuous maternal and child health care, health care professionals have a catchment period for lactating mothers, where chances to bridge the informational gap on HBMB present. While it may not be easy, findings from the current

study and others present that there is a significant relationship between knowledge and acceptability, and thus, practices relating to acceptability to donate or use banked donor human breast milk.

#### **5.4 Lactating Mothers' Attitudes towards Human Breast Milk Banking**

In the completed study, most of the participating lactating women (57.1%) exhibited positive attitudes towards the concept of human breast milk donation and banking. The relatively high rate of lactating women' positive attitude may be attributed to the maternal concern for child safety, nutrition and health (Gelano et al., 2018). This attribution may be further supported by findings from the FGDs, where the mothers indicated that they would donate their breast milk to their relatives, or a friend for the sake of the child's health, even though they may not do it to a human breast milk bank. Further, these findings are supported by discussants' positions during FGDs, where mothers' only concern with human breast milk banking was the possibility of disease and infection, and the impact it would have on their children. One discussant indicated that *"I am opposed to donating breast milk to a milk bank due to the possibilities of disease, and the challenges associated with finding and registering at a breast milk bank for donation"* (FGD<sub>2</sub>, LM<sub>4</sub>, 2021). Another discussant posited: *"I would personally not give my child donated human milk. I don't think I would convince myself that it is safe for her if I don't know who donated it."* (FGD<sub>2</sub>, LM<sub>2</sub>, 2021).

Health workers during the KIIs affirmed that most mothers have reservations about human donor breast milk banking only due to the concerns that donated milk would harm their children. Key Informants, who were the health workers for the completed study, were professionals well-versed in the provision of health care services to lactating

mothers, during gestation and following birth (WHO, 2019). As relates to breast milk donation and banking at Pumwani Maternity Hospital, the nurses, medical doctors and nutritionists working within the maternity, breast milk bank and MCH departments were most instrumental. Their role includes providing the existence of HBM donation as an option for fillings gaps in infant nutrition, and provision of awareness on existence of donor human breast milk banking services at Pumwani Maternity Hospital. Their contributions to the completed study helped the researcher understand the positions of lactating mothers' knowledge and acceptability of the concept from a professionals' point of view. Some health workers indicated during the KIIs that if provided with enough assurance that donated human breast milk is the best option when conventional breastfeeding is impossible, they would be positively inclined towards the practice. *“I feel that knowledge is the greatest hindrance to the success of this intervention. If mothers were better aware of the concept, and the measures employed to sanitize and sterilize the donated milk, they may be willing to donate, or use donated human milk”* (KII<sub>20</sub>, HW<sub>5</sub>, 2021).

Previous studies support this position. In a publication developed following a research on mothers' attitudes on human donor breast milk banking across Nairobi, Kenya, the APHRC presented options for improving mothers' attitudes towards the concept (APHRC Nutrition Report 2019). The approach included focusing on the child as well as the mother, to ensure that mothers are assured of the role of donated human breast milk in promoting infant nutrition. Through the Mother-Baby Friendly Initiative *Plus* (MBFI+), the organization aimed at maximizing on the willingness of mothers to protect their children's health at all costs to incorporate human breast milk donation and banking into



the promotion of and care of infant health in Kenya. Additionally, Gelano et al. (2018), in a study investigating the perception of donor breast milk and the acceptability of the same among mothers in a developing community, found that mothers are more accepting of new methods of infant feeding if enough assurance is provided that it is the best possible option at that time.

Concern about infants unable to meet their nutritional needs due to gaps in breastfeeding is enough motivation for mothers to shift their attitudes from negative to positive, leading them to human breast milk donation and banking points (Villanueva, 2011; Miranda et al., 2016). The benefits of human breast milk are well-known, attributable to the wide reach of awareness regarding the importance of exclusive breastfeeding in previous years. The findings of the current study support those of Mackenzie, Javanparast & Newman (2013), who found that mothers are often possessing of positive attitudes towards possible options to bettering infant health and nutrition. The newness of the concept of breast milk donation and banking in Kenya has been cited as the greatest possible hindrance to the success of projects related to breast milk banks and donation drives. A study by Chagwena et al. (2020) found that health workers are the most instrumental in imparting knowledge that would impact on the attitudes of lactating mothers towards donating or using donated human breast milk.

