Capstone Practicum Report

Acceptability and Determinants of Breast Milk Donation and Banking Among Mothers and Healthcare Providers in Two Rwandan hospitals: A Mixed Methods Study

By

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DECLARATION

We, Peace Ingabire and Marie Immaculee Dusingize, hereby declare that the practicum capstone thesis has been written by us without any external unauthorized help, that it has been neither presented to any institution for evaluation nor previously published in its entirety or in parts. Any parts, words or ideas, of the thesis, however limited, which are quoted from or based on other sources, have been acknowledged as such without exception.

Signature:  **Date**: 16th November 2025

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DEDICATION

To our parents and siblings, who never needed proof to believe in us; who call us their pride even before they see our deeds. Your unwavering faith has been our quiet strength through every step of this journey.

To the newborns and pre-term infants whose lives begin in fragility yet are filled with immeasurable promises; to their mothers, whose love and courage persist even when circumstances make giving difficult; and to the healthcare providers who stand faithfully beside them, offering skill and hope in the most critical moments. This work is inspired by you.

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ABSTRACT

Background:

Breast milk donation and banking are globally endorsed strategies to ensure optimal nutrition and survival for medically vulnerable newborns. Donor breast milk is the preferred alternative when maternal milk is unavailable; however, its acceptance is shaped by sociocultural factors. In Rwanda, breast milk donation is a novel concept, with limited evidence on community perceptions or readiness to engage with milk banking initiatives. Understanding maternal and healthcare provider attitudes, cultural beliefs, perceived benefits, and barriers is essential for guiding policy development and implementing culturally responsive programs. This study assessed the acceptability of breast milk donation and identified factors influencing willingness to donate among postpartum mothers and healthcare providers in two Rwandan hospitals.

Methods:

A mixed-method cross-sectional design provided a comprehensive assessment of perceptions toward breast milk donation. The quantitative component included 208 mothers with infants admitted to neonatal departments and 41 healthcare providers (HCPs) from Ruhengeri Level 2 Teaching Hospital and Kirehe District Hospital. Structured questionnaires measured acceptability, willingness to donate, awareness, cultural beliefs, perceived benefits, and barriers using a six-item Likert scale. Non-parametric tests, including Mann–Whitney U, Kruskal–Wallis, and chi-square analyses, examined associations. Qualitative data from semi-structured interviews were analyzed using inductive thematic analysis, with saturation confirmed at both code and analytical levels.

Results:

Awareness of breast milk donation was low among mothers (11.1%), with information primarily provided by healthcare providers (HCPs), while 78% of HCPs reported prior familiarity. Mothers' perceptions were influenced by individual perceptions, with 63% associating milk sharing with familial ties and 40.8% expressing concerns about disease transmission. HCPs similarly identified belief-driven resistance as a key challenge (75.6%).

Both mothers and HCPs acknowledged the benefits of breast milk donation, including improved infant nutrition (mothers 96.2%, HCPs 87.8%), reduced neonatal mortality (mothers 85.1%, HCPs 75.6%), and lower infection risk (mothers 72.1%, HCPs 70.7%). Reported barriers among mothers included lack of awareness (93.3%), cultural beliefs (81.7%), and safety concerns (80.3%), while HCPs highlighted cultural resistance (80%) and limited infrastructure (77.5%). Key facilitators

included education and awareness programs (mothers 91.3%, HCPs 100%) and strong healthcare provider support (mothers 84.5%, HCPs 90.2%).

Overall acceptability was high among both mothers (84.6%) and HCPs (82.9%), with willingness to donate (88%) exceeding willingness to accept donor milk (77.4%) among mothers. Qualitative findings reinforced the quantitative results, highlighting conditional maternal acceptability based on safety assurances, infant need, and family approval, as well as the importance of education, institutional support, and community engagement.

Conclusion:

This study provides foundational evidence for implementing breast milk donation and banking programs in Rwanda. High acceptability suggests potential for successful adoption, but targeted education, community engagement, and active healthcare provider involvement are critical to address cultural concerns, knowledge gaps, and logistical challenges. These insights can guide maternal and neonatal health policy and national strategies to reduce neonatal morbidity and mortality through evidence-based feeding interventions.

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LIST OF ABBREVIATIONS

- **BM** – Breast Milk
- **BMD** – Breast Milk Donation
- **BMB** – Breast Milk Bank / Breast Milk Banking
- **CF** – Complementary Feeding
- **CI** – Confidence Interval
- **DBM** – Donor Breast Milk
- **EBF** – Exclusive Breastfeeding
- **HCP(s)** – Healthcare Provider(s)
- **HMF** – Human Milk Foundation
- **IRB** – Institutional Review Board
- **KDH** – Kirehe District Hospital
- **LBW** – Low Birth Weight
- **MOH** – Ministry of Health
- **NEC** – Necrotizing Enterocolitis
- **NICU** – Neonatal Intensive Care Unit
- **PIs** – Principal Investigators
- **RL2TH** – Ruhengeri Level II Teaching Hospital
- **SPSS** – Statistical Package for Social Sciences
- **UGHE** – University of Global Health Equity
- **UNICEF** – United Nations Children's Fund
- **WHO** – World Health Organization

CHAPTER 1: INTRODUCTION

1.1 Background

Breastfeeding remains one of the most effective interventions for improving neonatal and child survival (WHO, 2023d, 2025). It is widely recognized as the foundation of optimal infant health and survival, offering unmatched nutritional, immunological, and developmental benefits during early life (UNICEF, 2025; WHO, 2023e). Yet, globally, less than half of newborns (≈45%) receive human milk within the first hour after birth, indicating that many infants -including approximately 13.4 million babies born preterm each year or over 20 million infants born with low birth weight- miss early opportunities for maternal milk exposure due to factors such as maternal or infant illness, death, or separation after birth (*Policybrief-Equitable-Access-Human-Milk.Pdf*, 2017; WHO, 2023a, 2023b). Additionally, evidence shows that preterm infants are less likely than term infants to receive any breast milk in the first days of life (e.g., 71.3% of extremely preterm infants vs. 84.6% of term infants received breast milk in early life), highlighting disparities in access to maternal milk among the most vulnerable newborns (Chiang et al., 2019; *Policybrief-Equitable-Access-Human-Milk.Pdf*, 2017). Mothers of very pre-term infants are also more likely to experience delayed onset of full milk production and practical breastfeeding challenges, which can further limit access to their own milk early postpartum (Xuemei et al., 2024). In such cases, donor breast milk offers an alternative that ensures optimal nutrition, reduces the risk of severe neonatal conditions such as necrotizing enterocolitis (NEC) and infections; thus, contributing to improved survival (Quigley, D Embleton, et al., 2024).

The World Health Organization (WHO) recommends that all infants be exclusively breastfed for the first six months of life, with early initiation of breastfeeding within one hour of birth, followed by the timely introduction of nutritionally adequate complementary foods while continuing breastfeeding up to two years (WHO, 2023b; UNICEF, 2025a). However, globally, only about 44% of infants aged 0–6 months are exclusively breastfed between 2015 and 2020 (WHO, 2023b), highlighting the persistent gap between recommendations and practice. This low implementation rate is influenced by multiple factors, including maternal employment, limited access to lactation support, cultural norms, early introduction of formulas, and healthcare system barriers that hinder optimal infant feeding practices (Al-Aqqad et al., 2025; Andini et al., 2025; Awawdi et al., 2025; Mkono et al., 2024; Nyirahirwa et al., 2023; Singh et al., 2024).

Alongside breastfeeding promotion efforts, donor breast milk and breast milk banking have expanded in recent years and have been associated with increased access to breast milk to hospitalized and preterm infants, as well as reductions in feeding interruptions and morbidity such as NEC and infections in observational and pre/post studies (Hamidi et al., 2025; Kashyap & Choudhari, 2024). According to the WHO and UNICEF (The ASEAN Secretariat et al., 2022;

WHO, 2023c), when a mother's own milk cannot be provided, screened donor breast milk from a breast milk bank is the preferred alternative for vulnerable infants, provided that a safe, quality assured system is in place. Evidence from systematic reviews and country-level reports further suggests that milk banking, when integrated with lactation support, can increase the proportion of infants receiving breast milk and improve short-term neonatal outcomes, although implementation and safety considerations differ by setting (Chagwena et al., 2020; HMF, 2021; Kashyap & Choudhari, 2024).

Despite global progress, disparities persist. Across sub-Saharan Africa, breastfeeding outcomes remain suboptimal despite longstanding promotional efforts (Olapeju et al., 2025; Wan et al., 2023). Inadequate exclusive breastfeeding practices result in 1.24 million infant deaths in Asia and Africa during the first six months of life, and Sub-Saharan Africa accounts for approximately 41% of global under-five mortality each year (Nyirahirwa et al., 2023). Despite having some of the highest infant mortality rates globally, the continent only has eight operational milk banks as of 2025, with facilities limited to South Africa, Kenya, Nigeria, Angola, Cameroon, Mozambique, Uganda, and Cape Verde (Obeng-Gyasi et al., 2025). While several countries have made progress in promoting early initiation of exclusive breastfeeding; social norms, myths, awareness, and cultural beliefs continue to influence maternal practices (Handayani et al., 2025; Lokossou et al., 2021; Modjadji et al., 2023). These same contextual factors also influence how breast milk donation is perceived. Studies exploring the acceptability of breast milk donation reveal varied attitudes, including willingness to donate or use donor milk among some participants, conditional acceptance based on trust, screening, or infant need, and reluctance by others due to cultural or religious beliefs (Mampane & Wolvaardt, 2024a; Ogundare et al., 2024; Tende et al., 2023). These underscore the importance of context sensitive approaches in promoting donor breast milk and milk banking across the region.

These patterns also reflect in Rwanda, where breastfeeding is widely promoted and remains a near-universal practice (*UNICEF Rwanda.Pdf*, 2024). According to national survey data, exclusive breastfeeding (EBF) rates among infants under six months declined from about 87.3% in 2015 to 80.9% in 2020, representing a 6.3 percentage-point reduction (*Rwanda2019_20.Pdf*, . Although the survey does not report causal factors directly, secondary analyses suggest that early introduction of complementary foods, challenges for working mothers to sustain exclusive breastfeeding after maternity leave, and differences between rural and urban practices have contributed to this decline in exclusive breastfeeding coverage (RBC, 2024b; *Rwanda_Demographic_Health_Survey_2019_20.Pdf*, 2021).

Furthermore, evidence from rural Rwanda indicates that nearly half (46.5%) of preterm and low-birth-weight infants face feeding difficulties, often accompanied by growth and developmental delays (Kirk et al., 2017). While feeding difficulties do not necessarily imply complete absence of

breast milk, evidence from neonatal care settings shows that preterm infants are significantly less likely to receive their mother's own milk. For example, a recent study among preterm infants with feeding challenges found that only 35.4% were receiving mother's own milk at discharge, and very few were exclusively breastfed (Bala et al., 2024). These lower rates reflect difficulties with breastfeeding initiation and sustained milk expression, as well as prolonged mother–infant separation, which together limit timely access to mother's own milk among pre-term infants. Despite the national commitments to improve neonatal outcomes, no breast milk banks currently exist, and the practice of breast milk donation remains largely unfamiliar. This gap poses challenges for neonatal units that often struggle to provide adequate feeding options when mothers are unable to breastfeed. Donor human milk and breast milk banking could help ensure that these vulnerable infants receive the protective benefits of human milk during the critical early period when maternal milk is unavailable or insufficient.

Although some neighboring countries, like Uganda and Kenya, have begun establishing breast milk banks, evidence on maternal and care provider attitudes and acceptability remains limited in Rwanda. Understanding these perceptions is essential for informing future policy and guiding program design. Exploring mothers' and healthcare providers' beliefs, perceptions, and readiness towards this practice will help identify sociocultural, institutional, and logistical considerations, critical for the introduction of milk banks in Rwanda.

This study thus aims to explore the acceptability of breast milk donation for neonatal feeding in two Rwandan hospitals, focusing on the perspectives, beliefs, and factors influencing this acceptability among mothers and healthcare providers. The findings will guide evidence-based strategies for integrating breast milk donation into neonatal care as a sustainable approach to improving infant health outcomes.

1.2 Problem statement

Despite the health benefits of breast milk for neonatal survival and development, Rwanda faces challenges in ensuring optimal nutrition for infants whose mothers are in situations where they are unable to breastfeed. Exclusive breastfeeding in Rwanda has declined from 87% in 2015 to 80.9% in 2020, indicating that fewer infants are receiving this foundational nutrition (*Rwanda2019_20.Pdf*, . At the same time, formal breast milk donation and breast milk banking are not currently available in the country, and only eight other African countries have functional milk banks as of 2025 (Obeng-Gyasi et al., 2025). Without donated breast milk or milk banks, preterm and low-birth-weight infants; who are already vulnerable to feeding difficulties, growth delays and increased mortality risk; may face heightened risks of poor outcomes in neonatal units. Little is known regarding the acceptability and perceptions of mothers and healthcare providers in Rwanda to engage with breast milk donation and banking systems. This study seeks to address this gap by

examining the beliefs and factors influencing the acceptability of breast milk donation among mothers and healthcare providers in two Rwandan hospitals, to inform culturally sensitive approaches for the potential of introducing breast milk donation and banking to enhance neonatal nutrition and survival.

1.3 Objectives

General Aim: To explore the acceptability and perspectives of mothers and neonatal healthcare providers on breast milk donation for neonatal feeding.

By September 2025, this study aimed to:

- Assess the acceptability of breast milk donation among mothers and healthcare providers at two district hospitals (Ruhengeri Level 2 Teaching Hospital (RL2TH) and Kirehe District Hospital (KDH))
- Explore mothers' perspectives on breast milk donation and banking at two district hospitals (RL2TH& KDH)
- Examine healthcare providers' perspectives on breast milk donation for children under six months of age at two district hospitals (RL2TH & KDH)

1.4 Justification of the Project

This study is justified by the lack of information on the acceptability and determinants of breast milk donation and banking in Rwanda, despite nearly universal breastfeeding and declining rates of exclusive breastfeeding. Vulnerable infants, particularly preterm and low-birth-weight newborns, often cannot be exclusively breastfed due to maternal illness, separation, or insufficient milk supply, placing them at high risk of suboptimal nutrition and adverse outcomes. Understanding mothers' and healthcare providers' perspectives on donation and milk banking is critical to identifying sociocultural, logistical, and system-level facilitators and barriers. By integrating quantitative and qualitative approaches, this study provides novel insights into the feasibility of introducing donor milk and milk banking in Rwandan hospitals. The findings will generate evidence to inform policy, guide health system planning, and support the design of culturally appropriate and effective neonatal nutrition programs aimed at improving survival and health outcomes for at-risk infants.

1.5 Organization of the Report

This report is structured to provide a coherent and comprehensive account of the study. It begins with an abstract summarizing the purpose, methodology, key findings, and implications. The main body consists of six chapters. Chapter One introduces the study by outlining the background, problem statement, research objectives, and justification, establishing the relevance of breast milk

donation within Rwanda's neonatal health context. Chapter Two reviews global, regional, and national literature on breastfeeding, donor human milk, and milk banking, highlighting sociocultural and health-system factors as well as the conceptual framework guiding the study. Chapter Three describes the mixed-methods methodology, including the study design, setting, target population, sampling strategy, data collection procedures, analytical approaches, and ethical considerations. Chapter Four presents the integrated quantitative and qualitative results, illustrating patterns of awareness, perceptions, barriers, benefits, and acceptability among mothers and healthcare providers. Chapter Five discusses these findings in relation to existing evidence and examines implications for Rwanda's health system. Chapter Six concludes with a summary of key findings and provides recommendations for policy, implementation, and future research.

CHAPTER 2: LITERATURE REVIEW

2.1 Importance of Breast Milk for Neonatal Nutrition

Breast milk is widely recognized as the optimal source of nutrition for infants (Neerven, 2025; Yi & Kim, 2021). It provides an essential combination of macronutrients, micronutrients, antibodies and bioactive compounds such as immunoglobulins, antioxidants, growth-factors; that support infant growth, strengthen immunity and protect against infections (Neerven, 2025; Yi & Kim, 2021). Breast milk also offers a balance of protective molecules that support gut maturation, shape early microbiota, reduce the risk of infections, and protect against long-term illnesses (Yi & Kim, 2021). These are substances that no formula or breast milk substitutes can fully replicate (Gato et al., 2022; Hossain & Mihrshahi, 2022; Huang et al., 2021; Manurung et al., 2023; Patnode et al., 2025).

Among preterm or low-birthweight (LBW) infants, the benefits are even more profound. A recent systematic review found that donor breast milk in neonatal units reduces the risk of necrotizing enterocolitis (NEC) by up to 47% compared to formula feeding (Quigley, Embleton, et al., 2024). Furthermore, in addition to assisting with gut-microbiota development, breast milk contributes to improved neurocognitive outcomes and lowers infant mortality (Biagioli et al., 2011). The benefits of breastfeeding are often summarized in the acronym BREASTFEEDING: *Best for babies, Reduces allergies, Economical, Antibodies, Sterile and pure, Temperature ideal, Fresh, Easy to establish, Emotional bonding, Easily digested (every 2–3 hours), Immediately available, Nutritionally complete, and Guards against gastroenteritis* (Candelario, 2013; Çınar et al., 2025; Kariyawasam et al., 2025; Szyller et al., 2024; UNICEF, 2025)

Because of these compelling benefits, the World Health Organization (WHO) recommends; for infants with LBW including very low birth weight who cannot receive their mother's own milk; that donor breast milk be used rather than formula provided that safe, affordable milk-banking facilities are available or can be set up (WHO, 2023c) The UNICEF's *Guidelines & Minimum Standards for Infant and Young Child Feeding* also recognize breast milk banking as an essential service through which donor breast milk can be safely collected and processed. The guidelines emphasize that donor milk shall not replace the mother's own milk but may serve as a bridge when the mother's milk supply is still being established (The ASEAN Secretariat et al., 2022).

These global policies and clinical consensus reflect a unified stance: while mother's own milk remains the first and best choice, donor breast milk is the preferred alternative when mother's milk is unavailable.

2.2 Global and Regional Trends in Breastfeeding and Exclusive Breastfeeding (EBF)

Globally, breastfeeding and especially exclusive breastfeeding (EBF) for the first six months remain major public health goals. In low- and middle-income countries (LMICs), only about 37% of infants under six months are exclusively breastfed (Olufunlayo et al., 2019). In sub-Saharan Africa (SSA), the EBF rate is higher at ~53.3% among infants under six months (Olapeju et al., 2025). In East Africa specifically, prevalence of EBF among infants less than six months has been reported as 69.3 % in Burundi, 63.2 % in Uganda, 61.4 % in Kenya and 50 % in Tanzania (Nyirahirwa et al., 2023).

