A Mixed Methods Study of Informal Human Milk Sharing in Ireland

Niamh Vickers, MSc (Research), BSc (Hons), RGN, RM, RPHN, RNT, IBCLC

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School of Nursing, Psychotherapy and Community Health

Dublin City University

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Supervisors: Dr. Gillian Paul and Professor Anne Matthews

Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of PhD is entirely my own work, and that I have exercised reasonable care to ensure that the work is original and have conformed to the regulations on the use and declaration of Generative AI, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work. I hereby certify that no Generative Artificial Intelligence (Gen AI) tools have been used in the creation of this thesis.

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List of Abbreviations

ABM	Academy of Breastfeeding Medicine
BMS	Breast Milk Substitutes
CMF	Commercial Milk Formula
DHM	Donor Human Milk
DNA	Deoxyribonucleic Acid
ePIP	Extended Pillar Integration Process
FDA	U.S Food and Drug Administration
FSAI	Food Safety Authority of Ireland
GP	General Practitioner
HCP	Healthcare Professional
HIV	Human Immunodeficiency Virus
HM	Human Milk
HM4HB	Human Milk For Human Babies
HMB	Human Milk Bank
HSE	Health Service Executive
IBCLC	International Board Certified Lactation Consultant
IHMS	IHMS
JBI	Joanna Briggs Institute
MMR	Mixed Methods Research

MMSR	Mixed Methods Systematic Review
MOM	Mother's Own Milk
NFQ	National Framework of Qualifications
PHN	Public Health Nurse
PIP	Pillar Integration Process
PPD	Postpartum Depression
PPI	Patient and Public Involvement
PPIE	Patient and Public Involvement and Engagement
PRISMA	Preferred Reporting Items For Systematic Reviews and Meta-Analyses
QUAL	Qualitative
QUANT	Quantitative
SDGs	Sustainable Development Goals
SPSS	Statistical Package For The Social Sciences
SRQR	Standards For Reporting Qualitative Research
STROBE	Strengthening The Reporting of Observational Studies In Epidemiology
UK	United Kingdom
UN	United Nations
UNICEF	United Nations Children's Fund
US	United States
WABA	World Alliance For Breastfeeding Action

WHO World Health Organization

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Abstract

Author

Niamh Vickers

Thesis Title: A Mixed Methods Study of Informal Human Milk Sharing in Ireland

Abstract:

Background: Human milk (HM) is the absolute, unparalleled source of nutrition for infants with advantageous and enduring outcomes spanning multiple domains. Informal human milk sharing (IHMS) has emerged as a contemporary phenomenon that exists as the voluntary, unregulated, commerce free exchange of HM among individuals outside of formal human milk bank (HMB) systems.

Aim The overarching aim of this research was to explore the characteristics, practices and lived experiences of donors and recipients of IHMS in Ireland.

Methodology: A four-phase mixed methods approach was embedded, incorporating a mixed methods systematic review (MMSR), and a sequential explanatory mixed methods study comprising a cross-sectional survey of donors and recipients in Ireland (n=103), followed by semi-structured interviews of a subsample (n=15) of respondents from the cross-sectional survey. The final phase comprised the integration of findings that emanated from the MMSR and the two strands of the sequential explanatory mixed methods study by the application of the extended pillar integration process (ePIP).

Findings: The integration of the findings from the three disparate sources of evidence in this study yielded four overarching meta-themes: (1) the biopsychosocial constructs of IHMS; (2) systematic barriers and invisibility; (3) inherent trust and the 'wee subculture'; and (4) symbiotic emotional restoration. The biopsychosocial constructs of IHMS denotes the foundational imperatives and values underpinning IHMS engagement. Findings highlight systemic barriers to HMBs and substantive healthcare gaps in IHMS. Navigating risk and safety assurance by the 'wee subculture' espouses the architecture of trust and safety in IHMS. IHMS functions as an emotional entity with explicit psychological outcomes underscoring the practice transcends the exchange of HM.

Conclusion: This research provides the first scholarly exploration of IHMS in Ireland and offers comprehensive insights to the IHMS landscape in Ireland. The findings underscore an imminent necessity for policy reform and the enhancement of HMB systems. Implications for practice and future research directions are delineated.

Chapter One: Introduction

1.1 Introduction

This study explores the phenomenon of informal human milk sharing (IHMS) in Ireland, situated within the domain of the key actors who engage in this contemporary infant feeding practice. Specifically, it investigates the characteristics, practices and lived experiences of donors and recipients of IHMS in Ireland. This first chapter provides the contextual background to the investigation, positioning this research within the existing scholarly evidence that underpins the significance of this research. The overarching aim and objectives of the mixed methods study are presented, including a delineation of each objective aligned to its affiliated phase in the research. These are further developed in the thesis conspectus that concludes this chapter.

1.2 Background and Context

1.2.1 Breastfeeding and The Human Milk Imperative

Breastfeeding is considered a global public health endeavour, underpinned by its innumerable benefits that span individual, societal, economic and environmental dimensions (Machado et al., 2025). Indeed, breastfeeding has been articulated as an infant's primary vaccine, a first deference, an efficacious means of supporting and sustaining the health and development of infants with everlasting effects (World Health Organization, 2025). The myriad of infant benefits attributed to breastfeeding are immeasurable and continue to emerge through the proliferation of robust, scientific evidence. Scholarly evidence continues to assert the positive correlations between breastfeeding and the attainment of advantageous infant and child health outcomes (Patnode et al., 2025, Purkiewicz et al., 2025). Moreover, breastfeeding confers extensive maternal-related benefits such as reduced risk of various non-communicable diseases, postpartum anxiety and depression (Purkiewicz et al., 2025, Coutsoudis et al., 2026). Recently, longitudinal data in Ireland has established lower rates of self-reported depression and anxiety over a 10-year period in multiparous women who breastfed, indicating the potential for enduring psychological outcomes ascribed to breastfeeding (McNestry et al., 2026). Significantly, these immediate and enduring health benefits for the maternal-infant dyad are extensive, empirically substantiated and continually

advancing. As noted, the multitude of benefits exceed individual health outcomes and thus breastfeeding has recently been conceptualised as a strategic 'One Health' intervention and an essential pathway to the achievement of many of the Sustainable Development Goals (SDGs) (Machado et al., 2025). Indeed, as a renewable and sustainable resource, breastfeeding is associated with a lower carbon footprint, reduced waste and energy consumption compared to commercial milk formula (CMF) which underscores its significance within the interconnected planetary, environmental and economical spheres (Bai and Alsaidi, 2024, Machado et al., 2025, Pérez-Escamilla and López-Bassols, 2026).

Human milk (HM) is a dynamic, biological fluid comprising an absolute nutrient profile, inimitable bioactives and reparative constituents that contribute to early immune system programming and trigger the aforementioned advantageous trajectories (Paramashanti et al., 2026, Sun et al., 2025, Porębska et al., 2026). Consequently, HM embodies an unmatched resource, positioned as one of the most unique and sustainable biological entities in the history of mankind (Coutsoudis et al., 2026). Consequently, the World Health Organization (WHO) advocates exclusive breastfeeding for the first six months of life, with continued breastfeeding along with appropriate complementary foods until two years and beyond (WHO, 2025). Nevertheless, despite the aforementioned efficacious outcomes, the global exclusive breastfeeding at 6 months rate stands at 48%, evidencing a 12% disparity from the global target of 60% by 2030 (WHO, 2025). Breastfeeding rates in Ireland are one of the lowest in Europe, reported as 44% at 3 months postpartum, which is a notable gap from the global rates of exclusive breastfeeding at 6 months (McMonagle et al., 2025). It has been acknowledged that systemic and multifactorial barriers exist to breastfeeding encompassing, individual, economic, health system, and sociocultural factors which necessitate multidimensional interventions to address (Moret-Tatay et al., 2025).

1.2.2 The Transition of HM from an Imperative Need to a Superior Choice

When mothers' own milk (MOM) is unavailable or insufficient, donor human milk (DHM) is the recommended substitute for infants who require supplemental feeds (WHO, 2022). DHM pertains to HM that has been pasteurised and distributed from a human milk bank (HMB) (Newman et al., 2025). Importantly, it has been asserted that all HM alternatives including wet nursing and DHM are superior to the provision of CMF (Ahmad

and Haque, 2025). The provision of HM via an alternative means is a practice that has existed throughout antiquity, originating as an imperative need in earlier historical contexts to existing as alternative choice in contemporary times (Stevens et al., 2009).

Prior to the advent of CMF in the 19th century, HM was the exclusive means of sustaining the lives of infants either directly from the mother or in the absence of MOM, the social norm was the provision of HM by another lactating individual (Marinelli, 2020, Stevens et al., 2009). The interchangeable terms 'wet nursing' or 'cross nursing' or 'cross feeding' represent this antiquated practice, where an infant is fed directly at the breast of an individual who is not the biological mother. Further, there was also evidence of alternative infant feeding practices in historical contexts prior to CMF, such as the provision of animal milks via infant feeding devices, however, these were often associated with significant infant mortality due to an absence of appropriate equipment for sterilisation or appropriate storage facilities prior to the industrial revolution (Stevens et al., 2009). Therefore, direct breastfeeding either via the biological mother or an alternative lactating individual was an imperative to optimise infant survival (Runjić Babić, 2020).

Wet nursing became an established profession in the 18th century in numerous geographical contexts, including Ireland, where wet nurses were typically the urban or rural poor (Cassidy, 2015). This practice persisted throughout the millennium until its significant decline with the emergence of CMF in the 1920's (Wagg et al., 2022). Notably, by the 1950's there was a general consensus among physicians and the public that CMF was an optimal and safe substitute for breastfeeding (Stevens, Patrick and Pickler, 2009). At the turn of the 20th century, infant mortality was at its peak, and Dublin had the highest infant mortality rate nationally (Cassidy, 2015). Notably, it was speculated that a direct, causative factor was the abandonment of breastfeeding in Dublin at this time (Cassidy, 2015). CMF replaced breastfeeding as a result of advancements in chemistry, food preservation methods, hygiene and sterilisation practices which contributed to the conception that CMF was a safe alternative to breastfeeding (Stevens et al, 2009). As such, the provision of HM transitioned to a choice, rather than an imperative need for infant survival as CMF was a opined as a safe alternative (Runjić Babić, 2020).

The emergence of HMBs in the 20th century marked a pivotal transition in the sharing of HM. The year 1909 marked a historical milestone in the establishment of the first HMB in Vienna, Austria. Approximately 20 years later, the Rotunda Hospital in Dublin established a HMB which collected and pooled HM from mothers and distributed it to infants before its notable cessation in the 1960's (Cassidy, 2015). Importantly, the termination of this facility preceded the epidemic of the Human Immunodeficiency Virus (HIV) which permeated the 1980's and 1990's (Orsini and Martini, 2025) that resulted in the closure of the majority of HMBs worldwide due to the identification of HIV in HM (Corpeleijn et al., 2010). Since their re-emergence, more than 750 HMBs have been established worldwide (Obeng-Gyasi et al., 2025). HMBs are predominately located in high income countries reflecting a critical disparity, particularly in regions such as Africa which have the highest rates of infant and maternal mortality worldwide (Obeng-Gyasi et al., 2025). HMBs are regulated entities that recruit donors, screen, collect, store, process and distribute HM to infants who require supplemental feeds offering substantive nutritional and immunological benefits to infants (Israel-Ballard, La Rose and Mansen, 2024). HMBs are primarily not for profit entities, however, in recent years there has been an emergence and growth of private milk companies (PMCs) that sell pasteurised HM and HM products for profit (Shenker et al., 2024). On the island of Ireland, there is one HMB, a not for profit organisation, located in Enniskillen, Co. Fermanagh, Northern Ireland which is a cross-border initiative and has provided DHM to hospital settings throughout the country for the past 26 years. In 2024, this dedicated facility provided over 1000 litres of DHM to 783 infants in neonatal units across Ireland (Western Health and Social Care Trust, 2026). Despite their inherent value, DHM from HMBs is not universally available to all infants who require supplemental feeds, which restricts equitable access to all infants (Barin et al., 2025, Fu et al., 2026). Accordingly, IHMS has emerged as an alternative feeding practice for parents in the absence of MOM or DHM from a regulated HMB.

1.2.3 The Contemporary Context of IHMS

The demand for HM provision has grown exponentially in recent years, of which can be proportionality attributed to parental desire to provide HM to their infants as opposed to the provision of CMF (Palmquist and Doehler, 2016, Rusi et al., 2024). IHMS has been symbolised as a modern embodiment of wet nursing and has emerged as a contemporary infant feeding practice (Gribble, 2018). IHMS is defined as the voluntary and non-commercial exchange of HM between individuals outside of the regulated HMB systems (Peregoy, 2022). IHMS and formal HMB sharing have a common prerogative which is the provision of HM to infants. However, they are dissimilar in that IHMS is the exchange of raw, unpasteurised HM and is devoid of any processing associated with the HMB systems (Coutsoudis et al., 2026). IHMS has also proliferated in recent years as a consequence of the advancements in technologies represented by the availability of electric breast pumps, enhanced storage appliances (O' Sullivan et al., 2016) as well as the internet (Geraghty, Heier and Rasmussen, 2011). Digital platforms and social media have enabled the visibility and accessibility of IHMS (Khuan et al., 2025).

A defining characteristic of IHMS is the non-commodification of HM which is in contrast to the selling of HM, that also exists as a parallel and emerging topic in the contemporary scholarship. The selling of HM on the internet has been associated with alternative communities distinct from IHMS discourses, such as body building and fitness industries, chronic diseases sufferers and specific health food diet proponents (Steele, Foell and Freitag, 2015). Various sites exist for women to advertise, promote, sell and ship their donated HM to consumers (ibid). Contrastingly, IHMS exists on the opposing end of this spectrum, where milk is exchanged among friends, family, acquaintances and through dedicated online platforms such as the Human Milk For Human Babies (HM4HB) Facebook site which emerged over 16 years ago. HM4HB is a global online network whose mission is to promote the provision of HM to infants worldwide. HM4HB is committed to promoting and fostering a community among individuals who want to engage in IHMS (HM4HM, 2026). The global HM4HB Facebook page has over 73,000 followers (HM4HB Global Network, 2026). The HM4HB Republic of Ireland and Northern Ireland community has over 5,700 followers in May 2026 (HM4HB Republic of Ireland and Northern Ireland, 2026).

1.2.4 Prevailing IHMS Discourses

In contrast to HMB system, IHMS exists as an unregulated practice and as a result of the discordant views, IHMS remains complex. HM as previously described, is a biological substance and consequently there are potential risks associated with the sharing of unpasteurised, raw milk among individuals. The inherent risks include exposure to food-borne illnesses (Steele et al., 2015), bacterial contamination (Keim et al., 2013), exposure to infectious diseases including HIV, hepatitis B, hepatitis C, syphilis and cytomegalovirus (Keim, 2014, Vogel, 2011) and contamination with unsafe substances such as orally bioavailable drug residues, non-human-sourced components, chemical and environmental pollutants (Steele et al., 2015, Blackshaw et al., 2021). A study conducted in the United States (US) tested 101 samples of HM purchased on the internet and established that 10% contained bovine DNA, providing scientific evidence of the potential risk of contamination associated with HM selling (Keim et al., 2015). Accordingly, there is a resounding dissonance in the discourse between the opponents and proponents of IHMS. Opponents contest the engagement with IHMS, declaring it as a risky and a categorically dangerous practice, purporting that engagement is a display of irresponsible parenting evidenced by 'gambling with infants lives' and engaging in a game of 'Russian roulette' (Carter, Reyes-Foster and Rogers, 2015, Vogel, 2011). Contrastingly, advocates of IHMS counter this view and posit that the provision of CMF is associated with greater risks (Vogel, 2011). Indeed, there are potential risks associated with not breastfeeding and also with the provision of CMF. For instance, a recent review of aflatoxins in CMF over the past two decades established that in global markets, most were at unauthorised levels (Sharafi et al., 2022). Aflatoxins are carcinogenetic, mutagenetic, immunosuppressive and potent liver toxins that can cause significant health issues (Alameri et al., 2023). Additionally, from January-May 2026, major recalls of CMF across the global dairy industry were declared due to the contamination of CMF with cereulide, a powerful toxin that can cause severe gastrointestinal illness (Food Safety Authority of Ireland, 2026, U.S. Food and Drug Administration, 2026).

IHMS can be conceptualised as an alignment with the dominant discourse of the importance of breastfeeding and the provision of HM to infants. Accordingly, it has been posited that the dominant campaign of 'breast is breast' has moral connotations for

mothers and is depicted as a choice that defines one as a 'good mother' (Quinones, 2023, Scott and Bute, 2025). The commitment to this 'good mother' ideology has been linked to breastfeeding discourses (Runjić Babić, 2020, Verniers, Bonnot, and Assilamehou-Kunz, 2022). Paradoxically, there is a discordance between these debates where HM is perceived as 'best' yet inherently dangerous if shared outside of regulated systems. Consequently, many global health organisations do not recommend IHMS, particularly the exchange of HM over the internet. The Academy of Breastfeeding Medicine's (ABM) mission statement on IHMS asserts that while IHMS can benefit families, it carries various intrinsic risks. Therefore, they advise that the responsibility rests with those who engage. For those who choose to engage, the ABM endorses medical screening and safe milk handling as well as strongly discouraging exchanges via the internet (Sriramen et al., 2018). Recently, a global review of policy and position statements on IHMS highlighted inconsistencies across various geographical contexts with approaches to IHMS engagement broadly categorised into; absolute proscription of IHMS, support for individual autonomy in decision making with screening and safe milk handling practices incorporated and/or recommend individuals should revert to a healthcare professional (HCP) for advice (Palmquist et al., 2019). Nevertheless, there is a notable absence of policy or position statements pertaining to IHMS in Ireland.

1.3 The Present Study

IHMS has emerged as a contemporary and a controversial feeding practice that is situated within a broader landscape of breastfeeding which is unanimously endorsed and positioned as a preeminent global public health endeavour with immediate, enduring and multifaceted benefits. IHMS functions as a means to the attainment of this goal. In Ireland, IHMS is notably absent from any public health policy, position or guidance documents. In spite of this, online platforms for IHMS engagement in Ireland have thousands of followers. Substantive tensions exist between those who endorse and those who oppose the practice of IHMS which necessitates further research to explore these perspectives. IHMS donors and recipients are the key actors in this practice and there is a need to explore the factors and experiences of their engagement. This research will contribute to the growing evidence-base in the domain of IHMS from a global perspective and contribute a novel understanding in the Irish context. Given breastfeeding rates in Ireland are the

lowest in Europe, exploring contemporary infant feeding experiences and practices can facilitate solutions to promote, protect and support breastfeeding. The World Alliance for Breastfeeding Action (WABA) call to action emphasises the necessity to prioritise breastfeeding through creating sustainable support systems (WABA, 2025). To that end, this research will establish foundational and empirical insights in the domain of IHMS in Ireland, which has been recently considered as an optimal, sustainable support system (Coutsoudis et al., 2026).

1.4 Research Aim and Objectives

1.4.1 Research Aim

The overarching aim of this study was to explore the characteristics, practices and experiences of donors and recipients of IHMS in Ireland.

1.4.2 Research Objectives

The research comprised four objectives to meet the aim in order to address the research question which were to:

1. Identify, evaluate, synthesize and integrate the qualitative and quantitative evidence on the factors associated with IHMS among donors and recipients.
2. Describe the profiles, motivations, practices and experiences of IHMS donors and recipients in Ireland.
3. Explore and gain an in-depth understanding of the lived experiences and practices of IHMS among donors and recipients in Ireland.
4. Synthesize and integrate the findings of the MMSR, quantitative and qualitative phases to provide a deep, multidimensional and comprehensive understanding of IHMS.

1.5 Thesis Conspectus

This thesis is organised and presented in seven chapters. The four research objectives align with the four distinct phases of this research which are elucidated in Chapters Three to Six. These chapters include three published papers (Chapters Three, Four and Five) and one non-published paper chapter (Chapter Six). These chapters are preceded by this

introductory chapter (Chapter One) and the methodology chapter (Chapter Two) and a concluding chapter (Chapter Seven).

The first phase of this research is presented in Chapter Three and encompasses a mixed methods systematic review (MMSR) utilising a convergent integrated approach which aimed to identify, evaluate and integrate the extant evidence pertaining to the factors associated with IHMS among donors and recipients. Chapter Four presents the second phase of this research which constitutes the initial, quantitative strand of the sequential explanatory mixed methods study. This phase comprised a cross-sectional survey of the characteristics, motivations, practices and experiences of IHMS donors and recipients in Ireland. The second strand of this sequential explanatory mixed methods study which encompassed semi-structured interviews of donors and recipients is delineated in Chapter Five. Following this, the final phase encompasses the integration of findings derived from the MMSR and the two sequential strands by the application of the extended Pillar Integration Process (ePIP) and is delineated in Chapter Six. Finally, Chapter Seven represents the concluding chapter of this thesis which examines the trajectory of the research completed and consolidates the key insights from each consecutive phase. This final chapter also incorporates a critical discussion of the integrated findings emanating from the integration of findings and elucidates the original contributions, implications, strengths, limitations and recommendations of the research. The scholarly publications arising from this research are presented in Table 1.1.

Table 1.1 Titles of Research Publications

Vickers, N., Matthews, A., and Paul, G. (2023) Perspectives and factors associated with IHMS: a mixed methods systematic review protocol. HRB open Research, 6 (24). https://doi.org.12688/hrbopenres.13718.2. Presented in Appendix A.
Vickers, N., Matthews, A., and Paul, G. (2024) Factors associated with IHMS among donors and recipients: A mixed methods systematic review. PLoS One, 19(3), https://doi.org/10.1371/journal.pone.0299367 . Presented in Chapter Three.

Vickers, N., Matthews, A., and Paul, G. (2025) IHMS practices: A cross-sectional survey of donors and recipients in Ireland. Maternal and Child Nutrition, e70113. https://doi.org/10.1111/mcn.70113. Presented in Chapter Four.
Vickers, N., Matthews, A., and Paul, G. (2025) Informal Human Milk Sharing, Journal of the European Lactation Consultants Alliance, 1(37), pp.22-25. Presented in Appendix B.
Vickers, N., Matthews, A., and Paul, G. (2026) Informal Human Milk Sharing: The experiences and practices of IHMS in Ireland. Presented in Chapter Five. Accepted for Publication May 18th 2026 in Maternal and Child Nutrition.

1.6 Summary

This introductory chapter provided pertinent insights pertaining to the phenomenon of IHMS, a proliferating infant feeding practice existing in the contemporary context. This included the elucidation of IHMS within the broader domain of breastfeeding discourses. These discourses unanimously position the provision of HM as an imminent global public health endeavour with advantageous outcomes that span a multitude of domains. Moreover, this foundational chapter explicated the nuances of infant feeding, specifically drawing on both the historical and contemporary understandings and trajectories of infant feeding practices including those in which IHMS originated. Further, the prevailing debates within the domains of infant feeding and IHMS were expounded, drawing on the current tensions surrounding its practice. Significantly, the necessity for empirical investigations to understand the perspectives from the key players within the IHMS landscape was outlined which included the need for and the significance of this study. The overarching aim and associated objectives of this study were delineated, followed by a presentation of the architecture of the thesis. The subsequent chapter in this thesis (Chapter Two) will comprise the detailed methodological approach to this study.

Chapter Two: Methodological Approach

2.1 Introduction

In this chapter, the overall methodological approach to this study is elucidated which includes the rationale for the strategic and methodical choices implemented in each successive phase of this research. Thereafter, the pragmatist paradigm which was adopted as the philosophical foundation and approach to this study is discussed. Following this, an overview of each of the four phases of the research is presented. Then, a discussion on the ethical considerations of this research will be detailed. Finally, a comprehensive account of the researchers positionality and the associated reflexive practices embedded throughout the research process will be provided.

2.2 Mixed Methods Research (MMR) Approach

Research approaches or paradigms are the underpinning and foundational concepts guiding the approach to and navigation of the research process (Dawadi, Shrestha, and Giri, 2021. Indeed, the paradigmatic lens adopted has an inherent impact on the fundamental attributes of the overall research from conception to completion (Rahman, 2023). For the attainment of coherent and meaningful research, it is requisite for scholars to consider the alignment of paradigms, epistemological stances, methodology and associated methods (Allemang, Sitter and Dimitropoulos, 2021). Research approaches comprise the interconnection of philosophical assumptions or worldviews, research design and associated methods (Creswell and Creswell, 2023). The juxtaposition between the qualitative and quantitative paradigms are broadly discerned by the nature of the collected data where qualitative is orientated to the collection of narrative data, with inductive and subjective interpretations, while quantitative focuses primarily on the collection of numerical data, with deductive, objective interpretations (Creswell and Creswell, 2023, Tashakkori and Newman, 2023). Further distinctions extend to the underpinning philosophical assumptions, research strategies and methods employed (Creswell and Creswell, 2023). Mixed Methods Research (MMR) has been postulated as a complementary paradigm to the traditional quantitative and qualitative approaches (Dawadi, Shrestha, and Giri, 2021). Indeed, MMR has evolved exponentially from the earlier, formalised articulation of triangulation in the late 1950's in the seminal work by

Campbell and Fiske transcending to the position of a distinct and evolving methodological paradigm in contemporary scholarship (Johnson, Onwuegbuzie, and Turner, 2007).

Notably, the immense evolution and popularity of MMR is evidenced by the categorical proliferation of published scholarly outputs with reference to MMR, the conception of dedicated journals specific to MMR and the production and development of handbooks dedicated to this distinct research approach (Shan, 2022). Despite the remarkable growth in popularity, discourses and advancements of MMR there is no universal definition of MMR identified in the literature. A wealth of definitions of MMR are evidenced which collectively elucidate this methodological approach, positioning it as a distinct paradigm along with the traditional quantitative and qualitative approaches. Consequently, MMR has been classified as the third methodological paradigm (Johnson, Onwuegbuzie and Turner, 2007) and enables researchers to negate the view of a qualitive-quantitative dichotomy (Creswell and Creswell, 2023, Tashakkori and Newman, 2023). Nevertheless, this classification has been debated and controversies pertaining to this remain in contemporary discourses (Adu et al., 2022). An intrinsic understanding of MMR is the acknowledgement and respect for the significance of the traditional approaches, but MMR provides a compelling alternative approach which has a robust methodological basis that can provide more comprehensive, extensive, balanced and valuable results (Johnson, Onwuegbuzie and Turner, 2007, Ellaway, 2020). A widely acknowledged definition of MMR that the researcher has assumed is depicted by Creswell and Creswell (2023) is:

> Mixed methods is an approach to inquiry involving both quantitative and qualitative data, using a specific procedure or design, combining (or integrating) the two forms of data within the design and drawing conclusions (metainferences) about the insight to emerge from the combined databases (Creswell and Creswell, 2023 pp.5).

Conceptually, therefore, MMR is the intentional utilisation of both quantitative and qualitative data underpinned by the defining characteristic of MMR which is the purposeful integration of both quantitative and qualitative paradigmatic data within an overall design which is appropriately selected for the inquiry with the intended outcome being the generation of integrated insights. Indeed, the importance of discerning MMR beyond the premise of simply attaining data from separate quantitative and qualitative sources and to the comprehension of the crux of MMR which is characterised by the

innovative feature of the intentional integration of the collated information from both databases to generate enhancements and greater insights (Creswell and Inoue, 2025).