Slightly less than half (49.6%) of the participating lactating women in the current study presented that they understood that breast milk donation and banking is critical to bridging the current gaps in breastfeeding benefits in Kenya. A collective 50.4% were in disagreement. These findings were supported by findings by those of Senthilkumar (2018), who found that mothers' attitudes towards human donor breast milk banking are

fairly positive, albeit inconsistent due to the concern that donor human breast milk loses the complete nutrients needed for the baby during the pasteurization process. These findings, derived from India, a country where the concept of human breast milk donation and banking is fairly progressed indicate that the process of shifting the attitudes of lactating mothers towards HBMB is a continuous process, whose results take time to be realized.

An intervention study on the awareness, attitudes and acceptability of human donor breast milk banking conducted by Magowan et al. (2020) in Uganda found that through targeted education and awareness creation, negative attitudes towards HBMB by lactating mothers can be quelled. These findings support those of the completed study that indicate that mothers are willing to learn about breast milk banking, to understand its importance, the process and how they can participate (n=142; 38.3%). A report presented by Path International (2015) indicates that improving the attitudes of the targeted mothers' in the process of making human milk banking a priority in South Africa is one of the critical steps in their project. Collectively, the findings of the current study and those of previous studies indicate that attitudes towards human donor breast milk banking are flexible, and can be modified from negative to positive through efforts such as improved awareness, and targeted nutrition education for mothers and relevant stakeholders.

Of importance to note is that the concern for a majority of the lactating mothers in this study had a negative attitude towards human breast milk donation and banking due to the concerns of disease and infection in the pasteurized donated human milk, as was evidenced by the discussions in the FGDs. When there is a concern that an option to infant feeding could cause more harm than good, the acceptability and associated

attitudes will often dip, and interventions related to such concerns may most likely fail (Iloh et al., 2018; WHO, 2020). In the foregoing, however, a majority of positive attitudes among lactating mothers on the concept of donor human breast milk banking is indicative of a positive view of the concept generally; which translates to possible high rates of acceptability, and thus providing hope for successful implementation of the intervention.

### **5.5 Lactating Mothers' Acceptability of Human Breast Milk Donation**

The practices of the acceptability of donor human breast milk banking among lactating mothers related to how comfortable a mother was donating or using donor human breast milk, their likelihood of picking donated breast milk over any other replacement feeding option, and whether or not they have used donated human breast milk from a milk bank. Similar studies have used these factors as the indicators of acceptability of breast milk donation or banking (Kimani-Murage et al., 2019; Iloh et al., 2018; Gelano et al., 2018; Costoudis, Petrites & Costoudis, 2011). Costoudis, Petrites & Costoudis use the likelihood to pick donor human breast milk over other replacement feeding options such as infant formula as the indicator of acceptability. In their study, Kimani-Murage et al. (2019) utilized the comfort while donating human milk and usage of donated human breast milk in the past as the selected study indicators on the acceptability of breast milk donation in Kenya. Gelano et al. (2018), and Iloh et al. (2018) utilized the willingness of mothers to donate or use and donate human breast milk respectively, as the factors to determine their acceptability of the concept. Informed by these previous application of these indicators of practices, the researcher, in the completed study, utilized three indicators to determine acceptability: choosing donor human milk over other options,

willingness to donate or use, and comfort while donating or using donor human milk from a breast milk bank.

The completed study established that more than a third ( 36.4%) of the lactating mothers reported to be accepting of the concept of human donor breast milk banking, while only less than a quarter (24.8%) reported practices that would indicate unacceptability of the concept as an option to breastfeeding and infant feeding. These findings may be attributed to the positive attitudes possessed by most mothers on the concept as an option to infant feeding and care. These findings indicate that lactating mothers visiting Pumwani Maternity Hospital are relatively open to accepting the implementation of donor human breast milk banking as part of the efforts to quell challenges related to infant nutrition.

The findings of this study are in tandem with those of previous research conducted by scholars in Kenya, Africa and the rest of the world. In a study, APHRC found that lactating mothers had a 99% acceptability rate associated with their positive attitudes to the concept of breast milk being the most important food for infants. While the study by APHRC did not conclusively indicate that mothers would be accepting of the concept at individual level, its findings are supporting evidence that the findings of the current study are in tandem with the true situation of the population in Nairobi, Kenya. The findings of this study are further supported by those of a study by Iloh *et. al.* (2018), who found that the prospects of breast milk donation and banking being accepted by mothers in Nigeria is relatively high.