Although some countries in the region are approaching or surpassing the WHO Global Nutrition Target of achieving 60% EBF by 2030 (WHO, 2025), these figures mask persistent challenges in infant feeding; many families in LMICs still cannot afford or safely access infant formula as an alternative when breast milk is inadequate, which perpetuates suboptimal neonatal feeding and nutrition (Azhar et al., 2025; *CONBF-Global-Brief-ENG-2023-10-31.Pdf*, Neves et al., 2020). These gaps underscore the vulnerability of newborns who rely exclusively on maternal milk and highlight the need for complementary strategies, such as donor breast milk, when breastfeeding alone is not feasible. High rates of EBF are associated with reductions in infant morbidity and mortality: for example, a meta-review found that children who were not exclusively breastfed during the first 6months of their life had approximately 2.3-fold higher odds of developing pneumonia during the under-five period (Abate et al., 2025).

Many countries have adopted policies to promote EBF and breast milk donation, although the operational implementation of donor breast-milk banking shows large variation. According to the global status of breast milk banking, there are over 750 milk banks worldwide, but most are in high-income countries. Substantial differences persist in regulatory frameworks, infrastructure, donor screening, pasteurization methods, and distribution systems (Obeng-Gyasi et al., 2025).

Evidence syntheses further highlight that although the global policy environment is evolving, standardized and adaptable frameworks remain limited (Israel-Ballard et al., 2024). In Africa, for example, South Africa leads the continent (with over 20 milk banks), while other countries such as Kenya, Nigeria, and Uganda have only recently established programs or are at early stages (Obeng-Gyasi et al., 2025). Overall, despite strong global policy momentum and a growing evidence base supporting donor breast milk, the translation into practice remains inconsistent, particularly in low-resource settings.

2.3 Donor Breast Milk Banking: Evidence of Effectiveness and Best Practices

The use of donor breast milk (DBM) through breast milk banks (BMBs) has matured across many health systems, with a steadily expanding evidence base supporting its benefits. A systematic literature review found that, compared to formula feeding, DBM reduces the risk of NEC, late onset sepsis, diarrheal diseases, and Bronchopulmonary dysplasia, while also enhancing nutritional and immune outcomes among pre-term and Low birth weight infants (Kashyap & Choudhari, 2024).

Because the clinical benefits of DBM depend on maintaining its safety and bioactive quality, operational best practices are central to effective milk banking. These practices encompass donor screening, safe collection, transport and storage of milk, standardized pasteurization, bacteriological testing, and accreditation (Unger & O'Connor, 2024a). Implementing such standardized procedures ensures that donor milk retains its nutritional and immunological integrity while minimizing risks of contamination.

Beyond clinical and operational considerations, there is emerging evidence on cost-effectiveness. A retrospective cohort study done in USA of very-low-birth-weight infants found that those who received mother's own milk supplemented with donor milk had median total hospital and feeding costs of US $169,555 compared to US $185,740 for those fed mother's milk supplemented with formula; representing a cost saving of approximately US $15,555 per infant (Johnson et al., 2020). This cost advantage is largely attributed to shorter hospital stays as well as fewer complications. In Kenya, a study at the Pumwani Maternity Hospital in Nairobi found that the introduction of a breast milk bank and lactation support program led to increased breast milk feeding and reduced neonatal ward length of stay (Wilunda et al., 2023).

These findings underscore that donor breast milk banking is not only a clinically effective, safe, standardized, and economically sustainable component of modern neonatal care, but also particularly valuable in resource-limited settings with high rates of prematurity and neonatal morbidity. Despite these benefits, regional challenges persist, including concerns about safety (e.g.; disease transmission), limited infrastructure for pasteurization and storage, logistical constraints, financial barriers, insufficient awareness among HCPs and communities, and cultural beliefs surrounding the sharing of breast milk (Obeng-Gyasi et al., 2025).

2.4 Acceptability, Awareness and Cultural Factors of Milk Donation

Even where donor breast milk is technically feasible, acceptability among mothers, families and healthcare providers is a critical barrier. A study in Uganda found that donor breast milk can be acceptable to caregivers of vulnerable babies in hospital settings; but lack of awareness, limited

knowledge of screening/processing, and need for community and hospital education were key barriers (Magowan et al., 2020). Another study in Tanzania (Muhimbili National Hospital) found that although community awareness of milk donation was low (88% had never heard of milk donation), acceptance of donor breast milk for use and for banking was high: 86.5% agreed to donate, and 83.5% agreed to use donor breast milk, with 66.95% accepting donor breast milk banking because of health benefits of breast milk (Kimaryo et al., 2024).

In Ghana, women's perspectives on breast milk banking revealed important cultural, religious and logistical issues: while maternal and child health programs promoting exclusive breastfeeding, formal milk banking systems are very limited (Obeng et al., 2023). Similarly in South Africa (Limpopo Province), religious concerns, fear of infectious diseases and distrust in unknown donors were among reasons for negative attitudes (Mampane & Wolvaardt, 2024b). Further, a scoping review of interventions to promote voluntary donation of breast milk noted that the reasons for donation and attitudes toward banking vary across parts of the world, economic, cultural and religious factors influencing acceptability (Krishnan et al., 2023). Together, these findings illustrate that even in contexts with supportive breastfeeding policies, cultural norms, religious beliefs, and logistical challenges influence mothers' acceptance of donor milk.

In Rwanda, no breast milk banks currently exist, and there is limited evidence regarding the potential acceptability of donor breast milk or willingness to donate among mothers, families, or healthcare providers. While studies from other African contexts highlight factors influencing acceptance—such as awareness, cultural and religious beliefs, trust in screening and processing, and the role of healthcare providers—no research has yet examined how these factors might apply to the Rwandan context. Exploring these issues in Rwanda is therefore critical to understanding potential barriers and facilitators for implementing breast milk donation and banking programs.

2.5 National Context: Rwanda

Within Rwanda, breastfeeding and exclusive breastfeeding (EBF) are strongly promoted. The national policy recommends EBF for the first six months, in accordance with WHO recommendations (Ahishakiye et al., 2020). However, the Demographic and Health Survey (DHS) also shows that EBF in the first six months without any other formula is decreasing; declining from 87.3% in 2015 to 80.9% in 2020; a 6.3% reduction. The same survey reports that 33% of children under age 5 are stunted and 9% severely stunted. The prevalence of stunting rises sharply with age: from 16% among infants under 6 months (the exclusively breastfed period) to a peak of 40% among children aged 24–35 months, emphasizing the role that early feeding practices have on child growth (Joella Mukashyaka et al., 2025; RBC, 2024; *Rwanda__2019_20.Pdf*, 2021).

This pattern highlights the critical role of early feeding practices, as adequate exclusive breastfeeding during the first six months provides essential nutrients and reduces the risk of common infections which can impair healthy growth in infancy (Hadi et al., 2021). Suboptimal breastfeeding or early introduction of complementary foods has been associated with increased the risk of growth faltering and later stunting in low- and middle-income country settings, partly due to poorer nutrient intake and higher infection burden during a period of rapid linear growth(Christian et al., 2023). These pathways underscore why maintaining high exclusive breastfeeding rates is important for reducing stunting in later infancy and early childhood, thus emphasizing the need for strategies that ensure access to sufficient maternal or donor milk for vulnerable infants.

Preterm-birth complications remain a significant contributor to neonatal mortality in Rwanda, and breast milk has protective benefits (Gato et al., 2022; Nwankwo et al., 2022; Zhang et al., 2024). Evidence from neonatal care units in rural Rwanda shows that preterm and small sick newborns are much less likely to be fed on the breast at birth with only ~5.4 % receiving direct breastfeeding on the day of birth, and that preterm delivery significantly reduces the odds of exclusive breastfeeding at discharge, indicating that many vulnerable infants do not receive their mother's milk without additional support (Gato et al., 2022). Preterm infants are therefore particularly at risk of being deprived of their mother's milk, underscoring the need for alternative strategies to ensure access to human milk (Gato et al., 2022). Despite strong policy and promotion of breastfeeding, there is currently no formal milk bank in Rwanda. Little is known about local perceptions and beliefs surrounding breast-milk donation and banking.

2.6 Factors Influencing Acceptability and Implementation of Breast-Milk Banking

Reported facilitators generally relate to awareness, trust, supportive policies, and institutional systems (M. A. M. Ahmed et al., 2024; Magowan et al., 2020; Mathias et al., 2023). A consistent facilitator is awareness of the nutritional and clinical superiority of breast milk compared to formulas particularly for premature and low birth weight infants. In Uganda, for instance, caregivers' recognition that breast milk is healthier and safer than formula was associated with higher acceptance of donor milk (Magowan et al., 2020). Similarly, trust in healthcare providers and hospital systems has been shown to promote confidence in the safety of donor milk, as families rely on medical guidance regarding screening and handling procedures. In a similar study in Uganda, belief in knowledgeable and safe care by healthcare providers was a strong facilitator (Magowan et al., 2020). Education and counselling interventions, delivered both in hospital and community settings, have also been effective in improving willingness to donate or use donor milk. In settings where milk banking has been integrated into neonatal care, policy frameworks and

standardized safety protocols; including screening, pasteurization, storage, and transportation, have supported both institutional uptake and public acceptance (Unger & O'Connor, 2024b).

However, several barriers continue to hinder the adoption of breast-milk banking, particularly in low-resource settings. Low awareness remains a recurrent challenge: a Tanzanian study found that 88% of participants had never heard of milk donation for banking (Kimaryo et al., 2024). Additionally, cultural and religious beliefs, often intertwined with fears of disease transmission, have been shown to limit both donation and use of donor milk, as observed in South Africa and other African contexts (Mampane & Wolvaardt, 2024b). Beyond these sociocultural factors, infrastructural limitations; such as the lack of equipment for screening, pasteurization, and cold-chain storage; pose significant operational challenges (Israel-Ballard et al., 2024). The absence of national policies and guidelines further constrains the development of sustainable milk banking systems (Obeng-Gyasi et al., 2025).

Some studies have also noted variation between willingness to donate and willingness to use donor milk, suggesting that acceptability operates on multiple levels influenced by personal, cultural, and institutional factors (Mampane & Wolvaardt, 2024b). These findings collectively indicate that the establishment of breast-milk banks require not only community sensitization but also strengthened health system capacity, supportive policy environments, and understanding local contexts and perceptions.

CHAPTER 3: METHODS

3.1 Settings

This study was conducted in the neonatology departments of two district hospitals; Kirehe District Hospitals (KDH) and Ruhengeri Level Two Teaching Hospital (RL2TH). Both facilities serve rural conservative populations in Rwanda's Eastern and Northern provinces, respectively. They were purposively selected because they represent typical Rwandan healthcare settings with high neonatal admissions availing diverse maternal backgrounds, and significant neonatal care capacity despite the hospitals' limited resources.

At the time of the study, approximately 776 neonates were admitted to KDH, and around 842 to RL2TH over a six-month period (Source: preliminary desk research in both hospitals). Neither hospital had an operational breast milk bank, and no formal breast milk donation practices were documented. The recurring shortage of infant formulas and the prevalence of feeding challenges among pre-term and low-birth-weight neonates further highlighted the importance of exploring this area in these contexts.

While formula supply at KDH is currently supported through Partners In Health (PIH) which provides formula for mothers who do not have sufficient breast milk during hospitalization and, when needed, after discharge at RL2TH, mothers are responsible for purchasing formula themselves, with no external support available (Source: preliminary desk research in both hospitals), breast milk donation programs could offer a sustainable, locally best driven solution to these neonates particularly valuable in settings where external aid may fluctuate. There is no breast milk bank in Rwanda, and breast milk donation practices were not documented or observed in either hospitals or within local communities. All these factors make these settings particularly relevant for exploring the feasibility and potential impact of introducing breast milk donation initiatives in rural hospitals.

3.2 Design

A concurrent qualitative-dominant mixed-methods design was employed, in which both qualitative and quantitative data were collected simultaneously. The qualitative component explored mothers' and healthcare providers' perspectives on breast milk donation, while the quantitative component assessed the level of acceptability and the determinants influencing its potential adoption. This mixed approach enable both measurement of prevalence and determinants, and a contextual understanding of social and cultural dynamics, enabling triangulation of findings to provide a comprehensive understanding of the factors shaping the feasibility of breast milk donation and banking in Rwandan hospital settings.

3.3 Population

The study targeted two key groups: Mothers with neonates admitted to the neonatology units of the selected hospitals during the study period, and healthcare providers working within the same and collaborating units, including doctors, nurses, midwives, expert mothers, and social workers. These groups were chosen to capture both community-level perspectives (mothers) and professional insights (HCPs) on breast milk donation and banking.

3.4 Sample

3.4.1 Inclusion criteria

1. Mothers whose neonates were admitted to the hospital at the time of the study, including both in-hospital and out-of-hospital births.
2. Doctors, nurses, midwives, expert mothers, and social workers working in the neonatology departments of the two hospitals.

3.4.2 Exclusion criteria

1. Mothers under the age of 18 years old, who are not legally emancipated because they can't provide consent
2. Non-biological caregivers who stayed with the neonates on behalf of the mothers
3. Non-clinical staff and administrative personnel who were not directly involved in neonatal care

3.4.3 Sample

3.4.4 Quantitative sampling

Based on the 2024 hospital admission records over a period of six months, an estimated total of 1618 mothers had neonates admitted in both neonatology units (776 neonatal admissions at KDH and 842 at RL2TH). The minimum required sample size was calculated using the OpenEpi sample size calculator for a single proportion, assuming a 95% confidence interval and a 5% margin of error, and a design effect of 1. The following formula was used:

$$n = [DEFF*Np(1-p)]/ [(d^2/Z^2_{1-\alpha/2}*(N-1) +p*(1-p)]$$

Because no prior studies on the acceptability of breastmilk donation or banking have been conducted in Rwanda, the national prevalence of exclusive breastfeeding (80.9%) reported in the 2020 Rwanda Demographic Health Survey was used as a proxy hypothesized proportion (p) (OpenEpi, 2025). Exclusive breastfeeding was considered an appropriate behavioral indicator, as

it reflects maternal attitudes and practices towards optimal infant feeding, concepts closely related to the willingness to engage in or accept breast milk donation.

This yielded a required sample of 208 participant mothers, and they were proportionally allocated between the two hospitals (100 at KDH and 108 at RL2TH).

At the time of the study, the neonatology staff comprising doctors, nurses, and expert mothers, consisting of 25 personnel at RL2TH and 22 at KDH. Given the limited staff strength and therefore small population size, the study aimed for 100% participation from all healthcare providers employed in the two neonatology departments. However, due to staff availability at the time of data collection, the research team was able to reach only 41 participants. These 41 healthcare providers represent the fully accessible staff population in the neonatal units of both hospitals during the study period.

3.4.5 Qualitative sampling

The qualitative sample consisted of 20 mothers and 11 healthcare providers (sampling doctors, nurses, midwives, and expert mothers) from both hospitals, selected through a convenience sampling approach. Participants were interviewed until data saturation was reached, the point at which no new information emerged from participant responses. Our findings indicated that near code saturation was reached around the tenth mother interview, and around the eighth HCP interview, but further interviews were conducted to attain an acceptable level of analytical saturation, ensuring adequate depth and variation across participant groups. This aligns with recent studies emphasizing that saturation should be linked to analytical adequacy (Squire et al., 2024). Similar studies have also shown that a slightly larger number of interviews may be required to achieve meaningful saturation, particularly when participants represent diverse backgrounds and contexts (Sarker, 2025; Squire et al., 2024). We applied analytic memoing to document when saturation appeared to occur.

3.5 Data collection

3.5.1 Data collection procedure

Following the acquisition of ethical approval from the UGHE IRB and the authorization from the Ministry of Health (MOH), the Principal Investigators (PIs) obtained formal institutional permission from both hospital leadership to conduct the study.

Before launching full data collection, a pilot study was conducted to assess the clarity and flow of all the tools, as well as the performance of our data collectors. Findings from the pilot study revealed that, while the tools were generally understandable, data collectors required additional

training, particularly on conducting semi-structured interviews. A one-day refresher training was conducted to strengthen their skills.

Data collection occurred over a two-month period and were collected using two complementary approaches; quantitative surveys with mothers and healthcare providers, and qualitative semi-structured in-depth interviews with mothers and healthcare providers; to explore the acceptability of breast milk donation for neonatal feeding in rural Rwanda.

To recruit participant mothers, data collectors visited the neonatal units where all eligible mothers were physically present while caring for their hospitalized newborns. Each mother was approached individually at her bedside. The data collectors first introduced themselves, provided a brief introduction and summary explanation of the study's purpose, followed by a simple question to assess initial interest in participation. For mothers who expressed willingness to contribute, the data collectors then proceeded to provide a full explanation of the study, including its objectives. They proceeded by describing the voluntary nature of participation, and reviewed all the components of the consent form, including the option to decline participation without consequences. For participants involved in the qualitative component, consent for audio-recording was included. The same approach was used to recruit eligible HCPs.

Because some participating mothers were unable to read or write, all survey questionnaires were administered in interviewer-administered format. Data collectors read each question aloud in Kinyarwanda, clarified any items as needed, and recorded responses verbatim. Quantitative data were collected electronically using Google forms, directly filling information into the survey tool to ensure accuracy and completeness of data collection. Responses were accessible only to the research team. For qualitative data, interviews were audio-recorded with consent, supplemented by field notes, and later transcribed and translated for analysis.

3.5.2 Quantitative data collection

Quantitative data were collected using structured questionnaires administered through Google Forms. These forms facilitated data entry and secure storage throughout the study period. The quantitative component targeted mothers and HCPs:

Mothers

A purposive sample of 208 mothers (based on neonates admitted to hospitals over 6 months) was surveyed. The survey assessed mothers' awareness, cultural perceptions, and beliefs related to breast milk donation and banking. Key domains included familiarity with breast milk donation, attitudes toward donating or receiving donor milk, and perceived barriers and facilitators. Each

survey concluded with a Likert scale measure assessing the overall acceptability of breast milk donations.

Healthcare Providers

41 HCPs including doctors, nurses, midwives, expert mothers, and direct social workers working in the neonatal units, completed the survey. Items focused on HCPs' perspectives regarding the role, feasibility, integration of breast milk donation in neonatal care, and institutional related factors affecting acceptability. Like the mothers' survey, a Likert scale item assessed their overall acceptability.

Google form datas were exported into Microsoft Excel for cleaning and preparation for analysis. Uniform data collection tools and extraction templates were used across both hospitals to ensure consistency and reliability.

3.5.3 Qualitative data collection

The qualitative component involved semi structured in-dept interviews with conveniently selected mothers and HCPs to gather detailed insights into their views on breast milk donation and its potential implementation in neonatal care.

Mothers

Approximately 20 mothers of neonates admitted to the neonatal units at KDH and RL2TH were invited to participate. Interviews explored personal experiences with neonatal feeding, cultural and social beliefs, perceived barriers and facilitating factors, and overall views on introducing a breast milk donation program. The interviews were conducted in private hospital locations to ensure confidentiality and comfort. Each interview lasted approximately 20 minutes or less.