The rationalisation and justification of the researchers' paradigmatic lens, research design and overall process are imperative to the attainment of the research goals. Notably, research in a multitude of disciplines has become inherently complex, which cannot be fully realised and comprehended using a mono methodological tradition (Dawadi, Shrestha, and Giri, 2021). Consequently, MMR has emerged as a robust methodological response to these contemporary complexities and to overcome the potential limitations by purposefully intertwining both qualitative and quantitative insights to yield a more comprehensive understanding of the phenomenon under investigation (Dawadi, Shrestha, and Giri, 2021, Wasti et al., 2022, Creswell and Creswell, 2023). Notably, it has been posited that MMR transcends a simple choice to a requisite and indispensable form of inquiry which is necessitated to attain all-inclusive insights and enhancement of collective understanding in our inherently and increasingly complex social world (Subedi, 2023).

2.2.1 Rationale for the MMR Approach

As aforementioned, to generate meaningful research, due consideration should be afforded to the selection of the appropriate research approach, underpinning philosophical worldviews, designs and methods. The justification for the adoption of a MMR approach in this present study was rationalised and justified by the following influences. Foremost, the aim and associated objectives of this present study could not have been fully realised by the adoption of a singular qualitative or quantitative approach alone. It has been articulated that MMR should only be utilised when the combination of the qualitative and quantitative data more comprehensively addresses the research question than a singular approach (Subedi, 2023). The justification for the use of MMR is commonly articulated and founded on the premise that MMR facilitates 'complementarity' which recognises that using both qualitative and qualitative data enables a more thorough and complete account of a phenomena under investigation (Doyle et al., 2016).The importance of this as an imperative for adopting a MMR approach in the present study was grounded by the reality that there was a notable absence of empirical evidence of IHMS in Ireland which necessitated a comprehensive and detailed investigation of the phenomenon. Indeed, the adoption of a MMR approach enabled an explicit depiction and understanding of the

phenomenon (the what) and meaning (the why) (Wasti et al., 2022, Subedi, 2023). Further, the utilisation of MMR enabled rich, comprehensive and inclusive insights through the effective integration of the disparate data sources. Indeed, this pertains to the concept of 'integrative efficacy' of mixed methods inferences which purports that through the effective integration, a more inclusive understanding of the phenomenon is ascertained (Tashakkori and Newman, 2023).

Additional justifications for a MMR approach included the concept of expansion where the utilisation of a MMR approach facilitated both breadth and depth by the employment of quantitative and qualitative strands, respectively (Tashakkori and Newman, 2023). Expansion also enables the findings from the quantitative phase to be explained by the qualitative interviews that were conducted in the subsequent phase (Doyle et al., 2016). A further rationale is attributed to the concept of development which involves using one method to guide or develop the subsequent method as utilised in this sequential explanatory mixed methods study (Lall, 2021). Through the incorporation of MMR by the acquisition of both quantitative and qualitative data, the researcher could answer the 'what' and 'how' but also the 'why' of IHMS by the purposeful collection and integration of both objective and subjective evidence respectively in order to attain a holistic understanding of this complex phenomenon (Subedi, 2023).

2.3 Philosophical Underpinnings and Research Paradigm: Pragmatism

The terms philosophical 'assumptions', 'underpinnings', 'worldviews' are used interchangeably in the literature which equally signify the researchers broad philosophical orientation of the world (Creswell and Creswell, 2023), or beliefs pertaining to their comprehension of the nature of reality (ontology), their beliefs about how knowledge is created (epistemology), and their perspectives on the values in research (axiology) (Pretorius, 2024, Shannon-Baker, 2023). Philosophical underpinnings or assumptions are instrumental to any research inquiry as they function as the lens in which the researcher perceives the world (Creswell and Creswell, 2023). Indeed, it has been acknowledged that the identification, consideration and clear, explicit articulation of one's philosophical underpinnings, assumptions or worldviews is fundamental to ensuring coherence, trustworthiness, credibility and transparency in research (Howes, 2017, Pretorius, 2024).

Moreover, exploring and considering these imperative philosophical tenets facilitates the construction of robust, ethically assured, and practically relevant studies (Pretorius, 2024). These foundational beliefs influence the researcher's understandings within the ontological, epistemological and axiological domains and are evidently encapsulated within specific philosophical 'research paradigm(s)'.

There are a plethora of research paradigms clearly articulated in the literature with some complementary to each other and some in opposition (Dawadi, Shrestha, and Giri, 2021). Qualitative researchers have most commonly worked within a constructivist/interpretivist paradigm and quantitative typically follow the positivist/postpositivist paradigm (Creswell and Creswell, 2023, Doyle et al., 2016, Tashakkori and Newman, 2023). The positivist/postpositivist paradigm represents the traditional approach and most often associated with quantitative methods which focus on objectivity, generalisability, deductive reasoning and formal rhetoric, whereas the constructivist/interpretivist paradigm is typically aligned with qualitative methods with emphasis on subjectivity which is elicited from the participants views, inductive approaches and informal rhetoric (Creswell and Creswell, 2023, Kaushik and Walsh, 2019). Notable and contentious debates permeated the scholarly landscape throughout the last three decades of the 20th century identified as the 'paradigm wars' whereby it was postulated that mixing the two paradigms was categorically unviable owing to the stark and intrinsic differences in their foundational underpinnings, a stance which was coined as the 'incompatibility thesis' (Doyle et al., 2016). The inherent premise for this was founded on the perception that the mixing of these would evidently result in a philosophical clash which would negatively impact the quality, validity and coherence of the inquiry (Subedi, 2023). A diverse body of evidence has emerged contributing to the ongoing discourses, developments and advancements of paradigms in MMR (Molina-Azorin and Fetters, 2020). There are numerous paradigms which have been discussed and proposed with the MMR discourses such as: dialectics (Shannon-Baker, 2016), pragmatism (Morgan, 2007, Freshwater and Cahill, 2013, Shannon-Baker, 2016), dialectical pluralism (Johnson, 2008/2017, Shannon-Baker, 2023), performative (Schoonenboom, 2019, transformative (Freshwater and Cahill, 2013, Shannon-Baker, 2016), yinyang philosophy (Fetters and Milina-Azorin, 2019), various Indigenous philosophies (Shannon-Baker, 2023) and emancipation

(Shannon-Baker, 2016). Each paradigm has its own ontological, epistemological, axiological beliefs that guide methodological approaches however, it has been acknowledged that many of these overlap (Shannon-Baker, 2023).

Pragmatism as a research paradigm is rooted in the philosophy of pragmatism which originated in the late 19th century in the US and is derived specifically from the earlier works of William James, Charles Sanders Peirce, Chauncey Wright, John Dewey, George Herbert Mead, Arthur Bentley among others (Creswell and Creswell, 2023, Kaushik and Walsh, 2019) and more contemporary contributors include Richard Rorty, John P. Murphy, and Michael Quinn Patton (Creswell and Creswell, 2023). The philosophical movement of pragmatism emanated from a rejection of these scholars pertaining to the traditional assumptions of the nature of reality, inquiry and knowledge (Kaushik and Walsh, 2019, Pretorius, 2024). Pragmatism is not committed to any one system of philosophy owing to the inherent upheld pragmatic belief that reality is not fixed and that it is constantly changing and debated (Pretorius, 2024). Thus, from an ontological perspective it is contented that perspectives relating to reality are dynamic, expansive and are only positioned in the current understandings (Shannon-Baker, 2023). Pragmatism is a dynamic paradigm and at its crux is the philosophical view that the methodological and philosophical approach adopted in any given inquiry should be selected based on what will work best to address the research inquiry (Pretorius, 2024). Therefore, pragmatism prioritises practical outcomes by focusing on the research problem and embracing a plurality of methods which will generate knowledge that will solve real-world problems (Creswell and Creswell, 2023). Epistemologically, therefore, pragmatists believe that knowledge can be acquired and generated through both objective evidence and subjective interpretations based on what will best meet their needs (Shannon-Baker, 2023, Maarouf, 2019, Creswell and Creswell, 2023). Thus, drawing on the strengths of both approaches a more comprehensive understanding of the phenomenon under investigation can be ascertained (Pretorius, 2024). Axiologically, pragmatists value the influence of subjectivities such as experiences, beliefs, values, and posit that these should not be perceived as an impediment, rather they ought to be used in such a way to reinforce and improve the research (Shannon-Baker, 2023, Maarouf, 2019).

This study is situated within a pragmatist paradigm which was adopted as both the philosophical foundation and approach to the study. This is grounded in the researchers' philosophical beliefs that align with the pragmatic paradigm. Foremost, the researcher upholds the imperative that reality is indeed dynamic, unfixed and that the choice of methodology and subsequent selection of methods should unequivocally be based on those that will attain the most substantive insights and understandings to address the research problem. Indeed, the researcher also acknowledges the distinct value in both objective and subjective inquiry and associated evidence derived from these and embraced the importance of utilising a plurality of methods to comprehensively and holistically investigate IHMS in Ireland. The researchers philosophical stance and overall research problem facilitated the use of a mixed methods approach, namely a sequential explanatory mixed methods design in order to methodically and efficaciously achieve the overall aim and associated objectives of this study.

2.4 Research Design: Sequential Explanatory Mixed Methods

MMR has evolved significantly over time and continues to advance and progress in contemporary scholarship. As with any research inquiry, the researcher must also choose the type of study design to address the specific research problem which provides an explicit framework for the procedures within the study (Lall, 2021, Creswell and Creswell, 2023). Within the paradigm of MMR, there are a multitude of designs in which the researcher must appropriately choose in order to address the research problem. As previously mentioned, it is imperative to provide an explicit rationalisation and justification for the selected design and due consideration should be afforded to this vital step. It has been acknowledged that research questions that require a MMR approach have facets that require both quantitative and qualitative information (Lall, 2021). In the present study, a MMR design was requisite in order to address the research problem under investigation. This study aimed to investigate the characteristics, practices, and experience of donors and recipients of IHMS which necessitated both quantitative and qualitative information in order to achieve the overall aim and specific objectives of the study. A visualisation of the MMR design for this overall research is illustrated in Figure 2.1.

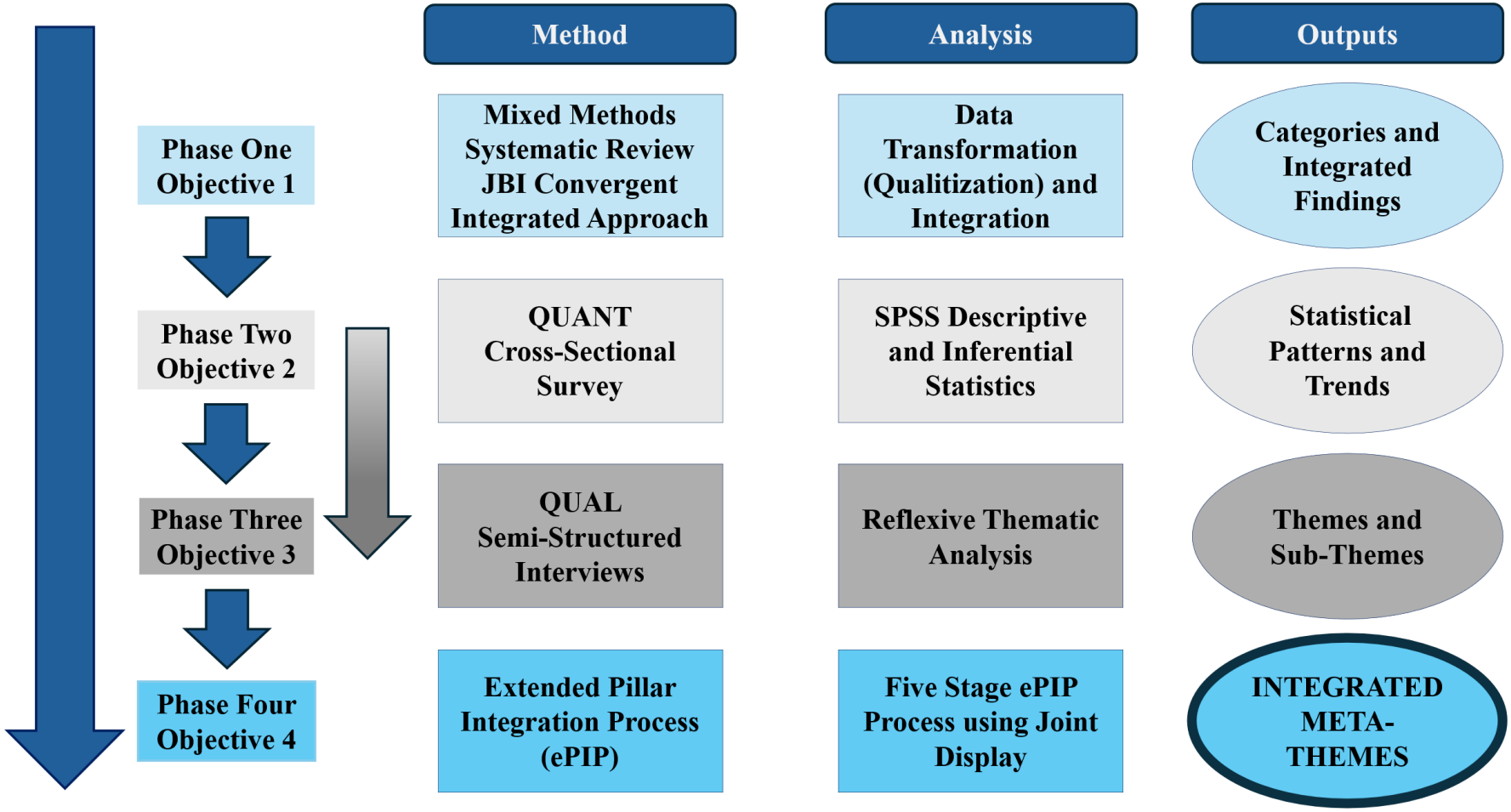


Figure 2.1 Diagrammatic Visualisation of the Research Study

2.4.1 Sequencing

Careful deliberation to the sequencing, relative priority and integration was afforded when planning the present study and these have been recognised as imperatives in the designing of a MMR study (Lall, 2021). In determining the research design, the sequential explanatory design was chosen as this was the appropriate design to decisively and efficaciously achieve the overall research aim of this research and gain a holistic understanding of IHMS in Ireland. The explanatory sequential design comprises two distinct phases where the acquisition and analysis of quantitative data (numeric) is completed in phase one and subsequently qualitative data (text) is gathered and analysed in phase two which enables the expansion and explanation of quantitative data (Lall, 2021, Creswell and Creswell, 2023). The rationale for the sequencing in sequential explanatory designs is that the initial quantitative data collection and analysis provides an overall depiction of the phenomenon and the succeeding phase helps explain, expand and refine the numerical data by comprehensively exploring participants' insights more in-depth. Ultimately, this enables the attainment of a more holistic depiction of the phenomenon. Moreover, the incorporation of qualitative methods can also reveal unanticipated issues which are significant to the research problem and also facilitate a more comprehensive elucidation of the quantitative findings (Wasti et al., 2022).

2.4.2 Relative Priority: QUANTITATIVE→QUALITATIVE

The relative priority in a MMR study pertains to the significance or importance of the quantitative and qualitative data in addressing the overall research question (Dawadi, Shrestha, and Giri, 2021). There are three possibilities that researchers can choose pertaining to the designation of priority in MMR studies and careful deliberation should be afforded to this step which includes the assignment of equal weighting, quantitative priority and qualitative priority (Ivankova, Creswell and Stick, 2006, Dawadi, Shrestha, and Giri, 2021). It has been acknowledged that in sequential explanatory MMR studies, quantitative priority is most common as the quantitative phase occurs first in the sequence and contributes the predominant aspect of the data collection (Ivankova, Cresswell and Stick, 2006, Creswell and Creswell, 2023). Nevertheless, within the present study, the priority assigned to the quantitative (quant) and subsequent qualitative (qual) phase was equal denoted as QUANT→QUAL which represents equal weighting to both phases as

illustrated in Figure 2.1. The rationale and justification for assigning an equivalent weighting and priority to both phases was influenced and substantiated by their equivalent and indispensable contribution to the study aim and objectives. Foremost, the quantitative phase provided the baseline characteristics, practices and experiences offering foundational insights to an unexplored geographical context and thus provided the primary empirical baseline evidence on IHMS characteristics, motivations, practices and experiences of donors and recipients in Ireland and provided the underpinning data for the succeeding qualitative phase. However, the qualitative phase provided the crucial insights and depth in the understanding of the lived experiences and practices of IHMS in our geographical context. Consequently, it was appropriate to assign equivalent weighting to both sequential phases.

2.4.3 Integration

Integration is a defining characteristic of MMR and as such it should provide 'a whole greater than the sum of its parts' (Doyle et al., 2016 p.630). Indeed, it has been argued that due consideration should be afforded to the principles and practices of integration in order to maximise the strengths of a MMR study (Fetters, Curry and Creswell, 2013, Fetters, 2019). It has been acknowledged that integration can occur not only at the interpretation level but at the design and methods levels in MMR studies (Doyle et al., 2016). Through careful reflection at the outset of this research, the principles and practices of integration were deliberated and considered which enabled the purposeful and strategic planning of the integration throughout the study. It has been suggested that by unpacking these principles and components of integration, it enables researchers to leverage significant potential of their research and consequently enhances the analysis and the overall findings of research (Bazeley, 2024).

In this study, integration was achieved at the design level and is characterised by the utilisation of a sequential explanatory design where one phase (quant) informed the succeeding phase (qual) (Fetters, Curry and Creswell, 2013). Additionally, integration through the methods was achieved through the following approaches delineated as: connecting and building (Fetters, Curry and Creswell, 2013). Integration through connecting was evidenced by the sampling frame where the sample for the qualitative phase were derived from respondents from the quantitative phase (Fetters, Curry and

Creswell, 2013). Finally, integration through building is an intrinsic feature of a sequential explanatory mixed methods study and is represented by how the quantitative phase informs the development of the qualitative phase (Doyle et al., 2016). In this study, the findings of the quantitative survey informed the development of the interview questions for the subsequent phase, the semi-structured interviews. Integration was also achieved at both reporting/interpretation level as evidenced by the application of the ePIP. While both the data from each phase was analysed separately, the use of the ePIP to systematically integrate the findings was incorporated to integrate the findings. The rationale for the utilisation of ePIP is presented in later in this Chapter. The process and application of the ePIP for the integration of the study findings is presented in Chapter Six. Integration was also achieved at the discussion level by the development of the overarching meta-themes which are the integrated findings that emanated from the amalgamation of the findings from the MMSR, and the quantitative and qualitative data findings (Doyle et al., 2016). The integrated findings are critically discussed in Chapter Seven.

2.4.4 Advantages and Challenges of a Sequential Explanatory Mixed Methods Design

The sequential explanatory mixed methods design is associated with specific advantages and some distinct challenges in its implementation that were considered at the planning stages of this research. As the acquisition of data is completed in distinct phases, it has been asserted that these study designs are often straightforward to complete, even for researchers working independently (Creswell and Plano Clark, 2011). Moreover, as this was the first empirical investigation of IHMS in Ireland, this design was both appropriate and strategically selected in order to purposefully achieve the overall aim and associated objectives of study. The sequential explanatory design facilitated the elicitation of both breath (quantitative survey) and depth (qualitative interviews) which provided the opportunity to expand on and explain the findings of the initial phase which represents a distinct advantage of this design (Lall, 2021, Creswell and Creswell, 2023). As with all research designs, there are some disadvantages to the sequential explanatory designs which are evidenced. Foremost, as the data is collected sequentially, this design is associated with longer timelines for its implementation which may pose challenges for the recruitment of participants for the qualitative phase (Doyle et al., 2016). This potential

challenge was addressed by incorporating an 'expression of interest' form at the end of the quantitative survey for respondents who participated in the survey who could proceed to complete this step if they were interested in participating in the qualitative interviews. This is presented in Appendix C.

2.5 Overview of Study Phases

As previously explained, this research consisted of four distinct, consecutive phases, each of which explicitly align with one of the core objectives derived from the overarching aim of this research and are comprehensively explicated in Chapters Thee to Six of this thesis. Each distinct phase has been mapped to the associated research objective, specific method/technique utilised, and connected to the pertinent thesis chapter as visually depicted in Table 2.1 This following section will provide additional, requisite information associated with the methodological rationale, implementation or conduct pertaining to each phase.

Table 2.1: Research Phases Mapped to Research Objectives and Associated Chapter

Research Phase	Method/ Technique Implemented	Research Objective	Thesis Chapter
Phase 1	Mixed Methods Systematic Review (MMSR) following a Convergent Integrated Approach	Identify, evaluate, synthesize and integrate the qualitative and quantitative evidence on the factors associated with IHMS among donors and recipients.	**3**
Phase 2	Sequential Explanatory Study Initial Strand (QUANT) Quantitative Survey	Describe the profiles, motivations, practices and experiences of IHMS donors and recipients in Ireland.	**4**
Phase 3	Sequential Explanatory Study Subsequent Strand (QUAL) Semi-Structured Interviews	Explore and gain an in-depth understanding of the lived experiences and practices of IHMS among donors and recipients in Ireland.	**5**
Phase 4	Integration of Findings from Phases 1,2,3. Extended Pillar Integration Process (ePIP)	Synthesize and integrate the findings of the MMSR, quantitative and qualitative phases to provide a deep, multidimensional and comprehensive understanding of IHMS.	**6**

2.6 Phase 1: Mixed Methods Systematic Review (MMSR)

2.6.1 Rationale for Conducting a MMSR

The MMSR is comprehensively detailed in Chapter Three of this thesis which aimed to identify, evaluate and synthesize the available evidence of factors associated with IHMS among donors and recipients. The rationale for the conduct of a MMSR following a convergent integrated approach was a strategic decision in order to comprehensively, methodologically and transparently achieve Objective 1 of this research. The justification for conducting a MMSR as opposed to an alternative mode of evidence synthesis was influenced and underpinned by the following understandings. Foremost, an initial review of the relevant literature established the existence of two recent scoping reviews on the topic of IHMS; one undertaken in the US by Kullmann et al (2022) which synthesized the existing scholarly evidence within the US relating to IHMS and a second scoping review conducted by Akma Jamil et al (2021) which identified and mapped the extant global evidence underpinning IHMS. Indeed, these scoping reviews provided imperative and timely understandings of IHMS and functioned as vital evidence for guiding future research directions in the scholarly landscape of IHMS. Ultimately, these provided a catalyst for recognising the imperative necessity for the conduct of a systematic review to comprehensively investigate the factors associated with IHMS among donors and recipients who are the key actors in IHMS practices.

Strategically, the choice of conducting a MMSR was underpinned by the acknowledgement of the existence of both qualitative, quantitative and primary mixed methods studies on the topic during the preliminary literature search. Indeed, a defining characteristic of a MMSR is the inclusion of qualitative, quantitative and primary mixed methods studies which is an inherent strength of this type of evidence synthesis and functioned as an underpinning catalyst for the conduct of a MMSR in this present study (Lizarondo et al., 2020). Moreover, the rationale for conducting an MMSR was also underpinned by the recognition of the implicit strengths of MMSRs in their potential to provide enhanced and richer understandings than autonomous modes of evidence synthesis (Lizarondo et al., 2020). Ultimately, the incorporation of numerical, objective data associated with the positivist paradigm in addition to subjective data expounded in

the interpretative and critical paradigms facilitates the ability to confirm, substantiate or expand findings (Stern et al., 2020).

The MMSR in this study was conducted in accordance with the Joanna Briggs Institute (JBI) guidance for conducting MMSRs presented in Chapter 8: MMSRs in the JBI Manual for Evidence Synthesis (Stern et al., 2020). The justification for following the methodological guidance of the JBI was underpinned by the researcher's acknowledgement of the complexity associated with the conduct of MMSRs which necessitated explicit guidance for ensuring the MMSR was robust, systematic, methodologically sound, transparent and in alignment with best practice guidelines (Stern et al., 2020).

2.6.2 Rationale for Utilizing the JBI Convergent Integrated Approach for the MMSR

The MMSR utilised a convergent integrated approach as outlined by the JBI methodological guidance (Stern et al., 2020). The rationale for adopting this approach was substantiated by the specific review question that was formulated. Indeed, it is postulated that if the specific research question being addressed can be answered by both qualitative and quantitative evidence, researchers are guided to pursue a convergent integrated approach in the conduct of the MMSR. Therefore, the type of review question will facilitate the elucidation of the appropriate approach to be adopted for the conduct of the MMSR (Stern et al., 2020). The MMSR conducted in Chapter Three answered the following review questions:

- What are the factors associated with the practice of IHMS among donors?
- What are the factors associated with the practice of IHMS among recipients?

Categorically, these questions could be answered by both qualitative and quantitative evidence which substantiated the justification for incorporating the convergent integrated approach to conducting the MMSR. MMSRs are conducted by meticulously following the requisite steps associated with other systematic reviews including: devising the research question, formulation of inclusion/exclusion criteria, creating a robust search strategy, execution of a systematic search of key databases, retrieval of relevant studies, assessment

of methodological quality and data extraction (Lizarondo et al., 2020).The distinguishing feature of MMSRs pertains to data synthesis and integration. A fundamental characteristic of the convergent integrated approach to MMSRs is the process of the integration of qualitative and quantitative evidence which necessitates the execution of data transformation in advance of the combining/integrating of evidence. The recommended data transformation method as advocated by JBI in the convergent integrated approach is the 'qualitization' of quantitative data owing to the recognition that this process is less erroneous than the conversion of qualitative data into quantitative data, a process identified as 'quantitization' (Stern et al., 2020, Lizarondo et al., 2025). Recently, JBI published further guidance on the principles of data transformation by the method of 'qualitization' and emphasised the categorical significance of precise, meticulous, and thoughtful data extraction which facilitates the seamless integration of evidence from disparate sources (Lizarondo et al., 2025). Moreover, the updated guidance recommended the inclusion of a supplementary file comprising evidence that explicitly portrays the data that were obtained verbatim from the associated data source and from the data that were modified. The rationale for the provision of this updated guidance was underpinned by the verity that diverse comprehensions and potential misunderstandings of the fundamental process of qualitization was evidenced in the scholarly landscape of MMSRs following a convergent integrated approach and thus this update provided further, comprehensive methodological guidance for this imperative process. While acknowledging that this updated guidance was published following the completion of the MMSR presented in Chapter Three, and published in PLoS One in 2024, the researcher incorporated these requisite steps and included a detailed supplementary file distinguishing the raw quantitative data, qualitized data and emerged categories in the published MMSR. This comprehensive file is included in Appendix D and a sample excerpt from these supplementary files illustrating the alignment with the JBI guidance is detailed in Table 2.2.