During the FGDs, and KIIs, the researcher realized that the lactating mothers' acceptability and reported practices of breast milk donation and banking were influenced

by their attitudes and knowledge levels. A third of the participating lactating mothers were positively inclined to accepting donor human breast milk banking as a component of the child nutrition and care process. As such, the creation of knowledge and the dissemination of information may influence the improvement of knowledge and attitudes of lactating mothers on human breast milk donation and banking, and thus, collectively increase the prospects of its acceptability among this group.

The findings on lactating mothers' acceptability of donor human breast milk banking are in concurrence with those of Gelano et al. (2018), that mothers who have had an experience with inadequate or no breast milk production at one time, or ones who have had their infant admitted into a NICU at one point were more accepting of breast milk donation and banking. These specific findings support that mothers' acceptability of breast milk banking at personal level is influenced by different factors, the most crucial being those that relate to the wellbeing of their infants.

## **5.6 Associations between Lactating Mothers' Socio-Demographic Characteristics, Knowledge, Attitude, and Acceptability of Human Breast Milk Banking**

### **5.6.1 Association between Lactating Mothers' Socio-Demographic Characteristics and their Knowledge, Attitude and Acceptability of Human Breast Milk Banking**

The findings of the completed study present that there is a significant statistical association between the specific socio-demographic characteristics (age, level of education and marital status) of lactating women and their acceptability, attitude and knowledge on human breast milk banking. These findings are in agreement with those of Kimani-Murage et al. (2018), who found that the acceptability and positive attitudes of

participating mothers in their study tended to improve with increasing level of education, and age in Kenya. The findings were also in tandem with the findings of Chagwena et al. (2020), who found that the acceptability of breast milk banking increased with increasing level of education of health workers in Zimbabwe. While the findings of Chagwena et al. (2020) are not directly linked to lactating women as the respondents on HBMB, they are findings derived from a study focused on health workers, with the level of education as one of the measured variables.

In a study investigating the perception of donor human breast milk and its acceptability among mothers in a developing community, Iloh et al. (2018) also presented findings that are in line with those of the current study. Iloh et al. (2018) found that in a developing community in Nigeria, mothers with a lower age tended to have higher levels of knowledge on donor breast milk banking while those with lower education levels and young have a lesser likelihood of being accepting of donor human breast milk banking. The current study found no significant relationship between occupation or employment form and the attitude, knowledge and acceptability of lactating mothers on donor human milk banking. Informed by these findings, the hypothesis stating that there is no significant relationship between the socio-demographic characteristics of lactating mothers visiting Pumwani Maternity Hospital and their knowledge of human breast milk donation and banking; and there is no sign was rejected. Additionally, the hypothesis stating that there is no significant relationship between the socio-demographic characteristics of lactating mothers and their attitude towards donor human breast milk banking was rejected.

### **5.6.2 Associations between Lactating Mothers' Knowledge, Attitudes and Acceptability of Donor Human Breast Milk Banking**

The lactating mothers' knowledge on the concept of donor human breast milk banking was adequate, as evidenced by more than half (50.1%) of the participants in the current study had adequate knowledge on the concept. Further, there was evidence of intricate knowledge on the concept by 49.1% of the mothers, who had more than just the basic knowledge, knowing of the process of pasteurization and banking donated human breast milk. The knowledge on the presence of a human donor breast milk bank at Pumwani Maternity Hospital was minimal, with only 39.9% of the mothers possessing this information. According to the findings of this study, lactating mothers' knowledge level influenced their attitudes and acceptability of the concept of human donor breast milk banking. These findings may be attributed to the presence of no significant difference between the knowledge and the attitudes of the lactating mothers on donor human breast milk banking. The findings of this study are supported by findings by Costoudis, Petrites & Costoudis (2011), who indicated that the knowledge of women in a South African urban setting (such as the one making up the respondent population of the completed study) is influenced by their attitudes. In a similar study, Govender (2020) concluded that the attitudes of mothers influence their knowledge, and their acceptability of breast milk donation and banking, in a South African urban setting. These studies are relevant to this study in that they included a study population similar to that utilized in the current study: lactating mothers visiting a public healthcare facility with a breast milk bank within it.