Healthcare Providers

Ten healthcare providers, including doctors, nurses, midwives, and expert mothers, participated in interviews examining feasibility, operational considerations, institutional factors, and anticipated challenges of implementing breast milk donation in the hospital setting.

All interviews were conducted in Kinyarwanda, audio-recorded with the informed consent, and transcribed verbatim before translation into English for analysis. Data collection occurred at spaced intervals to accommodate the variable hospitalization durations of neonates, ensuring diverse samples of participants admitted at different times.

3.6 Data collection tools

The data collection tools for both the quantitative and qualitative components were developed by adapting and tailoring instruments from similar studies conducted in African settings with economic and sociocultural contexts comparable to Rwanda, including Uganda, Kenya, Ghana, and South Africa (Kanyi, 2024; Kanyi et al., 2025; Namuddu et al., 2023; Tende et al., 2023). These tools were further refined to reflect the specific characteristics and cultural nuances of the Rwandan population and needs in neonatal care context.

Prior to full scale data collection, a pilot study was conducted to assess the clarity, sense, flow, and cultural appropriateness of the instruments. The pilot included five quantitative surveys with mothers, 5quantitative surveys with HCPs, 2qualitative interviews with mothers, and 2qualitative interviews with HCPs. Feedback from the pilot indicated that tools were generally understandable; however, minor adjustments were necessary. Revisions included rephrasing certain items for clarity and adjusting probing prompts in the interview guides to enhance depth and consistency.

3.6.1 Quantitative data collection tool: Survey for mothers

The structured questionnaire for mothers was designed to assess their awareness, attitudes, beliefs, and cultural perceptions related to breast milk donation. It consisted of five major sections. The demographic part, the first part, collected information about age, education level, occupation, and economic status (Ubudehe category). The second part collected data that provided an understanding of breast milk donation, benefits for neonates, and general awareness of breast milk donation and banking. The third part included questions to collect data regarding mothers' cultural norms and beliefs, perceptions about breast milk sharing, potential concerns, and perceived barriers to participation. The fourth part explored the mother's interest, likelihood of donating, and willingness to engage if the programs were initiated. The last part, the fifth, entailed a Likert scale-based acceptability of intervention measure assessing psychometric properties (Weiner, Halko, et al., 2017).

3.6.2 Quantitative data collection tool: Survey for healthcare providers

The structured tool for HCPs focused on their professional perspectives on introducing breast milk donations in neonatal care settings. The first part also covered demographics involving the job role, years of experience, and if applicable, any prior experience with breast milk donation programs. The second part assessed their understanding of milk banking, perceived benefits of the program, and its potential impact on neonatal outcomes. The third part extracted opinions on establishing a milk bank, policy barriers, and institutional practicalities of implementation. The fourth part reviewed their views on existing hospital policies and required institutional support for introducing

milk donation programs. In the form of the Likert scale questions, the last part, the fifth, was an acceptability of intervention measure, including some psychometric properties (Weiner, Lewis, et al., 2017).

3.6.3 Qualitative data collection tool: Semi-structured interviews for mothers

The semi-structured interview guide for mothers explored deeper insights into their lived experiences, cultural perceptions, attitudes, and emotional considerations related to breast milk donation. Key areas included: Experiences with neonatal feeding, cultural, social, and religious beliefs influencing breast milk sharing, perceived barriers and facilitators, attitudes toward potential breast milk donation programs, openness and willingness to engage with such initiatives. The guide used open-ended questions and prompts to allow participants to provide comprehensive and context-rich narratives.

3.6.4 Qualitative data collection tool: Semi-structured interviews for healthcare providers

The interview guide for HCPs was designed to capture detailed professional insights regarding the feasibility and implementation of breast milk donation programs. The guide explored: awareness, attitudes towards breast milk donation, perceptions of cultural acceptance among mothers and the broader community, anticipated operational, logistical, and ethical challenges, and requirements for successful implementation in the hospital settings. The open-ended format allowed HCPs to elaborate on their practical experiences, perceived institutional readiness, and recommendations for program integration.

3.7 Key Measures

3.7.1 Dependent Variables

1. Acceptability

Acceptability measured the extent to which participants positively received the concept of breast milk donation and breast milk banking. This was measured using a six-item Likert scale (0–4), Classified into High acceptability: ≥ 2.4 and Low acceptability: < 2.4

3.7.2 Independent Variables

1. Awareness

This variable assessed participants' awareness of breast milk donation and breast milk banking. It captured whether individuals had ever been exposed to the concept which scored 1 or were entirely

unfamiliar with it which scored 0, emphasizing the role of informational exposure in shaping attitudes and behaviors.

2. Cultural Beliefs and Attitudes

These variables integrated cultural values, and individual perceptions that influenced participants' interpretations of breast milk donation and banking. It reflected how culturally informed beliefs and personal attitudes affected perceptions of safety, appropriateness, and moral acceptability, ultimately shaping acceptance and decision-making regarding donation.

3. Perceived Benefits

Perceived benefits captured the advantages of participants associated with breast milk donation, including infant health promotion and support for vulnerable babies. Understanding these perceived benefits helped explain motivational factors that encouraged acceptance and potential participation in milk donation programs.

4. Perceived Barriers

Perceived barriers encompass the challenges or concerns that may limit acceptance or willingness to donate. These included fears about safety, misinformation, cultural restrictions, logistical difficulties, or lack of trust in milk banking systems, highlighting obstacles that interventions must address to optimize uptake.

3.8 Data collectors

Data collection was carried out by two data collectors, who were fluent in both English and Kinyarwanda. Prior to data collection, the data collectors had received formal training in both quantitative and qualitative research techniques including survey administration, in-depth interviewing, transcription, and translation. Additional refresher training was provided following a PI supervised pilot study, to strengthen interviewing techniques and ensure consistent application of study tools. The data collectors were responsible for administering surveys and conducting semi-structured interviews. All procedures adhered strictly to ethical standards to protect participants' privacy and confidentiality. Only authorized members of the research team had access to identifiable data, and all interactions were conducted only after obtaining informed consent.

3.9 Data management

3.9.1 Quantitative data management

Data was collected using a survey through Google Forms survey. Upon submission, responses were automatically stored on a password-protected Google Drive accessible only to PIs. For

analysis, raw dataset was downloaded in excel format and stored on an encrypted password-protected institutional laptop, on which data-cleaning process was done. Once cleaned, the dataset was imported into SPSS for analysis. Throughout the process, data access remained limited exclusively to the PIs. No identifiable personal information was shared outside the study team, ensuring confidentiality and adherence to ethical data-management standards.

3.9.2 Qualitative data management

After the interviews, all audio recordings were uploaded to password protected computers only accessible to the PIs, and the files were immediately deleted from the recorders to prevent unauthorized access. No identifiable information, like participant names, were collected. Instead, unique codes were assigned to maintain confidentiality. Subsequently, audio recordings were transcribed verbatim and then translated into English, with all transcripts saved as digital word documents.

The audio files as well as the digital transcripts were also stored on password-protected laptops only restricted to the PIs. Hard copies of consent forms and field notes were stored in a locked cabinet. In accordance with institutional policy, all data will be stored at the University of Global Health Equity for ten years following study, after which they will be permanently destroyed.

3.10 Data analysis

All quantitative analyses were conducted using IBM SPSS Statistics version 26. Descriptive and inferential statistics were performed in alignment with the study objectives and with analytical approaches commonly applied in maternal health and donor-milk acceptability research.

3.10.1 Quantitative Analysis

Sociodemographic recategorization

Maternal age was grouped into four categories: <20, 20–29, 30–39, and ≥40 years. These categories follow common age strata used in maternal health and donor-milk acceptability research in Africa and other settings, allowing comparison with prior work that reports age in similar bands, for example, studies in Nigeria and multi-site African samples. This grouping also reflects meaningful reproductive life stages; adolescence/young adults, early/mid reproductive age, and older reproductive age, relevant to awareness and acceptability outcomes (Iloh et al., 2018).

Healthcare providers' years of neonatal-care experience were dichotomized into <3 years vs. ≥3 years. This categorization is informed by studies in neonatal care settings suggesting that approximately three years of continuous neonatal-care exposure marks the acquisition of foundational clinical familiarity, procedural competence, and confidence in unit-specific practices (Chagwena et al., 2020; Cuttini et al., 2020).

Socioeconomic categorization (Ubudehe)

Socioeconomic status was assessed using the Ubudehe household classification system. Because participants were more familiar with the earlier four-tier model (Categories 1–4, ranging from poorest to most wealthy), these categories were used in the questionnaire. For consistency with current national standards, responses were later recoded into the updated Ubudehe framework (Categories A–E), as defined by the Government of Rwanda, where Category A represents the most well-off and Category E includes households with severe vulnerability or no means of livelihood (LODA, 2020).

Awareness and perception variables

Awareness of breast-milk donation was coded as Yes/No. Participants who had heard of breast-milk donation identified their primary source, categorized as healthcare providers, family/friends, or media (radio, TV, internet).

Perception variables included: understanding of breast-milk banks, belief that milk sharing may create familial ties, concerns about disease transmission, trust in health professionals to ensure safety. These were entered as categorical variables ("Yes", "No", "Unsure"). Data were analyzed descriptively using frequencies and percentages to summarize awareness levels, information sources, and perception patterns. Associations between sociodemographic variables and awareness or perception indicators were examined using Pearson's chi-square tests.

Acceptability Scale Construction and Scoring

Acceptability of breast-milk donation was evaluated using a six-item Likert scale, scored from 0 (strongly disagree) to 4 (strongly agree), yielding a maximum possible score of 24. Scale reliability was assessed using Cronbach's α, with values > 0.70 considered acceptable for internal consistency; the scale demonstrated high reliability for both mothers and healthcare providers.

Individual acceptability scores were calculated by averaging the six items. To interpret the 0–4 range, equal intervals of 0.8 were applied: 0–0.8 = strongly disagree, 0.8–1.6 = disagree, 1.6–2.4 = neutral, 2.4–3.2 = agree, and 3.2–4 = strongly agree.

For summary analyses, continuous mean scores were further dichotomized using a theory-based cutoff of ≥2.4; the threshold marking entry into the "agree" range. This cutoff, adapted from similar studies in East and Southern Africa (Alkharusi, 2022; Lindner & Lindner, 2024; Sayili et al., 2024), facilitates the calculation of proportion of participants expressing agreement while maintaining interpretive consistency across studies and provides an overview of respondents' positions, while avoiding sample-dependent cutoffs.

Recategorization of occupations

Maternal occupations were recoded into three analytically meaningful groups: Unemployed (housewives, students, individuals without paid work), Self-employed (farmers, traders, tailors, hairdressers, domestic workers), and formally employed (teachers, healthcare providers, police officers, customer-care agents, mobile-money agents). The final variable was treated as nominal, and group differences in acceptability scores were examined using the Kruskal–Wallis H test.

Inferential Analysis

To examine determinants of acceptability;

- Mann–Whitney U tests were used to compare mean acceptability scores across independent variables with two categories. These included comparisons of acceptability by hospital, pregnancy status, prior awareness of breast milk donation, and years of experience among healthcare providers. This test was selected because acceptability scores were non-normally distributed.
- Kruskal–Wallis H tests were applied for comparisons involving independent variables with more than two categories, including education level, Ubudehe socioeconomic status, age groups, maternal occupation categories, and source of information.
- Chi-square tests of independence were used to assess associations between categorical variables, including the relationship between dichotomized acceptability (≥2.4 vs <2.4) and perception indicators, as well as between sociodemographic variables (e.g., education, socioeconomic status) and awareness or perception variables (e.g., safety concerns, perceived risk of disease transmission, beliefs about creating familial ties).

Non-parametric tests were chosen because acceptability scores violated normality assumptions on visual inspection and Shapiro–Wilk testing. Statistical significance was determined at $p < 0.05$. No variables exceeded 5% missing data; listwise deletion was applied for inferential analyses.

3.10.2 Qualitative Analysis

Qualitative data were analyzed using manual inductive thematic analysis, following Braun and Clarke's six phases (S. K. Ahmed et al., 2025). Transcripts were initially read for familiarization, followed by open coding. English transcripts were independently coded by the two PIs, who iteratively developed a codebook that was finalized through discussion. Each transcript was then read and coded individually by the PIs, and the coded transcripts were reviewed and agreed upon jointly. Codes were subsequently condensed into categories and final themes.

Saturation Procedures

Saturation assessment combined code saturation (no new codes appearing) and analytical saturation (no further depth added to existing themes). Near code saturation was reached around Interview 8, but interviewing continued until acceptable analytical saturation was achieved across both participant groups.

Throughout analysis, analytic memoing was used to document emerging interpretations and track theme development. This strengthened transparency and ensured that the final themes were grounded in participant narratives rather than researcher assumptions.

Integration of Mixed-Methods Findings

Quantitative and qualitative findings were integrated during interpretation to identify converging evidence across methodological strands. Qualitative insights were used to contextualize quantitative patterns, especially regarding beliefs, cultural norms, perceived safety, and trust; the core constructs underlying acceptability.

3.11 Ethical Considerations

Assessment of risk to participants: This research did not pose any risk to the participants. The information obtained was used in a confidential manner, and findings are released in aggregate form.

Beneficence: The study may generate information that can potentially be used by policymakers and other stakeholders to inform change based on the study's findings. The participants were refunded three euros for their transport costs.

Information and Consent process: The details of the study were communicated to the participants before they consented to participate. Participation in the study was completely voluntary, and participants were informed that they could stop at any time they did not wish to continue participating. Interviewers sought permission to record the conversation. If participants did not wish to be recorded, interviewers wrote their responses. The consent form was available in English and Kinyarwanda, to eliminate any language barrier during the consenting process. A copy of the signed informed consent was provided to the participants. The data collectors read all the information for the illiterate participants, and in case they were unable to sign, they used fingerprints on the consent form.

Privacy and confidentiality: All data was collected anonymously and will be stored securely to protect the privacy of the neonates and their families. No personal identifiable information was collected. Ethical approvals were sought from the UGHE Institutional Review board, the MOH, and the leadership of both hospitals. All results will be presented in an aggregated manner and thus will not be traced back to any participant.

Safekeeping of data: All digital data and voice recordings will be kept in password-protected laptops, and paper documents will be kept in a locked cabinet at UGHE with only the research team having access to them. The data will be destroyed ten years after completion of the study.

Principle of justice: Fair treatment of all participants was ensured. No vulnerable groups were included in the study. The study aimed to contribute while respecting the rights and dignity of all participants.

Positionality statements: The team recognized that their professional backgrounds could influence the research process and interpretation of data. They took care to recognize potential biases, while considering the cultural context of the study population.

CHAPTER 4: RESULTS

4.1 Quantitative results

4.1.1 Sociodemographic characteristics

A total of 208 mothers responded to the questionnaires; 100 (48.1%) were from Kirehe District Hospital and 108 (51.9%) from Ruhengeri L2TH. The mean age of mothers was 30.1± 6.7years, 97 (46.6%) were in the age range 30-39years old, 28 (13.5%) had no formal education, 94 (45.2%) had primary, 68 (32.7%) had secondary education, and 18 (8.7%) had tertiary education.

Most mothers were self-employed 151 (72.6%), primarily working as farmers, traders, tailors, hairstylists, or maids. About one quarter 47 (22.6%) were unemployed, a category that also included housewives and one high school student, of whom 27.6% held refugee status. A smaller proportion 10 (4.8%) were formally employed, including teachers, healthcare providers, customer care agents, police officers, and mobile agents.

Most mothers belonged to Ubudehe category B; 94 (45.2%), followed closely by category C; 93 (44.7%), and category D; 21 (10.1%). No mothers were in category A or E. For 61 mothers (29.3%)**,** this was their first pregnancy (Table 1).

Table 1 Mothers' demographics

Variable	**Categories**	**n (%)**
Sample		208 (100%)
Hospital	KDH	100 (48.1%)
	RL2TH	108 (51.9%)
Age (Years)	Less than 20	13 (6.3%)
	20-29	82 (39.4%)
	30-39	97 (46.6%)
	40 and above	16 (7.7%)
Education level	No formal education	28 (13.5%)
	Primary education	94 (45.2%)
	Secondary education	68 (32.7%)
	Tertiary education	18 (8.7%)
Occupation	Unemployed	47 (22.6%)
	Self employed	151 (72.6%)
	Formal employed	10 (4.8%)
Economic status	Category D	21 (10.1%)
	Category C	93 (44.7%)

	Category B	94 (45.2%)
Pregnancy status	First pregnancy	61 (29.3%)
	Not the first pregnancy	147 (70.7%)

Among the 41 healthcare HCPs surveyed, 20 (48.8%) were from KDH and 21 (51.2%) were from RL2TH. 3 (7.3%) were doctors, 31 (75.6%) were nurses, 4 (9.8%) were midwives, 2 (4.9%) were expert mothers, and 1 (2.4%) was a social worker. Most HCPs 27 (65.9%) had less than three years of professional experience in the neonatology department (Table 2).

Table 2 HCP' s demographics

Variable	**Categories**	**n (%)**
Sample		41
Hospital	KDH	20 (48.8%)
	RL2TH	21 (51.2%)
Job title	Doctor	3 (7.3%)
	Nurse	31 (75.6%)
	Midwife	4 (9.8%)
	Expert mothers	2 (4.9%)
	Social worker	1 (2.4%)
Years of experience	<3	27 (65.9%)
	>=3	14 (34.1%)

4.1.2 Awareness and perspectives regarding breast milk donation among Mothers and HCPs

Most mothers 185 (88.9%) had never heard of breast milk donation, while only 23 (11.1%) reported prior awareness. Among those who had heard about it, healthcare providers were the most common source of information;13 (6.3%), followed by family or friends; 6 (2.9%), and media outlets; 4 (1.9%). Regarding the awareness of breast milk banks, only 5 (2.4%) mothers reported that they knew what a breast milk bank was.

Perception-wise, 131 (63.0%) believed that sharing breast milk with others could create familial ties or relationships. Perceptions of the risk of disease transmission through breast milk donation were mixed: 85 (40.8%) believed there was a risk, 75 (36.1%) did not perceive any risk, and 48 (23.1%) were uncertain (Table 3).

Table 3 Awareness, perception regarding breast milk donation and banking~ Mothers

Variable	Categories	N (%)
Have heard of breast milk donation	No	185 (88.9%)
	Yes	23 (11.1%)
Where the respondent learnt about breast milk donation.	Healthcare provider	13 (6.3%)
	Family or friends	6 (2.9%)
	Media	4 (1.9%)
Knowledge of what a breast milk bank is	No	203 (97.6%)
	Yes	5 (2.4%)
Perception of whether sharing breast milk with others could create familial ties or relationships	Yes	131 (63%)
	No	27 (13%)
	Unsure	50 (24%)

Among HCPs 32 (78.0%) reported having prior exposure to the concept of breast milk donation and banking. 26 (63.4%) were somewhat familiar, while 10 (24.4%) indicated they were not familiar with the concept. Nearly all respondents, 40 (97.6%), believed that breast milk donation could be beneficial for neonates. Three-quarters, 31 (75.6%), agreed that there is cultural resistance to the donation of breast milk in the community. In terms of feasibility, 16 (39%) and 21 (51.2%) viewed the establishment of a breast milk bank as very feasible and feasible, respectively (Table 4).