Table 2.2 Sample Excerpt derived from the MMSR presenting the Quantitative Findings, Qualitized Data and Emerged Categories

Study	Quantitative Findings	Quantitative transformation/Qualitized Data	Emerged Category
Schafer et al., 2018	Emotions related to recipients decisions to feed donor milk considered the positive and negative affect. Positive affect reported: Empowered 3.19 (1.10), 0.00–4.00 Relief 3.78 (0.54), 0.00–4.00 Happy 3.60 (0.73), 0.00–4.00 Confident 3.46 (0.89), 0.00–4.00 Informed 3.60 (0.65), 0.00–4.00 *Mean positive affect 3.53 (0.61), 1.20–4.00* Negative affect reported: Sad 1.01 (1.07), 0.00–4.00 Inadequate 0.86 (0.97), 0.00–4.00 Anxious 0.86 (0.97), 0.00–4.00 Confused 0.29 (0.60), 0.00–3.00 *Mean negative affect 0.96 (0.80), 0.00–3.75* *Netpositive (N = 205, outcome)* *2.57 (1.23), −2.15-4.00*	Recipients generally felt positive emotions relating to their decision to feed donor human milk including: relief, happy, informed and empowered. Respondents rarely felt negative emotions relating to their decision to feed donor milk.	4 Motivator

2.7 Phase 2: Sequential Explanatory Study: Quantitative Cross-Sectional Survey

2.7.1 Rationale for Survey Method and Survey Instrument Utilised

The second phase of this research constituted the initial, quantitative strand of the sequential explanatory mixed methods study. This phase comprised an online cross-sectional survey of IHMS donors and recipients (n=103) in Ireland and is explicated in its

entirety in Chapter Four of this thesis. The following section will elaborate on the rationale for the choice of method employed and the associated instrument utilised for data collection. The pilot study that was completed in advance of the study will be outlined. Following the completion of the MMSR in Phase 1 which identified, synthesized and evaluated the extant literature on the factors associated with IHMS, it was affirmed that there was a distinct absence of empirical evidence within the geographical context of Ireland pertaining to IHMS. A central recommendation from the MMSR was the necessity for further research on IHMS to be undertaken in underexplored geographical contexts as there was an implicit lack of geographical diversity in the extant literature synthesized in the MMSR. Therefore, the sequential explanatory mixed methods study was strategically planned, comprising this initial strand, a quantitative survey followed by the subsequent qualitative strand.

In order to accomplish Objective 2 of this research that endeavoured to describe the profiles, motivations, practices and experiences of IHMS donors and recipients in Ireland, a cross-sectional survey was purposefully chosen. The incorporation of survey methods enable researchers to establish quantitative data, trends, beliefs, patterns and test for associations among variables (Creswell and Creswell, 2023). Ultimately, a survey method was the most appropriate, particularly given the absence of empirical evidence within the Irish context of IHMS which necessitated the elicitation of baseline insights which was accomplished in this phase. The measurement instrument selected and employed in this phase was a modified version of the Milk Sharing Practices Survey originally developed and validated by Peregoy (2022) in the US. Permission was sought and granted to use and modify the tool for this current study. This instrument had previously undergone robust validation processes including: the survey content was derived from the findings of an ethnographic study of IHMS recipients, iterative validation procedures including two sequential validation studies, incorporating cognitive interviewing to evaluate construct validity and enhance clarity in the first, and the combination of both cognitive testing and usability testing in the second (Peregoy, 2022). The instrument was appraised and was considered a robust and appropriate instrument given its applicability and validity. A pilot study preceded the conduct of the cross-sectional survey which was undertaken with a purposive sample of International Board Certified Lactation Consultants (IBCLCs),

breastfeeding mothers, academics and individuals who had prior experience with IHMS. During the pilot phase, the participants of the pilot study were provided with an information leaflet detailing the aim and objectives of the research as well as the measurement instrument. The participants were requested to review the measurement instrument and provide written feedback. Following the compilation of the received feedback, necessary adaptations were completed. Subsequently, the finalised measurement was piloted on Qualtrics platform by the pilot participants for usability testing. This pilot phase was instrumental in ensuring the appropriateness of the instrument to the geographical context, enhancement of the contextual validity and in the evaluation usability (Creswell and Creswell, 2023). The modified version of the survey instrument is included in Appendix E.

2.8 Phase 3: Sequential Explanatory Study: Qualitative Semi-Structured Interviews

2.8.1 Rationale for Semi-Structured Interview Method

The subsequent phase of this research comprised the qualitative strand of the sequential explanatory study which consisted of semi-structured interviews (n=15) with IHMS donors and recipients who had participated in the preceding quantitative survey and is comprehensively elucidated in Chapter Five. The associated objective was to explore and gain an in-depth understanding of the lived experiences and practices of IHMS among donors and recipients in Ireland. As aforementioned, the preceding quantitative phase enabled the acquisition of broad, extensive insights and the attainment of the ‘what’ of IHMS in Ireland which subsequently informed the development of the succeeding qualitative phase (Wasti et al., 2022, Doyle et al., 2016, Subedi, 2023). Ultimately, the findings derived from the survey explicitly guided the development of the semi-structured interview questions and enabled the opportunity to explain and expand the findings and in essence, comprehend the ‘why’ of IHMS from the subjective insights of donors and recipients (Wasti et al., 2022). The semi-structed interview guide is included in Appendix F which was formulated based on the findings of the initial survey as well as from the incorporation of Patient and Public Involvement (PPI).

2.8.2 Patient and Public Involvement

The concept of PPI has gained considerable attention and substantive prominence over the past two decades particularly within the scholarly landscape of health-related research, owing to its advantageous contributions towards enhancing the quality, inclusivity, impact and relevance of research endeavours (Mand et al., 2026, Mah, Dobson and Thomson, 2025,Van Vliet et al., 2025). A widely accepted definition of PPI is research that is 'carried out 'with' or 'by' members of the public rather than 'to', 'about', or 'for' them' (HSE, 2021, pp.3). Conceptually, it represents a collaborative partnership among researchers and members of the public or patients in research activities at various stages rather than active participants recruited to the study (Lu et al., 2026). Recently, various organisations have adopted the term 'Patient and Public Involvement and Engagement' (PPIE) which encapsulates the collaboration among researchers and patient/public representatives in various, diverse activities such as imparting research findings or increasing awareness through various events (Lu et al., 2026). The substantive value of its inclusion in research is further evidenced by funding bodies and ethics committees stipulating PPI as a prerequisite for the approval of funding for research (Jackson et al., 2020, Lu et al., 2026).

In the present study, the incorporation of PPI was intentionally planned and considered to be an imperative and advantageous constituent of this research. PPI involvement encompassed the inclusion of collaborative interactions with two individuals who had lived experience of IHMS, one as a donor and one as a recipient. Following the analysis of the cross-sectional survey, the researcher formulated the interview guide derived from the key insights elucidated from the survey. This preliminary guide/protocol was refined based on PPI participation in the reviewing, refining and provision of crucial insights. Indeed, their contributions in advance of the commencement of the qualitative phase were instrumental in the provision of imperative insights founded on their experiential knowledge of IHMS within Ireland. Ultimately, the encapsulation of the lived experiences imparted by the PPI members enabled the guide/protocol to be authentic, meaningful and unequivocally grounded in experiential insights. Moreover, the researcher perceives the strategic incorporation of PPI enriched the overall value of the research. This perception aligns with a recent concept analysis that stipulated that research enhancement was a primary benefit articulated in the majority of the included studies which explored the value

of PPI in research (Lu et al., 2026). The researcher also incorporated PPI engagement at the outset of recruitment of participants to the online cross-sectional survey where the gatekeepers/ administrators of the online Facebook platforms raised awareness of the research and posted the information flyer for the study. The study flyer is included in Appendix G. Furthermore, these individuals disseminated the scholarly outputs of the study on these specific platforms upon publication which enabled the findings of the research to be accessible to those who participated in the study as well as wider dissemination through social media channels. Indeed, PPI engagement extends to activities such as raising awareness and the dissemination of knowledge (HSE, 2021).

2.9 Phase 4: Integration of Findings Incorporating the Extended Pillar Integration Process (ePIP)

The final phase of this research, aligning with Objective 4 of this study was to synthesize and integrate the findings of the MMSR, quantitative and qualitative phases of the sequential study to provide a deep, multidimensional and comprehensive understanding of IHMS. While the points of integration within this study from the design and methods level have been previously described, the following section will provide a rationale for the integration technique incorporated to integrate the findings from the MMSR and the quantitative and qualitative data from the sequential study.

2.9.1 Rationale for Utilising the ePIP for the Integration of Study Findings

There has been an increase in data integration techniques and methods available to researchers as a result of the growing awareness of the value and significance of integration in MMR (Gauly, Ulahannan, and Grove, 2024). However, it has been reported that various MMR studies have shown a lack of integration or minimal integration and thus it has been cited as a significant challenge in MMR (Fetters and Tajima, 2022). It has been suggested that advanced planning can assist in overcoming this challenge (Fetters and Tajima, 2022), Therefore, the selection of the most appropriate, methodical and transparent integration technique for the facile merging of findings in this present was an imperative step. Some common techniques of integration include triangulation, visual presentation by joint display, or following a thread (Johnson, Grove and Clarke, 2019).

Triangulation is an approach to the integration of findings in MMR studies which is conducted following the analysis of data from each of components separately. In this approach, findings from each phase of the study are presented on one page which enables the researcher to elicit convergences, discrepancies and areas of complementarity among the findings (O' Cathain, Murphy and Nicoll, 2010). The Triangulation Protocol developed by Farmer and colleagues (2006) provides comprehensive guidance on the conduct of triangulation however, this was specifically developed for multiple qualitative studies (Farmer et al., 2006). Therefore, due to a lack of empirical applicability of the Triangulation Protocol to MMR studies, it was deemed an unsuitable method for the present study (Gauly, Ulahannan, and Grove, 2024). An alternative method considered was Following a Thread method which was developed by Morrin-Ellis and colleagues who argued that integration: 'denotes a specific relationship between two or more methods where the different methods retain their paradigmatic nature but are inter-meshed with each other in pursuit of the goal of knowing more' (Morrin-Ellis et al., 2006, pp.51). This method demonstrates that data from multiple data sources can be integrated and comprises the exploration of specific findings and themes across all data sets (Morrin-Ellis et al., 2006, Johnson, Grove, and Clarke, 2019). However, a limitation in the Following a Thread method has been the lack of specific guidance or steps in its application (Johnson, Grove and Clarke, 2019). While Following a Thread has been suggested as a useful analytical framework for the integration of findings in MMR, a recent systematic review exploring the usability and applicability of this established that the included studies in the review did not offer adequate or transparent reports of how the method had been applied (Dupin and Borglin, 2020). Therefore, this method was not selected due to the lack of specific guidance on its application which was deemed an imperative of this study in order to demonstrate effective and transparent integration.

An alternative approach to data integration is the use of joint displays which is the presentation of data on a visual matrix which is utilised to integrate and visually represent the integration process of qualitative and quantitative data sources (Gutterman et al., 2015, Gutterman, Molina-Azorin and Fetters, 2020, McCrudden, Marchand and Schutz, 2021). Moreover, joint displays provide a framework for organising data, combining, comparing and linking results from disparate data sources and subsequently facilitates the

identification of meta-inferences by its application (Guetterman, Fàbregues and Sakakibara, 2021). There has been an increased call for the use of joint displays in MMR founded on the acknowledgement that the use of joint displays enables the achievement of integration as well as inferential transparency in MMR (McCrudden, Marchard and Schutz, 2021, Fetters and Tajima, 2022). Joint displays can be visually displayed in many ways including tables, figures, graphs, matrixes or diagrams and innovations in their use are widely evidenced in the contemporary literature (McCrudden, Marchand and Schutz, 2021). Due to a lack of clearly defined analytical procedures for integration utilizing a joint display approach, Johnson and colleagues (2019) conceptualised the Pillar Integration Process (PIP) which presented a systematic and explicit analytical technique comprising a four-stage process for the visual depiction and meticulous integration of diverse data types and encompasses a joint display approach (Johnson et al., 2019).The PIP enabled the elucidation of new insights that transcend those attained in singular strands (Fetters, Curry, and Creswell, 2013). The four stage sequential processes of the PIP comprises listing, matching, checking and pillar building which are completed following the separate analysis of the qualitative and qualitative data as detailed in Figure 2.2 (Johnson et al., 2019).

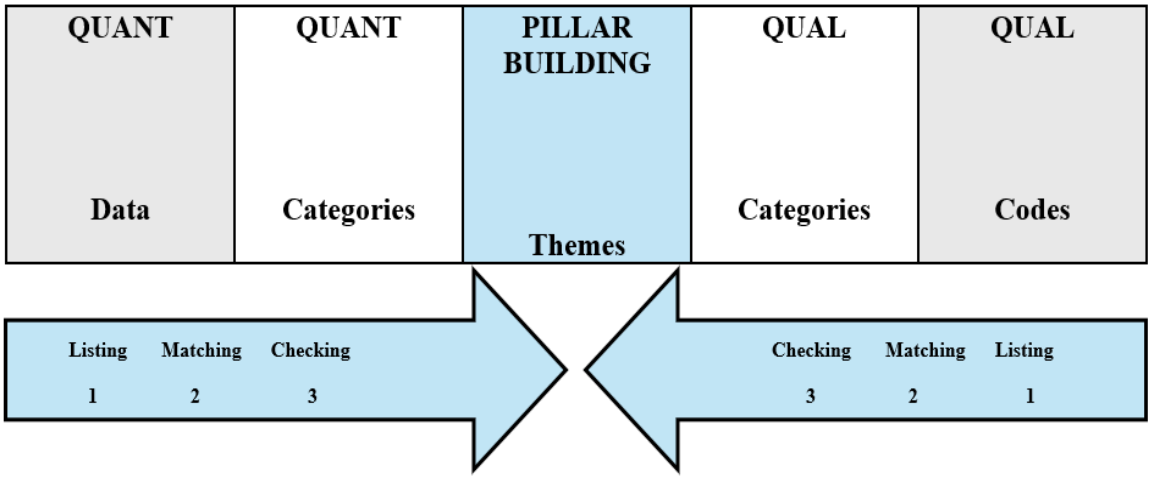


Figure 2.2 Generic Diagrammatic Visualisation of the PIP process
(Adapted from: Johnson, Gove, Clarke, 2019)

While the PIP was deemed an appropriate, robust and transparent tool for the integration of disparate sources of evidence, it was limited to the integration of only two data sources (Gauly, Ulahannan, and Grove, 2024). The ePIP is an expansion of the PIP and is an

innovative integration method purposefully developed to integrate data from three data sources, building on the original PIP. Therefore, the ePIP was selected due to its novel and unique capacity to integrate more than two data strands (Gauly, Ulahannan, and Grove, 2024). Moreover, the ePIP provides explicit and comprehensive guidance on its application (Gauly, Ulahannan, and Grove, 2024). The utilisation of this novel methodological integration framework enabled the purposeful, comprehensive integration of the MMSR, as well as the primary quantitative and qualitative data findings of this sequential explanatory mixed methods study. Accordingly, the utilisation of this innovative technique for the integration of findings facilitated the explicit illumination of IHMS, uncovering divergences and convergences across global and local evidence which enabled a more multi-faceted understanding of IHMS from both the global and local contexts. The ePIP comprised a five-stage sequential process which involved completing the following stages: listing, matching, checking, development of overarching meta-themes and writing up (Gauly, Ulahannan, and Grove, 2024). The ePIP is presented as a seven-column visual display and is illustrated in Figure 2.3.

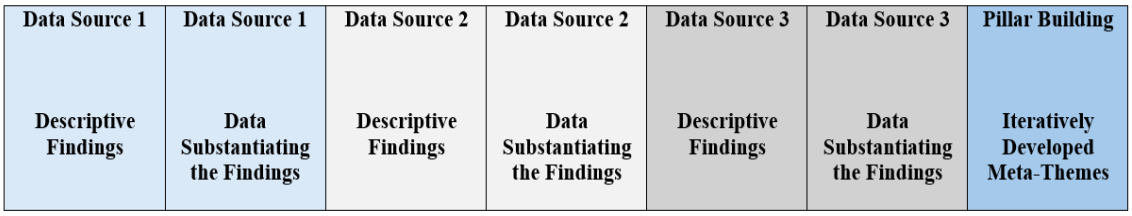


Figure 2.3 Generic Diagrammatic Visualisation of the Extended Pillar Integration Process (ePIP) (Adapted from: Gauly, Ulahannan, and Grove, 2024)

In the ePIP the initial step is the listing of data from the first data source in the first and second column. Descriptive and data substantiating the findings are explicitly documented. Preliminary meta-themes are then documented in the pillar building column located on the first column on the right. A defining characteristic of the ePIP framework is the iterative development of these aforementioned meta-themes. This represents a crucial methodological divergence from the original PIP where the meta-themes were developed at the final stage of the analytical process (Johnson, Grove and Clarke, 2019, Gauly, Ulahannan, and Grove, 2024). During the second sequential step, the descriptive findings and data substantiating the findings are documented for the remaining data

sources two and three sequentially. Any new findings emanating from either source are entered into a new row and any that correspond to the previous data source(s) are listed in the same row. Preliminary meta-themes are added as required and reviewed on an ongoing basis during this matching phase. The succeeding phase is checking where all columns on the joint display are meticulously reviewed and refined incorporating peer debriefing which enhances validity and mitigates any potential bias (Gauly, Ulahannan, and Grove, 2024). The subsequent phase comprises the systematic appraisal of meta-themes and grouping into overarching meta-themes. In the ePIP the final stage is the writing up and specific guidance pertaining to this is provided which includes the necessity for formulating an overview table which visually displays all the meta-themes and the source(s) in which they have been derived from as well as a narrative description (Gauly, Ulahannan, and Grove, 2024). The ePIP was considered to be a rigorous and transparent integration technique with explicit guidance on its application and therefore was incorporated into present study. In Chapter Six, the synthesis and integration of analysis of the three data sources through the implementation of the ePIP is comprehensively detailed.

2.10 Ethical Considerations

Ethical considerations in research can be broadly categorised into two distinct foundational underpinnings which encompass the integration of fundamental principles to protect the research participants and the explicit adherence to professional standards for ethical conduct (Pietilä et al., 2020). Importantly, the determination of quality in research encompasses both the establishment of scientific rigor and the appropriate implementation and adherence to ethical principles and practices (Dublin City University, 2024). Indeed, those who engage in research are expected to uphold the highest standards of both scientific and ethical principles in their pursuits, in order to minimise risks and maximise the potential benefits associated with their research endeavours (Dublin City University, 2024). Ethical approval was sought and granted for this research from Dublin City University Research Ethics Committee (DCUREC/2024/083) on May 21st, 2024, as evidenced in Appendix H.

The core principles of ethics include respect for persons, nonmaleficence, beneficence and justice (Heale and Shorten, 2017, Varkey, 2021). The researcher espoused the ethical principle of respect for persons in this study by upholding the participants right to autonomy by ensuring that those who participated in the research did so on a voluntary basis. This was supported by the provision of comprehensive participant information leaflets (PILs) across both the quantitative and qualitative phases which facilitated informed consent, and are presented in Appendix I and J, respectively. To ensure participants could seek clarification, the researcher's contact details were included on the PILs and the informed consent form for the qualitative interviews. Moreover, at the commencement of each interview the researcher explicitly offered participants the opportunity to ask questions. The principle of beneficence represents the obligation of 'doing good' and non-maleficence in accordance with the Hippocratic proverb denoting 'above all, do no harm' (Mondragón Barrios et al., 2022). Collectively, these ethical principles describe how researchers must endeavour to maximise the benefits and avoid any harm (Pietilä et al., 2020).

The researcher provided information on the PIL which emphasised the potential benefits of participating in the study which were broadly categorised as indirect benefits such as the contribution to the generation of new knowledge in the IHMS landscape. It has been emphasised that the benefits should be explicitly proposed at the outset so that individuals can decide whether the benefits are worth any actual or potential risks or unintended consequences as part of the process of informed consent (Barrios et al., 2022). While there were no anticipated risks associated with participating in the study, the researcher ensured that specific measures were taken to mitigate any harm. Foremost, each participant was informed of how their data would be used and stored as well as the specific measures relating to the protection and management of their data. Indeed, it is widely acknowledged that both privacy and confidentiality are crucial in research practice (Pietilä et al., 2020). Although there were no anticipated risks directly correlated with participating in the study, the researcher was acutely aware of the recruited population and the prevalence of postpartum depression (PPD) and anxiety among Irish mothers in the first year postpartum. Findings of a recent longitudinal cohort study of Irish primiparous women established that depressive, anxiety and stress symptoms in the first year postpartum are

reported in 14.2%, 9.5%, and 19.2% of mothers, respectively (Hannon et al., 2022). Moreover, it has been noted that these are under-diagnosed in clinical settings and that contacts with healthcare professionals (HCP) after 3 months postpartum for mothers are infrequent (Hannon et al., 2026). Therefore, the researcher provided information on PPD and the contact details of national support services for mental health services at the end of the survey as detailed in Appendix K. The final ethical principle of justice is interpreted as the fair, equitable and appropriate treatment of participants (Heale and Shorten, 2017, Varkey, 2021). This was evidenced in this research where all participants were afforded an equal opportunity to participate in the qualitative interviews. Similarly, all interviews were conducted in a consistent manner ensuring fair and equitable processes were embedded.

2.11 Researcher Reflexivity

The concept of reflexivity has been extensively debated and much scholarly attention has been devoted to the illumination of its significance and necessity within the research process (Braund et al., 2024). There are varied definitions ascribed to the notion of reflexivity, yet collectively at the crux of these nuanced classifications is the practice of recognising, embracing and engaging with the subjectivity we bring to our research (Olmos-Vega et al., 2023, Braund et al., 2024). Ultimately, it encapsulates the view that the researcher is the functional agent in the construction of knowledge (Trainor and Bundon, 2021). Reflexivity is also an intentional and ongoing process which compels researchers to embrace subjectivity and 'own their perspectives' (Braun and Clarke, 2023 pp.4). It is of way of capitalising on the researcher's own identities and knowledge (Olmos-Vega et al., 2023).

I embedded reflexivity across the duration of this research deliberately, by continuously embracing and reflecting on the view that my own personal assumptions, experiences and various identities subjectively shaped the knowledge generated and consequently this personal belief aligns with the assertion that objective construction of meaning is not possible as 'knowledge generation is inherently subjective and situated' and this subjectivity is therefore the primary 'instrument' for analysis (Braun and Clarke, 2022, pp.8). This understanding is shared by Bourke (2014) who asserted that the attainment of

absolute objectivity is a naïve endeavour due to the inability for us to eliminate our intrinsic subjectivity. Some scholars argue that the integrity of research is not dependent on the researcher's biographical details but founded on the multifaceted processes of truth-seeking (Savolainen et al., 2023). Nevertheless, intentional engagement and articulation of one's positionality facilitates transparency. Consequently, it brings clarity to how the research focus and subsequent analysis could naturally be shaped by personal assumptions and interpretations inherent to subjective inquiry (Cayir et al., 2022).

I embodied a dualistic insider/outsider position in this study. The 'insider' status was evidenced by sharing some similar attributes with the participants (Bukamal, 2019). I identify as a White Irish, mother of two children who has previous personal experience of breastfeeding and comparable views with the participants in the value of HM which characterised a facet of my 'insider' position in this study. While these similarities such as the lived experiences of motherhood and breastfeeding were evident, I had no prior personal engagement with IHMS which corresponded to an 'outsider' position in this regard. I am a registered Nurse, Midwife, Public Health Nurse (PHN) and IBCLC and have a decade of clinical experience providing support for breastfeeding and the provision of postnatal care. I also have extensive clinical experience in providing care and support to mothers experiencing postnatal challenges and breastfeeding issues. While these encounters were dissimilar to my personal lived experiences, they were constructed through an 'insider' purview. The experiential experiences facilitated an internalisation of these numerous encounters enabled significant 'insider' proximity to the potential complexities and facilitated a deeper and authentic resonance with the participants. Conversely, as a HCP, an 'outsider' lens was maintained regarding IHMS practices given the absence of national policy or guidelines pertaining to IHMS in Ireland to facilitate HCP engagement and the potential medico-legal implications associated with HCP input with IHMS in the absence of guidance.

Throughout the research process, I engaged in an iterative and ongoing process of reflexivity, introspection, and self-awareness to navigate the 'insider/outsider' status. Finlay (2002) highlights that this process of introspective reflexivity is a way to use personal experiences as catalysts for interpretating and elucidating participant insights rather than using them as an end in itself. During data collection and analysis, I embraced

multiple means of engaging with reflexivity. During the semi-structured interviews, I engaged in the process of reflective journalling and memo writing which enabled me to purposefully narrate personal thoughts, feelings, deliberations, pertinent insights and decisions. Reflexive writing is considered a useful method to implement reflexivity which enables researchers to provide clarity to the complexities associated with introspectively deliberating the research process (Olmos-Vega et al., 2023). The incorporation of regular reflexive discussions between the research team ensured analytical depth. Collaborative reflexivity has been articulated as a valuable tool to deliberate decisions and assumptions (Olmos-Vega et al., 2023). Collaborative reflexivity was also evidenced in the incorporation of PPI as previously elucidated in this chapter and throughout each interview where I implemented participant feedback to ensure accuracy of the accounts and validate my subjective comprehension of the participant accounts. Ultimately, the incorporation of these iterative processes facilitated transparency and enhanced the rigor and integrity of the study.

2.12 Summary

This chapter presented the overall methodological approach of this research, comprising a detailed depiction of the overall research design, philosophical underpinnings, research paradigm and the associated study phases. This included an explicit rationale for the design, approaches and associated choices made throughout the planning and implementation of the research. The ethical considerations of this research were explored followed by a presentation of the researcher's positionality and reflexive practices incorporated into this study. The subsequent chapter will present the first phase of the research that comprised a convergent integrated MMSR of the factors associated with IHMS among donors and recipients.

Chapter Three: Factors Associated with IHMS among Donors and Recipients: A Mixed-Methods Systematic Review

The work presented in this chapter has been published in PLoS One:

Vickers, N., Matthews, A., and Paul, G. (2024) Factors associated with IHMS among donors and recipients: A mixed methods systematic review. *PLoS One*, 19(3), https://doi.org/10.1371/journal.pone.0299367

As per DCU Guidelines for candidates, supervisors and examiners on the 'PhD by Publication' format, the PDF versions of published works for the publication outlet cannot be included in the PhD thesis, and all published work should appear in manuscript/thesis format. The content presented in this thesis is correspondent with the content of the published papers, with the exception of minor formatting variations.

3.1 Declaration of Authorship

Section 1: Candidate's Details	
Candidate's Name	Niamh Vickers
DCU Student Number	A22269621
School	School of Nursing, Psychotherapy and Community Health
Principal Supervisor	Dr. Gillian Paul Professor Anne Matthews
Title of PhD by Publication Thesis	A Mixed Methods Study of Informal Human Milk Sharing in Ireland
Section 2: Paper Details	
Title of co-authored paper included in the thesis under examination	Factors associated with informal human milk sharing among donors and recipients: A mixed methods systematic review
List of authors as in order given on accepted/published version	Niamh Vickers, Professor Anne Matthews, Dr. Gillian Paul
Publication Details (e.g. Year of Publication, Journal Name, Issue Number, Page Numbers, Place of Publication, DOI, ISSN, URL etc.)	2024, PLoS One, 19 (3), doi: https://doi.org/10.1371/journal.pone.0299367 Journal ISSN: 1932-6203
Publication Status (e.g. Published, Accepted)	Published
Provide a brief statement here on the disciplinary ranking of this publication and the peer-review process involved (e.g. how many reviewers, single blinded or other, initial decision, revision timeline etc and any other details that	PLoS One is a multidisciplinary journal publishing articles from natural sciences, medical research, engineering, social sciences and humanities. The impact factor was 2.9 in 2025. The peer review process is single-anonymised peer review. The article was submitted on October 4 2023, revised and accepted for publication on February 8 2024. The article was published on March 8 2024. It

speak to the rigour of the peer review process)	had two peer reviewers. It had one round of revisions between submission on October 4 2023 and acceptance in February 2024.