The findings of the completed study demonstrate the need for the creation of awareness and dissemination of more knowledge relating to the concept of human donor breast milk

banking for infant care and nutrition. Further, these findings are a demonstration that the primary site of the first national human breast milk bank at Pumwani Maternity Hospital needs to be promoted more to mothers, in order to ensure its successful and lasting existence. Informed by this, the researcher rejected two hypotheses. The first was the hypothesis stating that there is no significant relationship between lactating mothers' knowledge on donor human breast milk banking and their acceptability to practice donation or use of donor human breast milk. The second rejected hypothesis was the one stating that there is no significant relationship between lactating mothers' knowledge on donor human breast milk banking and their attitude towards donor human breast milk banking.

The study also revealed that lactating mothers' attitudes towards the concept of banking donated human breast milk influenced their acceptability to practice donation, or use of donated, and banked human breast milk. As such, there was no significant difference in these variables, as it was discovered that mothers with positive attitudes towards the concept were more likely to accept to donate, or accept to use donated human breast milk. According to Kimani-Murage et al. (2018), mothers are more likely to be accepting of human breast milk donation and banking if they possess a positive attitude towards the concept as an important option to infant feeding. Informed by this specific study finding, the hypothesis stating that there is no significant relationship between the attitude of lactating visiting Pumwani Maternity Hospital and their acceptability of breast milk donation and banking was rejected.



## **CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **6.1 A Summary of Findings**

This was a cross-sectional analytical study exploring the knowledge, attitudes and acceptability of the concept of human breast milk donation and banking among lactating mothers visiting Pumwani Maternity Hospital, in Nairobi County, Kenya. The researcher collected and utilized both qualitative and quantitative data, to get an in-depth picture of the associations between knowledge, attitude and acceptability of the concept among lactating mothers, while also exploring the factors influencing each of the variables.

Specific socio-demographic attributes (age, level of education and marital status) were found to be great influencing factors of the knowledge, and attitude of lactating mothers towards human breast milk donation and banking; while the occupation of the lactating mothers was not found to be significantly associated with their attitude and knowledge. Lactating mothers' knowledge level on the concept was significantly associated with their acceptability of donor human breast milk banking. Further, lactating mothers' attitude was significantly associated with their acceptability of the concept of breast milk donation and banking. Concerns with the sanitation of the donated human breast milk, and a lack of adequate knowledge on the concept as a whole were found to be the primary reasons why most lactating mothers were either unwilling, or hesitant to donate or use donated human breast milk.

### **6.2 Conclusions**

The conclusions of the current study, made based on the study findings, and in reference to the study objectives, are as follows:

1. The findings from this study show that most of the lactating women visiting Pumwani Maternity Hospital are young mothers with college education; and engaged in formal employment.
2. Most of the lactating mothers had moderate knowledge on the concept of human breast milk donation and banking; but did not know that a breast milk bank exists at Pumwani Maternity hospital.
3. A majority of the mothers had positive attitudes towards the concept of donor human breast milk banking and would donate human breast milk to a bank if need arose. Furthermore, a good percentage of the lactating women would use donated human breast milk from a milk bank if need arose and it was prescribed by a healthcare professional.
4. A majority were not accepting of the practice in that they would not practice human breast milk donation, or use donated human breast milk due to concerns such as the sanitation of the milk, and presence of disease in donated human breast milk.
5. The lactating mothers' knowledge level was found to influence their attitudes and acceptability of the concept of donor human breast milk banking. Further, their attitudes were found to influence their acceptability of the same. Despite having adequate knowledge, and reporting positive attitudes towards donor human breast milk banking, a majority of the mothers were unaccepting of the concept while a good number were unsure of their position on donating or using donated human breast milk.

All the study hypotheses were rejected:

H<sub>01</sub>: There is no significant relationship between the socio-demographic characteristics of lactating women and their knowledge of human breast milk donation and banking at Pumwani Maternity Hospital, in Nairobi County, Kenya.

H<sub>02</sub>: There is no significant relationship between the socio-demographic characteristics of lactating mothers and their attitudes towards donor human breast milk banking at Pumwani Maternity Hospital, in Nairobi County, Kenya.

H<sub>03</sub>: There is no significant relationship between lactating mothers' knowledge on donor human breast milk banking and their acceptability to practice donation or use of donor human breast milk at Pumwani Maternity Hospital, in Nairobi County, Kenya.

H<sub>03</sub>: There is no significant relationship between the attitude of lactating mothers and their acceptability of donor human breast milk banking at Pumwani Maternity Hospital, in Nairobi County, Kenya.