Table 4 Awareness, perception regarding breast milk donation and banking~ HCPs

Variable	Categories	N (%)
Had prior exposure to the concept of breast milk donation/ banking	Yes	32 (78%)
	No	9 (22%)
Familiarity with the concept of breast milk donation and banking	Not familiar	10 (24.4%)
	Somewhat familiar	26 (63.4%)
	Very familiar	5 (12.2%)
Belief that breast milk donation could be beneficial for neonates	Yes	40 (97.6%)
	Unsure/No	1 (2.4%)
Belief that there is a cultural resistance to donation of breast milk in the community	Yes	31 (75.6%)
	Unsure/ No	10 (24.4%)
Sees feasibility in implementing a breast milk bank	Very Feasible	16 (39%)
	Feasible	21 (51.2%)

	Not sure	3 (7.3%)
	Not feasible	1 (2.4%)

4.1.3 Perceived benefits, barriers, and facilitators of breastmilk donation program

Mothers

In terms of perceived value, 100 (48.4%) of mothers rated breast milk donation and banking as "important," while 84 (40.4%) considered it "very important." When asked about the perceived benefits, the most frequently cited benefit was improved infant nutrition, 200 (96.2%), followed by reduced neonatal mortality, 177 (85.1%) and reduced risk of infections, 150 (72.1%).

Regarding perceived barriers, most mothers reported lack of awareness about milk donation, 193 (93.3%) as a key challenge. This was followed by cultural beliefs and stigma, 170 (81.7%), concerns about milk safety, 167 (80.3%), limited hospital infrastructure, 111 (53.4%), and fear of reduced personal milk supply, 108 (51.9%).

With respect to facilitators and support needs, most mothers identified education and awareness programs, 189 (91.3%), and support from healthcare providers, 175 (84.5%), as key enablers of milk donation. Additionally, 110 (53.1%) emphasized the importance of establishing milk banks in hospitals to increase participation and ensure safety (Table 5).

Table 5 Mothers' perceived benefits, barriers, facilitators

Item	**Categories**	**n (%)**
Rating the importance of having a milk bank in their hospital	Very important	84 (40.4%)
	Important	100 (48.4%)
	Neutral	10 (4.8%)
	Not important	7 (3.4%)
	Not sure	7 (3.4%)
Benefits	Improved Infant nutrition	200 (96.2%)
	Reduces the risk of infections	150 (72.1%)
	Reduces neonatal Mortality	177 (85.1%)
	Others	5 (2.4%)
Barriers	Lack of awareness about milk donation	194 (93.3%)
	Cultural beliefs and stigma	170 (81.7%)
	Concerns about milk safety	167 (80.3%)

	Lack of hospital infrastructure	111 (53.4%)
	Fear of affecting my milk supply	108 (51.9%)
Facilitators	Better education and awareness programs	189 (91.3%)
	Support from healthcare providers	175 (84.5%)
	Creation of milk banks in the hospital	110 (53.1%)

Healthcare Providers

Among healthcare providers, the most frequently reported benefits of breast milk donation were improved infant nutrition; 36 (87.8%), reduced neonatal mortality; 31 (75.6%), and reduced risk of infections; 29 (70.7%).

In terms of barriers, healthcare providers identified cultural resistance; 32 (80%), and lack of awareness among mothers; 31 (77.5%), as the main obstacles to milk donation. Additional challenges included inadequate infrastructure for milk storage; 31 (77.5%), and the need for staff training; 27 (67.5%).

Regarding facilitators, all healthcare providers; 41 (100%), emphasized the need for training on how to promote and manage breast milk donation. They also highlighted the importance of institutional policies; 37 (90.2%), community engagement strategies to overcome cultural barriers; 37 (90.2%), and improved awareness about milk donation; 36 (87.8%) (Table 6).

Table 6 HCPs' Perceived benefits, challenges, and support needed for the program

Item	**Categories**	**n** (%)
Potential benefits	Improved infant nutrition	36 (87.8%)
	Reduced incidence of infections	29 (70.7%)
	Reduced neonatal mortality	31 (75.6%)
Perceived challenges	Lack of awareness among mothers	31 (77.5%)
	Cultural barriers	32 (80%)
	Lack of infrastructure for milk storage	31 (77.5%)
	Staff training needs	27 (67.5%)
Support needed by HCPs	Training on how to promote and manage breast milk donation	41 (100%)
	Better knowledge and awareness about milk donation	36 (87.8%)
	Institutional policies supporting milk donation	37 (90.2%)
	Community engagement strategies to overcome cultural barriers	37 (90.2%)

4.1.4 Acceptability to donate or receive breast milk

The six-item acceptability scale demonstrated good internal consistency (~high reliability) with Cronbach's α = 0.858 for mothers, and 0.935 for HCPs. The items assessed key domains of acceptability, including attitudes towards donor milk, perceived benefits, perceived safety, willingness to donate or use donor milk, and overall comfort with the intervention, thereby supporting both the reliability and validity of the measure.

Overall, most participants expressed positive attitudes toward the practice. The proportion of mothers who agreed or strongly agreed with each statement ranged from 55.7% for "My family supports the idea of me donating breastmilk" to 95.6% for "I believe breastmilk donation can help save the lives of babies who need and don't have breastmilk." Few mothers reported disagreement, with the highest proportion of disagreement observed for "I see myself accepting for my baby to use donated breastmilk" (18.0%). Neutral responses were generally low across all areas (Figure 1).

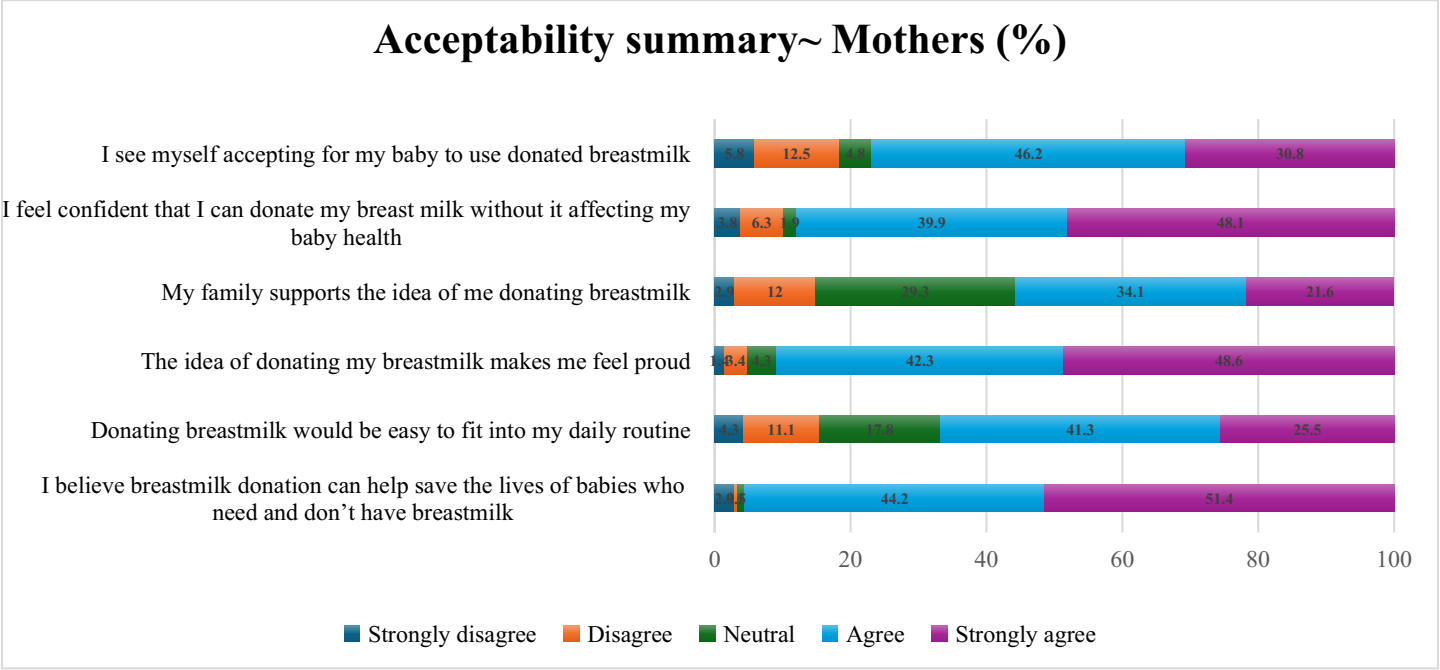

Figure 1 summarizes the acceptability of breast-milk donation among mothers across six items

On the other hand, the HCPs' agreement with each statement ranged from 53.7% for seeing ease in managing the implementation of breastmilk donation program in their hospitals to 80.5% for feeling confident and comfortable promoting and explaining the benefits of breast milk donation program. The highest proportion of disagreement was observed for seeing ease in managing the implementation of breastmilk donation programs in their hospitals, with 29.3% (Figure 2).

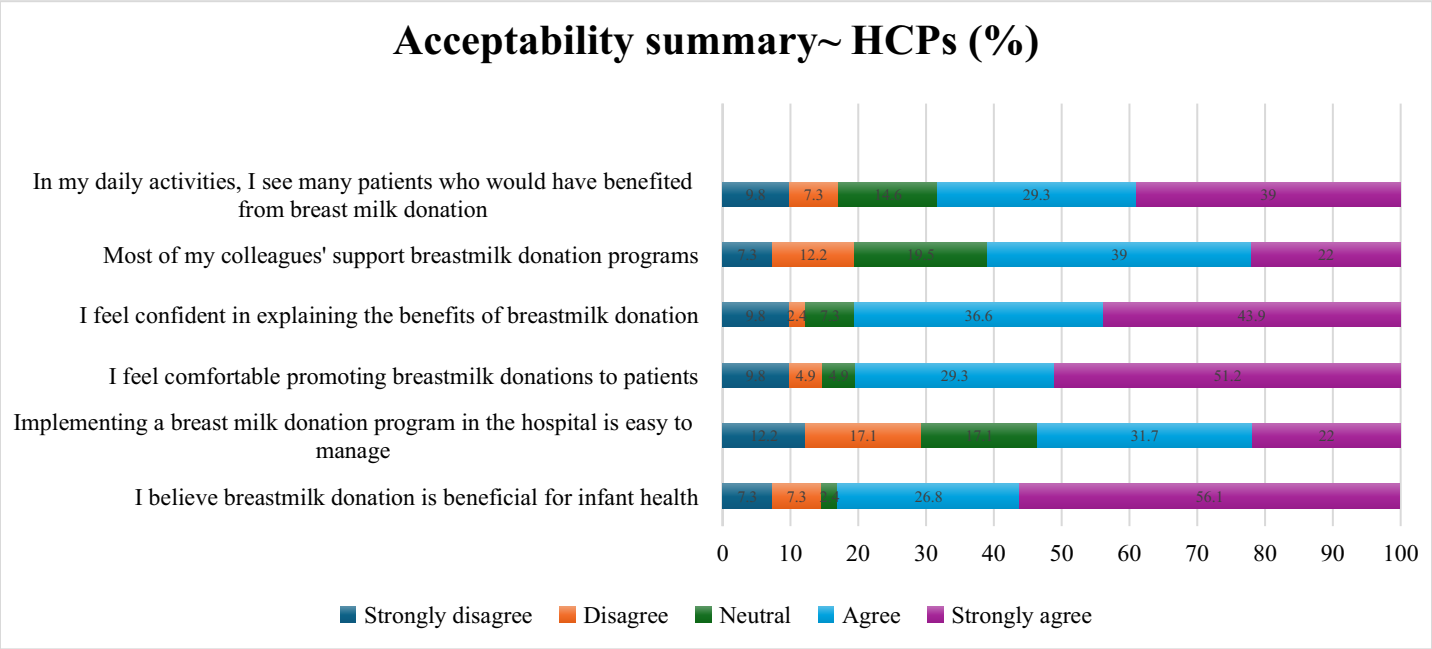

Figure 2 Summarizes the acceptability of breast milk donation among HCPs across six items

Using a cutoff of 2.4, which marks the beginning of the "agree" range on the Likert scale, acceptability scores were dichotomized into "agree" (≥ 2.4) and "disagree/neutral" (< 2.4). Based on this classification, the overall acceptability of the breast milk donation program was high. Among mothers, 176 (84.6%) scored in the "agree" category while 32 (15.4%) either "disagreed" or were "neutral" about the program. Among the healthcare providers, 82.9% (n = 34) agreed whereas 7 (17.1%) disagreed or remained neutral. The mean acceptability score among mothers was 3.02 (SD = 0.77), with individual scores ranging from 0 to 4. Among healthcare providers, the mean was 2.83 (SD = 1.10).

This overall acceptability correlated with mothers' expression of willingness to donate where 183 (88.0%) of mothers answered that they would be willing to donate, however only 161 (77.4%) were willing to accept donated milk for their babies (Table 7).

Table 7 Willingness to donate and accept donated breast milk

Variable	**Categories**	**n (%)**
Willingness to donate to other babies	Yes	183 (88%)
	No	20 (9.6%)
	Maybe, depending on the circumstance	5 (2.4%)
Willingness to accept donated breast milk	Yes	161 (77.4%)
	No	32 (15.4%)

	Maybe, depending on the circumstances	15 (7.2%)

Kruskal–Wallis (H) and Mann–Whitney (U) tests comparing mean acceptability scores among mothers across demographic characteristics showed a significant difference by hospital (U 30335.0, Z= −5.49, $p < 0.001$). Significant differences in acceptability scores were also observed by educational level (H (3) = 11.01, $p = 0.012$) and economic status (Ubudehe category) (H (2) = 8.43, p = 0.015).

No significant differences were observed across age groups (H(3) = 1.65, p = 0.649), occupation (H(2) = 2.231, p = 0.328), pregnancy status (if it was their first pregnancy or not) (U = 4099.0, $p = 0.327$), prior awareness of breastmilk donation (U = 2117.5, $p = 0.970$), or source of information (H(3) = 5.75, $p = 0.124$) (Table 8).

Table 8 Acceptability across mothers' socio-economic characteristics

Variable	Subcategory	n	Acceptability score	Statistic	p-value
Hospital	Kirehe L2TH	100	96.0%	U = 3035.0	<0.001
	Ruhengeri L2TH	108	80.0%		
Educational level	No formal education	28	64.3%	H (3) = 11.01	0.012
	Primary	94	87.0%		
	Secondary	68	77.9%		
	Tertiary	18	100%		
Economic status	Category 1	21	71.4%	H (2) = 8.43	0.015
	Category 2	93	86.0%		
	Category 3	94	86.2%		
Mothers' age group	<20	13	84.6%	H (3) = 1.65	0.649
	20–29	82	86.6%		
	30–39	97	82.5%		
	≥40	16	87.5%		
Occupation	Unemployed	47	80.9%	H (2) = 2.231	0.328
	Self-employment	152	84.9%		
	Formally employed	9	100%		
First pregnancy	No	147	85.7%	U = 4099.0	0.327
	Yes	61	85.0%		
	No	185	83.2%	U = 2117.5	0.970

Prior Awareness	Yes	23	95.7%		
Source of information	Never heard of it	185	83.2%	H (3) = 5.75	0.124
	Healthcare provider	13	100%		
	Family/ Friends	6	83.3%		
	Media	4	100%		

Comparisons of mean acceptability scores among HCPs showed no significant differences across demographic or professional characteristics. No difference was found in acceptability between hospitals (U = 178.5, Z = −0.54, p = 0.592) nor by years of professional experience (*U = 359.0, Z = −0.32, p = 0.751*).

Similarly, there were no significant differences across job titles, as indicated by the Kruskal-Wallis test (H(4) = 3.42, *p* = 0.489). Overall, acceptability levels among HCPs were consistent regardless of workplace, experience, or cadre (Table 9).

Table 9 Acceptability across HCPs' professional characteristics

Variable	**Subcategory**	**N**	**Acceptability score**	**Statistic**	**p-value**
Hospital	Kirehe L2TH	20	80.0%	U = 178.5	0.592
	Ruhengeri L2TH	21	85.7%		
Job	Doctor	3	100%	H = 3.42	0.489
	Nurse	31	77.4%		
	Midwife	4	100%		
	Expert-Mother	2	100%		
	Social Worker	1	100%		
Years of Experience	<3 years	27	81.5%	U = 359.0	0.751
	>3 years	14	85.7%		

4.1.5 Factors Associated with Acceptability of Breast Milk Donation among Mothers

Seven factors were found to be associated with breast milk donation acceptability level: 1) mothers who believed that breast milk donation reduces the risk of infections were more likely to ($\chi^2(1)=4.45$, $p=0.035$); 2) mothers who perceived that breast milk donation reduces neonatal mortality ($\chi^2(1)=6.42$, $p=0.011$); 3) fear of affecting one's milk supply ($\chi^2(1)=13.03$, $p<0.001$); 4) Lack of hospital infrastructure to support milk banking ($\chi^2(1)=17.71$, $p<0.001$); 5) creation of a milk bank in the hospital ($\chi^2(1)=15.05$, $p<0.001$), and 6) sharing breast milk could create familial ties ($\chi^2(2)=37.06$, $p<0.001$) and 7) Perceived risk of disease transmission through donated milk ($\chi^2(2)=18.44$, $p<0.001$) (Table 10).