This paper (Chapter 3) is one of three co-authored papers to be submitted as part of the PhD by publication thesis submitted for examination.

Section 3: Candidate's Contribution to the Paper

Provide details below of the **nature** and **extent of your contribution** to the paper (include both your intellectual and practical contributions) and your overall contribution in **percentage terms**. Note that these categories can be customised according to disciplinary norms
The nature and extent of my contribution to the published paper is detailed below. My overall contribution to this paper in percentage terms is 90%.

Briefly outline your contribution to the **conception** of the work described in this paper:

The initial conception of the MMSR was done collaboratively with my supervisors. Following an initial scope of the literature pertaining to the subject area, I devised the specific aim and associated objectives of the MMSR. These were then refined during supervisory meetings.

Briefly outline your contribution to the **literature review** in this paper:

I conducted the literature review presented in this paper. The literature review was reviewed by my supervisors following the completion of the first draft.

Briefly outline your contribution to the **methodological design**:
The decision to conduct a MMSR was decided in collaboration with my supervisors. I proceeded to select the type of MMSR that was conducted and discussed this with my supervisors. My supervisors provided guidance on resources for me to engage with including: JBI methodological guidance, covidence etc.

Briefly outline your contribution to **data collection**:
My contribution to the data collection for the MMSR was the development of the systematic search strategy, conducting the initial search, importing to convidence, title/abstract screening, full text screening, risk of bias assessment/ methodological quality, devising the extraction template, data extraction. My supervisors reviewed the search strategy, completed title/abstract screening, full text screening, risk of bias assessment/methodological quality, reviewing data extraction template, data extraction,.

Briefly outline your contribution to **data analysis**:

Following the data extraction phase, I conducted the data transformation by the qualitization of quantitative data. I assembled then pooled this with the qualitative data from the primary qualitative studies and the qualitative data from the mixed methods. The process of transformation was reviewed by my supervisors.

Briefly outline your contribution to the **synthesis and summary of findings**:
When the qualitized data was assembled and pooled with the qualitative data, I identified categories based on similarity of meaning and generated a set of integrated findings.
The process of synthesis and integration was continuously reviewed by my supervisors.

Finally, outline your contribution to the **writing** and **revision** of the paper:
I wrote the original draft of the manuscript and completed revisions based on feedback from my supervisors. I revised the manuscript based on the peer review comments/ suggestions and these were reviewed and approved by my supervisors.

Section 4: Signature and Validation

I confirm that the following statements are true:

(a) the information I have provided in this form is correct
(b) this paper is based on research undertaken during my candidature at DCU

Signature of PhD Candidate: Niamh Vickers **Date:** 28th May 2026

I confirm that the information provided by the candidate is correct:

Signature of Principal Supervisor: Dr. Gillian Paul, Professor Anne Matthews
Date: 28th May 2026

In some cases, it may be appropriate for verification to be given by both the principal supervisor **and** the lead/corresponding author of the work (where the lead/corresponding author of the work is not the candidate or the principal supervisor) N/A

3.2 Chapter Introduction

Chapter Two presented the methodological approach for this study, detailing the overarching aim, associated objectives, methodological approach and justifications as well as an overview of the four phases of this research. Chapter Three presents the first phase of this research. This phase comprised a convergent integrated MMSR of the motivations, barriers and facilitators associated with the practice of IHMS among donors and recipients. Specifically, the MMSR functioned as the foundational phase of this research and as an imperative conduit to the achievement of Objective 1 of this research which aspired to integrate the existing disparate evidence on the factors associated with IHMS among donors and recipients. The incorporation of both donors and recipients as the study population was a purposeful and strategic decision grounded in the reality that both cohorts are the key actors in the practice of IHMS. Indeed, it was considered imperative and necessary to incorporate both of these distinct yet collective cohorts to accomplish and achieve the overall aspirations of the research.

Preceding the execution of the MMSR, a protocol for the MMSR was registered on International Prospective Register of Systematic Reviews (PROSPERO CRD42023405653), approved following a peer review process and published on HRB Open which enhanced both the transparency and methodological rigor of the MMSR. The protocol is presented in Appendix A. The MMSR, published in PLoS One in 2024, was conducted in accordance with the Joanna Briggs Institute methodological guidance for conducting MMSRs which enhanced the rigor, transparency and conduct of the review. Ultimately, the MMSR provided the requisite foundation for the planning and implementation of the primary quantitative and qualitative phases of this sequential explanatory study outlined in Chapter Four (Quantitative Strand) and Chapter Five (Qualitative Strand), respectively.

3.3 Abstract

The multiple benefits associated with the provision of HM exceed individual health outcomes, engendering substantial economic, societal and environmental domains. HM is the absolute, unparalleled source of nutrition for infants. IHMS is a modernistic and rapidly progressing practice. No systematic review of the factors on this contemporary practice among donors and recipients of IHMS exists. The aim of this review was to identify, evaluate, synthesize and integrate the evidence on the factors associated with IHMS among donors and recipients. A mixed methods systematic review was conducted according to the Joanna Briggs Institute methodological guidance utilizing a convergent integrated approach. The following databases were systematically searched: CINAHL, Scopus, Medline and Embase and Web of Science between inception to August 2023. A grey literature search was conducted using multiple techniques. This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Twenty-four studies were included in this review. Ten integrated findings relating to the factors associated with IHMS among donors and recipients were identified. The four integrated findings pertaining to donors included: altruistic motivation and value, resistance to commercialisation and overcoming inaccessibility, uniting digital and personal connectedness and lack of awareness and acceptance of IHMS in healthcare settings. The six integrated findings relating to recipients included: maternal or infant factors, superiority and advantageous impact of breastmilk, HMB influences, digital connections and transparency, HCP facilitation of IHMS, and professional and logistical implications. This review highlighted a multitude of factors that motivate, facilitate and impede the practice of IHMS. Future research is required to explore these factors further within broader geographical locations to enhance the generalisability and rigor of the body of knowledge. Further studies should consider the exploration of the experiences and psychological impact of IHMS on donors and recipients. The provision of HM to all infants is an imperative public health endeavour and thus positioning this as a key benchmark for research and practice is crucial.

3.4 Introduction

Breastfeeding is widely accepted as a preeminent public health endeavour with advantageous outcomes in the optimisation of child health and survival (North et al., 2022). Globally, organisations recommend exclusive breastfeeding for the first six months of life and the continuation of breastfeeding along with complementary food until two years and beyond (WHO, 2021, American Academy of Pediatrics, 2022). The benefits of breastfeeding transcend individual outcomes, and comprise parallel positive outcomes within the societal, environmental and economic domains (Vickers , Matthews and Paul, 2023). Breastfeeding is a focal component of the Sustainable Development Goals (SDGs) which are championed by all United Nations (UN) member states. The global targets of the SDGs intend to create a healthier, more sustainable world, through ending poverty, protecting the planet and the pursuit of harmony and prosperity for all (Holden, Linnerud and Banister, 2017, United Nations, 2022). HM is a sophisticated and individually specific bodily fluid that demonstrates inherent variability and adaptability (Vickers, Matthews and Paul, 2023). It is characterised by extensive individual variation in terms of its nutritional composition and the presence of bioactive components (Mosca and Gianni, 2017). Accordingly, there is a distinct absence of a perfect substitute for HM as various constituents are exclusively present in HM from a lactating individual (Kim, 2020). Therefore, HM is the absolute, unequalled, source of nutrition for infants (Vickers, Matthews and Paul, 2023).

On a global scale, the exclusive breastfeeding rates for infants aged 0-6 months stand at a suboptimal 44% (WHO, 2021), despite the multifaceted benefits associated with breastfeeding. Prominently, a discernible gap frequently emerges between the expressed intention to breastfeeding and its implementation, as obstacles impeding breastfeeding transcend individual factors and encompass intricate social, cultural and political dimensions (Brown, 2019). In instances where MOM is unavailable or insufficient, alternatives that have been recommended include, breastfeeding by another lactating woman, expressed milk from a human milk bank (HMB) or a breastmilk substitute such as CMF (WHO, 2003). There is a global consensus that MOM is the preferred source of nutrition for infants and if not available, pasteurised DHM from a HMB is considered the

desirable choice (Committee on Nutrition et al., 2017, ESPGHAN Committee on Nutrition et al., 2013, Pound, Unger and Blair, 2020, WHO, 2011).

The practice of HM sharing is not a recent phenomenon but rather has origins in antiquity (Vickers, Matthews and Paul, 2023). The act of sharing HM can be attributed to the practice of 'wet nursing', wherein infants were breastfed by a lactating woman who was not their biological mother. The term wet nursing, or cross-nursing has been observed in various cultures worldwide spanning centuries (Wagg, Hassett and Callanan, 2022). The phenomenon of human MS has progressed exponentially and the modern day banking of HM originated in the 20th century (Thorley, 2012). The availability of breast pumps, including high-quality double breast pumps and the capacity to store expressed HM have categorically enhanced the viability and feasibility of HM sharing (O' Sullivan, Geraghty and Rasmussen, 2016, Peregoy et al., 2022). Human milk banks (HMBs) offer the distribution of pasteurised DHM predominately to vulnerable infants when MOM is insufficient or unavailable (Baumgartel, Sneeringer and Cohen, 2016, Arslanoglu et al., 2023). HMBs are instrumental in the provision of HM to infants, in particular preterm infants with vulnerabilities (Arslanoglu et al., 2023), however they are not universally available or widely accessible worldwide (Israel-Ballard et al., 2019, PATH, 2013). Additionally, for profit HMBs have emerged, engaging in remunerating lactating women for their expressed HM, which is subsequently sold to healthcare institutions (UNICEF/UNICEF UK Baby friendly initiative, 2021).

The emergence of digital technologies has propelled the evolution of IHMS (Akma Jamik et al., 2021). The concept of peer-to-peer milk sharing is one such advancement in this practice and has been opined as a modern embodiment of an ancient practice (Gribble, 2018a). The use of HM through informal, peer-to-peer human milk sharing is increasing globally (Cassidy et al., 2018). The recognition of commonly interchangeable terms used for this practice include: 'peer-to-peer milk sharing,', 'informal milk sharing', 'milk sharing via the internet', 'internet based peer-to-peer milk sharing'. The term informal human milk sharing IHMS will be used within this current review and pertains to the specified terms outlined above. These terms, used reciprocally, denote the practice of the voluntary and commerce-free trading of human milk outside the HMB system (Peregoy et al., 2022). Inherent to this practice is the collaboration and agreement of donors and

recipients of HM in relation to the exchange (Palmquist et al., 2019). Commercialisation of HM is becoming another recent advancement, where numerous internet-based platforms facilitate the commercial selling and purchasing of HM (Steele et al., 2015).

In recent years, a growing body of research has been dedicated to exploring various aspects related to the practice of IHMS. Nevertheless, it is important to note that as of now, no systematic review specifically addressing this subject exists or is currently underway. Nonetheless, two recent scoping reviews by Akma Jamil et al (2021) and Kullmann et al (2022) have provided comprehensive mappings of the existing scholarly literature concerning IHMS, encompassing both the US and International contexts, respectively. These prominent reviews in the realm of IHMS have acted as catalysts for enhancing the breadth and depth of understanding surrounding this contemporary practice (Vickers, Matthews and Paul, 2023). Within the domain of IHMS, donors and recipients are the key actors inherent to this practice and it is crucial to gain an in-depth, and comprehensive understanding of the factors that motivate, facilitate and impede them. There is a justification for undertaking a systematic review to effectively integrate the existing evidence relating to these factors which will aim to assess consistency of findings across the literature, their generalisability to diverse settings and populations and potential implications for informing future healthcare decision-making (Büchter, Weise and Pieper, 2020, Mulrow, 1994).

3.5 Materials and Methods

3.5.1 Study Aim and Review Questions

This MMSR aimed to identify, evaluate and integrate the quantitative, qualitative and mixed-method studies pertaining to the factors associated with IHMS among donors and recipients. The following questions aligned to the review question were:

•What are the factors (motivations, barriers and facilitators) associated with the practice of IHMS among donors?

•What are the factors (motivations, barriers and facilitators) associated with the practice of IHMS among recipients?

3.5.2 Study Design

This MMSR was conducted in accordance with the Joanna Briggs Institute (JBI) guidance for conducting MMSRs as outlined in Chapter 8: Mixed methods systematic reviews in the JBI Manual for Evidence Synthesis (Aromataris and Munn, 2020, Stern et al., 2020). The protocol for this systematic review was registered on International Prospective Register of Systematic Review PROSPERO CRD42023405653 and published with HRB Open Research (Vickers, Matthews and Paul, 2023). The protocol for this review has been approved following a peer review process. This has provided a robust foundation for the execution of this current MMSR. This review was completed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRIMSA) flow diagram (BMJ, 2021). This contemporary 27-item checklist was published in 2021 and was incorporated in this review as detailed in Appendix L (BMJ, 2021).

3.5.3 Search Strategy

A three-phase process was utilised for the search strategy as recommended by JBI and as documented in the approved protocol for this mixed-methods systematic review (Vickers, Matthews and Paul, 2023). This search strategy was developed and conducted to find both published and unpublished studies. Foremost, a preliminary search of CINAHL (Cumulative Index to Nursing and Allied Health Literature) Complete, Scopus (Elsevier) and MEDLINE was undertaken incorporating key terms. An analysis of the key words/ terms in the titles, abstract and index terms was used to describe the articles yielded in the preliminary search which facilitated the development of a comprehensive search strategy to be developed. The keywords and search terms were peer-reviewed by the Subject Librarian in the School of Nursing, Psychotherapy and Community Health, Dublin City University. A systematic and iterative process utilising synonyms, subject headings, Boolean operators (“AND” and “OR”) and controlled vocabulary terms were used for each database search. The full search strategy for each of the databases is detailed in Appendix M. The following databases were searched: CINAHL (Cumulative Index to Nursing and Allied Health Literature) Complete (inception 1961), Scopus (inception 2004), MEDLINE (inception date 1879) and EMBASE (Excerpta Medica Database) (inception date 1980). The date of the final search was 14th August 2023. No language or date restrictions were applied to the searches. This was to ensure all relevant literature

was identified and to facilitate a comprehensive search. In addition, a grey literature search was conducted using multiple techniques. First, Google Scholar was searched to supplement principal database resources to retrieve additional literature (including Grey literature). This was incorporated to improve the evidence base in retrieval of additional resources (Gusenbauer and Haddaway, 2020). Google Scholar has been documented as a suitable supplementary resource for additional sources of evidence, including grey literature (Haddaway et al., 2015). It has been suggested that grey literature yielded from Google Scholar appears after approximately 20 to 30 pages of the search results and thus a title screen of the first 60 pages (600 resources) was conducted (Haddaway et al., 2015). Both title and full text search of Google Scholar was conducted. The rationale for this is founded on the affirmation that grey literature sources in the form of organisational reports and theses are predominately yielded via title searches (Haddaway et al., 2015). The utilisation of both title and full text searching was to ensure comprehensiveness and completeness. Additionally, a search of Web of Science and Open Grey was conducted to increase the breadth and depth of sources of evidence for the MMSR. Dissertation Abstracts was searched via the ProQuest database and a keyword search was conducted to source unpublished theses and dissertations relevant to the review question.

3.5.4 Study Selection

Inclusion criteria determined by using the PICo framework focused on studies exploring the factors (motivations, barriers, facilitators) of IHMS (Interest) from donors and recipients who engage in IHMS (Population) from a global perspective (Context) as recommended by JBI for MMSR (Stern et al., 2020). Studies that also included other components of milk sharing such as wet nursing/cross feeding and milk banks were also included, if the practice of IHMS was also reported, but only data relating to IHMS were extracted for this MMSR. The PICo framework enabled the identification of the defining characteristics for the inclusion criteria of this MMSR as outlined in Table 3.1.

Table 3.1 PICo Framework, Inclusion and Exclusion Criteria of the MMSR

PICo	Inclusion Criteria	Exclusion Criteria
Population	Studies including donors and recipients of IHMS	Studies exclusively investigating donor milk banks, commercial milk banks, or wet nursing/cross feeding. Studies investigating clinical outcomes of donor human milk. Studies exploring perspectives from individuals other than donors or recipients. Studies which are not primary research studies.
Interest	Studies on factors (motivations, barriers, facilitators) of IHMS	
Context	Globally	

The review considered original and grey literature sources with no language or date restrictions applied. The review included qualitative, quantitative and mixed-method studies. Mixed-method studies were considered only if the individual qualitative and quantitative components could be extracted separately (Lizarondo et al., 2022). In total, 568 citations were identified through the systematic search and were exported to Zotero Citation Management System. References were exported from Zotero Citation Management System version 6/2022 to Covidence and 449 duplicates were removed. Using Covidence, titles and abstracts were screened independently by the first author. A second co-author completed title and abstract screening independently. Following this, 39 full-text studies were screened and assessed independently by the authors for congruence with the specified inclusion criteria. Of these, 15 studies were excluded with explicit justification given for excluding. Through constructive discussions, any disagreements were resolved and a final decision was reached using a consensus-driven approach. The final review included 24 studies as presented in the PRIMSA flow diagram as visually presented in Figure 3.1.

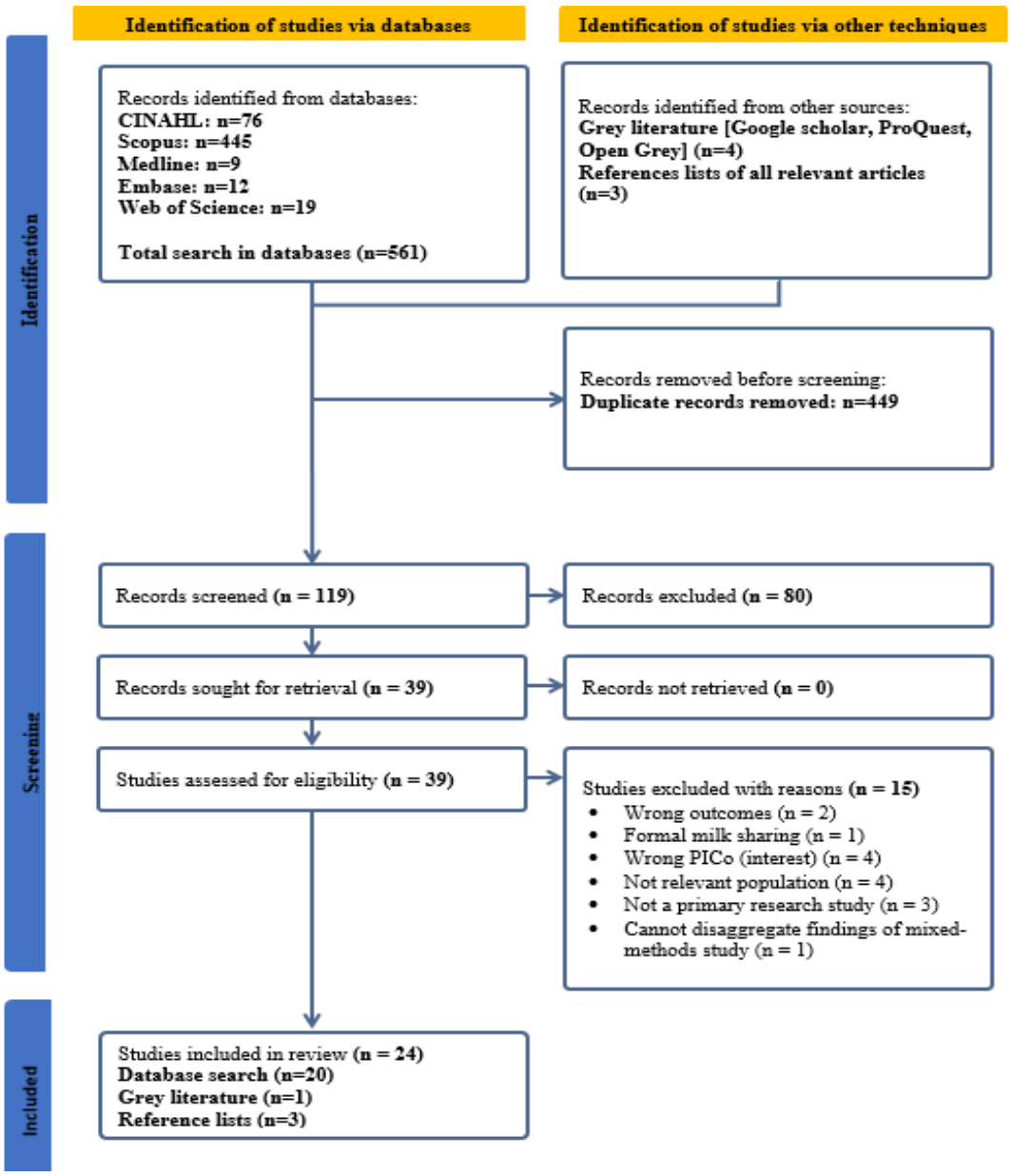


Figure 3.1 PRISMA Flowchart of the Study Selection and Inclusion Processes

3.5.5 Risk of Bias Assessment (Methodological Quality)

A fundamental and key differentiating feature of a systematic review is the rigorous appraisal of the studies included in the review (Porritt, Gomersall and Lockwood, 2014). This key step in the systematic review process relates to the risk of bias assessment (Munn et al., 2023). The terms critical appraisal, bias assessment, assessment of study validity, assessment of methodological limitations are terms used interchangeably in the literature to describe this process. The premise of this step is to evaluate the methodological quality

of each separate study. All studies were assessed using the pertinent JBI critical appraisal tool dependent on the study design of each separate study. Eligible quantitative studies and the quantitative components of the mixed methods studies were evaluated with the relevant standardised JBI quantitative appraisal tool. Qualitative studies that were included and the qualitative components of the mixed-methods studies were evaluated using the standardised JBI qualitative critical appraisal tool. A key characteristic of the inclusion of mixed-methods studies was affirming that the qualitative and quantitative components could be extracted separately so that appropriate appraisal, extraction, synthesis and integration could be conducted. A quality percentage score was given to each criterion that the assessment tool evaluated (Temeng et al., 2023). Grey literature was appraised for methodological quality using the ACCODS checklist (Tyndall, 2010). All studies, regardless of their methodological quality underwent data extraction and synthesis. The appraisal outcomes for each of the 24 included studies are included in Appendix N. The most common criterions in the risk of bias assessment that led to a reduction in quality in the qualitative studies and qualitative components of the mixed studies was the exclusion of a statement locating the researcher culturally or theoretically, the exclusion of an explicit portrayal of the influence of the researcher(s) on the research and not stating the philosophical perspective of the research. In the quantitative studies and quantitative components of the mixed studies, the aspects of the risk of bias assessment that were most commonly omitted and subsequently led to a reduction in quality were the identification of confounding factors and strategies to deal with them.

3.5.6 Data Extraction

Data extraction was undertaken in Covidence using the standardised JBI data extraction form for MMSR following a convergent integrated approach (Aromataris and Munn, 2020). This is the recommended data extraction for MMSRs following a convergent integrated approach (Lizarondo et al., 2022). Data extraction was completed by the first author and the process was cross-checked by the co-authors to ensure accuracy. The following information was extracted and tabulated for each study: author, year, study design, methodology, number and characteristics of participants, study setting and any other context information, geographic location, outcomes or findings significant to the review objectives.

3.5.7 Data Transformation, Synthesis and Integration

Following the data extraction phase, the quantitative data underwent a transformative process referred to as 'qualitization'. This technique involved the transformation of quantitative data into textual descriptions and narrative interpretation, which enabled a fluid integration with the data derived from the qualitative studies, so as to respond directly to the review questions. The process of qualitization is recommended by the JBI methodology group, as it reduces the potential errors of converting qualitative data into numerical format, termed quantitization (Stern et al., 2020).

A convergent integrated approach according to the JBI methodology for MMSRs was applied in this review. Subsequently, the qualitized data was assembled and then pooled together with the qualitative data from the qualitative studies and the qualitative components of the mixed methods studies, to identify categories based on similarity in meaning and to create a set of integrated findings in the form of line of action statements.

3.6 Results

3.6.1 Description of Included Studies

The characteristics of the final studies included in this MMSR are presented in Appendix O. Of the 24 included studies, four were quantitative (16.6%), three were mixed methods (12.5%), and seventeen were qualitative (70.8%), published between 2009-2022. The sample sizes ranged from 1 to 1050 participants with six studies focused solely on donors, four on recipients and fourteen 14 included both donors and recipients in their study. The majority of studies were conducted and based in the US (n=18) (O' Sullivan, Geraghty and Rasmussen, 2016, Gribble, 2018, McCloskey and Karandikar, 2018, McCloskey and Karandikar, 2019, McNally and Spratz, 2020, Perrin et al., 2016, Bressler, Dambra-Candelaria and Spatz, 2020, Wilson, 2018, Gribble, 2014a, Gribble, 2014b, Gribble, 2014c, Gribble, 2013, O' Sullivan, Geraghty and Rasmussen, 2018, Keim et al., 2014, Perrin et al., 2014, Cassar-Uhl and Liberatos, 2018, Schafer, Ashida and Palmquist, 2018, Palmquist and Doehler, 2016), two in Australia (Thorley, 2012, Thorley, 2009, and one each in Ghana, Canada, Turkey and the United Kingdom (Obeng et al., 2022, Papanicilaou, 2013, Onat and Karakoç, 2019, Wagg, Hassett and Callanan, 2022). While the primary location of the country in which the study was conducted was noted, some

studies included some participants outside of their primary location and is evidenced in Appendix O (Thorley, 2012, Gribble, 2018, McCloskey and Karandikar, 2018, McCloskey and Karandikar, 2019, Gribble, 2014a, Gribble, 2014b, Gribble, 2014c, Gribble, 2013, Thorley, 2009). These combined additions included some participants from India, Indonesia, Columbia, Lebanon, Netherlands, Europe, Oceania, Asia.

3.6.2 Review Findings

This MMSR explored the motivations, barriers and enablers of donors and recipients associated with IHMS. The findings of this MMSR are discussed across the themes and integrated findings below and the donor and recipient cohorts are presented separately for clarity.

In relation to the motivations, barriers and enablers, of donors and recipients associated with IHMS, the qualitized data, qualitative data and emergent categories and integrated findings are detailed in Appendix D. These are summarised and visually presented in Figure 3.2 and Figure 3.3.