H<sub>05</sub>: There is no significant relationship between the knowledge of lactating mothers on donor human breast milk banking and their attitude towards donation and use of banked donor human breast milk at Pumwani Maternity Hospital, in Nairobi County, Kenya.

## **6.3 Recommendations**

### **6.3.1 Recommendations for Administration**

The researcher recommends that the Nairobi City County Health Department administration helps Pumwani Maternity Hospital enforce and promote the creation of

awareness on the existence of a human breast milk banking facility at Pumwani Maternity Hospital. The projected benefit of this recommendation is that it may help more lactating mothers acquire knowledge on both the concept of human breast milk donation, and the existence of the facilities at Pumwani Maternity Hospital that they can access.

### **6.3.2 Recommendations for Practice**

1. Nutritionists, nurses, physicians and pharmacists in HBMB should work in conjunction to provide lactating mothers with donated human breast milk as the most plausible option to infant feeding when milk production is impossible or delayed.
2. The HBMB project stakeholders should equip the relevant healthcare professionals with relevant information and data to help them disseminate accurate, reliable and constant information to lactating mothers on human breast milk donation, banking and use.

### **6.3.3 Recommendations for Further Research**

1. Further research needs to be conducted on the same topic; but for other counties and other possible sentinel sites for breast milk banks across Kenya.
2. The researcher also recommends further research on the effects of socio-cultural characteristics on the attitudes and acceptability of donor human breast milk banking in Kenya.

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<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwi2k42Yv8XjAhXoz4UKHYsjD8IQFjAAegQIBRAC&url=https%3A%2F%2Fdhsprogram.com%2Fpubs%2Fpdf%2Ffr308%2Ffr308.pdf&usg=AOvVaw1mhpsHZR5X7hcjNVLn5-2E>
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## **APPENDICES**

### **APPENDIX A: INTRODUCTORY LETTER AND INFORMED CONSENT**

#### **PART A: INTRODUCTORY LETTER**

##### **Researcher Introduction**

My name is Christine Mwendu Mati, a post-graduate student at Kenyatta University, in the School of Public Health and Applied Human Sciences. I am pursuing a Master of Science Degree in Food, Nutrition and Dietetics. I am conducting a study on the attitude, knowledge and acceptability of donor breast milk banking in Kenya. The information derived from this study will be useful in the development of relevant policies related to breast milk donation and banking in Kenya.

##### **The Purpose of the Study**

The purpose of the proposed study is to investigate whether the knowledge of its existence and the attitude of women towards the practice may have an influence on how acceptable the solution is to the women, and its plausibility in solving the problems related to gaps in infant feeding.

##### **The Study Procedure**

The study will include focus group discussions and interviews with the respondents selected for the study through systematic random sampling. Key informant interviews will also be included in part of the day's activities. Your participation in the study would be highly appreciated, and will aid in the successful completion of the study. Participation is wholly voluntary, however. Your response will provide relevant

information on breastfeeding, being a lactating mother, and the attitude and knowledge on donation and use of breast milk banking in Kenya.

### **Risks and Discomforts**

The current study does not include a procedure that may place the participants in any danger or risk. Some of the questions that will be asked in this study, may however make you feel uncomfortable, as they involve details on personal opinion. If any one question makes you overly uncomfortable, kindly feel free to state it and decline to answer. Additionally, you are allowed to drop off the interview at any stage, with no consequences.

### **Confidentiality and Validity of Data**

The information you give to myself and the research team will only be used for the current study. All of the information will be used in confidence and the identities of any participants will be kept confidential. All of the records related to your identity as a participant will be maintained in confidentiality and this will not disadvantage you. Additionally, your name will not be disclosed or stated in any of the reports derived following the completion of this study.

### **Benefits of the Study**

Kindly note that participation in this study will not provide any direct special benefits to you financially or in the form of gifts or grants. However, following the completion of the study, the findings may inform policies which will improve the position of access to human breast milk and breastfeeding for infants in Nairobi and Kenya in general.

**Protection and Care of Research Participants**

The researcher and the research assistants will make sure to carefully explain the process of the study to the participants at every stage and assure them that they will not be at any risk, due to the procedure. The explanations will be done in a language that the respondents understand, to ensure that there are no gaps in understanding. The study only involves collection of opinion and measuring knowledge and no direct physical interaction with the respondent will be involved. The interviews will be conducted in rooms, which will allow for a protective discussion area.