Table 10 Factors associated with mothers' acceptance of breast milk donation and banking

Variable	**Category**	**Sub-category**	**Acceptability n (%)**	**P-value**
Benefits	Improve infant nutrition	No	6 (75%)	0.442
		Yes	170 (85%)	
	Reduce the risk of infections	No	54 (93.1%)	0.035
		Yes	122 (81.3%)	
	Reduce neonatal mortality	No	30 (100%)	0.011
		Yes	145 (81.9%)	
	Reduce the cost	No	172 (84.7%)	0.772
		Yes	4 (80%)	
Barriers	Lack of knowledge	No	10 (71.4%)	0.157
		Yes	166 (85.6%)	
	Cultural beliefs and stigma	No	34 (89.5)	0.359
		Yes	142 (83.5)	
	Concerns about milk safety	No	37 (90.2)	0.265
		Yes	139 (83.2)	
	Lack of hospital infrastructure for milk banking	No	93 (95.9)	<0.001
		Yes	83 (74.8)	

	Fear of affecting my milk supply	No	94 (94)	<0.001
		Yes	82 (75.9)	
Facilitators	Better education and awareness programs	No	16 (84.2)	0.959
		Yes	160 (84.7)	
	Support from healthcare providers	No	30 (90.9)	0.275
		Yes	146 (83.4)	
	Creation of milk banks in hospitals	No	93 (94.9)	<0.001
		Yes	83 (75.5)	
Sharing breast milk with others would create familial ties or relationships	No		13 (48.1)	<0.001
	Yes		123 (93.9)	
Risk of disease transmission through breast milk donation	No		71 (94.7)	<0.001
	Yes		61 (71.8)	

4.1.6 Factors Associated with Acceptability of Breast Milk Donation among Healthcare Providers (Table 11)

For healthcare providers, significant associations were found between acceptability and participants' familiarity with the concept of breast milk donation and banking ($\chi^2(2) = 8.184$, $p = 0.017$). Those who were somewhat or very familiar with the concept demonstrated higher acceptability rates (92.3% and 82.9%, respectively) compared to those not familiar (80%). Feasibility perception of implementing a breast milk bank in the hospital showed a significant relationship with acceptability ($\chi^2(3) = 11.150$, $p = 0.011$) where 89.0% of the HCPs providers who found it feasible agreed to the program. The need for hospital-specific policies to support milk

donation programs was another area with significant association to acceptability ($\chi^2(1) = 4.98$, $p = 0.026$), indicating most participants (85%) agreed with policy development.

Table 11 Factors associated with HCPs acceptability of breast milk donation and banking

Category	**Variable**	**Sub-category**	**Acceptability N (%)**	**P-value**
Familiarity	Familiarity	Not familiar	8 (80%)	0.017
		Somewhat	24 (92.3%)	
		Very familiar	2 (40%)	
Benefit to neonates	Improved nutrition	No	5 (100%)	0.279
		Yes	29 (80.6%)	
	Reduced infections	No	10 (83.3%)	0.965
		Yes	24 (82.8%)	
	Reduced mortality	No	9 (90%)	0.494
		Yes	25 (80.6%)	
Feasibility	Feasibility	Feasible	33 (89.0%)	0.011
		Not feasible	1 (33.3%)	
Challenge	Lack of awareness	No	10 (100%)	0.099
		Yes	24 (77.4%)	
	Cultural barriers	No	6 (66.7%)	0.142
		Yes	28 (87.5%)	
	Lack of infrastructure	No	9 (90%)	0.494
		Yes	25 (80.6%)	
	Staff training needs	No	12 (85.7%)	0.733
		Yes	22 (81.5%)	

Policy	Policy needs	No	0 (0%)	0.026
		Yes	34 (85%)	

Overall, the quantitative findings show that while acceptability of donor breast milk is generally high, it is shaped by persistent gaps in awareness, safety concerns, and cultural interpretations; patterns that require deeper exploration through qualitative insights.

4.2 Qualitative results

A total of 20 mothers of neonates were admitted to the neonatal units; 10 from KDH and 10 from RL2TH; participated in the qualitative interviews. A convenience sampling approach was used to recruit mothers who were available and willing to share their experiences, regardless of their age, parity, ubudehe category, education level, or occupation. Interviews explored their experiences with neonatal feeding, cultural and social beliefs, perceptions of safety, and views on the potential introduction of a breast milk donation program. In addition, 10 healthcare providers were interviewed (5 from each hospital), including doctors, nurses, midwives, and expert mothers involved in neonatal care, irrespective of their years of experience. These interviews examined feasibility and operational considerations, institutional readiness, and anticipated challenges and enabling factors for implementing donor breast milk within the hospital setting.

Figure 3a and 4 summarizes the themes, subthemes, categories, and codes that emerged from the analysis.

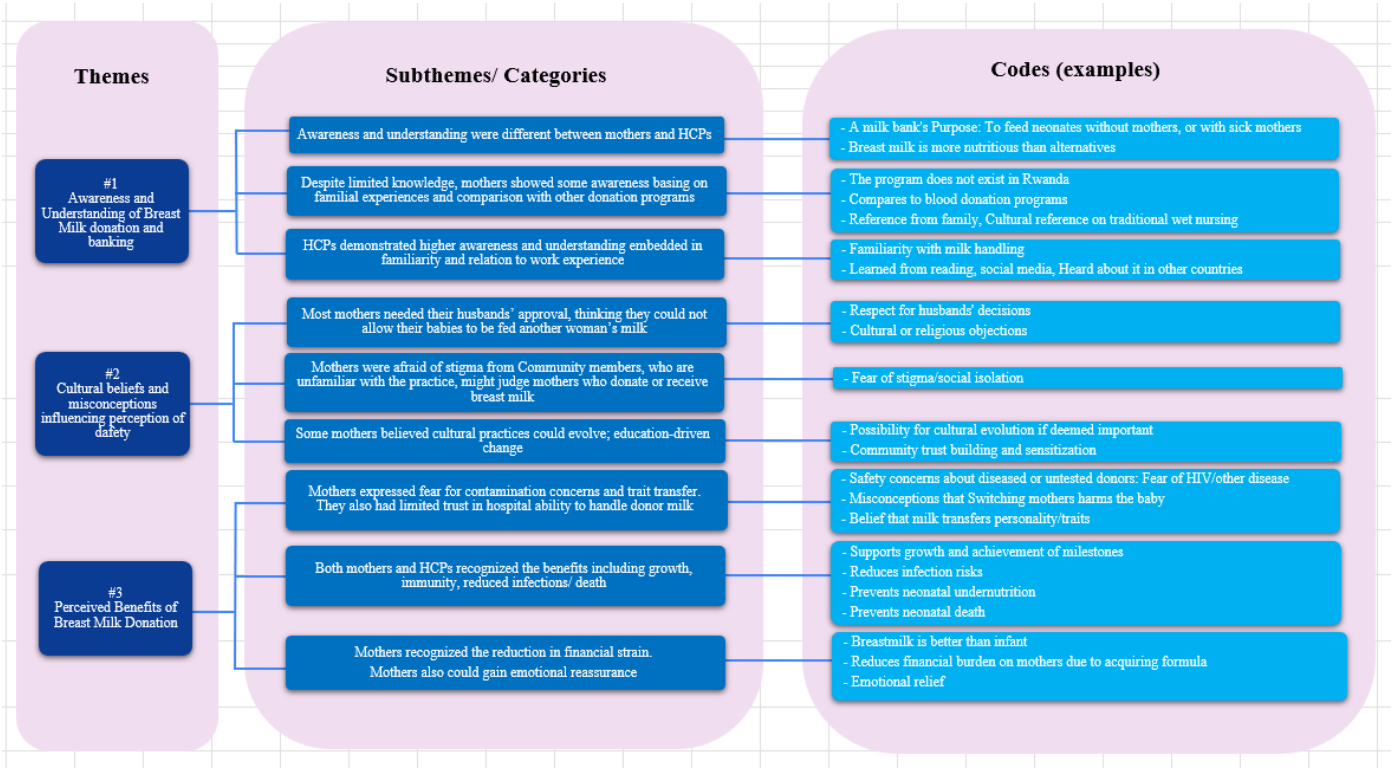

Figure 3 Qualitative themes 1, 2, 3

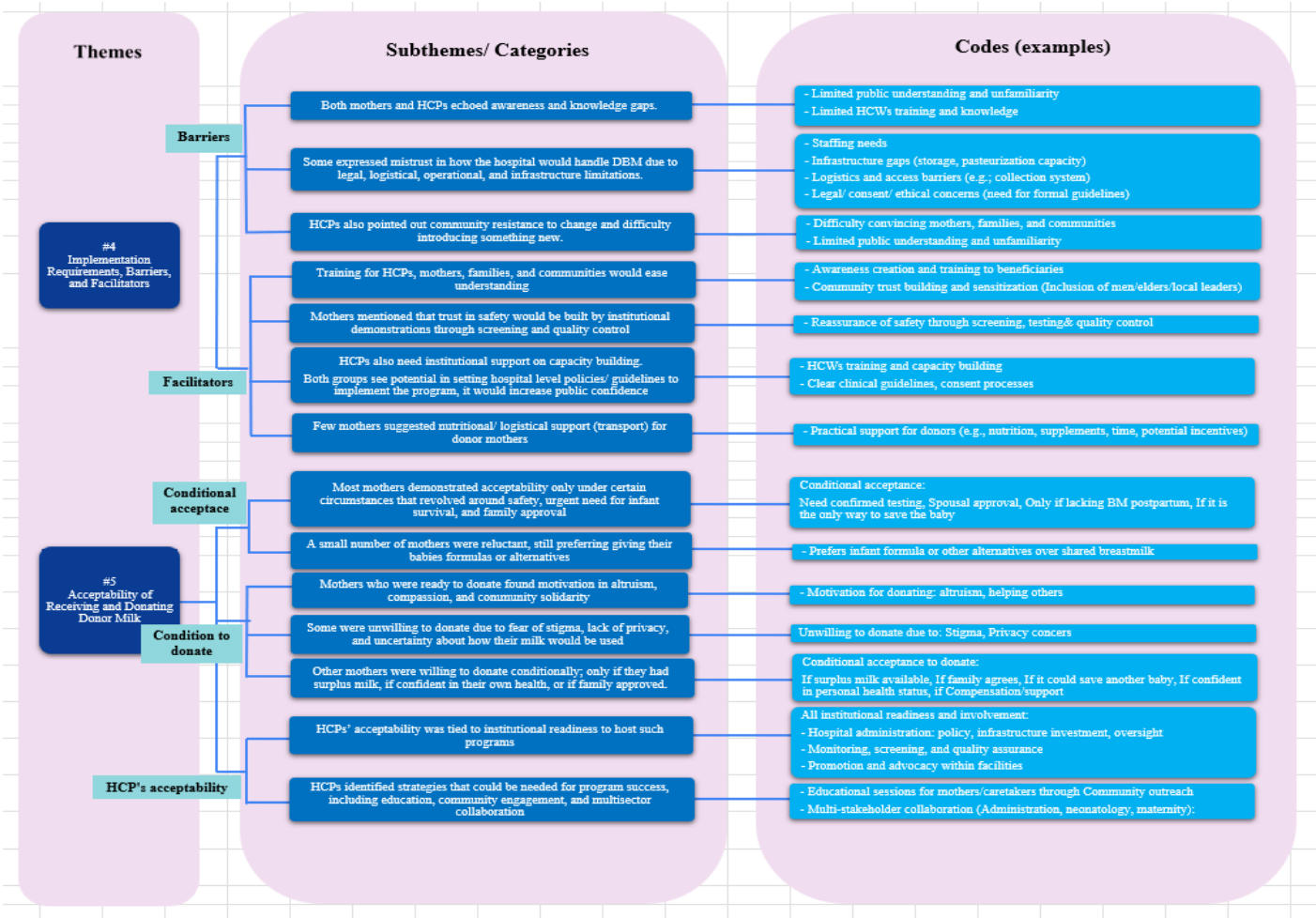

Figure 4 Qualitative themes 4, 5

4.2.1 Theme 1: Awareness and understanding of breast milk donation and banking differ between mothers and healthcare providers.

Consistent with quantitative findings, most mothers demonstrated limited awareness of breast milk donation, stating that they had never heard about breastmilk donation. Several described it similar to traditional wet nursing, where women breastfed each other's children within families or neighborhoods. A few also compared it to blood donation, saying that both involve giving something from the body to help others in need.

> *We see it nowhere. Except that some of us see it on social media, but the mothers residing in rural areas, they cannot see it anywhere.* ~M2-08

…The same way that in the past they used to tell us that when your mother died, you could go to breastfeed from another neighboring mother, and it would be ok… my grandmother breastfed a girl from region whose mother had died. ~M2-07

I would consider it a similar way when the baby does not have enough blood; they give them additional blood. The same way they give them donated blood… it would be the same to breastmilk, donated to the ones that are not being able to directly obtain breastmilk from the mother. ~M2-02

Among those with some knowledge, many explained that breast milk donation helps feed babies whose mothers are deceased, ill, or unable to produce enough milk. Others associated with its purpose with caring for premature infants or those unable to breastfeed immediately after birth. A few also mentioned that breast milk is more nutritious than other feeding alternatives. Some mothers expressed curiosity but said they lacked information about how breast milk is collected, stored, or used in hospitals.

There are mothers that do not have breastmilk, or the mothers have passed away, if such babies got the donated breastmilk, it would be good for their nutrition and growth, thus beneficial to us all. ~ M2-03

We learnt that breastmilk is the first thing that has all the nutrients that the baby needs, and that nothing could replace it. So, if the breastmilk is available, it is understandable that it is better to give the baby breastmilk than giving formula. ~ M2-08

Quantitative findings showed comparably higher awareness among healthcare providers. It was complemented by qualitative narratives where most reported that they were familiar with the concept of breast milk donation and banking. Some stated that they had learned about it through professional experience, reading, or hearing about similar programs in other countries. Healthcare providers mentioned that they knew the milk should be expressed, stored under hygienic conditions, and used for infants whose mothers are unable to breastfeed due to illness, death, or insufficient milk production. While awareness among healthcare providers was higher, both groups identified the absence of formal programs and limited national-level information as key barriers to wider understanding.

Breastmilk donation and banking, I know that that exists in foreign countries, but to this day, there is no such program in Rwanda. ~H2-03

It can be helpful, sometimes the neonates are born but their mothers don't have BM, or the mother is dead, or transferred to another hospital without the baby... therefore it can be helpful to help that child to have a healthy life. ~ H1-01

What I know about breast milk banking, we don't have that in Rwanda. But I have read around. It is a banking, or service/department that prepares and stores breast milk. The breast milk is kept, designated to feed neonates that do not have their mothers, or whose mothers are sick. Such breast milk, as I read, helps such neonates, helping them to stay well nourished; as we know, breast milk contains natural ingredients to facilitate better growth. Secondly, since breast milk is well kept, it protects neonates from infections. ~ H2-01

4.2.2 Theme 2: Cultural beliefs and misconceptions influence mothers' views on breast milk donation and its safety.

Qualitative findings provided deeper insight into the cultural factors shaping mothers' perceptions of breast milk donation. Many mothers spoke of deep respect for their husbands' opinions, noting that some men might not approve of their child being fed another woman's milk. Participants also mentioned fears of stigma or social isolation in communities unfamiliar with the practice, with some suggesting that community members might judge or misunderstand mothers who donate or receive breast milk. Others believed that cultural practices could evolve through continued education for both parents and community members, increasing awareness and openness toward the practice.

Yes, culture-wise… there are times when husbands do not understand the way you are going to feed his baby another woman's breastmilk. And here, we highly respect our husbands…~M2-07

In the village, they can isolate you/ stigmatize you... because you donated BM, because of how people understand things differently… yet you are just helping ~ M1-05

…If the donating woman is from another family, it would really be difficult. But it would require educating us all, including the husband, to make us understand that it would be safe. ~M2-07

Concerns and misconceptions were also commonly raised. Some mothers expressed fears that donated milk could carry diseases or contamination if not properly tested, while others worried that switching mothers or feeding from multiple women could harm the baby. Limited understanding of milk screening and storage processes led to reduced trust in the safety of donated milk.

Concern is that the donor might have an unknown disease, I think I would be concerned if there is no thorough research/ testing to this BM, on the side of healthcare workers and preparations. ~~ M1-08

...currently I can't breastfeed. And maybe in the future I will be healed and I can breastfeed, but my baby has already been fed by someone else. That would mean that my own breastmilk would hurt the baby since s/he would have been fed another mother's breastmilk. ~M2-01

...since nowadays there exist a lot of conditions like AIDs... you understand it would be bad to donate the breastmilk from a person with AIDs. ~M2-07

Healthcare providers acknowledge similar cultural and safety concerns. Many stated that these beliefs reflect limited information rather than strong opposition to milk donation. These accounts underscore that resistance to breast milk donation stems possibly from limited understanding rather than cultural opposition, suggesting that targeted education could increase acceptance

As we know, Africans or even in Rwanda, breastfeeding is cultural. It is not practice, it does not normally exist, that someone feeds their neonate someone else's breastmilk. But I think we can grow past such an understanding. Yes, our culture is beautiful, we can conserve it, but again, a culture that limits our development, we must avoid that... ~H2-01

... but if there are teachings, the believes would change, because now people don't understand it. It can be helpful. ~~H1-01

4.2.3 Theme 3: Both mothers and healthcare providers recognized multiple benefits of breast milk donation for infant health and maternal emotional and financial assurance.

Both mothers and healthcare providers strongly endorsed the benefits of breast milk donation, describing it as highly advantageous for infants and mothers alike. For infants, participants emphasized that donated breast milk supports healthy growth, strengthens immunity, helps babies reach developmental milestones, and reduces the risk of infections, undernutrition, and neonatal death. Many mothers also described breast milk as "what the baby is meant to have," viewing it as superior to formula or other substitutes. For mothers, several highlighted that donation can reduce financial strain for families who cannot afford formulas and prevent reliance on unsafe alternatives such as cow milk, offering both practical and emotional reassurance. Together, these findings indicate broad perceived benefits of breast milk donation, reinforcing its potential role in improving neonatal outcomes and supporting maternal wellbeing.

...the doctors tell us that breastmilk is better, since it protects the baby from frequent diseases, favorizes fast weight gain, thus quickening the time we get to go back home. ~ M2-07

Breastmilk is essential, helps babies grow well, protects them from frequently contracting infections, and as we are thought and we see for ourselves, breastmilk is essential. ~M2-09

for me I'm happy for this program because it can prevent mother from stress and anxiety and malnutrition for babies. And those formulars are expensive compared to the BM~~ H1-04

Primarily because it would help the parents who opt for infant formulas. Breastmilk contains nutrients and antibodies that can't be found in infant formulas. ~H2-04

Yes, as doctors explained to us that there is nothing that could replace breastmilk; the formula is because there is no other option. It is just so that the baby does not die of hunger. Breastmilk has nutrients. We learnt that breastmilk is the first thing that has all the nutrients that the baby needs, and that nothing could replace it. So, if the breastmilk is available, it is understandable that it is better to give the baby breastmilk than giving formula. ~ M2-08

If I wouldn't have to buy it, I think I would be ok. Because they are currently asking me to pay 20k for the formula, I can't find that. ~M2-09

4.2.4 Theme 4: Successful Implementation of Breast Milk Donation Programs Depends on Awareness, Trust, and Institutional Support

Subtheme 4a: Limited Awareness, Infrastructure, and Trust Reduce Program Feasibility

Participants identified several barriers that limited the acceptability and practical implementation of breast milk donation and banking. Complementary with the quantitative findings, mothers frequently cited limited awareness, understanding, and little to no familiarity with the concept. Some expressed uncertainty about screening and safety procedures, fear of infections; others expressed mistrust in how hospitals would handle or store donated milk.