Donor Motivations, Barriers and Enablers
Motivations
o Desire to help **(Altruistic motivation and value)** o Excess/surplus milk **(Altruistic motivation and value)** o Milk bank restrictions and objections **(Resistance to commercialisation and overcoming inaccessibility)** o Wanted to know where the milk was going **(Altruistic motivation and value)** o Commerce free approach **(Resistance to commercialisation and overcoming inaccessibility)** o Intrinsic value and significance of breastmilk **(Altruistic motivation and value)** o Perceived deficits of formula **(Resistance to commercialisation and overcoming inaccessibility)**
Enablers
o Social media/internet **(Synergistic enablers: uniting digital and personal connectedness)** o Donor milk bank inaccessibility **(Resistance to commercialisation and overcoming inaccessibility)** o Facilitating personal connections **(Synergistic enablers: uniting digital and personal connectedness)**
Barriers
o Healthcare related barriers **(Lack of awareness and acceptance of IHMS in healthcare settings)**

Figure 3.2 Categories and Integrated Findings for Donor Motivations, Enablers and Barriers of IHMS

Recipient Motivations, Barriers and Enablers
Motivations
o Physical or physiological challenges **(Maternal or infant factors)** o Return to school or work **(Maternal or infant factors)** o Value of breastmilk **(Superiority and advantageous impact of human milk**) o Avoidance of commercial milk formula **(Superiority and advantageous impact of human milk)** o Maternal mental health/well-being **(Superiority and advantageous impact of human milk** o Donor milk bank related **(Human milk bank influences)**
Enablers
o Social media/Internet **(Digital connections and transparency)** o Trust and transparency **(Digital connections and transparency)** o Distinct healthcare professionals **(Healthcare professional facilitation of IHMS)**
Barriers
o Healthcare related barriers **(Professional and logistical implications)** o Perceived donor milk supply **(Professional and logistical implications)** o Time-related barriers **(Professional and Logistical implications)**

Figure 3.3 Categories and Integrated Findings for Recipient Motivations, Enablers and Barriers of IHMS.

The findings of the MMSR relating to donor participants motivations, enablers, and barriers included four integrated findings which are presented in Table 3.2 and discussed

Table 3.2 Integrated Findings for Donor Motivations, Enablers, and Barriers of IHMS

1. Altruistic motivation and value
2. Resistance to commercialisation and overcoming inaccessibility
3. Synergistic enablers; uniting digital and personal connectedness
4. Lack of awareness and acceptance of IHMS in healthcare settings

3.6.3 Altruistic Motivation and Value

The desire to help was the most significant motivator reported for donors to engage in the practice of IHMS and was reported in eleven of the included studies (Thorley, 2012, Gribble, 2018, Perrin et al., 2016, Bressler, Dambra-Candelaria and Spatz, 2020, Wilson, 2018, Gribble, 2014a, Keim et al., 2014, Thorley, 2009, Obeng et al., 2022, Papanicilaou, 2013, Onat and Karakoç, 2019).This was often underpinned by the donors reporting a surplus or excess of breastmilk (Thorley, 2012, O' Sullivan, Geraghty and Rasmussen, 2016, Bressler, Dambra-Candelaria and Spatz, 2020, Wilson, 2018, Gribble, 2014a, Papanicilaou, 2013, Onat and Karakoç, 2019). The beliefs about/ of the significance and exceptional value of breastmilk held by donors was evident in six of the studies within the review (Perrin et al., 2016, Wilson, 2018, Thorley, 2009, Papanicilaou, 2013, Bressler, Dambra-Candelaria and Spatz, 2020, Gribble, 2014a). Breastmilk was perceived as 'powerful' (Schafer, Ashida and Palmquist, 2018, Papanicilaou, 2013), 'precious' (Gribble, 2014a) and donors expressed a profound reluctance to waste it, thus this formed a compelling reason to engage in IHMS (Gribble, 2014a, Thorley, 2009). The substantive benefits of breastmilk were noted by donors including the importance of breastmilk to infants (Wilson, 2018, Gribble, 2014a, Papanicilaou, 2013) and mothers (Papanicilaou, 2013). The value of breastmilk perceived by donors in the review was evident in their motivation to seek information about the intended recipients which served as a stimulus for engaging in IHMS (Gribble, 2018, Perrin et al., 2016, Onat and Karakoç, 2019). In four of the studies included in the review, donors performed a needs assessment on the

intended recipients to ascertain why the milk was required and where the milk was going (Gribble, 2018, Gribble, 2013, Papanicilaou, 2013, Onat and Karakoç, 2019).

3.6.4 Resistance to Commercialisation and Overcoming Inaccessibility

Donors articulated the superiority of DHM to CMF which they noted enables infants to attain all their nutritional and vitamin requirements (Wilson, 2018), thrive, and experience 'none of that discomfort' associated with CMF (Gribble, 2018). Various personal objections and restrictions associated with donor human milk banks (HMB) were evident within the review which served as motivator for engaging in IHMS. These included the dissatisfaction with the exorbitant costs for recipients in obtaining DHM from a HMB (Perrin et al., 2016, Gribble, 2013), the impracticalities associated with HMBs such as logistical efforts or the various regulations associated with donating to a HMB (Perrin et al., 2016, Gribble, 2014a, Gribble, 2013, Papanicilaou, 2013). In one study it was noted that most donors could not donate to the HMB as they did not pass the pre-donation screening (Onat and Karakoç, 2019). Similarly, inaccessibility to donate to HMB's was noted in a further study where donors met various challenges with donating such the lack of HMBs in their locality, HMBs were not accepting donations, they did not meet the requirements of donating or a lack of response from the HMB (Gribble, 2013).These prohibitions emerged as enabling and motivating factors for donors to participate in IHMS. Additionally, some donors were propelled to engage IHMS rather than a HMB as they preferred that their milk remained unpasteurised, as they believed this retained the distinct and valuable properties of HM (Perrin et al., 2016, Gribble, 2013). Various studies identified that donors were compelled to IHMS as they preferred a commerce-free approach associated with most IHMS arrangements (Perrin et al., 2016, Gribble, 2013). In their study, Onat and Karakoc (2019) identified that all donors in their study (n=48) received no payment for the milk exchange, emphasizing the prevailing inclination of donors towards a commerce-free approach, aligning with the philosophy of these other findings (Onat and Karakoç, 2019).

3.6.5 Synergistic Enablers: Uniting Digital and Personal Connectedness

Digital platforms were a common enabling factor for donors to engage with IHMS. In the review, only one of the studies specifically reported on IHMS that did not occur via online platforms (Keim et al., 2014). In their study, Obeng et al (2022) did not specify if online

platforms were used amongst any donors in their study and within the presentation of their findings, this was not evident (Obeng et al., 2022). In another study, milk sharing devoid of the use of digital platforms was implicit (Thorley, 2009). In the other 17 studies included in the review which studied donors, the sharing by donors of HM via online networks was frequent. Within four of the reviewed studies, the internet and social media platforms were explicitly identified as predominant facilitators and enablers for donors to engage in IHMS (Gribble, 2018, Perrin et al., 2016, Bressler, Dambra-Candelaria and Spatz, 2020, Papanicilaou, 2013). In two of the studies, donors became aware of IHMS through self-initiated internet searches which served as a significant enabling factor to engage in the practice of IHMS (Perrin et al., 2016, Papanicilaou, 2013). The utilisation of digital platforms in initiating the practice of IHMS served as a means of enabling the continuation of IHMS and the development of ongoing personal connections among the donors and recipients (Papanicilaou, 2013, Bressler, Dambra-Candelaria and Spatz, 2020). In their study, O' Sullivan et al., (2018) found that most donors provided milk to a friend or someone they knew. In this current review, it was noted that donors often articulated that they judged the needs and circumstances of the requesting recipients which provided assurance that their milk was being used for a genuine need (Gribble, 2018, Gribble, 2013, Papanicilaou, 2013). The personalisation of the exchange is evidenced by the majority of donors and recipients meeting in person for the exchange of DHM (Papanicilaou, 2013, Gribble, 2018, Gribble, 2013, Palmquist and Doehler, 2016, Onat and Karakoç, 2019).

3.6.6 Lack of Awareness and Acceptance of IHMS in Healthcare Settings

In parallel to the evidence ascertaining that donors engage in IHMS independently, it is also observed that often milk sharing by donors is practiced without considerations or input from HCPs, which is a notable barrier. The majority of donor participants in one study indicated that they were not provided with any guidance or insight regarding options for milk sharing by HCPs (Perrin et al., 2016). This finding was reinforced by Onat and Krackov (2019), where it was ascertained that the majority of donors reported that healthcare workers did not recommend milk donation (Onat and Karakoç, 2019). Two of the studies reported that due to the unregulated nature of IHMS, donor participants often felt they were doing something wrong or illegal (Bressler, Dambra-Candelaria and Spatz,

2020, Papanicilaou, 2013). In three of the studies, it was ascertained that certain HCPs such as lactation consultants and midwives were sometimes supportive of the practice (O' Sullivan, Geraghty and Rasmussen, 2016, Perrin et al., 2016, Papanicilaou, 2013) and acted as facilitators in the milk exchange process (O' Sullivan, Geraghty and Rasmussen, 2016).

The findings of the MMSR relating to recipient participants motivations, enablers and barriers and six integrated findings which are presented in Table 3.3 and discussed below.

Table 3.3 Integrated Findings for Recipient Motivations, Enablers, and Barriers of IHMS

1. Maternal or infant factors
2. Superiority and advantageous impact of breastmilk
3. Human milk bank influences
4. Digital connections and transparency
5. Healthcare professional facilitation of IHMS
6. Professional and logistical implications

3.6.7 Maternal or Infant Factors

In this review, physical or physiological factors relating to the mother or infant were primary motivators for recipients to source donor milk. Maternal milk insufficiently was noted in 11 studies as the most frequently cited maternal-associated factor prompting the exploration and engagement in the practice of IHMS (Pound, Unger and Blair, 2020, Thorley, 2012, O' Sullivan, Geraghty and Rasmussen, 2016, McCloskey and Karandikar, 2019, McNally and Spratz, 2020, Gribble, 2014b,, Schafer, Ashida and Palmquist, 2018, Thorley, 2009, Papanicilaou, 2013, Onat and Karakoç, 2019). Two studies compiled data on the proportion of participants who experienced insufficient milk supply. 68% and 88% of participants in studies by Schafer *et al.,* (2018) and Onat and Krackoc (2019) respectively, reported maternal milk insufficiency.

Infant related issues were also frequently cited as influential factors to engage in IHMS (O' Sullivan, Geraghty and Rasmussen, 2016, McCloskey and Karandikar, 2019, McNally

and Spratz, 2020, Gribble, 2014, Perrin et al., 2014, Palmquist and Doehler, 2016, Thorley, 2009). In one study, more than half (57.8%) of participants articulated infant related issues as the reason for seeking donor milk (Palmquist and Doehler, 2016). Some of the studies reported on explicit infant issues which motivated participants to consider IHMS, including the most commonly cited infant related issues which were: weight concerns (Gribble, 2014b, McNally and Spratz, 2020), breastfeeding attachment issues (Gribble, 2014b, McCloskey and Karandikar, 2019, O' Sullivan, Geraghty and Rasmussen, 2016, Thorley, 2009), health related problems with the infant (McCloskey and Karandikar, 2019, Perrin et al., 2014, Thorley, 2009) and history of prematurity (O' Sullivan, Geraghty and Rasmussen, 2016, Perrin et al., 2014). Another motivating factor for engaging in IHMS was the return to employment or school which was identified in two of the studies in the review (Gribble, 2014a, Perrin et al., 2014).

3.6.8 Superiority and Advantageous Impact of Breastmilk

In the review, it was noted that interrelated factors pertaining to the perception of breastmilk, CMF, and the impact of donor milk on wellbeing formed significant motivators for the engagement in IHMS. In eight studies breastmilk was consistently characterised by recipients as beneficial, healthy and the best alternative for infant feeding in the absence of MOM (Pound, Unger and Blair, 2020, McCloskey and Karandikar, 2019, McNally and Spratz, 2020, Gribble, 2014a, Cassar-Uhl and Liberatos, 2018, Papanicilaou, 2013, Onat and Karakoç, 2019). One study reported that 83.3% of recipients chose donor milk as it was the healthiest option (Cassar-Uhl and Liberatos, 2018). Further, Onat and Krackoc (2019) reported that 62.5% of recipients viewed donor milk as the most natural way to feed infants in the absence of MOM (Onat and Karakoç, 2019). CMF was consistently noted as being an inferior alternative choice of infant feeding within the review (Pound, Unger and Blair, 2020, Thorley, 2012, McCloskey and Karandikar, 2019, Gribble, 2014a, Gribble, 2014c, Cassar-Uhl and Liberatos, 2018, Papanicilaou, 2013, Onat and Karakoç, 2019). The motivation to avoid CMF due to reported undesirable side effects for infants was noted among recipients, these included pain (Pound, Unger and Blair, 2020, Gribble, 2014a) , constipation (Pound, Unger and Blair, 2020, McNally and Spratz, 2020), allergy (McCloskey and Karandikar, 2019, McNally and Spratz, 2020, Gribble, 2014a, Keim et al., 2014). Three of the studies also explicitly highlighted

recipients' concerns with risks associated with CMF and avoidance of these was a clear justification for engaging in IHMS (Gribble, 2014c, Cassar-Uhl and Liberatos, 2018, Onat and Karakoç, 2019). In four of the studies, it was identified that the risks associated with CMF were greater than the risks of providing donor milk to infants (Gribble, 2014c, Cassar-Uhl and Liberatos, 2018, Thorley, 2009, Papanicilaou, 2013). Concerns regarding the constituents of CMF was another notable factor in choosing IHMS in some of the studies (McCloskey and Karandikar, 2019, Gribble, 2014b, Papanicilaou, 2013).

The impact of CMF on stress and maternal well-being was reported in some of the studies. In one study, it was identified that having to supplement with CMF resulted in negative emotions (Gribble, 2014a). The actual or perceived use of CMF resulted in feelings of depression, stress or anxiety in recipients in two of the studies (Pound, Unger and Blair, 2020, Gribble, 2014a). Corresponding to this, receiving donor milk resulted in the alleviation of stress and provision of comfort in several of the included studies (Pound, Unger and Blair, 2020, Papanicilaou, 2013, McCloskey and Karandikar, 2019). None of the included studies reported that IHMS resulted in negative emotions. In their study of IHMS recipients (n=205), Schafer, Ashida and Palmquist (2018) highlighted a significant positive emotional associate with IHMS. In another study, an analysis of recipients' satisfaction with their supplement choice reported that recipients of DHM were more satisfied with their supplement choice compared to those who chose CMF as a supplement (Cassar-Uhl and Liberatos, 2018).

3.6.9 Human Milk Bank Influences

In the review, HMBs were discerned as being a motivating factor for recipients to engage with IHMS for several reasons. It was noted in some of the studies, that recipients would not be eligible to receive DHM from a HMB due to not meeting specified criteria (McCloskey and Karandikar, 2018, Gribble, 2014a, Gribble, 2013). Three of the studies identified the prohibitive costs of HMB's which presented financial obstacles to the recipients in being able to engage or sustain the ongoing costs, which compelled them to engage with IHMS (McCloskey and Karandikar, 2018, McNally and Spratz, 2020, Gribble, 2013). The inaccessibility to HMB due to proximity was also documented as motivator to engage in IHMS (McCloskey and Karandikar, 2018, Gribble, 2013). Some

studies also reported on personal beliefs held by some recipients regarding HMB which propelled them to the alternative of milk exchanging via IHMS. These included the dissatisfaction with HMB pasteurisation which was identified in one study by recipients as a process which diminishes valuable proteins (McCloskey and Karandikar, 2018) and a recipient belief of the avoidance of anything overly interventionist, a sentiment that correlates with HMB (Wilson, 2018).

3.6.10 Digital Connections and Transparency

The use of digital platforms and the subsequent interactions with donors through communication, open dialogue and connection, founded primarily online, were noticeable enabling factors in the engagement of IHMS for recipients in this review. As previously noted, only one of the studies specifically reported on milk exchanges that did not occur via online platforms (Keim et al., 2014) and milk sharing devoid of the use of digital platforms was implicit in a further study (Thorley, 2009). The remaining studies in the review reported that establishment of milk exchanges online was frequent. Three of the studies reported that social media made the practice of IHMS more accessible to participants (Pound, Unger and Blair, 2020, Gribble, 2014c, Papanicilaou, 2013). It was noted in two studies that strong social support for recipients was predominantly via online platforms which emphasises the enabling role of digital connection in the practice of IHMS (Pound, Unger and Blair, 2020, Schafer, Ashida and Palmquist, 2018). The establishment of trust, derived from transparent discourses surrounding donors and the construction of personal connections between the recipients and donors were noted as enabling factors in the engagement and continuation of IHMS (Pound, Unger and Blair, 2020, Thorley, 2012, Gribble, 2018, Gribble, 2014c, Papanicilaou, 2013).

Some of the studies documented the concept of donor screening by recipients, indicating that informal or lay screening methods were used rather than a formal screening process, prior to the acceptance of DHM in seven of the studies (Pound, Unger and Blair, 2020, Thorley, 2012, McCloskey and Karandikar, 2019, Gribble, 2014c, Thorley, 2009, Papanicilaou, 2013, Onat and Karakoç, 2019). The most frequently reported areas of lay screening related to donors use of alcohol (Gribble, 2014c, Pound, Unger and Blair, 2020, Papanicilaou, 2013, Onat and Karakoç, 2019) medications (McCloskey and Karandikar, 2018, Gribble, 2014c, Pound, Unger and Blair, 2020, Papanicilaou, 2013, Onat and

Karakoç, 2019) and smoking (Pound, Unger and Blair, 2020, McCloskey and Karandikar, 2018, Papanicilaou, 2013, Onat and Karakoç, 2019). In two of the studies, it was reported that open communication between the donors and recipients provided a sense of reassurance and comfort to the recipients and was a pivotal factor for engagement with IHMS (Pound, Unger and Blair, 2020, Gribble, 2014c). This finding is supported by reports of the rejection of donor milk in instances where there was difficulty communicating with the donor or where a personal connection with the donor did not develop (Pound, Unger and Blair, 2020, Gribble, 2014c). Additionally, comfort in the use of DHM was also derived from knowing that the donor was also breastfeeding their own child and was reported in three of the studies (Wilson, 2018, McNally and Spratz, 2020, Papanicilaou, 2013). Notably, a rejection of donor milk was also noted if donors were not breastfeeding their own child (Gribble, 2014c).

3.6.11 Healthcare Professional Facilitation of IHMS

In the review, four studies reported that certain HCPs were an enabling factor in the participation in IHMS (O' Sullivan, Geraghty and Rasmussen, 2016, McCloskey and Karandikar, 2018, McNally and Spratz, 2020, Cassar-Uhl and Liberatos, 2018). The most cited HCPs associated with enabling IHMS identified in this review were breastfeeding specialists/lactation consultants (McCloskey and Karandikar, 2018, McNally and Spratz, 2020), midwives (O' Sullivan, Geraghty and Rasmussen, 2016, McCloskey and Karandikar, 2018) nurses (McCloskey and Karandikar, 2018) and medical professionals (McCloskey and Karandikar, 2018, Cassar-Uhl and Liberatos, 2018). While some studies reported HCPs as enabling factors in IHMS, this finding was not consistent and will be discussed further in this review.

3.6.12 Professional and Logistical Implications

Professional and logistical implications of IHMS were noted as barriers within the current review. Foremost, HCP related barriers were evident. While some HCPs were cited as being enablers of milk sharing as discussed above, this finding was in contrast with some studies which noted they were a barrier to the engagement of IHMS. Notably, in their study, Cassar-Uhl and Liberatos (2018) some HCPs were identified as the source of the DHM; however, this category was identified as the lowest scoring category overall, with only one in five recipients reporting their source of DHM was identified through HCPs.

This is implicit of notable professional barriers to IHMS. In their study, McCloskey and Karandikar (2018) noted that many recipients acknowledged an awareness of the formal and informal professional prohibitions relating to promoting and permitting of IHMS by organisations and HCPs. In a further study, a lack of awareness and exhibited opposition towards the concept of IHMS by HCPs was noted (McNally and Spratz, 2020). Another key logistical barrier which was reported in four studies in the review, was the fear or actual experience of running low on DHM (Pound, Unger and Blair, 2020, Gribble, 2018, McCloskey and Karandikar, 2019, McNally and Spratz, 2020). Another significant barrier noted in the review pertaining to recipients was a time related barrier where the logistical efforts of attaining DHM was time-intensive in terms of the geographical distance of donors from the recipients (Papanicilaou, 2013, McCloskey and Karandikar, 2018, McCloskey and Karandikar, 2019, McNally and Spratz, 2020).

3.7 Discussion

This is the first MMSR to synthesize the evidence on the motivations, barriers and facilitators of donors and recipients of IHMS. In this MMSR, twenty-four studies met the inclusion criteria. The key findings of this review detail an array of factors associated with IHMS from the key actors involved in this emerging, and rapidly advancing practice. This review has elucidated the intrinsic and absolute value of breastmilk, positioned by both donors and recipients. The profound significance and superiority ascribed to HM by both groups underscores its unique and highly positioned standing which formed a key motivator for the engagement in IHMS. Analogous to this, is the commonality of the perceived deficits of CMF compared to HM within both donor and recipient cohorts. This propelled donors and recipients to engage in the sharing of HM. These findings of the perceived intrinsic superior value of HM and the inferiority of CMF is evidenced in further empirical research including an evaluation of parents perceived healthiness of MOM, peer-shared HM and CMF, where it was consistently noted that CMF was the least reported healthiest option for infants (Carter, Reyes-Foster and Carter, 2018).

Interestingly, HMB was identified as a motivator for both groups to engage in IHMS and as an enabler for donors to share milk as opposed to donating to a HMB. HMBs were multifactorial in relation to the reasons why both groups engaged with IHMS including;

the inaccessibility for many recipients and donors to engage with HMB due to restrictions, prohibitions, financial and logistical implications. Consequently, these factors formed reasons for the engagement in IHMS. Interestingly, these notable restrictions and prohibitions while acting as motivators to the engagement in IHMS in this present study also act as known barriers to the donation of milk to HMB in the domains of individual, systemic and social barriers, as identified in a recent systematic review (Doshmangir, Naghshi and Khabiri, 2019). It is widely acknowledged that HMBs are not widely accessible, nor is DHM universally available to all infants (Arslanoglu et al., 2023, Israel-Ballard et al., 2019, Kent, 2017). The absence of adequate infrastructure, regulation and guidance within HMBs poses challenges to ensuring quality control, safety provisions and scalability (DeMarchis et al., 2017). In contrast to many jurisdictions, Brazil has the most comprehensive, publicly funded network of HMBs in the world (Prouse, 2021). There is a need for policy makers and governmental bodies to provide guidance and explicit recommendations for HMB and the provision of DHM to infants in the absence of MOM. As such, there is a demand for comprehensive global guidelines outlining the essential standard operating procedures necessary for the effective operating of HMBs (Fang et al., 2021).

A prominent driver for donors in the engagement in IHMS was their unreserved motivation to assist and help others. This altruistic motivation is intertwined with the utmost, significant value perceived by donors of HM, whereby they wanted to know where their milk was going, ensuring a genuine need. This unequivocally relates to the recipient enabler for IHMS, where trust and transparency were key enablers for the engagement with the practice of IHMS. The uniting of digital technologies and subsequent personal connectedness, stemming from online platforms, was a synergistic enabler which led to a cooperative and shared understanding between donors and recipients. This shared connection fostered trust and transparency which were requisite factors in the consideration of engagement with IHMS for both donors and recipients. The most pervasive barrier to IHMS were healthcare related barriers for both the donor and recipient groups. This was evidenced by a lack of input from HCPs in IHMS, limited guidance/insight to the practice or an opposition to milk sharing held by HCPs. This may be attributed to global health organisations who discourage the use of informal peer milk

sharing such as the American Academy of Paediatrics (AAP) (2022) and the U.S Food and Drugs Administration (2018). This opposition to the practice is due to the inherent possible risks with the sharing of unpasteurised HM, a complex bodily fluid, in the transmission of disease, contamination when expressing or handling or indeed contamination with various, potentially unsafe substances (Landers and Hartmann, 2013, Underwood, 2013, Vogel, 2011). Somewhat differing, the WHO in the Global Strategy for Infant and Young Child Feeding emphasise that where breastfeeding is not feasible, the most suitable alternatives in a hierarchical depiction, is expressed MOM, HM from a healthy wet-nurse or HMB, or an appropriate breastmilk substitute is advisable (WHO, 2003). The ABM in their position statement on the sharing of HM provide guidance relating to milk sharing, incorporating key strategies which should be implemented to maximise the safety of milk sharing including: health screening of the donor and safe milk handling practices (Sriraman et al., 2018). However, this position statement refutes the engagement of internet-based HM sharing in any eventuality (Sriraman et al., 2018). It has been articulated that HCPs possess the potential to endorse regulations concerning milk sharing while actively participating in collaborative decision making processes to inform and educate families about donor health screening and safe handling practices (Kullmann, Adams and Feldman-Winter, 2022). An interesting finding in this review was that some HCPs were noted as being facilitators of IHMS in a limited number of studies, this is in contract to most studies who explored this component and documented the lack of awareness and insight by HCPs in relation to IHMS. This warrants further investigation and exploration. This review noted that maternal factors such as actual or perceived low milk supply was noted as the most prominent motivator for the engagement in IHMS by recipients. According to estimates, a relatively small proportion of women are physiologically unable to breastfeed, however a larger proportion of lactating women express concerns relating to their milk production/supply (McKeever, 2023). The most commonly cited breastfeeding challenge and reason for early cessation of breastfeeding or reduced breastfeeding exclusivity is perceived milk insufficiency (Gatti, 2008, Flaherman et al., 2018, Kent et al., 2021, Namyalo, Nankumbi and Ngabirano, 2023). Breastfeeding challenges and the early cessation of breastfeeding is consistently reported as a significant, mediating factor for poorer maternal mood in the postpartum period (Dennis and McQueen, 2009, Cooklin et al., 2018, Islam et al., 2021, Kendell-Tackett,

Cong and Hale, 2011, Borra, Iacovou and Sevilla, 2015, Brown, Rance and Bennett, 2016).

Within this current review, the actual or perceived use of CMF was found to be associated with increased anxiety, stress and self-reported depression among recipients. Interestingly, it has been confirmed that exclusive breastfeeding is associated with a reduced risk for PPD in a recent systematic review (Alimi et al., 2022). Notably, engaging in the practice of IHMS within this current review was aligned to positive feelings, a reduction in reported stress and in two of the studies, an articulated protective factor for the development of postnatal depression in recipients. This warrants further in-depth exploration to investigate the impact of IHMS on psychological well-being of recipient cohorts. This is necessitated by the verity that PPD is a widespread occurrence, with possible detrimental outcomes and significant estimates of one on five women experiencing PPD in the postnatal period globally (Wang et al., 2021).

3.8 Strengths and Limitations of the Study

This MMSR utilised multiple reviewers in the conduct of the review process, including the screening, selection, risk of bias assessment, extraction, synthesis and integration. This enabled an explicit development of rigor and reliability within. Another key strength is the integration of qualitative, quantitative and mixed-methods studies in the review, following a convergent integrated approach, guided by the JBI methodology (Ijezie at el., 2023). The incorporation of the standardised JBI critical appraisal tools for the risk of methodological quality/bias assessment was an explicit strength. The inclusion of all studies, irrespective of language or devoid of time limitations was an inherent strength, as well as the incorporation of grey literature sources in the included sources. Most of the studies in the MMSR included a single form of data collection at one time point which could potentially miss variability of changes in variables over time. Also, most of the studies included in this review were conducted in a limited number of countries, which may introduce geographic bias and reduce the generalisability of the findings to a broader population or different contexts within different countries or regions.