**Consideration of the Community**

In case any children with nutritional deficiencies are identified in the course of the study, the researcher will be sure to refer them or offer nutritional care counselling to the mothers.

**PART B: INFORMED CONSENT FORM**

Kindly read the information in Part A of this form or have it read it out to you in a language you understand. Once you have done that, you can proceed to signing this information consent form. By signing this form, it means that you understand the purpose of the study, the study procedures and the associated benefits and that you have agreed to participate in the study. If you have any questions, it is advised to ask them at this point.



**Participant’s Consent**

I .....understand the dictates of this study, the procedures involved and the information I will be expected to give to the research, and I agree to participate in the study.

Signature/ Thumb Print:

Date:.....

**Statement of the Interviewer**

I, the undersigned, have carefully explained the purpose of the study, the procedures, possible risks and the information they are expected to give in the course of the study. These explanations have been done in a language that the respondent clearly understands.

Name of Interviewer:.....

Interviewer Signature.....

**PART C: CONTACT INFORMATION**

Should you have further questions, or need clarification on the study at any point, feel free to contact the principal investigator by phone on 0706859930 or email at [christinemati76@gmail.com](mailto:christinemati76@gmail.com)

The study has been ethically cleared by the Kenyatta University Ethical Review Committee, and the National Council for Science, Technology and Innovation (NACOSTI). In case of any concerns or complaints, you can contact the authority KUERC through the Chairman by email at [chairman.kuerc@ku.ac.ke](mailto:chairman.kuerc@ku.ac.ke) or by phone



through (020) 8710901 or the Dean at Graduate school by mail through [dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)

**APPENDIX B: RESEARCHER-ADMINISTERED STUDY QUESTIONNAIRE**

**LACTATING MOTHERS’ KNOWLEDGE, ATTITUDE AND ACCEPTABILITY**

**OF HUMAN BREAST MILK BANKING AT PUMWANI MATERNITY**

**HOSPITAL, NAIROBI CITY COUNTY, KENYA**

**Study Questionnaire**

**Date of Interview:**.....

**Name of Administrator**

**(Researcher/Assistant):**.....

**Area of Enumeration (MCH/Maternity Wing):**.....

**Respondent Status: 1. Mother                      2. Lactating Mother:                      3. Young**

**Adult:**

**SECTION A: DEMOGRAPHIC DATA**

**1. Age? (Tick Where appropriate)**

i.        18 to 25   

ii.       26 to 35   

iii.      36 to 45   

**2. Marital Status**

i.        Single        [   ]

ii.       Married        [   ]

- iii. Separated [ ]
- iv. Divorced [ ]

**3. Highest level of education Attained:**

- i. None [ ]
- ii. Primary [ ]
- i. Secondary [ ]
- ii. Technical Institute [ ]
- iii. College [ ]
- iv. University [ ]
- v. Postgraduate [ ]

**4. Employment Status**

- i. Unemployed [ ]
- ii. Employed in Formal sector [ ]
- iii. Employed in non-formal sector [ ]
- iv. Self-employed [ ]

**SECTION B: KNOWLEDGE OF DONOR HUMAN BREAST MILK BANKING**

**5. Have you heard of/do you have any awareness of human breast milk donation?**

- i. Yes
- ii. No

**6. If yes, where have you gained the knowledge of the same from?**

- i. School courses [ ]
- ii. Media [ ]

iii. Personal Research [ ]

iv. Hospital Clinics [ ]

v. Other [ ]

(Explain).....  
.....  
.....

**7. Do you possess any knowledge of/on donor human breast milk banking?**

i. Yes [ ]

ii. No [ ]

**8. If you do, what knowledge on the concept do you have?**

(Explain).....  
.....  
.....

**9. Are you aware of the presence of a donor breast milk bank in your locality?**

i. Yes [ ]

ii. No [ ]

**SECTION C: ATTITUDE TOWARDS BREAST MILK BANKING**

**10. Donating human breast milk is critical to the management of inconsistencies in breastfeeding.**

5      4                      3                      2                      1

Strongly			Disagree	Strongly
----------	--	--	----------	----------

agree ( )	Agree ( )	Uncertain ( )	( )	Disagree ( )
--------------	--------------	------------------	-----	-----------------

**11. Donating breast milk if it was in excess or for good will is something I would do**

5                      4                      3                      2                      1

Strongly agree ( )	Agree ( )	Uncertain ( )	Disagree ( )	Strongly Disagree ( )
-----------------------	--------------	------------------	-----------------	--------------------------