The primary challenge is little understanding regarding that. If they were trained and understood the reasoning for all that, the community would understand. ~ M2-04

… but ensuring the safety would be worrisome. If there was a way to ensure that the donated breastmilk is safe, I think sharing and donating breastmilk would be ok. ~M2-04

I wouldn't trust that it would have been prepared. ~ M2-01

Healthcare providers echoed similar concerns, emphasizing gaps in public knowledge and limited professional training about breast milk banking. They noted that without clear institutional guidelines, proper storage facilities, or established laboratory procedures for screening and pasteurization, implementation would remain challenging.

> *Barriers are there like infrastructures, that bank, also teaching the mothers that will donate, and also healthcare providers having no knowledge about it can be a barrier ~H1-03*

> *The primary challenge is material hygiene, materials to express in, hygiene of where the milk will be kept, all of that, it requires a lot of material resources, fridges to keep them, and then other materials to warm them before giving them to the baby. ~H2-04*

> *Even ourselves, the hospital workers, there is a lot we do not know about the program. It would require training for us to also understand. ~H2-05*

Some participants also mentioned logistical and operational constraints, as well as ethical and legal concerns related to consent. Others questioned the feasibility and sustainability of maintaining milk banks in resource-limited settings, citing costs, equipment maintenance, and the challenge of ensuring a continuous supply.

> *...But on agreement with the baby's parent, then I would consider giving the breastmilk. ~M2-08*

> *I wonder how the breastmilk could get to us. I live very far away. Thinking of coming here every day to get the breast milk, of bringing the milk I could be donating, that would be very difficult. ~M2-09*

Subtheme 4b: Education, institutional support, and community engagement can facilitate the safe and acceptable implementation of breast milk donation programs.

Despite these barriers, both mothers and healthcare providers identified practical strategies that could facilitate the successful introduction of breast milk donation in Rwanda.

Mothers recommended that health professionals lead education sessions within communities, involving men, elders, and local leaders to counter stigma and cultural misconceptions. They also suggested that hospitals demonstrate milk safety through visible screening, testing, and quality-control measures. Healthcare providers highlighted the need for institutional support through professional training. They also recommended materials for proper handling and storage systems.

> *It requires creating awareness. Regarding safety, those in charge have to ensure the breastmilk is safe, since we all have different diseases. ~M2-04*

If you keep educating us about it, so that we really understand, even our husbands and families, local leaders, so that everyone understands that it is something that is ok. ~M2-07

I think it's okay, but also make sure that the BM, which is kept, is kept in a safe place that they won't cause any harm to the baby, ..." ~ H1-02

The primary support is about hospital staff, then training the hospital staff, followed by training mothers as well as the community for them to understand that such a program exists. Then the hospital would need materials that will be used to prepare the breast milk donated. ~H2-03

Both groups agreed that collaboration and following hospital-level policies/guidelines to implement the program would increase public confidence. A few also suggested providing nutritional or logistical support for donor mothers to encourage participation.

I think we could all work together to train the community, but only after have we also been trained. Another contribution would be to adhere to the established programs, following the guidelines that would rule the donation and storage of breastmilk and give it as we have been trained. ~H2-02

There are times mothers can't afford things that make them have more BM. Therefore, mothers can be helped by getting those things like porridge, or other things that helps to increase the BM ~ M1-09

4.2.5 Theme 5: Mothers' and Healthcare Providers' Acceptability of Breast Milk Donation Is Shaped by Safety Perceptions, Social Support, and Institutional Readiness

Subtheme 5a: Mothers' willingness to receive donor milk is conditional on perceived safety, personal need, and family approval.

Quantitative findings showed generally high but conditional acceptability of donor milk, which was further supported by qualitative accounts. Most mothers said they would accept donated breast milk only under specific circumstances such as when their own supply was insufficient, during illness, or if it was the only way to save their baby's life. Participants emphasized the need for confirmed testing, hospital supervision, and hygienic handling of donated milk. Several mothers added that they would seek approval from their spouses or family before deciding.

Maybe if it saved my baby, then I would agree. But it would be difficult for me to understand. ~M2-01

After breastmilk has been checked against all the possible contracted diseases. ~M2-07

Me giving my baby donated milk, it would really be difficult... the father would also have to decide. ~M2-08

If you keep educating us about it, so that we really understand, even our husbands and families, local leaders, so that everyone understands that it is something that is ok. ~M2-07

Despite this general openness, a small number of mothers expressed reluctance to use donated milk altogether, preferring alternatives such as infant formula or cow milk due to discomfort with using another woman's milk.

I wouldn't agree (to give my baby donated breastmilk) … Since me I don't have enough, I would keep giving my baby the infant formula, until I get enough breastmilk… I would find other ways to find my own breastmilk, but I cannot feed my baby another person's breastmilk. ~ M2-01

I would find cowmilk or any other type of milk. ~ M2-01

But I think that instead of another mother giving me their breast milk, it would be better to use the formula provided by the hospital. ~ M2-02

Subtheme 5b: Willingness to Donate Milk Is Motivated by Altruism but Limited by Practical and Social Concerns

Most mothers expressed readiness to donate breast milk, particularly if they had surplus milk or if the donation could help save another baby's life. Altruism and compassion were common motivations, with several mothers describing donation as an act of kindness and community solidarity.

Yes, I would (donate breastmilk), the same way if I don't have enough, someone else can give me theirs. …There is no problem, a person can donate happily, since babies are ours all. ~ M2-03

In some instances, willingness to donate was also conditional. Mothers emphasized that they would only participate if they were confident in their own health, and if family members, especially husbands, were approved. A few mentioned that they would appreciate practical support such as nutritional supplements or compensation to offset the time and effort involved. Smaller numbers were unwilling to donate, fear of stigma, or uncertainty about how their milk would be used.

Yes, if I trusted myself that I don't have any other disease, I would donate the breastmilk. But then I would worry, wondering if it would still be ok for another baby. ~M2-02

...If it was the only way to save that baby, and the mother agrees, I could give the breastmilk. ~M2-08

There are times mothers can't afford things that make them have more BM... therefore mother can be helped by getting those things like porridge, or other things that helps to increase the BM ~ M1-09

Subtheme 5c: Healthcare Providers Link Acceptability to Institutional Capacity and Program Feasibility

Healthcare providers supported breast milk donation but emphasized that their willingness to participate and promote it depended on institutional capacity. They stressed that all staff should be trained to support mothers directly. Also, providers noted that acceptability would be strengthened when staff are confident in existing systems, including storage and testing, and when hospitals foster ongoing education and engagement with both staff and stakeholders.

First is that every HCWs should have the knowledge, so that they can support the mothers they met, without waiting for specific people to come and do the teaching. ~ H1-02. In hospital we need many things, advocacy, because I think we will need other materials so that it can happen, and people also need a lot of teaching and also, we will need stakeholders ~ H1-05

These findings suggest that to establish a breast-milk bank in Rwanda (or similar settings), attention must be given to awareness-raising, culturally sensitive education, trust in screening/safety, and the role of healthcare providers as advocates.

In hospital we need many things, advocacy, because I think we will need other materials so that it can happen, and people also need a lot of teachings and, we will need stakeholders ~ H1-05

CHAPTER 5: DISCUSSION

The study specifically explored the acceptability of breast milk donation for neonatal feeding among mothers and healthcare providers in two Rwandan district hospitals. Overall, both groups showed high levels of acceptability, reflecting broad recognition of donor milk's potential to improve neonatal health outcomes. These findings are consistent with studies in other low- and middle-income countries showing positive attitudes and growing support for donor milk initiatives when communities are adequately informed (M. A. M. Ahmed et al., 2024; Ogundare et al., 2024).

Quantitative findings demonstrated generally high acceptability of breast milk donation among both mothers and healthcare providers, with strong agreement that donor milk benefits vulnerable infants and is safe when its handling, screening, and pasteurization procedures are clearly explained. Acceptability did not vary significantly across most demographic characteristics. However, the results also revealed important gaps; including low awareness, persistent fears of disease transmission, and cultural discomfort with sharing bodily fluids; which contributed to lower acceptance for some participants.

Qualitative data provided explanatory depth to these patterns. Many mothers had never heard of donor milk or milk banking and those who had heard about it often interpreted the concept through the lens of traditional wet nursing. Misconceptions about safety, contamination, and infection risk, particularly HIV, were common. Additionally, mothers anticipated social barriers such as spousal influence, family disapproval, and community perceptions. At the same time, both mothers and healthcare providers expressed strong motivations that could facilitate adoption: a shared belief in the health benefits of breast milk for vulnerable infants, trust in biomedical processes, perceived financial relief compared to formula, and cultural values of helping others. Concerns were largely centered on safety, hidden infections, and limited health-system readiness, rather than intrinsic opposition to the idea of donating or receiving milk.

Together, these quantitative and qualitative findings demonstrate that donor milk is broadly acceptable in Rwanda when concerns about safety, awareness, and institutional capacity are addressed. This alignment across data sources is illustrated in Figure 5, which highlights how both

strands converge around similar facilitators and barriers.

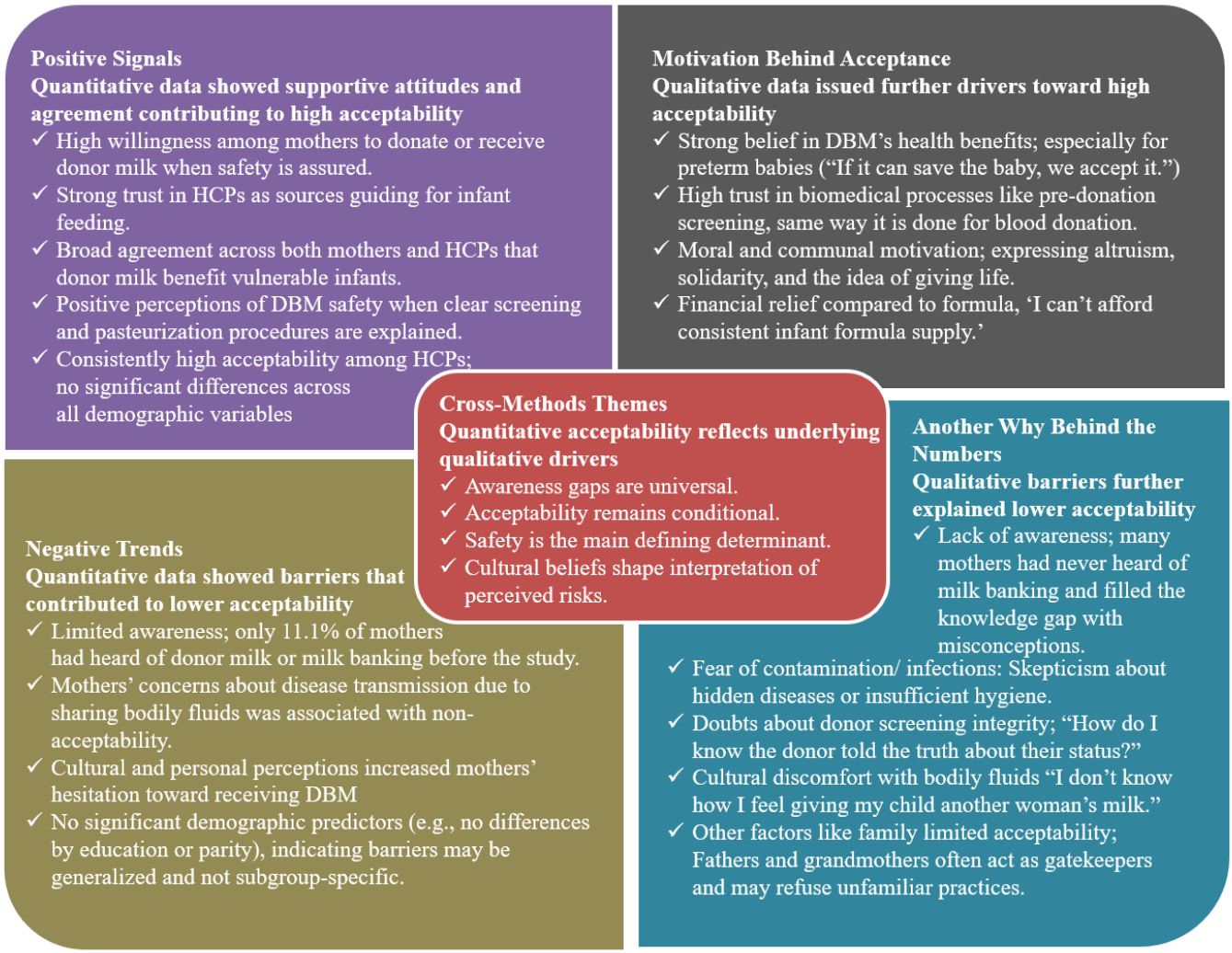

Figure 5 Link between quantitative and qualitative themes

Despite the high acceptability observed, awareness of breast milk donation and banking among mothers was very limited, with nearly 89% of mothers reporting that they had never heard of the concept. This low level of awareness mirrors findings from similar studies in Kenya, Uganda, Nigeria, and Ghana, where donor milk programs are still emerging (Kimani-Murage et al., 2019; Tende et al., 2023). Our qualitative data revealed that many mothers equated breast milk donation with traditional wet nursing, suggesting that pre-existing cultural analogies could be leveraged in awareness campaigns. Conversely, HCPs demonstrated greater conceptual understanding and familiarity but highlighted the absence of structured system or training to guide milk donation or

storage, echoing constraints reported in other African settings where infrastructure and policy gaps hinder adoption and implementation (Obeng-Gyasi et al., 2025; Wilunda et al., 2023).

Cultural beliefs strongly shaped participants' comfort with willingness to donate or receive breast milk. Many mothers indicated that husbands' or elders' approval and opinions would influence their decisions, consistent with patriarchal norms and community influence observed in Uganda and Ghana (Barbi et al., 2020; Magowan et al., 2020). Concerns about disease transmission, contamination, and the belief that sharing milk might create familial ties also reduced comfort with the practice. These fears echo prior research showing that misconceptions around infection transmission, particularly related to HIV, remains a major barrier in African contexts (Kimani-Murage et al., 2019). Importantly Both mothers and providers emphasized that these beliefs stem primarily from lack of knowledge rather than outright rejection of milk donation, underscoring the need of culturally sensitive education.

Participants in both groups strongly agreed that donor milk improves infant nutrition, reduces infections, and lowers neonatal mortality. These perceptions are in line with global evidence regarding donor milk's protective effects against necrotizing enterocolitis and other morbidities, especially for preterm and low-birth-weight infants (Quigley, Embleton, et al., 2024). Additionally, mothers described emotional and financial relief as secondary benefits, including reduced stress related to feeding difficulties and the high cost of formula. These broader psychosocial and economic dimensions align with global findings that donor milk contributes to maternal well-being and house stability especially in low resource settings (Brown et al., 2024; *CONBF-Global-Brief-ENG-2023-10-31.Pdf*, . Respondents also viewed breast milk donation as an opportunity to support vulnerable preterm infants or neonates who lost their mothers, reinforcing the humanitarian values embedded in milk sharing practices.

Barriers identified in this study; low awareness, cultural stigma, safety concerns, and limited infrastructure; aligned with evidence from other sub-Saharan African contexts (M. A. M. Ahmed et al., 2024; Ogundare et al., 2024). Mothers' mistrust regarding how donated milk would be handled highlights the need for transparent safety protocols, public communication, and visible systems for screening and pasteurization. HCPs similarly emphasized gaps in cold-chain facilities and standard operating procedures as key obstacles to implementation. Nevertheless, both groups agreed that awareness, professional health support, and clear institutional policies could substantially enhance acceptability. This mirrors lessons from Brazil's successful milk bank network, where strong policy backing and systematic training contributed to successful implementation (Leila Doshmangir et al., 2019; Mathias et al., 2023; Morosini, 2024; Subramanian, 2023).

Quantitative analysis revealed that education level and socioeconomic status were significantly associated with mothers' acceptability of breast milk donation, suggesting that health literacy influences perceived safety and trust in milk donation. This finding aligns with previous studies demonstrating that exposure to health information enhances acceptance and trust in milk donation (Bi et al., 2015). Additionally, beliefs about safety, infection risks, milk handling, and cultural acceptability strongly predicted willingness to donate or receive donor milk. Among HCPs, familiarity with the concept and perceived institutional feasibility shaped acceptability, highlighting the need for capacity-building and policy support.

Although 88% of mothers were willing to donate breast milk and 77% were willing to receive donor milk for their infants, acceptance was conditional, often dependent on safety assurance, clear need, and family approval. Similar conditional acceptance has been reported in Uganda and Nigeria, where willingness increased when education and safety information were provided (M. A. M. Ahmed et al., 2024; Ogundare et al., 2024). HCPs expressed high willingness to support milk donation but emphasized that their participation would depend on institutional readiness, availability of guidelines, and training.

Overall, these findings suggest that establishing a breast milk bank in Rwanda, and similar settings, requires coordinated efforts across awareness-raising, culturally sensitive community engagement, assurance of safety and screening, and strengthening of institutional capacity. HCPs are positioned to play a critical role as advocates, but their effectiveness will depend on clear policies, training, and infrastructure. The convergence of motivations and barriers between mothers and providers highlights a strong foundation upon which national and facility-level systems can be built to promote donor breast milk for neonatal care.

Limitations of the Study

While this study provides important insights into the acceptability and determinants of breast milk donation and banking among mothers and healthcare providers in two Rwandan hospitals, several limitations should be acknowledged.

First, the study was conducted in only two district hospitals, which may limit the generalizability of the findings. Although these hospitals serve diverse rural populations and represent typical Rwandan neonatal care contexts, perspectives from urban or private hospitals may differ.

Second, awareness of breast milk donation was extremely low among mothers, which may have influenced how participants interpreted some of the survey items. Even though data collectors provided standardized explanations during the interviews, unfamiliarity with the concept could have shaped responses in ways that were difficult to fully control.

Third, quantitative data relied on self-reported measures, which may have been affected by social desirability bias, especially given that breastfeeding is strongly promoted in Rwanda and healthcare providers are highly trusted. Mothers may have over-reported willingness to participate in donation programs or accept donor milk.

Fourth, the qualitative component used convenience sampling. Although saturation was achieved and participant diversity was sought, some voices; particularly those of highly conservative or hard-to-reach groups; may not have been fully represented.

Finally, the cross-sectional design and the absence of existing milk banks limit the ability to understand how acceptability might evolve over time. Participants' views were based on a hypothetical scenario, and their perceptions may change with real-world exposure to education, counselling, or actual implementation of donor milk banking. In addition, while this study explored acceptability and perceptions of breast milk donation and banking, it did not include a comprehensive assessment of logistical feasibility, which warrants further investigation through dedicated implementation or health systems research. Future evaluations in operational milk bank settings are needed to assess shifts in attitudes, practical experiences, and long-term acceptability.