3.9 Conclusion

This MMSR has provided an explicit interpretation and nuanced understanding of the motivations, facilitators and barriers of the key actors within the practice of IHMS. This comprehensive review has enabled a detailed understanding, synthesis and integration of the predominant factors associated with this modernistic practice including why and how donors and recipients are motivated, enabled and impeded in the practice of IHMS. Many of the studies identified in the MMSR were limited to a small number of countries and future research exploring the factors associated with IHMS is required in other countries and jurisdictions is warranted to add to the current body of knowledge in this area. This will enable more generalisable findings across wider geographical settings and cultural contexts. Such knowledge will further enable a greater understanding from a broader, all-encompassing perspective. The impact of IHMS on enhanced maternal psychological wellbeing was a finding in three of the studies where the receipt of DHM by an informal means resulted in the alleviation of stress and the provision of comfort (Pound, Unger and Blair, 2020, McCloskey and Karandikar, 2019, Schafer, Ashida and Palmquist, 2018). There is an imminent need to explore this further to leverage a more explicit insight and elucidate the potential influence of IHMS on the psychological wellbeing of mothers. Additional research is also warranted to investigate the experiences of individuals who engage in IHMS. Most of the studies were a cross- sectional design and there is a need to explore the practice of IHMS at different time points. This will enable a richer and absolute exploration of the practice and will facilitate clarity on variability in factors and perspectives over time. The approach to infant feeding has enduring consequences on individual, societal and environmental health and sustainability (Rollins et al., 2023). Consequently, there is an imminent need for positioning the provision of HM to all infants as a global priority (Rollins et al., 2023).

3.10 Chapter Summary

This chapter comprised the first phase of this study and addressed Objective 1 of this research which endeavoured to identify, evaluate, synthesize and integrate the qualitative and quantitative evidence on the factors associated with IHMS among donors and recipients. The next chapter, Chapter Four presents the second phase of this study and the

initial (quantitative) strand of the sequential explanatory mixed methods study. The findings and recommendations stemming from the MMSR in this chapter provided the foundational underpinnings for the subsequent phase of this study.

Chapter Four: Informal Human Milk Sharing Practices: A Cross-Sectional Survey of Donors and Recipients in Ireland

The work presented in this chapter has been published in Maternal and Child Nutrition:

Vickers, N., Matthews, A., and Paul, G. (2025) IHMS practices: A cross-sectional survey of donors and recipients in Ireland. *Maternal and Child Nutrition*, e70113. https://doi.org/10.1111/mcn.70113

As per DCU Guidelines for candidates, supervisors and examiners on the 'PhD by Publication' format, the PDF versions of published works for the publication outlet cannot be included in the PhD thesis, and all published work should appear in manuscript/thesis format. The content presented in this thesis is correspondent with the content of the published papers, with the exception of minor formatting variations.

4.1 Declaration of Authorship

Section 1: Candidate's Details	
Candidate's Name	Niamh Vickers
DCU Student Number	A22269621
School	School of Nursing, Psychotherapy and Community Health
Principal Supervisor	Dr. Gillian Paul Professor Anne Matthews
Title of PhD by Publication Thesis	A Mixed Methods Study of Informal Human Milk Sharing in Ireland
Section 2: Paper Details	
Title of co-authored paper included in the thesis under examination	Informal Human Milk Sharing Practices: A Cross-Sectional Survey of Donor and Recipients in Ireland
List of authors as in order given on accepted/published version	Niamh Vickers, Professor Anne Matthews, Dr. Gillian Paul
Publication Details (e.g. Year of Publication, Journal Name, Issue Number, Page Numbers, Place of Publication, DOI, ISSN, URL etc.)	2025, Maternal and Child Nutrition, e70113, DOI: https://doi.org/10.1111/mcn.70113 Journal ISSN: 1740-8695
Publication Status (e.g. Published, Accepted)	Published
Provide a brief statement here on the disciplinary ranking of this publication and the peer-review process involved (e.g. how many reviewers, single blinded or other, initial decision, revision timeline etc and any other details that speak to the rigour of the peer review process)	Maternal and Child Nutrition is a global maternal and child health open access journal. The journal impact factor is 2.6 and a cite score of 7.5 in 2026. The peer review process is a double-blind peer review. The manuscript was peer reviewed by two peer reviewers. The manuscript was submitted on June 10 2025, revised and accepted September 1 2025. It had one round of revisions between submission and acceptance.

This paper (Chapter 4) is one of three co-authored papers to be submitted as part of the PhD by publication thesis submitted for examination.

Section 3: Candidate's Contribution to the Paper

Provide details below of the **nature** and **extent of your contribution** to the paper (include both your intellectual and practical contributions) and your overall contribution in **percentage terms**. Note that these categories can be customised according to disciplinary norms

The nature and extent of my contribution to the published paper is detailed below. My overall contribution to this paper in percentage terms is 90%.

Briefly outline your contribution to the **conception** of the work described in this paper:

The initial conception of the study was done collaboratively with my supervisors.

Briefly outline your contribution to the **literature review** in this paper:

I conducted the literature review presented in this paper. The literature review was reviewed by my supervisors following the completion of the first draft.

Briefly outline your contribution to the **methodological design**:

The decision to conduct this study was decided in collaboration with my supervisors at the outset of the PhD planning phase. I devised the research questions, aims and objectives and these were reviewed by my supervisors. A pilot study was conducted to refine the measurement instrument under the guidance of my supervisors. My supervisors provided guidance on resources for me to engage with such as: sequential explanatory sequential designs, survey methods etc.

Briefly outline your contribution to **data collection**:

My contribution to the data collection for the survey was setting the final approved measurement instrument in Qualtrics, engaging with the administrators of the identified Facebook pages where recruitment for the study would be completed and monitoring the response rate. My supervisors provided guidance during the data collection phase.

Briefly outline your contribution to **data analysis**:

I completed the data analysis in collaboration with my supervisors using SPSS.

Briefly outline your contribution to the **synthesis and summary of findings**:

I completed the synthesis and devised a summary of the findings.

Finally, outline your contribution to the **writing** and **revision** of the paper:
I wrote the original draft of the manuscript and completed revisions based on feedback from my supervisors. I revised the manuscript based on the peer review comments/ suggestions and these were reviewed and approved by my supervisors.

Section 4: Signature and Validation

I confirm that the following statements are true:

(a) the information I have provided in this form is correct
(b) this paper is based on research undertaken during my candidature at DCU

Signature of PhD Candidate: Niamh Vickers **Date:** 28th May 2026

I confirm that the information provided by the candidate is correct:

Signature of Principal Supervisor: Dr Gillian Paul, Professor Anne Matthews
Date: 28th May 2026

In some cases, it may be appropriate for verification to be given by both the principal supervisor **and** the lead/corresponding author of the work (where the lead/corresponding author of the work is not the candidate or the principal supervisor) N/A

4.2 Chapter Introduction

The MMSR presented in Chapter Three identified, synthesized, and integrated the extant literature from disparate data sources inclusive of qualitative, quantitative and primary mixed methods studies relating to the factors associated with IHMS from donor and recipient perspectives. Specifically, the MMSR focused on the motivations, barriers and facilitators of IHMS and identified a complex array of factors from donor and recipient perspectives. Collectively, the MMSR established ten integrated findings, four pertaining to donors and six related to recipients. The MMSR established that donors primarily engage in IHMS due to an inherent altruistic desire which is often co-existing with an oversupply or excess of HM whereas recipients are predominately motivated by factors such maternal or infant physiological challenges, a return to school or work or for the perceived benefits of HM on their wellbeing. Further, the MMSR identified an emerging concept of the potential impact of IHMS in the alleviation of stress which was identified in a small number of studies in the review which necessitated further empirical research to investigate this further. Significantly, HM was perceived as superior to CMF with intrinsic value of HM held by both cohorts. Fundamentally, the use of digital platforms were distinct enablers for engagement with IHMS and facilitated the continuation of personal connections, trust and transparency among donors and recipients. The MMSR established that the most pervasive barriers to IHMS were healthcare related yet, paradoxically in a minority of situations, distinct HCPs acted as fundamental enablers for recipients for the engagement in IHMS. HMB barriers acted as key motivators for IHMS engagement and inadvertently acted as enablers for donors to engage in IHMS. However, the MMSR noted a critical nuance and potential limitation pertaining to findings whereby the included studies were conducted in a limited number of countries predominately in the US and thus potentially reducing the generalisability of the findings to the broader context.

The lack of geographical diversity necessitated a call to action for further research to be undertaken in underexplored contexts to add to the global scholarly discourses in the domain of IHMS. Notably, the absence of empirical evidence from Ireland in the IHMS landscape demarcated the geographical gap which will be addressed in the following chapters. The transition from the global synthesized evidence pertaining to the factors

associated with IHMS in Chapter Three to the primary empirical research within Ireland where there was a distinct absence of empirical evidence on IHMS necessitated a detailed and comprehensive investigation. Importantly, it was requisite that the investigation would transcend IHMS factors to the purposeful and strategic attainment of baseline insights, factors, practices and experiences of IHMS donors and recipients with the intention of ascertaining a comprehensive, in-depth and rich understanding of IHMS in Ireland. Accordingly, methodical and strategic decisions pertaining to the planning of the research were devised. Ultimately, this comprised the planning and undertaking of a sequential explanatory mixed methods study to conclusively address the research aim and objectives of the research. Consequently, Chapter Four presents the initial quantitative strand of this sequential explanatory mixed methods study published in Maternal and Child Nutrition in 2025, which comprised a national cross-sectional survey of donors and recipients in Ireland.

4.3 Abstract

The provision of HM is a global public health priority underpinned by its extensive benefits to infant and maternal health, and significant positive impacts within economic, societal, and environmental spheres. IHMS is a contemporary and increasingly prevalent phenomenon which involves the exchange of HM outside formal structures such as milk banks. This study aimed to investigate the characteristics, motivations, practices and experiences of donors and recipients who engage in IHMS in Ireland. A national cross-sectional survey included a validated questionnaire and was administered online in Ireland following ethical approval. The study is reported according to STROBE guidelines and detailed in Appendix P. Recipients reported significantly higher rates of caesarean sections, birth complications, and traumatic births compared to donors, with postpartum anxiety prevalent in both donors and recipients (51.4%). Recipients primarily sought donor milk due to perceived lactation insufficiency, concerns regarding commercial milk formula, infant related factors and belief in HM benefits. Donors were motivated by altruism and the desire not to waste their expressed milk. Most donors (84.5%) considered formal milk bank donations but were inhibited by practical barriers, favouring informal sharing via online platforms and direct exchanges. There was minimal discussions with HCPs about IHMS. The increasing significance of IHMS in Ireland is driven by diverse

maternal and infant needs, and online communities. Future research should investigate safety outcomes and long-term impacts of IHMS, the lived experiences of donors and recipients, as well as the examination of strategies to enhance engagement with formal milk banks.

4.4 Introduction

HM delivers comprehensive nutrition and a wealth of bioactive components crucial for early health and development (Lyons et al., 2020, Israel-Ballard, LaRose and Mansen, 2024). Neither the sophisticated, living biological medium of HM nor the unique psycho-social dynamics of the breastfeeding interaction can be adequately replicated (Perez-Escamilla et al., 2023). Breastfeeding significantly enhances infant and maternal health and its beneficial influence extends broadly, generating positive outcomes within economic, societal and environmental domains (Vickers, Matthews and Paul, 2024). Health outcomes differ substantially for dyads where the infant is fed with CMF compared to those who breastfeed emphasizing the increased risks linked to infant feeding with CMF (Stube, 2009, Buijssen et al., 2015). Consequently, the provision of HM to infants is a global public health priority (Meek and Noble, 2022). Breastfeeding is integral to achieving many of the Sustainable Development Goals (SDGs), targets championed by all United Nations member states with the collective intention of fostering a healthier, more sustainable planet and advancing peace and prosperity for all people (Holden et al., 2017). Global health organisations recommend exclusive breastfeeding until 6 months of life, with the continuation of breastfeeding along with complementary solid foods for 2 years and beyond (World Health Organization, 2021, Meek and Noble, 2022). Globally, rates of exclusive breastfeeding in the first six months of life have increased over the past decade reaching approximately 48% (UNICEF, 2023). However, Ireland has one of the lowest breastfeeding rates in the world (Murphy et al., 2023). Moreover, breastfeeding rates in Ireland drop significantly after initiation. Recent data from the Irish Maternity Indicator System (2024) shows that 64.2% of mothers initiate breastfeeding but this figure reduces substantially to 31.1% for exclusive breastfeeding at three months postpartum according to the World Breastfeeding Trends Initiative (WBTi, 2023). This low rate remains suboptimal considering the extensive, aforementioned benefits conferred by breastfeeding. When MOM is insufficient or unavailable, the recommended hierarchy of

infant feeding options are expressed HM from a donor mother as the next best alternative, followed by CMF, with MOM universally recognised as the optimal choice (WHO, 2023). This established hierarchy affirms the biological superiority and irreplaceable nutritional value of HM for infant feeding (Kim and Yi, 2020, Szyller et al., 2024).

Innovations in milk expression technologies and reliable storage solutions have considerably broadened the possibilities for providing HM beyond the biological mother (O' Sullivan et al., 2016; Peregoy et al., 2022). One major development stemming from this increased feasibility was the emergence of HMBs early in the 20th century with the first HMB opening in 1909 (Thorley, 2012, Israel-Ballard, LaRose, Mansen, 2024). Globally, there are approximately 750 HMBs in 66 countries (European Milk Bank Association, 2021). The only HMB serving the island of Ireland is a cross-border initiative located in Enniskillen, Northern Ireland. Established in 2000, it is responsible for the collection, pasteurisation, and distribution of donor HM to neonatal units throughout the country. These regulated facilities process and dispense pasteurised DHM (Arslanoglu et al, 2023, Monti et al., 2024). They offer critical nutritional support primarily for high-risk or preterm infants where MOM is unavailable (Bai and Kuscin 2021, Monti et al., 2024). However, the global network of HMBs has an uneven geographical distribution and limited accessibility which restricts their reach (Israel-Ballard, LaRose, Mansen, 2024). Concurrently, the sector has seen the emergence of commercialised models involving donor remuneration for milk and selling of HM to healthcare institutions. There are considerable ethical issues relating to the commercialisation of HM and the possible risk for donor exploitation (Rusi et al., 2024). Modern approaches involving the formal banking and provision of HM are contrasting to the practices of direct milk sharing, such as wet nursing, documented throughout antiquity where children were breastfed by relatives, acquaintances or strangers (Moro, 2018, Wagg et al., 2022). Recognising this evolving landscape, marked by both progress and considerable gaps in the universality of donor HM for infants is fundamental to the comprehension of the role and dynamics of the contemporary landscape of IHMS.

Milk sharing is defined as the voluntary, commerce-free exchange of HM between individuals outside of formal HMB systems (Peregoy et al., 2022). Conceptually and operationally, this practice contrasts significantly with both the acquisition of DHM from

regulated HMBs and the purchasing of commercially sold HM (Cassar-Uhl and Liberatos, 2018). The terminology to denote the practice in the literature varies, including 'peer-to-peer,' 'IHMS,' 'internet-based peer-to-peer milk sharing', and simply 'milk sharing'. The practice of IHMS has risen to prominence in recent years, concurrently serving as a growing area of research investigation and, at times, a contentious topic (Reyes-Foster et al., 2015). IHMS practices simultaneously exist within a social context where it may be subject to stigma or considered taboo (Wagg et al., 2022). Growing scholarly investigation into IHMS has coincided with the widespread adoption of digital communication technologies, including mobile internet and social media platforms most notably in Western societies (Razak et al., 2023). Over the past 15 years, HM exchange has been facilitated by websites and social media outlets (Cassuhr-Uhl and Liberatos 2018, Akma Jamil et al., 2021). These dedicated platforms provide a forum for donors and recipients to offer or request expressed HM for infant feeding which enables the direct, non-commercial exchange of HM between these individuals (Akma Jamil et al., 2021). The ABM position statement discourages obtaining HM through online platforms, in particular the commercial purchases due to the inherent risks related to inadequate donor screening and the potential for compromised milk safety (Sriraman et al., 2018). A geographical disparity in IHMS literature has been recognised, alongside calls from a recent systematic review for further research in diverse geographical locations to explore IHMS including the experiences of those who engage in this modern practice (Vickers, Matthews and Paul, 2024). This current research provides the first dedicated exploration of IHMS on the island of Ireland. Through a national survey, the characteristics, practices, and experiences of donors and recipients within the Irish context were explored.

4.5 Methods

4.5.1 Aim and Objectives

The overall aim of this study was to investigate IHMS in Ireland. The specific objectives were to describe the profiles, motivations, practices and experiences of IHMS donors and recipients in Ireland and to compare these groups regarding their sociodemographic characteristics, childbirth and postpartum experiences and satisfaction with IHMS. The research sought to answer the following research questions:

What are the sociodemographic profiles, motivations, practices, and experiences of IHMS donors and recipients in Ireland?

How do these groups compare regarding their childbirth and postpartum experiences and their satisfaction with IHMS?

4.5.2 Design and Setting

This study utilised a national online cross-sectional survey design to collect data regarding IHMS practices across Ireland.

4.5.3 Ethical Statement

Ethical approval to conduct the study was granted by Dublin City University Research Ethics Committee (DCUREC/2024/083) on 21st May 2024.

4.5.4 Sample

Respondents were recruited using convenience sampling through targeted advertisements posted on three specific Facebook pages: two dedicated to IHMS in Ireland and one focused on long term breastfeeding in Ireland. A preliminary review of the latter Facebook page revealed some activity relating to IHMS which justified its inclusion as a recruitment platform in this study. To be included in the study respondents must have donated or received HM via an informal means over the previous 18 months and must have been aged 18 years older.

4.5.5 Measurement Instrument

The measurement instrument utilised in this study is a previously validated tool known as the Milk Sharing Practices Survey originally developed in the US by Peregoy et al., (2022). This comprehensive instrument was informed by findings from a qualitative ethnographic study of IHMS recipients in the US (Peregoy, 2021). Permission from the original developers to use and adapt this instrument for use within the Irish context was secured. A pilot study was undertaken by a group comprising breastfeeding mothers some of whom had recent experience with IHMS, academics and IBCLCs. The researchers invited a small number of breastfeeding mothers, IBCLCs and academics from their personal and professional networks to participate. This purposive sampling approach was utilised to ensure representation from the target population, as well as clinical expertise

and academic rigor. During the pilot phase, the respondents gave feedback on the survey questions which provided valuable insights into the content validity of the instrument. Modifications included revised words for the Irish context. Several questions from the original instrument that did not directly align with our focal research objectives specific to IHMS were omitted. These exclusions included items on general breastfeeding experience, broader breastfeeding attitudes/beliefs, and attitudes/beliefs regarding CMF. This approach optimised respondent engagement while ensuring data relevance. This refinement process was essential to ensure the validity and relevance to the current research objectives. The survey instrument collected data across several key domains, including sociodemographic and clinical characteristics, childbirth and postpartum experiences, motivations and perceptions, milk sharing practices, and participant experiences with IHMS, in addition to HCP engagement. The respondents of the pilot phase were also invited to complete usability testing of the web-based survey via the Qualtrics platform. This iterative process ensured that the survey was both relevant and user-friendly.

4.5.6 Data Collection

The researchers contacted the administrators of three relevant Facebook pages. A copy of the ethical approval letter, a study flyer, and the participant information leaflet were provided to the administrators of these Facebook pages and permission was granted to post the flyer on these pages and data were subsequently collected over an 8 week period from July 26th 2024 to September 20th 2024.

Data were exported from Qualtrics to the IBM Statistical Package for the Social Sciences (SPSS). For all statistical analyses, the IBM SPSS Statistics for Windows Version 29.0 was used (IBM Corp., 2024). Descriptive statistics were employed to summarise the sociodemographic and characteristics of study respondents stratified into three cohorts; recipient, recipient and donor, and donor. For comparative analysis, bivariate analyses including Chi-square tests and Fisher-Freeman-Halton exact tests for small cell sizes were used to assess differences between the three cohorts in relation to categorical variables related to sociodemographic characteristics, childbirth and postpartum experiences, and satisfaction with IHMS. Survey instrument items specifically designed to investigate

IHMS characteristics, practices and experiences comprising cohort specific questions were analysed using descriptive statistics. The threshold for statistical significance in all comparative analyses was $p<0.05$.

4.6 Results

4.6.1 Sociodemographic Characteristics

One hundred and twenty-four (n=124) individuals accessed the survey. Of these, twenty-one (n=21) were excluded at commencement due to ineligibility or absence of informed consent leaving a total of one hundred and three (n=103) eligible responses. The 103 respondents included three cohorts; 24 recipients, 73 donors, and 6 respondents who were both recipients and donors (recipient/donor). Almost all (98.1%, n=101) identified as female and 1.9%, n=2 identified as male. All respondents had given birth to their youngest child. The sociodemographic profiles of the three cohorts within the study were compared using Chi-square and Fisher-Freeman-Halton exact test for small cell sizes and did not differ. However, the age distribution of the recipient/donor skewed older than the recipient and donor cohorts (p=0.003). The age profile of respondents ranged from 21-47 years with a mean of 34.9 years and a median of 35 years. Responses were received from respondents across 27 of the 32 counties in Ireland. Overall, the Republic of Ireland accounted for 70.9% (n=73) of responses and counties in Northern Ireland accounted for 29.1%, (n=30) of the sample as detailed in Table 1. The majority of the sample identified as Irish (82.5% n=85), married (68.9%, n=71), Roman Catholic (57.8%, n=59), working for payment/profit (70.6%, n=72) and highly educated, ranging from degree level to doctorate level (93.2%, n=96) (Table 4.1).

Table 4.1 Sociodemographic Characteristics of Study Respondents Stratified by Cohort; Recipient, Donor, Recipient/Donor

Sociodemographic Characteristics	Recipient (n=24)		Donor (n=73)		Recipient/ Donor (n=6)		Total (N=103)	
	n	(%)	n	(%)	n	(%)	n	(%)
Current Age*†								
20-30 years	10	(41.7)	16	(21.9)	0	(0)	26	(25.2)
31-40 years	10	(41.7)	49	(67.1)	2	(33.3)	61	(59.2)
40+ years	4	(16.7)	8	(11.0)	4	(66.7)	16	(15.5)
Gender								
Female	24	(100)	71	(97.2)	6	(100)	101	(98.1)
Male	0	(0)	2	(2.7)	0	(0)	2	(1.9)
Ethnicity								
Irish	19	(79.1)	61	(83.5)	5	(83.3)	85	(82.5)
Other white background	5	(20.8)	7	(9.5)	1	(16.6)	13	(12.6)
Indian	0	(0)	1	(1.3)	0	(0)	1	(0.97)
African	0	(0)	1	(1.3)	0	(0)	1	(0.97)
Other	0	(0)	3	(4.1)	0	(0)	3	(2.9)
Education								
Secondary or equivalent NFQ 4-6	2	(8.3)	4	(5.4)	1	(16.6)	7	(6.8)
Degree level or equivalent NFQ 7-8	12	(50)	40	(54.8)	3	(50)	55	(53.4)
Postgraduate/Masters/Doctorate NFQ 9-10	10	(41.7)	29	(39.8)	2	(33.3)	41	(39.8)
County								
Dublin	6	(25.0)	23	(31.5)	2	(33.3)	31	(30.0)
Northern Ireland	9	(37.5)	20	(16.7)	1	(16.7)	30	(29.1)
Other	9	(37.5)	30	(27.4)	3	(50)	42	(40.7)
Employment Status								
Employed	15	(62.5)	55	(75.3)	2	(33.3)	72	(69.9)
Fulltime parent	2	(8.3)	9	(12.3)	2	(33.3)	13	(12.6)
Other	7	(29.2)	9	(12.3)	2	(33.3)	18	(17.5)
Marital Status								
Single	9	(37.5)	15	(73.2)	0	(0)	24	(23.8)
Married	14	(58.3)	52	(21.1)	5	(83.3)	71	(70.3)
Other	1	(4.2)	4	(5.6)	1	(16.7)	6	(5.9)
Religion								
Roman Catholic	18	(75)	40	(54.7)	2	(33.3)	59	(57.2)
Church of Ireland	2	(8.3)	1	(1.3)	1	(16.6)	4	(3.8)
Islam	0	(0)	0	(0)	1	(16.6)	1	(0.9)
Presbyterian	1	(4.1)	1	(1.3)	0	(0)	2	(1.9)
Orthodox	0	(0)	1	(1.3)	0	(0)	1	(0.9)
No religion	3	(12.6)	16	(21.9)	1	(16.6)	21	(20.3)
Other	0	(0)	5	(6.8)	1	(16.6)	6	(5.8)

Abbreviations: NFQ, National Framework of Qualifications † Fisher-Freeman-Halton Exact Test was used due to expected cell counts less than five. *$p < 0.005$

4.6.2 Childbirth and Postpartum Experiences

Childbirth and postpartum experiences were examined across the three cohorts, with comparative analyses conducted using Chi-square tests and Fisher-Freeman-Halton exact test for small cell sizes as detailed in Table 4.2. In the study, all respondents reported to have given birth with a range of between one and six children and an average of 2.13 liveborn children (*Mdn*: 2, Mode: 1, *IRQ* 2-3). The majority of the respondents youngest infant(s) were born at 37+ weeks gestation (88.3%, *n*=91). A statistically significant difference in the mode of delivery was observed (*p*=0.003) where the donor cohort had a higher rate of vaginal delivery (68.5%, *n*=50) compared to recipients (37.5%, *n*=9) and recipient/donors (16.7%, *n*=1). Conversely, caesarean section rates were significantly higher in the recipient (45.8%, *n*=11) and recipient/donor (83.3%, *n*=5) cohorts compared to donors (28.8%, *n*=21) (*p*=0.014). Overall, 41.7% (*n*=43) of respondents reported birth complications, with recipients and recipient/donors more likely to experience these than donors. A statistically significant difference in reported traumatic birth was found (*p*=0.024) with recipients (50%, *n*=12) more likely to report trauma compared to donors (21.9%, *n*=16) and recipient/donors (16.7%, *n*=1). In the overall sample, the incidence of self-reported PPD was 19.4% (*n*=20) and postpartum anxiety was 51.4% (*n*=53) with no statistically significant differences observed between the cohorts (*p*=0.298).

Table 4.2 Childbirth and Postpartum Experience of Study Respondents stratified by Cohort; Recipient, Donor and Recipient/Donor

	Recipient (n=24)		Donor (n=73)		Recipient/ Donor (n=6)		Total (N=103)	
	n	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**
Number of Children								
1	11	(45.8)	25	(34.2)	0	(0)	36	(35)
2	8	(33.3)	24	(32.9)	2	(33.3)	34	(33)
3	5	(20.8)	24	(32.9)	4	(66.7)	34	(32)
Childbirth Experience								
Had complications during labour*†	15	(62.5)	25	(34.2)	3	(50)	43	(41.7)
Considered birth to be traumatic*†	12	(50)	16	(21.9)	1	(16.7)	29	(28.1)
Had postpartum depression	4	(16.7)	14	(19.2)	2	(33.3)	20	(19.4)
Had postpartum anxiety	15	(62.5)	34	(46.6)	4	(66.7)	53	(51.4)
Mode of Delivery								
Vaginal**†	9	(37.5)	50	(71.2)	1	(16.7)	60	(58.3)
Caesarean*†	11	(45.8)	21	(28.8)	5	(83.3)	37	(35.9)
Instrumental	4	(16.7)	6	(8.2)	0	(0)	10	(9.7)
Gestational Age at Birth								
<28 weeks	1	(4.1)	1	(1.3)	0	(0)	2	(1.9)
28-31 weeks	0	(0)	1	(1.3)	0	(0)	1	(0.97)
32-36 weeks	2	(8.3)	5	(6.8)	2	(33.3)	9	(8.7)
37+ weeks	21	(87.5)	66	(90.4)	4	(66.6)	91	(88.3)

*p <0.05
**p <0.01
† Fisher-Freeman-Halton Exact Test was used due to expected cell counts less than five.