**12. I would be open to using donated breast milk if necessity arose**

- i. Yes [ ]<sub>1</sub>
- ii. No [ ]<sub>2</sub>

**13. I would be open to using donated breast milk if necessity arose**

- i. Yes [ ]<sub>1</sub>
- ii. No [ ]<sub>2</sub>

#### **SECTION D: ACCEPTABILITY OF HUMAN BREAST MILK BANKING**

**14. I have used donor breast milk from a bank on prescription**

- i. Yes [ ]<sub>1</sub>
- ii. No [ ]<sub>2</sub>

**15. Given the option between banked breast milk, cow's milk and replacement formula, I would choose donated breast milk.**

- i. [ ]<sub>5</sub> Very likely

- ii.  <sub>4</sub> Likely
- iii.  <sub>3</sub> Uncertain
- iv.  <sub>2</sub> Unlikely
- v.  <sub>1</sub> Very Unlikely

**16. How comfortable do you feel donating breast milk for the purpose of breast milk banking**

- i.  <sub>5</sub> Very comfortable
- ii.  <sub>4</sub> Comfortable
- iii.  <sub>3</sub> Uncertain
- iv.  <sub>2</sub> Uncomfortable
- v.  <sub>1</sub> Very uncomfortable
- vi.  <sub>6</sub> Not applicable-I am unwilling to donate breast milk to a milk bank

**17. Based on the information given by the researcher on breast milk banking, how likely are you to donate or use donated breast milk from a milk bank?**

- i.  <sub>5</sub> Very likely
- ii.  <sub>4</sub> Likely
- iii.  <sub>3</sub> Not sure
- iv.  <sub>2</sub> Unlikely
- v.  <sub>1</sub> Very unlikely

**18. On the chance that you are not willing to donate breast milk bank, what factors inform your decision (Do not read the options first. Check any of the responses below they relate to you).**

- <sub>1</sub> I think it is unsanitary

[ ]<sub>2</sub> it is against my beliefs

[ ]<sub>3</sub> I believe breast milk donation is unacceptable

[ ]<sub>4</sub> I do not have enough knowledge about it to practice it

[ ]<sub>5</sub> My culture/religion considers it taboo

*End of Questionnaire. Thank you for participating in our study by answering these questions.*

## **APPENDIX C: FOCUS GROUP DISCUSSION GUIDE**

Hello, and thank you for agreeing to participate in these discussions.

We are interested in knowing your knowledge levels on human donor breast milk banking, your attitudes towards the concept, and your acceptability of the option when breastfeeding is not an option in terms of your willingness to donate or use donated human breast milk. Your responses will be useful in helping us design relevant communication strategies to promote more awareness of this option to infant feeding which will improve the exclusive breastfeeding rates for infants in Kenya in the long run. Please understand that your responses will be treated with strict confidentiality, and there won't be further reference made to any of you participating in the discussions outside of this study, or even when disseminating the information collected.

Thank you.

### **Theme 1: Knowledge on Donor Human Breast Milk Banking**

Have you heard of the concept of human breast milk donation? What do you know about it? Where did you get this information from?

What do you think are the primary reasons why human breast milk donation was adopted? What concerns do you have about the practice?

What do you think health workers can do to help lactating mothers better understand the concept of donor human milk banking?

Do you know of any donor human breast milk banking facility within your locality?

**Theme 2: Attitudes towards Donor Human Breast Milk Banking**

Do you think you (participants) would donate your breast milk to a milk bank? Why or why not?

Are there concerns you have about the process of human breast milk donation, preservation and banking?

Do you think this concept is useful to helping address gaps in infant feeding? Do you think the concept is being taken seriously enough?

What do you think is the most discouraging factor relating to human donor breast milk banking?

**Theme 3: Acceptability of lactating mothers of donor human breast milk banking**

Would you use donated human breast milk to feed your infant if it was the only available option? What if there were other options: would you choose donated human breast milk as the preferred replacement of breastfeeding?

Would you be comfortable donating your breast milk to a milk bank for the purpose of saving an infant's life and promoting their optimal nutrition?



**APPENDIX D: KEY INFORMANT INTERVIEWS (KIIs) GUIDE**

**KII Guidelines for Health Workers (Nutritionists, Nurses and Administrators)**

**Name:**.....**Position held:**.....

**Gender:**.....**Carder:**.....

**Date of Interview:**.....**Location of interview:**.....

Describe your awareness of breast milk donation and banking.