Despite these limitations, this mixed-methods study provides foundational evidence to inform policy, planning, and early implementation of breast milk donation and banking programs in Rwanda. A key strength of this work is its methodological approach: because this is a novel area of research, a mixed-methods design was necessary to capture quantitative trends as well as the qualitative reasons behind them, insights that would not have been possible using only a single quantitative or qualitative approach.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

This study explored the acceptability and determinants of breast milk donation and breast milk banking among mothers and HCPs in two Rwandan district hospitals. Despite limited awareness, both groups expressed high acceptability of the concept, strong recognition of the clinical benefits, and willingness to engage in donation programs. Cultural beliefs, perceived safety, and understanding of the health benefits all play a significant role in shaping attitudes toward donor breast milk.

The findings demonstrate that mothers and HCPs generally perceive breast milk donation as a valuable intervention to improve neonatal nutrition, reduce morbidity, and support vulnerable infants. Key determinants of acceptability included perceived benefits for infant survival, positive attitudes toward milk sharing, belief in the feasibility of establishing milk banks, and willingness to participate. However, concerns such as cultural norms, fear of disease transmission, lack of knowledge, and inadequate hospital infrastructure remain important barriers.

Overall, the study provides evidence that breast milk donation and banking are acceptable and potentially feasible within Rwandan neonatal care settings, provided that adequate systems, infrastructure, and community engagement efforts are implemented. The findings contribute essential baseline information for policy formulation, preparatory planning, and advocacy for integrating donor breast milk into Rwanda's neonatal health strategy.

Building on these findings, several recommendations are proposed to support the establishment of donor breast milk services in Rwanda. Awareness and education on breast milk donation should be strengthened through structured community and hospital-based programs, including integration into routine antenatal and postnatal care. Additionally, hospitals will require improved infrastructure, clear operational guidelines, and trained staff to support safe milk banking. Also, national policies and regulatory frameworks should be developed to guide donor to eligibility, quality assurance, and monitoring. Furthermore, community engagement is essential to address cultural concerns and build trust in practice. Given the high acceptability demonstrated, establishing a pilot breast milk bank in a Rwandan hospital is a critical next step, supported by future research on implementation, cost effectiveness, long-term acceptability, and broader community perspectives.

Looking forward, this findings of this study provide a basis for establishing Rwanda's first breast milk bank, developing a national framework for integrating donor milk into neonatal care, and creating approaches that can be adopted in other hospitals. By offering actionable insights and a strong foundation for implementation, this project positions Rwanda to adopt a lifesaving, evidence-based intervention that aligns with national priorities for reducing neonatal mortality and improving infant health.

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APPENDICES

Appendix I: Informed consent

Informed consent form (English)

Dear participant,

You are invited to participate in a research project that seeks to better understand neonatal feeding practices and mothers' acceptability on breast milk donation in two hospitals in Rwanda hospitals.

The primary purpose of the study is to assess the acceptability of breast milk donation, mothers' and healthcare providers' understanding, knowledge, perceptions, and attitudes regarding breast milk donation as an alternative neonatal care strategy, for newborns who may not be able to receive milk directly from their mothers. The findings will help us to establish the acceptability of breastmilk donation to guide recommendations and inform future decisions about the establishment of milk banks in Rwanda, as well as in sub-Saharan countries.

There is no known risk towards you if you choose to participate in this study. However, if you feel uncomfortable during the interview, we can postpone or stop the interview. You also have the right to leave studying at any time. The interview will not collect your name or any identifiable information. We will not share your individual responses with anyone outside the research team at any time. If you allow us, we can record your responses, but if you are not comfortable, we can write your responses instead. All information will be kept safe in locked storage or with computer and file passwords and will be destroyed after 10 years.

If you have any questions, concerns, or complaints about this project, please contact irb@ughe.org, or kirehe.hospital@moh.gov.rw, or **www.rrh.gov.rw**.

Statement of consent

Your agreement indicates you acknowledge that;

- You have understood the content of this form.
- You have had the opportunity to ask questions and have received answers that were satisfactory.
- You agree to participate in this project.

Participant name	Signature/ fingerprint	Date
Researcher name/person requesting consent	Signature	Date

Informed consent form (Kinyarwanda)

Inyandiko isaba uburenganzira bwo gukora ubushakashatsi

Muvandimwe ugiye kwifatanya natwe mu bushakashatsi,

Urarikiwe gutanga umusanzu mu mushinga w'ubushakashatsi buzabera ku bitaro bibiri by' u Rwanda, bugamije kurebera hamwe uko ababyeyi bakira igikorwa cyo gutanga amashereka.

Intego nyamukuru y'ubu bushakashatsi ni ukurebera hamwe imyumvire, ubumenyi, n'ibitekerezo ababyeyi, abaforomo, ndetse n'abaganga, bafite ku itangwa n'ibikwa ry'amashereka nk'ubundi buryo bwafasha impinja zidashobora kubona amashereka y'ababyeyi babo bitewe n'impamvu zitandukanye. Aya makuru azadufasha kumva ndetse no gusobanukirwa uko igikorwa cyo gutanga amashereka cyakwakirwa, ibi bikazadufasha gukora ubukangurambaga mu gushyiraho ibigega by'amashereka mu Rwanda ndetse no mu bihugu biri munsi y'ubutayu bwa Sahara.

Nta kibazo gikomeye kizwi gishobora kukubaho bitewe no kuba wifatanyije natwe muri ubu bushakashatsi. Ariko igihe wumvishe ubangamiwe mu gihe uri kuganirizwa, ikiganiro gishobora gusubikwa kikimurirwa ikindi gihe cyangwa kigahagarikwa burundu. Ku bushake bwawe, wemerewe kureka kwifatanya natwe muri ubu bushakashatsi. Ubushakashatsi kandi, ntabwo buzakusanya amakuru yerekeye amazina cyangwa se n'indi myirondoro yawe bwite. Amakuru ari butangwe, tubijeje ko atazigera asangizwa n'umuntu uwo ari we wese, keretse abagize itsinda ry'ubushakashatsi. Nimubitwemerera turafata amajwi kugirango tuzabone uko twandika ibyo twaganiriye twitonze, ariko niba bibangamiye twakwandika nonaha. Nyuma yo kuyakoresha, amakuru yose azabikwa mu bubiko bwizewe, no muri mudasobwa irinzwe n' ijambobanga. Amakuru azabikwa mu gihe cy'imyaka icumi, nyuma y'aho azasibwa.

Niba ufite ikibazo, ikifuzo, cyangwa igitekerezo kuri ubu bushakashatsi, wakohereza ubutumwa kuri konti ya imeyili (e-mail) irb@ughe.org. Cyangwa kirehe.hospital@moh.gov.rw, cyangwa **www.rrh.gov.rw**

Niba ugiye kwifatanya natwe mu bushakashatsi, wemeye ko;

- Wasobanukiwe neza ibiri muri iyi nyandiko
- Wagize amahirwe yo kubaza ibibazo waba wagize kuri ubu bushakashatsi, wahawe n'ibisobanuro bihagije.
- Wemeye kwifatanya natwe muri ubu bushakashatsi.

Izina ry’ uwemeye kwifatanya natwe	Umukono/Igikumwe	Itariki
Izina ry’ukora ubushakashatsi/ usaba uruhushya rwo gukora ubushakashatsi	Umukono	

Appendix II: Data collection tools (English)

Mothers~ Quantitative Survey

Part 1: Demographic Information:

1. Age of the mother: _____
2. Educational level:
   - ❑ No formal education
   - ❑ Primary education
   - ❑ Secondary education
   - ❑ Tertiary education
   - ❑ Other (specify): _____
3. Occupation:
   - ❑ Farmer
   - ❑ Trader
   - ❑ Housewife
   - ❑ Healthcare worker
   - ❑ Other (specify): _____
4. Economic status (Ubudehe category):
   - ❑ Category 1
   - ❑ Category 2
   - ❑ Category 3
   - ❑ Category 4
5. Is this your first pregnancy?
   - ❑ Yes
   - ❑ No

Part 2: Awareness and Knowledge

6. Have you ever heard of breast milk donation?
   - ❑ Yes
   - ❑ No
7. If yes, where did you learn about breast milk donation?
   - ❑ Health worker (nurse, doctor)
   - ❑ Family or friends
   - ❑ Media (radio, television, internet)
   - ❑ Other (specify): _____
8. Do you know what a breast milk bank is?
   - ❑ Yes
   - ❑ No

9. In your opinion, what are the benefits of breast milk donation for neonates? (Select all that apply)
    - ❑ Improves infant nutrition
    - ❑ Reduces the risk of infections
    - ❑ Reduces neonatal mortality
    - ❑ Other (specify): _____

Part 3: Cultural Beliefs and Perceptions; Barriers, Facilitators Towards Breast Milk Donation

10. What is your view on sharing breast milk to other babies, in case needed?
    - ❑ I strongly agree with it
    - ❑ I somewhat agree with it
    - ❑ I am neutral
    - ❑ I somewhat disagree with it
    - ❑ I strongly disagree with it
11. Do you think sharing breast milk with others could create familial ties or relationships?
    - ❑ Yes
    - ❑ No
    - ❑ Unsure
12. Do you think that breast milk donation could transmit diseases to the infant receiving the milk?
    - ❑ Yes
    - ❑ No
    - ❑ Unsure
13. What do you think are the barriers to donating breast milk in your community? (Select all that apply)
    - ❑ Lack of knowledge about milk donation
    - ❑ Cultural beliefs and stigma
    - ❑ Concerns about milk safety
    - ❑ Lack of hospital infrastructure for milk banking
    - ❑ Fear of affecting my milk supply
    - ❑ Other (specify): _____
14. What do you think would make it easier for mothers to donate breast milk?
    - ❑ Better education and awareness programs
    - ❑ Support from healthcare providers
    - ❑ Creation of milk banks in hospitals
    - ❑ Other (specify): _____
15. How important do you think it is to have a milk bank in your hospital?

- ❑ Very important
- ❑ Important
- ❑ Neutral
- ❑ Not important
- ❑ Not sure

Part 4: Interests and Attitudes Toward Breast Milk Donation

16. Would you consider donating your breast milk to other babies if needed?
    - ❑ Yes
    - ❑ No
    - ❑ Maybe, depending on the circumstances (mention some): _____
17. Would you be willing to accept donated breast milk for your baby if you were unable to breastfeed?
    - ❑ Yes
    - ❑ No
    - ❑ Maybe, depending on the circumstances (mention some): _____
18. How likely do you think it is that breast milk banks could be established in your hospital?
    - ❑ Very likely
    - ❑ Likely
    - ❑ Neutral
    - ❑ Unlikely
    - ❑ Very unlikely

Part 5: Acceptability of intervention measures

Item	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. I believe breastmilk donation can help save the lives of babies who need and don't have breastmilk	○	○	○	○	○
2. Donating breastmilk would be easy to fit into my daily routine	○	○	○	○	○
3. The idea of donating my breastmilk makes me feel proud	○	○	○	○	○
4. My family supports the idea of me donating breastmilk	○	○	○	○	○
5. I feel confident that I can donate my breast mil**k** without it affecting my baby health	○	○	○	○	○

6. I see myself accepting for my baby to use donated breastmilk	○	○	○	○	○

Mothers~ Semi-structured interview

1. Can you describe your experiences with neonatal feeding (e.g., breastfeeding, formula feeding)?
2. What are your thoughts on the idea of donating breast milk to other babies? How do you feel about sharing breast milk with others?
3. What do you think are the benefits of breast milk donation, especially for babies who need it?
4. What are your concerns about breast milk donation (e.g., safety, cultural beliefs)?
5. Would you be willing to donate your breast milk to another baby if there were a program in place?
6. If you were unable to breastfeed your baby, would you consider accepting donated breast milk? Why or why not?
7. What would make it easier for you to consider donating breast milk or accepting donated milk for your baby?
8. What do you think are the barriers to breast milk donation in your community, and how could they be overcome?

Healthcare providers~ Quantitative Survey

Part 1: Demographic Information

1. Job title:
   - ❑ Doctor
   - ❑ Nurse
   - ❑ Midwife
   - ❑ Expert mother (volunteer)
   - ❑ Other (specify): _____
2. Years of experience in neonatal care: _____
3. Have you had prior exposure to the concept of breast milk donation or milk banking?
   - ❑ Yes
   - ❑ No

Part 2: Knowledge and Perception

4. How familiar are you with the concept of breast milk donation and milk banking?
   - ❑ Very familiar
   - ❑ Somewhat familiar
   - ❑ Not familiar
5. In your opinion, what are the potential benefits of breast milk donation in neonatal care? (Select all that apply)
   - ❑ Improved infant nutrition
   - ❑ Reduced incidence of infections
   - ❑ Reduced neonatal mortality
   - ❑ Other (specify): _____
6. Do you believe that breast milk donation could be beneficial for preterm or sick neonates?
   - ❑ Yes
   - ❑ No
   - ❑ Unsure

Part 3: Perceptions and Attitudes Toward Breast Milk Donation

7. Do you think there is a cultural resistance to breast milk donation in your community?
   - ❑ Yes
   - ❑ No
   - ❑ Unsure
8. Would you support the introduction of a breast milk donation program in your hospital?
   - ❑ Yes

- ❑ No
- ❑ Unsure

9. How feasible do you think it is to implement a breast milk bank in your hospital?
   - ❑ Very feasible
   - ❑ Feasible
   - ❑ Not sure
   - ❑ Not feasible
10. What challenges do you foresee in the implementation of a breast milk donation program? (Select all that apply)
    - ❑ Lack of awareness among mothers
    - ❑ Cultural barriers
    - ❑ Safety concerns regarding the milk
    - ❑ Lack of infrastructure for milk storage
    - ❑ Staff training needs
    - ❑ Other (specify): _____

Part 4: Institutional Support and Policy

11. Do you think the hospital would need to develop specific policies to support breast milk donation programs?
    - ❑ Yes
    - ❑ No
    - ❑ Unsure
12. What kind of support would healthcare providers need to promote milk donation in the hospital? (Select all that apply)
    - ❑ Training on how to promote and manage breast milk donation
    - ❑ Better knowledge and awareness about milk donation
    - ❑ Institutional policies supporting milk donation
    - ❑ Community engagement strategies to overcome cultural barriers
    - ❑ Other (specify): _____

Part 5: Acceptability of intervention measures

Item	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. I believe breastmilk donation is beneficial for infant health	○	○	○	○	○
2. Implementing a breast milk donation program in the hospital is easy to manage	○	○	○	○	○

3. I feel comfortable promoting breastmilk donations to patients	○	○	○	○	○
4. I feel confident in explaining the benefits of breastmilk donation	○	○	○	○	○
5. Most of my colleagues' support breastmilk donation programs	○	○	○	○	○
6. In my daily activities, I see many patients who would have benefited from breast milk donation	○	○	○	○	○

Healthcare providers~ Semi-structured interviews

1. What do you know about breast milk donation and milk banks? What benefits do you think they offer for neonatal care?
2. Have you encountered any cultural or logistical challenges regarding the idea of breast milk donation in your hospital or community?
3. What do you think would be the main challenges in establishing a milk bank in this hospital?
4. Do you think breast milk donation could help reduce neonatal health complications like infections or malnutrition? Why or why not?
5. How would you feel about promoting or encouraging breast milk donation as part of neonatal care?
6. What kinds of support or resources do you think are needed to introduce and sustain a milk bank in your hospital?
7. What role do you think healthcare providers could play in supporting breast milk donation programs?

Appendix III: Data Collection tools (Kinyarwanda)

Mothers~ Quantitative survey

Ikusanyamakuru 1: Ibibazo by'ababyeyi

Igice 1: Imyirondoro

1. Imyaka y'umubyeyi: _____
2. Amashuri yize:
   - ❑ Sinigeze njya Kwiga
   - ❑ Nize amashuri abanza gusa
   - ❑ Nagarukiye ku ashuri yisumbuye
   - ❑ Nasoje Kaminuza
   - ❑ Andi mashuri atarondowe haruguru: _____
3. Ibyo umubyeyi akora:
   - ❑ Umuhinzi mworozi
   - ❑ Umucuruzi
   - ❑ Nguma mu rugo, ndera abana
   - ❑ Umuganga
   - ❑ Ibindi (bivuge): _____
4. Icyiciro cy'ubudehe:
   - ❑ Icya 1
   - ❑ Icya 2
   - ❑ Icya 3
   - ❑ Icya 4
5. Uyu ni umwana wa mbere?
   - ❑ Yego
   - ❑ Oya

Igice 2: Ubumenyi ku bijyanye n'itangwa cg ibikwa ry'amashereka

6. Waba warigeze kumva amakuru ku bijyanye no gutanga amashereka?
   - ❑ Yego
   - ❑ Oya
7. Niba ari yego, nihe wumvishe ayo makuru?
   - ❑ Ku baganga
   - ❑ Ku nshuti/ abavandimwe
   - ❑ Mu itangazamakuru (Radio, Televiziyo, Murandasi)

- ❑ Ahandi (Hatubwire): _____

8. Uzi ikigega kibika kikanatunganya amashereka?
   - ❑ Yego
   - ❑ Oya
9. Wumva ari izihe nyungu ziba mu gutanga amashereka ku mpinja? (Hitamo ibishoboka byose)
   - ❑ Bifasha imirire myiza y'uruhinja
   - ❑ Bigabanyiriza impinja ibyago byo kwandura udukoko
   - ❑ Bigabanya imfu z'impinja
   - ❑ Izindi nyungu (Zivuge): _____

Igice 3: Umuco n'imyumvire ku bijyanye n'imbogamizi ku itangwa ry'amashereka

10. Wumva/ ubona ute ibijyanye no guha amashereka izindi mpinja (zitari uwawe), igihe izo mpinja zindi zibikeneye?
    - ❑ Ndabyemera cyane
    - ❑ Ndabyemera
    - ❑ Ndifashe
    - ❑ Ntago mbyemera
    - ❑ Ntago mbyemera namba
11. Ese wumva gusangira amashereka kw' impinja byakongera imigenderanire n'ubushuti bw'imiryango?
    - ❑ Yego
    - ❑ Oya
    - ❑ Ntago mbizi
12. Ese wumva gutanga amashereka byakongera ibyago byo kwanduza indwara abana bakiriye ayo mashereka?
    - ❑ Yego
    - ❑ Oya
    - ❑ Ntabwo mbizi
13. Ni izihe mbogamizi utekereza zagaragara mu gutanga amashereka aho utuye(hitamo ibyo ubona bishoboka byose)
    - ❑ Kubura ubumenyi ku bijyanye n'itangwa ry'amashereka
    - ❑ Umuco n'imyumvire y'akato ku byerekeye itangwa ry'amashereka
    - ❑ Kutizera ubuziranenge bw'amashereka yatanzwe
    - ❑ Kubura ibikorwa remezo byagenewe gutunganya no kubika amashereka yatanzwe
    - ❑ Impungenge z'uko ushobora kubura amashereka
    - ❑ Ibindi (bivuge): _____
14. Ni iki cyakorwa kugirango byorohereze ababyeyi gutanga amashereka?