4.6.3 Motivations, Perceptions, and Healthcare Professional (HCP) Engagement with IHMS

The most frequently reported motivations and perceptions relating to IHMS as well as insights into HCP engagement in the three cohorts are presented in Table 4.3. Additional details are available in Appendix Q. Those who were recipients in the study reported several reasons for seeking donor milk. The most frequently cited motivations were concerns about insufficient milk supply or perceived infant hunger (46.7%, *n*=14) and an upheld belief that HM is the biological normal way of feeding (40%, *n*=12). Other notable motivators included concerns about CMF (26.7%, *n*=8), CMF intolerance (22%, *n*=6) or the infant had insufficient weight gain or significant weight loss (23.3%, *n*=18). Recipients initial awareness of IHMS emanated from personal initiative (50%, *n*=15) and online

community suggestions (50%, *n*=15), breastfeeding support groups (33.3%, *n*=10), online web searches (23.3%, *n*=7), or from friends/family members (20%, *n*=6). Decisions to pursue IHMS were influenced by other breastfeeding mothers (53.3%, *n*=16), specific IHMS websites (40%, *n*=12), and Facebook pages (36.6%, *n*=11). The most frequent donor motivation was the desire to help someone who needed milk (68.4%, *n*=54). Additional and key donor motivations included: not wanting their expressed breastmilk to go to waste (44.3%, *n*=35), having an excess supply of milk (46.8%, *n*=37) and a belief in the importance of HM (50.6%, *n*=40), knowing not everyone can produce enough (27.8%, *n*=22) and a perceived view that CMF is deficient (21.5%, *n*=17). The initial consideration of informal donation was primarily influenced by online communities (40.5%, *n*=32), the donor's own initiative (37.9%, *n*=30), breastfeeding support groups (16.4%, *n*=13), friends/family (18.9%, *n*=15).

There were positive aspects associated with IHMS from both the donor and recipient perspective. Recipients frequently cited reduced stress/anxiety and feeling supported by a community of mothers/parents (70%, *n*=21), increased breast milk provision to their infants (66.7%, *n*=20) and avoidance of CMF (60%, *n*=18). Among donors, some of the key positive aspects of IHMS were feeling good about helping (77.2%, *n*=61), happy their milk did not go to waste (56.9%, *n*=45) and IHMS was personally rewarding (44.3%, *n*=35). Across all participant cohorts, high levels of satisfaction with IHMS were consistently reported, with no instances of dissatisfaction. There were no statistically significant differences in satisfaction between the cohorts in relation to level of satisfaction (p=0.25). Specifically, 62.1% (*n*=36) of donors indicated they were very satisfied, 31% (*n*=18) satisfied, and 6.9% (*n*=4) neutral. Recipient satisfaction was even higher, with 95.8% (*n*=23) very satisfied and 4.1% (*n*=1) satisfied. Unanimously, all recipients/donors who answered this question (*n*=5) expressed very high satisfaction with IHMS.

Respondents were asked whether they had discussed milk sharing with HCP. Of those who responded to this question (*n*=100), 60%, *n*=69 noted that they did not discuss IHMS with HCP. For those who did not discuss milk sharing, the primary reason for this omission was that HCPs did not ask about IHMS (53.3%, *n*=32). Other stated reasons included respondents not feeling a necessity for discussion (25%, *n*=15), apprehension

regarding HCP disapproval or lack of comprehension (18.3%, *n*=11), discomfort in broaching the subject (16.6%, *n*=10), and perceived deficit in HCP education on IHMS (11.6%, *n*=7).

Table 4.3 Motivations, Influences and Perceptions of IHMS Respondents stratified by Cohort, Recipient, Donor, Recipient/Donor

	Recipient (n=24)		Donor (n=73)		Recipient/ Donor (n=6)		Total‡	
	n	(%)§	n	(%)§	n	(%)§	n	(%)§
Initial idea of Donating HM Informally								
Someone in an online community	-	-	30	(41.1)	2	(33.3)	32	(40.5)
Myself	-	-	27	(37)	3	(50)	30	(37.9)
Friend/Family Member	-	-	12	(16.4)	3	(50)	15	(18.9)
Positive Aspects of Donating								
Felt good about helping	-	-	56	(76.7)	5	(83.3)	61	(77.2)
Happy milk didn't go to waste	-	-	42	(57.5)	3	(50)	45	(56.9)
Personally rewarding	-	-	34	(46.6)	1	(16.7)	35	(44.3)
Important Motivations to Donate Informally								
Help someone who needed milk	-	-	49	(67.1)	5	(83.3)	54	(68.4)
Had excess expressed milk	-	-	35	(47.9)	2	(33.3)	37	(46.8)
Didn't want milk to go to waste	-	-	32	(43.8)	3	(50)	35	(44.3)
Think HM is important	-	-	36	(49.4)	4	(66.6)	40	(50.6)
Knowing not everyone can make enough milk	-	-	21	(28.8)	1	(16.7)	22	(27.8)
View CMF as deficient	-	-	15	(20.5)	2	(33.3)	17	(21.5)
Initial Idea of Receiving HM Informally								
Myself	11	(46)	-	-	4	(66.6)	15	(50)
Someone in an online community	14	(58)	-	-	1	(16.7)	15	(50)
Online web	5	(21)	-	-	2	(33.3)	7	(23.3)
Someone in a breastfeeding support group	8	(33)	-	-	2	(33.3)	10	(33.3)
Friend or family member	4	(17)	-	-	2	(33.3)	6	(20)
Positive Aspects of Milk Sharing as a Recipient								
I felt supported by a community of other mothers	16	(53.3)	-	-	5	(83.3)	21	(70)
My stress or anxiety was significantly reduced	17	(56.6)	-	-	4	(66.7)	21	(70)
I was able to provide more breastmilk to my child	16	(53.3)	-	-	4	(66.7)	20	(66.7)
I was able to avoid feeding my child CMF	13	(54.2)	-	-	5	(83.3)	18	(60)
Motivations for Seeking Donor HM								
Insufficient milk supply	12	(50)	-	-	2	(33.3)	14	(46.7)

Baby seemed hungry after being fed at the breast	12	(50)	-	-	2	(33.3)	14	(46.7)
HM is the biological normal way of feeding	11	(45.8)	-	-	1	(16.7)	12	(40)
Concerns about CMF	7	(29.1)	-	-	1	(16.7)	8	(26.7)
Insufficient weight gain/ significant weight loss	5	(21)	-	-	2	(33.3)	14	(23.3)
Infant was intolerant to CMF	4	(17)	-	-	2	(33.3)	6	(22)
People/Resources that Influenced Decision to Receive HM								
Other breastfeeding mothers	11	(46)	-	-	5	(83)	16	(53.3)
Eats on Feets or HMHB website	9	(38)	-	-	3	(50)	12	(40)
Facebook pages	11	(46)	-	-	1	(16.7)	11	(36.6)
Discussed IHMS with a HCP ¶								
Yes	4	(20)	19	(31.2)	4	(66.6)	27	(31)
No	16	(80)	42	(68.8)	2	(33.3)	60	(69)
Select Reasons why was IHMS Not Discussed with a HCP†								
HCP never asked	10	(62.5)	20	(47.6)	2	(100)	32	(53.3)
I didn't feel comfortable discussing with HCP	5	(31.2)	4	(9.5)	1	(50)	10	(16.6)
I didn't feel the need to discuss this with HCP	9	(56.2)	5	(11.9)	1	(50)	15	(25)
I didn't think HCP would understand or approve	4	(25)	6	(14.2)	1	(50)	11	(18.3)
I didn't view HCP as educated enough to weigh in on decision	2	(12.5)	4	(9.5)	1	(50)	7	(11.6)
Satisfaction with IHMS ¶								
Very satisfied	23	(95.8)	36	(62.1)	5	(83.3)	64	(73.6)
Satisfied	1	(4.1)	18	(31)	0	(0)	19	(21.9)
Neutral	0	(0)	4	(6.9)	0	(0)	4	(4.5)
Dissatisfied	0	(0)	0	(0)	0	(0)	0	(0)

‡ The base Total column varies by question and represents only the cohorts applicable to that question. For example, 'the initial idea for donating' applies to donors (n=73) and recipient/donors (n=6), Total (n=79).

§ Percentages may sum to greater than 100% as respondents could select multiple options.

¶ Denominator differs due to missing data.

† This question was only answered by respondents who answered no to the preceding question.

4.6.4 Respondent Characteristics, Practices and Experiences of IHMS

Donors were asked a series of questions relating to factors and their experience with IHMS from their perspective as detailed in Table 4.4. Additional data is available in Appendix R. A majority of donors (84.5%, *n*=67) considered donating to a HMB but less than half (41.7%, *n*=33) initiated the screening processes, with 27.8% (*n*=22) of those screened approved as HMB donors. The most common reasons for not screening as a HMB donor that donors selected included perceived time/expense (20%, *n*=16), milk was expressed prior to screening (20%, *n*=16), other reasons not listed (13%, *n*=10) and minimum volume requirements associated with HMB (9%, *n*=7). Donors typically shared with two families (*M*=1.96, *Mdn*=2, *IQR*=1) and initiated sharing when their infant was aged between 0-6 months old (*Mdn*: 4-6 months). Most shared excess milk intended for their own child (51.8%, *n*=41), while others provided both surplus and expressed milk intended for donating (30.3%, *n*=24) or milk expressed specifically for donation (17.7%, *n*=14). The majority reported having an oversupply of milk (70.8%, *n*=56) and almost all had a supply of frozen milk (88.9%, *n*=70) which was stored primarily in fridge freezers (62%, *n*=49) or deep freezers (32.9%, *n*=26). Connections with recipients were predominantly facilitated by online groups (70.8%, *n*=56), though established relationships also existed (18.9%, n=15). Recipients were often online acquaintances who they met in person (46.8%, *n*=37), online acquaintances they did not meet in person (30.3%, *n*=24), or friends (16.4%, *n*=13). Direct, in-person exchange of HM was the typical method (89.8%, n=71). At connection with recipients, the most common topics discussed included donor prescription drug use (50.6%, *n*=37), age of donor baby (49.3%, *n*=36), alcohol consumption (45.2%, *n*=33), age of the milk (45.2%, *n*=33), and tobacco use (43.8%, *n*=32).

Table 4.4 Characteristics, Practices and Experiences of Donors related to IHMS

	Donors (n=73)		Recipients and Donors (n=6)		Total (n=79)	
	n	**(%)§**	**n**	**(%)§**	**n**	**(%)§**
HMB consideration and screening						
Considered donating to a HMB	64	(87.6)	3	(50)	67	(84.5)
Commenced screening as a HMB donor	31	(42.4)	2	(33.3)	33	(41.7)
Approved as a HMB donor	22	(30.1)	0	(0)	22	(27.8)
Top reasons for not screening as a HMB donor						
Too time consuming and/or expensive	16	(22)	0	(0)	16	(20)
Milk was expressed prior to screening	16	(22)	0	(0)	16	(20)
Other reasons not listed	9	(12)	1	(16.7)	10	(13)
Minimum volume requirements	7	(10)	0	(0)	7	(9)
Initial idea of donating HM informally						
Someone in an online community	30	(41.1)	2	(33.3)	32	(40.5)
Myself	27	(37)	3	(50)	30	(37.9)
Friend/family member	12	(16.4)	3	(50)	15	(18.9)
Breastfeeding support group	11	(15.1)	2	(33.3)	13	(16.4)
Donor characteristics and type of HM donated						
Surplus HM intended for own child	39	(53.4)	2	(33.3)	41	(51.8)
HM expressed specifically for donating	12	(16.4)	2	(33.3)	14	(17.7)
Both surplus and HM intended for donating	22	(30.1)	2	(33.3)	24	(30.3)
Donor had an oversupply of HM	53	(72.6)	3	(50.0)	56	(70.8)
Storage location of expressed HM for donation						
Fridge freezer	47	(63.3)	2	(33.3)	49	(62)
Deep freezer	24	(32.8)	2	(33.3)	26	(32.9)
Fridge	1	(1.3)	2	(33.3)	3	(3.7)

Ice compartment	1	(1.3)	0	(0)	1	(1.2)
Discussion Topics Donor Perspective						
Age of donor baby (Age-Matching)	33	(45)	3	(50)	36	(45.5)
Alcohol consumption	31	(43)	2	(33.3)	33	(41.7)
Tobacco use	28	(38)	3	(50)	32	(40.5)
Prescription drugs	33	(45)	4	(66.4)	37	(46.8)
Age of milk (how long frozen)	31	(43)	2	(33.3)	33	(41.7)
Methods of initially connecting with recipients						
Online group (HMHB, Facebook)	52	(71.2)	4	(66.6)	56	(70.8)
Already knew them	12	(16.4)	3	(50)	15	(18.9)
Connected through a mutual friend	4	(5.4)	2	(33.3)	6	(7.5)
Donated milk to the following individuals						
Friend	9	(12.3)	4	(66.6)	13	(16.4)
Family member	4	(5.4)	1	(16.6)	5	(6.3)
Online acquaintance who they have met	33	(45.2)	4	(66.6)	37	(46.8)
Online acquaintance who they have not met	23	(31.5)	1	(16.6)	24	(30.3)
Methods of milk exchange						
Directly in person	5	(83.3)	66	(90)	71	(89.8)
Indirectly	1	(16.6)	10	(13.6)	11	(13.9)
Cross-nursed	1	(16.6	0	(0)	1	(1.2)
Mail/shipped	0	(0)	0	(0)	0	(0)

HM4HB Human Milk for Human Babies, HMB human milk bank

§ Percentages may sum to greater than 100% as respondents could select multiple options.

Recipient practices and experiences of IHMS were also explored, with specific details presented in Table 4.5. Additional data is available in Appendix S. Prior to considering IHMS, recipients considered other options for infant feeding including HMB (36.6%, *n*=11) or CMF (36.6%, *n*=11). Alternative milks were reported by 20%, *n*=6, however, some considered no other alternative to IHMS (20%, *n*=6). Similar to the donor cohort, recipients received milk from approximately two donors (*M*=1.9, *Mdn*=1, *IQR*=1). The median age at which infants began receiving donor milk was 4.5 weeks (Mode=0 weeks, *IQR*= 1.25-10 weeks). The age distribution was positively skewed, with the ages clustered at the initial end of the range but extending to older ages. Donor milk typically constituted 'a little or some' of the infant's intake (60%, n=18), complementing the recipient's own breastmilk (80%, *n*=24). Recipients generally connected with donors via online groups (79.1%, *n*=19), but some already knew their donor beforehand (16.6%, *n*=5). Comparable to the donors, direct exchange was most common (66.6%, *n*=20), although some exchanged milk indirectly where the donor gave it to someone else (36.6%, *n*=11). Interestingly, when exploring infant characteristics, almost half of recipients reported that their infant had a tongue or lip tie (46.6%, *n*=14).

The donated HM received was predominantly frozen (88.4%, *n*=23). Heat treatment of donor milk was rare (3.3%, *n*=1), primarily due to trust in milk safety (53.3%, *n*=16), lack of awareness (26.7%, *n*=8), or a desire to preserve milk components (26.7%, *n*=8). More than half of recipients reported not asking donors questions (53.3%, *n*=16) as a means of informal screening. However, recipients did undertake various other practices to minimise concerns. The most prevalent actions included ensuring appropriate transport temperature of HM (56.7%, *n*=17) confirming the donor was breastfeeding their own child (36.7%, *n*=11), researching the donor online (36.7%, *n*=11), and mixing the donor milk with their own HM during feeding (33.3%, *n*=10**).** Notably, 20% (*n*=6) took no specific action. Discussions upon connecting with donors covered several topics. The most common included donor prescription drug use (66.7%, *n*=20**),** alcohol/tobacco use (both 56.7%, *n*=17), recreational drug use (53.3%, *n*=16)**,** and the age of the milk (43.3%, *n*=13)**.** A high sense of urgency was reported in needing the milk (extremely urgent: 50%, *n*=15; urgent: 33.3%, *n*=10), and IHMS was considered very important (70%, *n*=21) or important (23.3%, *n*=7) for meeting their infant feeding goals.

Table 4.5 Characteristics, Practices and Experiences of Recipients Related to IHMS

	Recipients (n=24)		Recipients and Donors (n=6)		Total (n=30)	
	n	(%)§	n	(%)§	n	(%)§
How much of the milk was donated						
A little or some	13	(54.1)	5	(83.3)	18	(60)
About half	3	(12.5)	1	(16.7)	4	(13.3)
A lot	2	(8.3)	0	(0)	2	(6.6)
All of it	3	(12.5)	1	(16.7)	4	(13.3)
It varied	2	(8.3)	0	(0)	2	(6.6)
When the milk was received was it fresh or frozen						
Fresh	1	(1)	2	(33.3)	3	(11.5)
Frozen	19	(95)	4	(66.6)	23	(88.4)
When receiving milk was the infant receiving any of your milk						
Yes-throughout the milk sharing arrangement	19	(79.1)	5	(83.3)	24	(80)
Yes-throughout some of the milk sharing arrangement	0	(0)	1	(16.7)	1	(3.33)
No	4	(16.7)	0	(0)	4	(13.3)
How old was the infant when you began receiving milk						
0-4 weeks	13	(54.1)	6	(100)	19	(63.3)
4-12 weeks	6	(25)	0	(0)	6	(20)
12-26 weeks	2	(8.3)	0	(0)	2	(6.6)
26-60 week	3	(12.5)	0	(0)	3	(10)
Was the infant diagnosed with a lip or tongue tie						
Yes-tongue tie only	9	(37.5)	2	(32.3)	11	(36.6)
Yes-lip tie only	0	(0)	1	(16.7)	1	(3.33)
Yes-both lip and tongue tie	2	(8.3)	0	(0)	2	(6.66)
No	12	(50)	3	(50)	15	(50)
Don’t know/uncertain	1	(4.1)	0	(0)	1	(3.33)

What other options were considered before IHMS						
HMB	9	(38)	2	(33.3)	11	(36.6)
CMF	10	(42)	1	(16.7)	11	(36.6)
Animal milk	1	(4)	1	(16.7)	2	(6.66)
Other milk (coconut, almond, soy etc.)	3	(13)	3	(50)	6	(20)
None	3	(13)	3	(50)	6	(20)
Other	1	(4)	0	(0)	1	(3.33)
Methods of initially connecting with donors						
Online groups (Eats on Feets, HM4HB)	16	(66.7)	3	(50)	19	(79.1)
Already knew them	3	(12.5)	2	(33.3)	5	(16.6)
Source of DHM						
Online acquaintance (have met in person)	7	(29.2)	3	(50)	10	(33.3)
Online acquaintance (have not met in person)	5	(20.5)	2	(33.3)	7	(23.3)
Friend	2	(8.3)	3	(50)	5	(16.7)
Method of receiving milk						
Directly (met donor)	15	(62.5)	5	(83.3)	20	(66.6)
Indirectly (did not meet donor, but donor gave to someone else)	8	(33.3)	3	(50)	11	(36.6)
Did you heat treat the milk prior to feeding it to infant						
Yes	0	(0)	1	(16.7)	1	(3.3)
No	24	(100)	5	(83.3)	29	(96.6)
Reasons for not heat treating milk						
I trusted that the milk was clean/safe	13	(54.2)	3	(50)		(53.3)
Didn’t know heat treatment was an option/didn’t occur to me	7	(29.2)	1	(16.7)		(26.7)
I wanted to preserve the ‘good things’ in the milk	6	(25)	2	(33.3)	8	(26.7)
Did you screen donors by asking them questions						
Yes, everyone	7	(29.1)	1	(16.7)	8	(26.6)
Some people, but not all, regardless of familiarity	2	(8.3)	1	(16.7)	3	(10)
Only strangers, not friends or family	2	(8.3)	1	(16.7)	3	(10)
No one	13	(54.1)	3	(50)	16	(53.3)

Did you do any other actions to minimise concerns						
Ensured appropriate temperature during transportation	14	(58.3)	3	(50)	17	(56.7)
Ensured donor is breastfeeding her own child	8	(33.3)	3	(50)	11	(36.7)
Looked up donor online (Facebook, Google etc)	9	(37.5)	2	(33.3)	11	(36.7)
Mixed milk with breastfeeding parents when feeding	9	(37.5)	1	(16.7)	10	(33.3)
Managed pick-up by meeting in public or bringing companion	6	(25)	2	(33.3)	8	(26.7)
Examined milk containers for cleanliness	6	(25)	2	(33.3)	8	(26.7)
Discussion topics recipient perspective						
Alcohol consumption	13	(54.3)	4	(66.7)	17	(56.7)
Tobacco use	13	(54.3)	4	(66.7)	17	(56.7)
Prescription drug use	16	(66.7)	4	(66.7	17	(66.7)
Recreational drug use	12	(50)	4	(66.7	16	(53.3)
Age of milk (how long frozen)	10	(41.7)	3	(50)	13	(43.3)
When you began IHMS how urgent was it						
Extremely urgent	13	(54.1)	2	(33.3)	15	(50)
Urgent	7	(29.1)	3	(50)	10	(33.3)
A little urgent	3	(12.5)	1	(16.7)	4	(13.3)
Not urgent	1	(4.1)	0	(0)	1	(3.33)
How important was IHMS in helping to meet your feeding goals						
Very important	20	(83.3)	1	(16.7)	21	(70)
Important	3	(12.5)	4	(16.7)	7	(23.3)
Somewhat important	1	(4.1)	1	(16.7)	2	(6.6)
Would you recommend MS to a friend with breastfeeding challenges?						
Yes	20	(83.3)	6	(100)	26	(86.6)
No	0	(0)	0	(0)	0	(0)
Maybe	4	(16.7)	0	(0)	4	(13.3)

HM4HB Human Milk for Human Babies, CMF commercial milk formula, Informal human milk sharing IHMS, DHM donor milk, HMB human milk bank.

§ Percentages may sum to greater than 100% as respondents could select multiple options.

4.7 Discussion

This study was undertaken to address the recognised absence of empirical research on IHMS within the Irish context. By providing the first dedicated investigation of IHMS in Ireland, this research offers a foundational contribution to the field, detailing the characteristics, practices, and experiences of participating donors and recipients**.** Distinct motivations drive participation in IHMS, often linked to recipient needs emanating from challenging perinatal experiences, maternal or infant factors and concerns about CMF, and donor desires related to altruism and having an excess milk supply. While respondents reported overwhelmingly high satisfaction and perceived significant psycho-social benefits from IHMS, the findings also highlight a reliance on casual safety screening practices. The results underscore a substantial communication gap, revealing that the majority of respondents do not discuss their involvement in IHMS with HCPs, primarily because the topic is not proactively raised by HCPs.

4.7.1 Sociodemographic and Perinatal Characteristics

Our findings relating to the sociodemographic profiles of respondents revealed distinct alignment with comparable international scholarly research studies exploring IHMS practices in differing jurisdictions. Our sample comprised a homogeneous sample of white, married, employed and highly educated women, which reflects the findings of numerous international studies exploring IHMS (Palmquist and Doehler, 2015, Paynter and Goldberg, 2018, Peregoy et al., 2022, Oreg and Negev, 2023, Li et al., 2025). This consistent sociodemographic profile across various international IHMS studies suggests a potential trend in who is most likely to participate in research, which may have implications for the generalisability of findings.

The examination of childbirth and postpartum experiences within IHMS cohorts revealed significant distinctions, aligning with recent US research (Peregoy, 2021, Peregoy et al., 2022). Consistent with their findings, our study demonstrated that donors were more likely to have had a vaginal delivery and a lower incidence of complications in labour compared to recipients, and those who identified as being recipient/donors. Caesarean section rates were significantly higher among recipients and recipient/donors compared to donors. This observation is pertinent as it is well documented that caesarean section may delay breastfeeding initiation and shorten the duration of breastfeeding (Li et al., 2021) which can potentially contribute to the need for

supplemental milk sought through IHMS. The high prevalence of self-reported traumatic birth experiences among recipients in our study is a significant finding that aligns with existing research on breastfeeding challenges. It has been well established that traumatic birth experiences can contribute to difficulties in establishing or maintaining exclusive breastfeeding (Tzituridou-Chatzopolou et al., 2021). It has been noted in a recent study that these challenges can contribute to negative breastfeeding experiences (Norman et al., 2025). This further highlights a potential need for focused postpartum and lactation support for women who experience traumatic birth. While we found no inter-group differences in reported PPD, the overall prevalence of PPD was lower (19.4%) in our sample compared to that of a sample of IHMS respondents in the US (23.6%) (Peregoy, 2021, Peregoy et al., 2022). However, respondents in our study identified a higher rate of postpartum anxiety (51.4%) compared to the 41% reported among donors and recipients in the US (Peregoy, 2021, Peregoy et al., 2022). The elevated prevalence of postpartum anxiety is particularly noteworthy given that anxiety disorders often receive substantially less clinical focus and media attention compared to PPD (Fawcett et al., 2019).This finding suggests a potential unmet need for anxiety-focused support within IHMS populations.

4.7.2 Motivations, Practices and IHMS Experiences

In this study, the primary maternal-associated motivation for recipients to seek donor milk was insufficient milk supply. This finding aligns with a broad body of literature which has consistently highlighted that insufficient milk supply is a dominant driver for engaging in IHMS (Thorley 2009, Onat and Karakoc, 2019, Peregoy, 2021). Perceived insufficient milk supply is a major reason for discontinuing breastfeeding (Liu et al., 2021). Furthermore, the belief that breastmilk is the biologically normal way to feed infants emerged as another primary driver for recipients to engage in IHMS in our study which aligns with similar research (Onat and Karakoc, 2019, Peregoy, 2021). This finding emphasises the deeply held personal values associated with breastfeeding that influence the decision to seek HM. Similarly, recipient concerns about CMF were noted in our study which is a concern that is well-documented in the international literature (Gribble, 2014a; Cassar-Uhl and Liberatos, 2019, Pound et al., 2020; Keim et al., 2014, Peregoy, 2021).

Infant-related factors were also key drivers in the decision to seek donor milk, a finding that is well-documented in the literature exploring motivations for recipient engagement with IHMS

(O' Sullivan et al., 2016, McNally and Spratz, 2020, Thorley, 2009, Peregoy, 2021). These factors encompass a range of infant health and wellbeing considerations that prompt recipients to seek HM. Reflecting a consistent theme throughout IHMS literature, the overwhelmingly prominent driver for donor participation in our study was a deeply held altruistic desire to assist those in need. This key motivator was also frequently cited by donors as a central positive aspect of their IHMS experience, a finding consistently affirmed in previous research (Wilson, 2018, Vickers, Matthews and Paul, 2024).Further, a prominent motivation was a desire to avoid wasting their expressed milk which is a widely reported motivator supported by previous empirical work (Perrin et al., 2014, Thorley, 2009, Peregoy, 2021).