PROMPT: Are you aware lactating mothers can donate breast milk and it can be banked?

Describe the breast milk banking facilities present at Pumwani Maternity Hospital? Do you think they are serving lactating mothers well?

What do you know about mothers donating their breast milk?

PROMPTS: What do you think would help more mothers aware of the practice? Do you think the strategies to promote breast milk donation in place currently are effective?

Would you use or donate human breast milk or encourage lactating mothers around you at work and home to donate or use?

PROMPTS: Have you considered donating excess breast milk? Have you considered giving your child donated and banked breast milk? Have you encouraged lactating mothers to donate or use donated human breast milk in your professional capacity?

What is your general opinion and attitude towards breast milk donation and banking?

PROMPTS: Do you think it is an appropriate practice? Do you think it will help with gaps in breastfeeding in Kenya? Do you think the initiative within the hospital will take root and be accepted by lactating mothers in Kenya?

**APPENDIX E: KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE  
APPROVAL LETTER**



**KENYATTA UNIVERSITY  
CENTRE FOR RESEARCH ETHICS AND SAFETY**

Fax: 8711242/8711575  
Email: [chairman.kuerc@ku.ac.ke](mailto:chairman.kuerc@ku.ac.ke)  
Nairobi, 00100

P. O. Box 43844,

Tel: 8710901/12

Website: [www.ku.ac.ke](http://www.ku.ac.ke)  
Our Ref: **KU/ERC/APPROVAL/VOL.1**

Date: 25<sup>th</sup>/10/2021

Christine M.Mati  
P.O BOX 43844-00100  
Nairobi.

Dear Madam,

**RE: Lactating Mothers Knowledge attitude and acceptability of Human Breast Milk Bank at Pumwani Maternity Hospital, Nairobi City, 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/2349/11487** The approval period is **25<sup>th</sup> /10/2021 to 25<sup>th</sup>/10/2022.**

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 **KENYATA 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/1ytWefDwvz5h1oz\\_Vln0xbxg3uGdIDzMXFWNDsMrRPQ/edit?usp=sharing](https://docs.google.com/forms/d/1ytWefDwvz5h1oz_Vln0xbxg3uGdIDzMXFWNDsMrRPQ/edit?usp=sharing)


Yours sincerely




**Prof. Judith Kimiywe**

**Director: Centre for Research Ethics and Safety**


# APPENDIX F: NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION RESEARCH PERMIT

  
**REPUBLIC OF KENYA**

  
**NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION**

Ref No: **800102** Date of Issue: **29/October/2021**


### RESEARCH LICENSE




**This is to Certify that Miss.. Christine Mwende Mati of Kenyatta University, has been licensed to conduct research in Nairobi on the topic: LACTATING MOTHERS' KNOWLEDGE, ATTITUDE AND ACCEPTABILITY OF HUMAN BREAST MILK BANKING AT PUMWANI MATERNITY HOSPITAL, NAIROBI CITY COUNTY, KENYA for the period ending : 29/October/2022.**

License No: **NACOSTI/P/21/13996**

**800102**  
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 G: PUMWANI MATERNITY HOSPITAL/NAIROBI CITY COUNTY  
DATA COLLECTION PERMIT**

INTERNAL MEMO

**TO : NBU INCHARGE**

**REF : PMH/MS/76/1126/2021**

**DATE : 26<sup>TH</sup> NOVEMBER 2021**

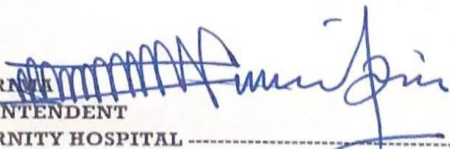
**RE: APPROVAL TO CONDUCT RESEARCH BY CHRISTINE MWENDE MATI**

Above matter refers, this is to notify your department that the above named officer has been cleared to conduct research in Pumwani Maternity Hospital having submitted his research proposal and ethical approval from approved institution.

The title of her research is "Lactating Knowledge Attitude and Acceptability of Human Breast Milk Bank at Pumwani Maternity Hospital, Nairobi City, Kenya".

Please accord her necessary assistance.

DR. JOHN M. MURRAY  
MEDICAL SUPERINTENDENT  
PUMWANI MATERNITY HOSPITAL



**APPENDIX H: PUMWANI MATERNITY HOSPITAL**