- ❑ Gutanga ubumenyi n'ubukangurambaga ku gikorwa cyo gutanga amashereka
- ❑ Ubufasha buturutse ku baganga
- ❑ Kugena ibigega bitunganya kandi bikanabika amashereka mu bitaro
- ❑ Ibindi (Bivuge): _____

15. Ese wumva ari iby'ingenzi kugira ibigega bitunganya bikanabika amashereka mu bitaro byacu?
    - ❑ Ni ingenzi cyane
    - ❑ Ni ingenzi
    - ❑ Ndifashe
    - ❑ Ntago ari ingenzi
    - ❑ Ntago mbizi

Igice 4 : Ubushake, inyunganizi, n'imyitwarire ku bijyanye no gutanga amashereka.

16. Ese wakwemera gutanga amashereka yawe ku bandi bana mu gihe bikenewe?
    - ❑ Yego
    - ❑ Oya
    - ❑ Byaterwa n'uko bimeze (duhe urugero): _____
17. Ese wakwemera guha umwana wawe amashereka yatanzwe n'undi mu gihe utabishoboye kumuha ayawe?
    - ❑ Yego
    - ❑ Oya
    - ❑ Byaterwa n'uko bimeze (duhe urugero): _____
18. Ubona hari amahirwe angana iki ko mu bitaro byacu hashyirwa ibigega bitunganya kandi bikanabika amashereka?
    - ❑ Birashoboka cyane (Amahirwe menshi)
    - ❑ Birashoboka (Amahirwe arahari)
    - ❑ Ndifashe
    - ❑ Ntago bishoboka (Nta mahirwe)
    - ❑ Ntibishoboka namba (Nta mahirwe namba)

Igice 5 : Gupima uko igikorwa cyakwakirwa kiramutse gishyizweho

Interuro	**Ndabihakana cyane**	**Ndabihakana**	**Ndifashe**	**Ndabyemera**	**Ndabyemera cyane**
1. Nizera ko gutanga amashereka bishobora	○	○	○	○	○

	gukiza ubuzima bw'abana bayakeneye kandi batayafite					
2.	Gutanga amashereka ni igikorwa nashyira byoroshye muri gahunda zanjye za buri munsi	○	○	○	○	○
3.	Igitekerezo cyo gutanga amashereka ndakishimiye	○	○	○	○	○
4.	Umuryango wanjye ushyigikiye ko natanga amashereka	○	○	○	○	○
5.	Nizeye ntashidikanya ko nshobora gutanga amashereka ku bandi bitagize icyo bihungabanya ku buzima bw'umwana wanjye.	○	○	○	○	○

6. Mbona nshobora kwemera ko umwana wanjye ahabwa amashereka yatanzwe n'undi mubyeyi	○	○	○	○	○

Mothers ~ Semi structured interview

Ikusanyamakuru 1 : Ikiganiro kimbitse n'ababyeyi

1. Muri make, watunyuriramo uburyo ugaburira umwana? (urugero: ndamwonsa, muha amata..)?
2. Ni iki utekereza ku bijyanye na gahunda yo gutanga amashereka kubandi bana? Wiyumva ute uramutse usangiye n'abandi amashereka?
3. Ni izihe nyungu utekereza zo gutanga amashereka, cyane cyane kumpinja ziyakeneye?
4. Ni izihe mpungenge ufite kubijyanye na gahunda yo gutanga amashereka (urugero: ubuziranenge, imyumvire)?
5. Wakwemera gutanga amashereka yawe kuwundi mwana uyakeneye, iyi gahunda ibaye ihari?
6. Ubaye udashoboye konsa umwana wawe, wakwemera amashereka yatanzwe n'undi mubyeyi? Kubera iki yego cg kubera iki oya?
7. Niki cyakorwa kugirango bikorohere gutanga amashereka cyangwa kwakira amashereka yatanzwe ngo uyahe umwana wawe?
8. Ni izihe mbogamizi ubona zaboneka kuri gahunda yo gutanga amashereka aho utuye? Ese ubona byakemurwa gute?

Healthcare Providers~ Quantitative survey

Ikusanyamakuru 2: Ibibazo by'abaganga n'abafasha b'abaganga

Igice 1: imyirondoro

1. Inshingano zawe:
   - ❑ Umuganga (Dogiteri)
   - ❑ Umuforomo
   - ❑ Umubyaza
   - ❑ Ufasha ababyeyi (Expert mother)
   - ❑ Nkora indi mirimo (bivuge): _____
2. Umaze imyaka ingahe wita ku mpinja zavutse? _____
3. Wigeze wumva amakuru y'ibijyanye no gutanga amashereka cyangwa gutunganya no kubika amashereka yatanzwe?
   - ❑ Yego
   - ❑ Oya

Igice 2: ubumenyi n'imyumvire

4. Usanzwe uzi bingana iki gahunda zijyanye no gutanga cyangwa gutunganya no kubika amashereka?
   - ❑ Ndabizi cyane
   - ❑ Ndabizi gake
   - ❑ Ntabwo mbizi
5. Ubona hari izihe nyungu mu bijyanye no gutanga amashereka mu kwita ku mpinja zikivuka? (Hitamo, ibishoboka)
   - ❑ Byongera imirire myiza y'uruhinja
   - ❑ Bigabanya ibyago byo kwandura indwara
   - ❑ Bigabanya imfu z'impinja zikivuka
   - ❑ Ibindi (Bivuge): _____
6. Ese wemera ko itangwa ry'amashereka rishobora kuramira impinja zavutse zidashyitse cyangwa impinja zirwaye?
   - ❑ Yego
   - ❑ Oya
   - ❑ Ntabwo mbizi

Igice 3: Imyumvire n' imyitwarire kubijyanye n'itangwa ry'amashereka.

7. Ese ubona hari imbogamizi ziturutse ku muco na kirazira zishobora kubogamira itangwa ry'amashereka aho utuye?

- ❑ Yego
- ❑ Oya
- ❑ Ntabwo mbizi

8. Ese washyigikira agahunda yo gutanga amashereka mugace utuyemo?
   - ❑ Yego
   - ❑ Oya
   - ❑ Ntabwo mbizi
9. Gahunda yo gutanga amashereka, wumva yashyirwa mubikorwa ku kigero kingana gute mu bitaro byanyu?
   - ❑ Byakorwa cyane
   - ❑ Byakorwa
   - ❑ Ntago mbizi
   - ❑ Ntibyakorwa
10. Ni izihe mbogamizi ubona zagaragara mw'ishyirwa mubikorwa rya gahunda yo gutanga amashereka? (Hitamo ibishoboka)
    - ❑ Ababyeyi kubura ubumenyi kubijyanye n'itangwa ry'amashereka
    - ❑ Imyumvire n'umuco utabishyigikira
    - ❑ Kubura ibikorwa remezo byo gutunganya no kubika amashereka mu bitari
    - ❑ Amahugurwa adahagije ku baganga
    - ❑ Ibindi (bivuge) _____

Igice 4: Ubufasha bw' ibitaro iyo gahunda iramutse ishyizweho

11. Ese urumva bikwiye ko ibitaro byashyiraho umurongo uhamye wo gushyigikira gahunda yo gutanga amashereka?
    - ❑ Yego
    - ❑ Oya
    - ❑ Ntago mbizi
12. Ni iyihe nkunga umukozi wo mu bitaro yakenera mu gushyigikira gahunda yo gutanga amashereka? (Hitamo byose bishoboka)
    - ❑ Amahugurwa ajyanye no gushyigikira no gutunganya gahunda yo gutanga amashereka
    - ❑ Ubumenyi buhagije ku bijyanye no gutanga amashereka
    - ❑ Gushyiraho umurongo ngenderwaho ufasha gahunda yo gutanga amashereka
    - ❑ Gufatanya n'abaturage mu guhindura imyumvire
    - ❑ Ibindi (Bivuge)

Igice cya 5:

Interuro	Ndabihakanye cyane	Ndabihakanye	Ndifashe	Ndabyemeye	Ndabyemeye cyane
1. Nemera ko gahunda yo gutanga amashereka ari ingenzi ku buzima bw'uruhinja.	○	○	○	○	○
2. Gushyira mu bikorwa gahunda yo gutanga amashereka mu bitaro ntibyagorana.	○	○	○	○	○
3. Ntacyo bintwaye gushishikariza ababyeyi gahunda yo gutanga amashereka ku bayakeneye.	○	○	○	○	○
4. Nifitiye icyizere mu gusobanura inyungu zo gutanga amashereka.	○	○	○	○	○
5. Benshi mu bo dukorana bashyigikiye gahunda yo gutanga amashereka.	○	○	○	○	○

6. Mu buzima bwanjye bwa buri munsi, mbona abarwayi bari kuzafashwa niyi gahunda yo gutanga amashereka.	○	○	○	○	○

Healthcare providers~ Semi-structured interview

Ikusanyamakuru 2: ibiganiro mpine ku bakozi.

1. Ni iki uzi kubijyanye na gahunda yo gutanga amashereka, ndetse nikigega kibika kikanatunganya amashereka? Ni iki wumva byamarira mu kwita ku bana bakivuka?
2. Waba warigeze uhura n'umuco cyangwa imyumvire ibogamye ku bijyanye na gahunda yo gutanga amashereka aho utuye cyangwa mu bitaro?
3. Ni izihe mbogamizi ubona zaboneka kuri gahunda yo gutanga amashereka muri ibi bitaro?
4. Ese ubona gahunda yo gutanga amashereka yafasha mu kugabanya ingaruka z'imirire mibi n'izituruka ku mwanda zagaragara kubana bakivuka? Kubera iki yego cyangwa kubera iki oya?
5. Ubyumva gute kubijyanye na gahunda yo gushishikariza no guteza imbere gahunda yo gutanga amashereka nka bumwe mu byuryo bwo kwita k'ubuzima bw'abana bakivuka?
6. Ni ubuhe bufasha cyangwa inkunga ikenewe mu bitaro ukoreramo, byafasha mu gutangiza gahunda yo gutanga amashereka?
7. Ni uruhe ruhare umukozi w'ibitaro yatanga mugushyigikira gahunda yo gutanga amashereka?

Appendix IV: Approvals

University of Global Health Equity- Institutional Review Board

Notification of Approval

Ref: UGHE-IRB/2025/381

February 10, 2025

Protocol Title:	Exploring the Acceptability of Breast Milk Donation for Neonatal Feeding: Perspectives of Mothers and Healthcare Professionals in Two Rwandan Hospitals.
Principal Investigator(s):	Peace Ingabire & Marie Immaculée Dusingize
Protocol #:	381
Funding Source:	UGHE
Initial IRB Review Date:	07th February 2025
Initial Review Type:	Expedited review
Additional Review Dates:	N/A
IRB Review Action:	**Approved**
Effective Date:	10th February 2025
Expiration Date:	09th February 2026

UNIVERSITY OF GLOBAL HEALTH EQUITY
P. O. BOX 6955, KIGALI, RWANDA
INSTITUTIONAL REVIEW BOARD
10 FEB 2025
APPROVED
VALID UNTIL DATE SHOWN

Dear Peace Ingabire and Marie Immaculée Dusingize

On February 07th, 2025, the University of Global Health Equity Institutional Review Board (UGHE IRB) approved your submitted study. **Please note that the approval for this protocol will lapse after one (1) year and must be renewed according to the procedures of the UGHE IRB.**

The IRB reminds you that you are responsible for fulfilling the following requirements:

- Changes, amendments, and addenda to the protocol or consent form (if applicable) must be submitted to the committee for review and approval, prior to activation of the changes.
- Only approved consent forms are to be used for the enrollment of participants.
- All consent forms signed by subjects must be retained on file, and are submitted to inspection, along with other project materials, during routine onsite visits or audits.
- Upon expiry of the approval, failure to apply for renewal will result in the suspension or termination of the study.
- The UGHE IRB must be notified at the closure of the study with a summary report.

Please contact the UGHE IRB via email at irb@ughe.org with any questions.

Sincerely,

Dr. Anselme Shyaka,
IRB Chair

REPUBLIC OF RWANDA

KIGALI, 09 MAY 2025
N°20/1315 /DPMEHF/2025

MINISTRY OF HEALTH
P. O. BOX: 84 KIGALI
www.moh.gov.rw

Vice Chancellor at the University of Global Health Equity (UGHE)
BUTARO

Re: Authorization to conduct research

Dear Vice Chancellor,

Reference is made to your letter dated March 7, 2025, requesting a support letter to allow your students to conduct research projects at various health facilities.

Based on the University of Global Health Equity (UGHE) - Institutional Review Board approval notifications provided to the remaining **(batch 2)** fourteen (14) research projects,

I am pleased to inform you that the Ministry of Health has granted you authorization to conduct the fourteen research projects mentioned in the attached list of students.

Kindly ensure that the results and the final report are shared with the Ministry of Health upon completion of the study. We trust that the data will be used in full compliance with national ethical and data protection standards.

For further information or clarification, please don't hesitate to contact Mr. Jerome H. BUSHUMBUSHO via his email at jerome.bushumbusho@moh.gov.rw or by Phone at **+250785420300.**

Sincerely,

"By Delegation of Authority"

Dr. Muhammad SEMAKULA
HoD of Planning, M&E, and Health Financing

Cc:

- **Hon. Minister of Health**
- **Hon. Minister of State/MoH**
- **Permanent Secretary/MoH**

SN	Students' Names	Project Title	Health Facilities
1	Marie Immaculee Dusingize Peace Ingabire	Exploring the Acceptability of Breast Milk Donation for Neonatal Feeding: Perspectives of Mothers and Healthcare Professionals in Two Rwandan Hospitals	Kirehe and Ruhengeri District Hospitals
2	Fred Nkurunziza Delphine Mizero	Exploring the barriers and facilitators in the management of diabetes among incarcerated individuals seeking care in the NCD clinic at Ruhengeri Level 2 Teaching Hospital in Rwanda.	Ruhengeri Hospital
3	Nathalie Uwamwezi	Fertility and family planning among oncology patients (IMB/PIH)	Butaro Hospital
4	Emmanuel Mugabo Byakagaba	Lab Test Turnaround Time Study in Butaro Level II Teaching Hospital	Butaro Hospital
5	Steve Ivan Rwema	Concept Note: Time Study Proposal in Butaro Level II Teaching Hospital Outpatient Department	Butaro Hospital
6	Alexandre Muhawenimana Alice Umutoni	Exploring Community Experience on First Aid Practices for Pre-hospital Injury Management in Northern Rwanda: A Case Study of Burera District.	Butaro Hospital
7	Alexander Habte Habtemariam, Marie Merci Cyuzuzo	Assessment of the Essential Emergency Surgical Care in all District Hospitals across Rwanda using WHO-situational analysis tool for Essential Emergency Surgical care: A Cross-Sectional Survey.	All Rwandan District Hospitals
8	Allison Ophélie Niragira Fanique Umuhoza	Fathers' Perspectives and Experiences on Parenting High-Risk Infants and Children with Developmental Disabilities.	Rwinkwavu Hospital
9	Aimable Ndayishimiye Feven Aregawi	The stage distribution among breast cancer patients consulted at Butaro Cancer Center of Excellence (BCCOE) from 2020 to 2024	Butaro Hospital
10	Bashir Garba, Marie Goreth Mukakayindo	Knowledge, Attitude, and Practice of Nurses and Midwives Regarding Maternity Triage in Rwanda: A Cross-sectional Study in Kibagabaga Level 2 Teaching Hospital and Muhima District Hospital	Muhima and Kibagabaga Hospitals
11	Sandra Shami Aimee Aline Kayiranga	Exploring Factors Associated with Inclusion and Child Care of under-five-year-old Children with Developmental Disabilities in Kirehe and Kayonza Districts.	Kirehe and Rwinkwavu Hospitals
12	Prince Rwema Ishimwe Wellars Mvuyekure	Assessing Quality of Life Variations Between Elderly Male and Female Living with Hypertension, Diabetes, Asthma and Heart Failure in Kayonza District, Rwanda.	Rwinkwavu Hospital
13	Belyse Mukayiranga Melina Uwamwezi	Assessing the Level of Readiness for Newborn Care in the Neonatal Department of JHPIEGO-Supported Hospitals in the Northern Province of Rwanda: A Cross-Sectional Study.	All JHPIEGO-supported hospitals
14	Clovis Gatete Nkeramihigo Sam Kamali	Assessing the Adherence of Practicing Physicians to the Rwandan Guidelines on the Diagnosis and Management of Pediatric Dehydration	Kirehe and Kibogora Hospitals

REPUBLIC OF RWANDA MINISTRY OF HEALTH	RUHENGERI LEVEL TWO TEACHING HOSPITAL Po.Box: 57, MUSANZE Website : rrh.gov.rw ruhengeli.hospital@moh.gov.rw	Client centered Service Integrity Teamwork Innovation

Musanze, 08/05/2025

Ref. ...498..../ **RL2TH /DG/2025**

Peace INGABIRE
DUSINGIZE Marie Immaculée
C/O UGHE

Re: Your request for data Collection

Dear students;

Reference is made to your letter applying permission for data collection of the research project entitled **"*Exploring the acceptability of breast milk donation for neonatal feeding: Perspectives of mothers and healthcare professionals in Two rwandana Hospitals*"**

We have the pleasure to inform you that you are allowed to conduct the above mentioned research project .However you're obliged to have all the required equipments for use and the final project report will be shared with Ruhengeri Level II Teaching Hospital.

Best regards.

Dr MUHIRE Philbert
Director General of Ruhengeri Level Two Teaching Hospital

Cc:

Chair of Ethics committe

REPUBLIC OF RWANDA **Kirehe, 09/06/2025**

KIREHE DISTRICT
KIREHE DISTRICT HOSPITAL
Email: Kirehe.hospital@moh.gov.rw

Ref N°: ……... /HKIR/2025

To: DUSINGIZE Marie Immaculee and Ingabire Peace
MGHD students and University of Global Health Equity

SUBJECT: Approval to Conduct Research Study at Kirehe District Hospital

Dear Dr. Dusingize and Dr. Ingabire,

Reference is made to your request regarding permission to conduct your research study titled: **"Exploring the Acceptability of Breast Milk Donation for Neonatal Feeding: Perspectives of Mothers and Healthcare Professionals in Two Rwandan Hospitals."**

We are pleased to inform you that **Kirehe District Hospital grants you approval to conduct your study** within our facility

We acknowledge the importance and potential impact of your research on neonatal health outcomes and appreciate your commitment to ethical standards, including informed consent, confidentiality, and minimizing disruption to hospital operations.

Please ensure close collaboration with relevant hospital departments and personnel to facilitate a smooth and efficient research process.

Should you require further support or coordination, kindly reach out to Mr. Pamphile ABAYISHIMA tel:0785245734 or on email: abapamphile@gmail.com

We wish you success in your research and look forward to the insights your study will provide.

Best Regards

Dr. NIYONKURU Ainé Ernest
Director General of Kirehe District Hospital