Online and digital communities served as critical conduits for both recipient and donor connections which reinforcing findings of a recent mixed-methods systematic review where online platforms were reported as key enablers for engagement with IHMS (Vickers, Matthews and Paul, 2024). Notably, the prevalence of direct, in-person exchange was high between individuals who connected through online channels which may underscore the element of trust and personal interaction that characterises many IHMS relationships.

The engagement with IHMS was associated with significantly high levels of satisfaction and other positive outcomes for both donors and recipients. Notably, a majority of recipients reported a reduction in their stress and anxiety, alongside a feeling of support from a community of mothers/parents. This reported reduction in stress and anxiety through the receipt of HM aligns with findings from recent studies and contributes to an emerging theme in the literature (Pound et al., 2020, McCloskey and Karandikar, 2019, Schafer et al., 2018, Wagg et al., 2022). This is a pertinent observation given the previously mentioned high rates of anxiety reported within this study.

4.7.3 Formal Donation, Safety and Healthcare Professional Engagement

The significant gap between donor interest in HMB donation and the low rates of progression through the screening processes is a key finding in our study. This disparity is attributable to factors including perceived time and expense, logistical impacts such as pre-screening milk expression, and minimum volume requirements which have been reported previously (Perrin et al., 2016, Papanicilaou, 2013, Onat and Karkoc, 2019). A recent mixed-methods systematic review concluded that these same barriers served as motivating factors for donors to engage in

IHMS (Vickers, Matthews and Paul, 2024). Another recent study exploring the barriers to milk bank donation in the US and UK reported a large proportion of the participant donors (69-76%) experienced a barrier to HMB donation and it was opined that barriers to donating milk to HMB might be setting-specific and related to milk bank processes and requirements (Dos Santos et al., 2024). A multitude of barriers spanning individual, systemic and social domains are recognised (Doshmangir et al., 2019). This underscores the need to urgently examine the availability, accessibility and appeal of formal donation pathways. This finding likely contributes to the active engagement within IHMS, which emerges as a more readily accessible alternative for donors.

The finding that over half of recipients did not directly screen their donors by asking them personal questions highlights a reliance on informal screening measures such as discussions on a range of topics including alcohol consumption, prescription drug use, recreational drug use, age of the milk and age of the donor baby/age-matching. Interestingly, only 3.33% (*n*=1) reported performing home pasteurisation on the DHM which is similar to a recent study undertaken in New Zealand in which 3% of parents reported carrying out home pasteurisation methods prior to feeding the infant the DHM (Harris et al., 2024). The reliance on informal safety measures, such as assurances of the donor breastfeeding their own child, alongside the infrequent use of heat treatment, stands in marked contrast to the detailed protocols for HMBs. HMBs have specific eligibility requirements for donation which includes serological screening for specific diseases (Kontopodi et al., 2021). There is a distinct divergence in safety approaches between informal and formal HM donation which necessitates ongoing evaluation and discussion within the context of IHMS.

The lack of communication with HCPs about IHMS was highlighted in the present study. The majority of respondents in this study did not engage in discussion relating to IHMS indicating a need for improved dialogue in this area. Undoubtedly, by understanding and addressing diverse perspectives they can better facilitate safe IHMS exchange practices (Abdul Razak et al., 2023). The Academy of Breastfeeding Medicine has also articulated that HCPs should support informed decision making about the risks and benefits of IHMS (Sriraman et al., 2018).

4.7.4 Strengths, Limitations and Implications

This study possesses several significant strengths which makes a significant and novel contribution to the field of IHMS. Foremost, it represents the first research on IHMS conducted in Ireland**,** providing essential foundational insights into a previously unexplored area within the national context. The national scope of the survey further enhances its strength, offering a broad perspective on IHMS practices across Ireland. Methodologically, the study utilised a previously validated survey tool that underwent robust validation processes. These strengths ensure the study significantly contributes to the evolving scholarly discourse in the domain of IHMS. Despite its strengths, this study has several limitations that warrant consideration. Firstly, the study was a cross-sectional study. Additionally, the overall sample size is relatively small, which constrains the generalisability of the findings. Another notable limitation was the limited sample size of the recipient/donor cohort (n=6) which precludes the ability to draw definitive conclusions from comparative analyses including this group. A key limitation is that the survey instrument used self-reported, single-item questions to assess specific childbirth and postpartum variables such as PPD, anxiety, birth complications and birth trauma. While these items offer fundamental, subjective insights, they lack the objectivity of validated scales which could have provided a more nuanced picture of these experiences. An additional limitation is the reliance on online recruitment via Facebook pages dedicated to milk sharing and breastfeeding. This approach carries a potential risk of sampling bias, as participants engaging in IHMS outside these digital platforms were likely excluded, consequently impacting the broader generalisability of the findings.

4.8 Conclusion

This primary research contributes vital data from a previously unexamined national context and offers a novel and indeed a foundational contribution to the discourses on IHMS globally. Our findings confirm that IHMS is an infant feeding practice within Ireland. IHMS in Ireland emanates predominately through the complex interplay of maternal/infant needs, upheld beliefs as well as altruistic donation. The engagement with IHMS is interestingly enabled by contextual and operational formal HMB barriers. The amalgamation of systemic barriers for donors for the utilisation of HMB donation was evident in this study. This study highlighted a predominant gap in dialogue with HCPs about IHMS. This underscores the imminent need for policy makers to provide guidance for HCPs to encourage open discussion with families to support their

informed decision-making relating to infant feeding choices. Further, policy efforts should address the pervasive barriers to the universality and accessibility of HMB from a donation and recipient context. Future research is required to investigate the outcomes of IHMS on recipient infants, as well as additional research to further explore the lived experiences of donors and recipients to enrich our current understanding within Ireland and other under-researched geographical contexts to contribute to this evolving contemporary landscape within a global context.

4.9 Chapter Summary

This chapter presented the second phase of this research which met Objective 2 of this research which aspired to describe the profiles, motivations, practices and experiences of IHMS donors and recipients in Ireland. This initial strand of the sequential explanatory mixed methods study provided substantive baseline insights of IHMS in the geographical context of Ireland. As aforementioned, the findings from this initial phase informed the development of the successive strand of this sequential explanatory mixed methods study which is illuminated in the next chapter (Chapter Five) which consisted of semi-structured interviews with a sample of donors and recipients (n=15) of IHMS in Ireland who had participated in this initial quantitative phase presented in this chapter. As previously described in Chapter Two, following the analysis of the cross-sectional survey, engagement with PPI representatives prior to the conduct of the semi-structured interviews was instrumental in ensuring the proposed interview guide/ protocol and associated questions were authentic, relevant, sensitive and meaningful.

Chapter Five: Informal Human Milk Sharing: The Experiences and Practices of Informal Human Milk Sharing in Ireland

The work presented in this chapter has been formally accepted for publication in Maternal and Child Nutrition, May 18th 2026.

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As per DCU Guidelines for candidates, supervisors and examiners on the 'PhD by Publication' format, the PDF versions of published works for the publication outlet cannot be included in the PhD thesis, and all published work should appear in manuscript/thesis format. The content presented in this thesis is correspondent with the content of the published papers, with the exception of minor formatting variations.

5.1 Declaration of Authorship

Section 1: Candidate's Details	
Candidate's Name	Niamh Vickers
DCU Student Number	A22269621
School	School of Nursing, Psychotherapy and Community Health
Principal Supervisor	Dr. Gillian Paul Professor Anne Matthews
Title of PhD by Publication Thesis	A Mixed Methods Study of Informal Human Milk Sharing in Ireland
Section 2: Paper Details	
Title of co-authored paper included in the thesis under examination	Informal Human Milk Sharing: The Experiences and Practices of Informal Human Milk Sharing in Ireland
List of authors as in order given on accepted/published version	Niamh Vickers, Professor Anne Matthews, Dr. Gillian Paul
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Provide a brief statement here on the disciplinary ranking of this publication and the peer-review process involved (e.g. how many reviewers, single blinded or other, initial decision, revision timeline etc and any other details that	Maternal and Child Nutrition is a global maternal and child health open access journal. The journal impact factor is 2.6 and a cite score of 7.5 in 2026. The peer review process is a double-blind peer review. The manuscript was peer reviewed by two peer reviewers. The manuscript was submitted on January 29 2026, revised and accepted on the May 18 2026. It had two

speak to the rigour of the peer review process)	rounds of revisions between submission and acceptance.

This paper (Chapter 5) is one of three co-authored papers to be submitted as part of the PhD by publication thesis submitted for examination.

Section 3: Candidate's Contribution to the Paper

Provide details below of the **nature** and **extent of your contribution** to the paper (include both your intellectual and practical contributions) and your overall contribution in **percentage terms**. Note that these categories can be customised according to disciplinary norms

The nature and extent of my contribution to the published paper is detailed below. My overall contribution to this paper in percentage terms is 90%.

Briefly outline your contribution to the **conception** of the work described in this paper:

The initial conception of the study was done collaboratively with my supervisors.

Briefly outline your contribution to the **literature review** in this paper:

I conducted the literature review presented in this paper. The literature review was reviewed by my supervisors following the completion of the first draft.

Briefly outline your contribution to the **methodological design**:

The decision to conduct this study was decided in collaboration with my supervisors at the outset of the PhD planning phase. The findings of the initial phase of this study informed the questions for this phase of the research. The interview guide was developed with PPI engagement and was reviewed by my supervisors. My supervisors provided guidance on resources for me to engage with such as: sequential explanatory sequential designs, semi-structured interviews, qualitative data analysis etc.

Briefly outline your contribution to **data collection**:

I conducted the data collection i.e. semi-structured interviews.

Briefly outline your contribution to **data analysis**:

I completed the transcribing of the interviews and data analysis in NVivo. The data were analysed inductively using reflexive thematic analysis. This was reviewed by my supervisors.

Briefly outline your contribution to the **synthesis and summary of findings**:

I completed the synthesis and devised a summary of the themes. These were reviewed by my supervisors.

Finally, outline your contribution to the **writing** and **revision** of the paper:
I wrote the original draft of the manuscript and completed revisions based on feedback from my supervisors. I revised the manuscript based on the peer review comments/ suggestions and these were reviewed and approved by my supervisors.

Section 4: Signature and Validation

I confirm that the following statements are true:

(a) the information I have provided in this form is correct
(b) this paper is based on research undertaken during my candidature at DCU

Signature of PhD Candidate: Niamh Vickers **Date:** 28th May 2026

I confirm that the information provided by the candidate is correct:

Signature of Principal Supervisor: Dr. Gillian Paul, Professor Anne Matthews
Date: 28th May 2026

In some cases, it may be appropriate for verification to be given by both the principal supervisor **and** the lead/corresponding author of the work (where the lead/corresponding author of the work is not the candidate or the principal supervisor) N/A

5.2 Chapter Introduction

Chapter Four presented the findings of the initial strand of the sequential explanatory mixed methods study and offered the foundational empirical evidence pertaining to IHMS in Ireland. Crucially, it provided the underpinning baseline that established that IHMS is a contemporary infant feeding practice in Ireland, denoting the profiles, perinatal experiences, characteristics, motivations, perceptions, practices, HCP engagement, satisfaction, and experiences of IHMS from donor and recipient perspectives. The detailed insights revealed that IHMS in Ireland is propelled by a distinct convergence of factors: maternal and infant factors such as lactation insufficiency, birth complications, and infant related issues alongside altruistic donor motivations, surplus of DHM and barriers to formal HMB. An important observation was the substantive interest of donors in formal HMB donation compared to the low rate of progression to being an approved donor. Moreover, the absence of HCP discussion relating to IHMS was notable with the majority of participants not discussing IHMS with HCPs which warranted further exploration. A comparison of the two cohorts revealed that recipients experienced higher rates of self-reported birth trauma, intrapartum complications, caesarean sections and postpartum anxiety. The findings also revealed that the most commonly reported positive aspect of IHMS articulated by recipients was their stress and anxiety was significantly reduced which affirms the advantageous psychological outcome ascribed to IHMS. Moreover, the donors reported positive emotional dimensions of IHMS including personal fulfilment and feeling good. Moreover, there was a resoundingly high level of satisfaction among participants with IHMS. While the MMSR initially established this emerging theme in the literature pertaining to the psychological dimensions of IHMS, further in-depth exploration of this was warranted to understand these attributes further from the lived experiences of donors and recipients. Mirroring the findings of the MMSR in Chapter Three, online and digital communities acted as instrumental conduits for IHMS connections. Moreover, the survey findings aligned with the trends identified in the MMSR relating to the high prevalence of direct in-person exchange of IHMS among participants.

The survey results in Chapter Four indicated that important topics such as alcohol consumption, tobacco use, drug use, age of donor baby and age of milk were discussed by most, yet it was noted that half of recipients reported to not screen donors by asking them questions. Moreover,

heat treatment of the received milk was notably absent and the primary rationale for not engaging in heat treatment by recipients was due to trusting the milk was clean/safe. These objective data points suggest an inherent trust in IHMS among participants which warranted further in-depth exploration. The findings of the quantitative survey provided instrumental evidence on the landscape of IHMS in Ireland from donor and recipient perspectives and accomplished Objective 2 of this body of research which was to describe the profiles, motivations, practices and experiences of IHMS donors and recipients in Ireland. Chapter Five presents the qualitative strand of this sequential explanatory mixed methods study which comprised semi-structured interviews (n=15) of donors and recipients who had participated in the initial quantitative phase of the sequential mixed methods study.

5.3 Abstract

IHMS is a contemporary and evolving infant feeding practice. In the qualitative phase of a sequential explanatory mixed methods study, this research explored the experiences, practices and perceived psychological and emotional impacts of IHMS from the perspectives of donors and recipients in Ireland. Fifteen participants were interviewed, ten donors, three recipients and two that were donors and recipients. The study is reported according to the standards for reporting qualitative checklist (SRQR) as detailed in Appendix T. Utilising reflexive thematic analysis, five themes were identified: (1) Motivations for IHMS (2) Formal milk banking: invisible, rigid and faceless (3) The healthcare professional paradox (4) Navigating risk and safety assurance by the 'wee subculture' (5) Emotional and psychological impact of IHMS. Our findings reveal that participation in IHMS was propelled by personal imperatives and contextual motivations. HMB's were described as rigid, invisible and *'quite the effort'*. Participant narratives depict a culture where CMF was *'pushed left, right and centre'* in maternity settings as well as the intentional concealment of IHMS from HCPs. Safety and risk mitigation was framed through *'a huge trust network'*. IHMS has profound emotional and perceived psychological outcomes that were represented as a *'light switch'* release of maternal stress and anxiety for recipients while fostering a sense of pride and a *'nice, warm, fuzzy feeling'* for donors. There is an imminent need for policy reform and robust clinical frameworks to facilitate HCP engagement, risk mitigation and enhancement of the visibility and accessibility of formal HMBs. Future research should evaluate HCP understanding of HMBs and IHMS in Ireland and similarly under-researched regions.

5.4 Introduction

Breastfeeding is the safest and most efficacious method of infant feeding (Ahmad and Haque, 2025). Accordingly, it has been opined that breastfeeding can be conceptualised as an infant's first vaccine, conferring immediate protection from disease with enduring advantageous effects (WHO, 2025). Central to these benefits is the provision of HM, a complex, dynamic and unparalleled substance comprising a comprehensive nutritional profile and substantive bioactive components (Szyller et al., 2024, Pérez-Escamilla et al., 2023). These bioactives contribute fundamentally to infant health, development and immune-stimulating functions (Szyller et al., 2024). A proliferation of scholarly evidence continues to reveal emergent advantages of HM which strengthens its role as a dynamic biological system that offers substantive benefits. Further, the utilisation of HM also bestows advantageous health, societal, environmental and economic outcomes (Vickers, Matthews, Paul, 2024). Consequently, global health organisations recommend breastfeeding initiation within the first hour of life, exclusive breastfeeding for 6 months and continued breastfeeding until 2 years and beyond along with complementary foods (WHO, 2023). Global exclusive breastfeeding rates within the first six months stand at 48%, which is a discernible gap from the World Health Assembly target of 60% by 2030 (WHO, 2025). In instances where MOM is not available, global health organisations recommended providing DHM from a milk bank, not CMF until MOM is obtainable or breastfeeding has been established (PATH, 2017). An emerging field of research demonstrates that direct breastfeeding confers enhanced benefits for the maternal and infant dyad (Coutsoudis et al., 2026). HM composition and caloric content are dynamic and systematically dependent on many factors including: circadian influences (Woortman et al., 2025, Italianer at al., 2020), environmental factors such as storage and handling (Slater, Juntereal and Chao, 2024), and thus expressed HM may very biochemically from breastfeeding. Further, the activation of metabolic pathways during breastfeeding through the interactions between an infant's saliva and HM and the establishment of the infant oral and gut microbiota further empirically affirm its enhanced benefits (Sweeney et al., 2018). Breastfeeding is also associated with reduced PPD, anxiety, cardiovascular disease, diabetes, breast and ovarian cancers (Coutsoudis et al., 2026).

It has been postulated that CMF is inferior to the various alternatives in the HM continuum including expressed HM, DHM, and wet nursing (Ahmad and Haque, 2025). The global network of HMBs has increased significantly in recent years driven predominately by the recognition of

the importance and value of DHM (Lahav and Harison, 2025). Globally, there are approximately eight-hundred operational HMB facilities across sixty-six countries (Belekar, 2025). HMBs are instrumental in the collection, screening, processing, pasteurisation, storage, quality control and safe dispensing of DHM to infants in the absence of MOM (Arslanoglu et al., 2023). It is widely acknowledged that HMBs play a significant role in the promotion, protection and support of breastfeeding (Fonseca et al., 2021). As such, HMBs have been asserted as vital pillars in neonatal public health (Machado et al., 2025). Moreover, recent findings affirm that the receipt of DHM has further positive implications that transcend infant health outcomes and positively impact parental wellbeing by reducing anxiety and enhancing mental health (Brown et al., 2024). Nevertheless, DHM is not universally available to all infants when required and global efforts are necessitated to expand HMBs worldwide (Israel-Ballard, La Rose, Mansen, 2024). In Ireland, there is one HMB located in County Fermanagh, Northern Ireland. This facility has been in operation for twenty-six years and provides DHM to twenty-seven hospitals across Ireland. In 2024, they distributed DHM to seven-hundred and eighty-three premature infants in Ireland (Western Health and Social Care Trust, 2026). Nevertheless, due to the lack of universal accessibility of DHM, there is evidence that some individuals engage in HMS as an alternative option for supplementation provision when MOM is not available (Vickers, Matthews, Paul, 2024, Li et al., 2025).

A recent mixed-methods systematic review (MMSR) highlighted the imminent demand for in-depth investigations of the experiences, practices and psychological impacts of IHMS (Vickers, Matthews, Paul, 2024). Accordingly, a sequential explanatory mixed methods study planned to explore IHMS within the geographical context of Ireland due to an absence of empirical research within this geographical context. This current study constitutes the qualitative phase which offers a pioneering contribution that explores the experiences, practices and perceived psychological and emotional outcomes of IHMS in Ireland. This study utilises reflexive thematic analysis to provide a deep and interpretive understanding of the nuanced realities of IHMS from the perspectives of donors and recipients in Ireland.

5.5 Methods

5.5.1 Aim

The aim of this study was to explore and gain an in-depth understanding of the experiences and practices of IHMS among donors and recipients in Ireland.

5.5.2 Research Design

As part of a larger mixed-methods explanatory sequential design, this phase utilised a descriptive, inductive methodology to bring meaning to the phenomena of IHMS and the subjective views of participants. The interview guide/protocol was developed to build upon and explain the findings of a preceding phase, a quantitative national survey of IHMS donors and recipients in Ireland (Vickers, Matthews, Paul, 2025).

5.5.3 Sample and Recruitment

Participants who indicated their interest in participating in interviews were recruited from an expression of interest form included in the initial phase of this study. The eligibility criteria for study participants were: (1) aged 18 years or older (2) participated in IHMS either as a donor or a recipient within Ireland in the last 18 months (3) participated in the initial quantitative phase of the study.

5.5.4 Ethics and Public and Patient Involvement

Ethical approval was sought and granted to conduct this study by Dublin City University Research Ethics Committee (DCUREC/2024/083) on the 21st May 2024. An interview guide/protocol was developed based on the analysis of the quantitative findings from the survey (Vickers, Matthews, Paul, 2025). To ensure relevance and sensitivity, the interview guide was refined through PPI with two individuals who provided lived experiences of IHMS from donor and recipient perspectives, respectively. Their feedback was instrumental in capturing the nuances of IHMS. Two pilot interviews were conducted to evaluate flow, clarity and effectiveness of the interview guide/protocol.

5.5.5 Data Collection

The interviews were conducted via the Zoom online platform. The duration of the interviews varied between 38-105 minutes.

5.5.6 Data Processing and Analysis

The collected interview data were transcribed verbatim and cross-referenced for accuracy by comparing them to the original recordings. Data were imported to NVivo (Version 15) for analysis. The data were analysed inductively utilising reflexive thematic analysis, drawing on the six-phase framework originally developed by Braun and Clarke (2006). This study adheres to the refined six-phase framework as detailed in Table 5.1 (Braun and Clarke, 2022)

Table 5.1 Thematic Analysis Process Following the Approach of Braun and Clarke (2022)

1	**Familiarisation with Data**	Data were imported to NVivo (version 15). Deep immersion included reading transcripts, taking reflective and notes relating to the raw data, listening to audio-recordings.
2	**Generation of Initial Codes**	An initial round of inductive coding was conducted by systematically engaging with each transcript line by line within NVivo (version 15) software. An initial 96 codes were generated at this phase.
3	**Generating Initial Themes**	These initial 96 codes were grouped and collated into potential themes by utilizing visual maps to explicitly view and organise patterns of meaning across the dataset . The generation of themes was an interpretive process constructed by the researcher based on the data, the researchers conceptual insights and the research questions,
4	**Development and Reviewing of Themes**	Candidate themes were visualised, reviewed and refined. During this phase the data were revisited to ensure that the named themes were distinct and coherent and represented distinct patterns of shared meaning and coherent across the dataset. This refinement process and the generation of themes ultimately led to the consolidation of the themes into a final set of five.
5	**Refinement and Naming of Themes**	The final set of themes were defined and named. This process involved writing a detailed narrative for each theme ensuring each theme was clearly delineated.
6	**Writing the Report**	This involved finalizing, refining and integrating the selected data extracts with a rich, comprehensive and interpretative narrative that connected the findings to the literature and research question.

5.5.7 Rigour

This study adheres to the Standards for Reporting Qualitative Research guidelines (O' Brien et al., 2014). This study incorporated PPI engagement which further strengthened its rigour. Participant feedback was utilised during data collection to ensure accuracy of accounts (Tracy, 2010). Reflexivity was integrated as an 'ongoing process of reflection' throughout the research process (Braun and Clarke, 2022, p.18). The primary researcher (NV) is a PhD candidate, midwife, nurse, lactation consultant (LC), mother of two children with prior, personal experience of breastfeeding but not IHMS. Analysis involved collaborative reflexivity with PhD supervisors (GP, AM) who possess extensive qualitative and shared disciplinary expertise. This collaborative dialogue, supported by reflective journaling and an audit trail ensured analytical depth (Olmos-Vega et al., 2023). The incorporation of pseudo-anonymised extracts from the data using pseudonyms to illustrate the findings and provide empirical support for the authors' interpretive commentary.

5.6 Results

A total of fifteen participants, of which 10 were donors, 3 were recipients and 2 who had engaged in IHMS as both donors and recipients were recruited for the study. The majority of participants (n=10) were between 30-39 years of age, with the remaining (n=5) aged 40 or over. The majority of participants had engaged in IHMS within the last year (n=8). From a geographical perspective, participants lived in two provinces in Ireland: Leinster (n=10) and Ulster (n=5). Four participants resided in counties in Northern Ireland. The demographic characteristics of study participants are detailed in Table 5.2. Five predominant themes were identified from the analysis of the data. Each theme had a number of subthemes which are visually displayed in Figure 5.1 and are detailed comprehensively below. An overview of the five themes and associated subthemes are also provided in Table 5.3.

Table 5.2 Demographic Characteristics of Participants in Semi-Structured Interviews

Characteristics	n	(%)
Participant Category		
Donor	10	(66.6)
Recipient	3	(20)
Donor/ Recipient	2	(13.3)
Last milk shared		
<6 months	6	(40)
< 12 months	2	(13.3)
>12 months	7	(46.6)
Current Age		
30-35 years	4	(26.6)
36-39 years	6	(40)
40+ years	5	(33.3)
Gender		
Female	15	(100)
Number of Children		
1	6	(40)
2	4	(26.6)
3	4	(26.6)
4+	1	(6.66)
Ethnicity		
White Irish	13	(86.6)
Other White background	1	(6.66)
Brazilian	1	(6.66)
Education		
Secondary or equivalent NFQ 4-6	2	(13.3)
Degree level or equivalent NFQ 7-8	7	(46.6)
Postgraduate/Masters/Doctorate NFQ 9-10	6	(40)
Province		
Leinster	10	(66.6)
Ulster	5	(33.3)
Employment status		
Employed	8	(53.3)
Fulltime parent	6	(40)
Student	1	(6.66)
Marital status		
Co-habiting	1	(6.66)
Married	14	(93.3)

Table 5.3 Overview of Themes and Associated Subthemes

Theme Name	Associated Subthemes	Overview of Theme
The Motivations for IHMS	Donor motivations: altruism, oversupply and the intrinsic value of human milk Recipient motivations: avoidance of CMF and clinical factors.	Highlights the motivations for engagement with IHMS. Donors were motivated to help others in need. This altruistic imperative was often associated with an oversupply of HM and a desire not to waste it. Recipients were motivated by a desire to avoid CMF. Various maternal and infant factors clinical factors were key motivators for engagement with IHMS.
Formal Milk Banking: Invisible, Rigid and Faceless	Invisible and unaware: '*unbelievable how little information there is'* Systemic barriers: *'quite the effort'* Lack of connection and perceived quality: *'faceless'*	Explores the perceived invisibility of HMBs particularly among HCPs. It highlights the reported barriers and inhibitors to the engagement with HMBs. It explores the reported lack of personal connection and a perception of reduced HM quality with HMB donation.
The Healthcare Professional Paradox	CMF culture and predominance: *'Pushed left, right, and centre'* Purposeful concealment and divergent specialist support: *'I'm not hearing that'*	Highlights the paradoxical role of HCP's who were described as barriers to breastfeeding through a perceived CMF culture, yet in rare cases functioned as facilitators of IHMS. The intentional concealment of IHMS from HCP's was common among participants.
Navigating Risk and Safety Assurance by the 'Wee Subculture'	Categorical trust within the village: *'a huge trust network'* Donor assurance: *'I'll give you the answers'*	Explores how risk and safety are constructed by IHMS participants. Safety and trust are framed through a 'wee subculture' which was depicted as a 'huge trust network' where its members have shared values and a collective belief in the significant value of HM. A sense of safety was established by donor transparency, narrative interactions and the in-person exchange of HM.
Emotional and Psychological Impact	Recipient release: IHMS as a *'light switch'* for acute distress and anxiety. Donor reward: IHMS as a source of pride and fulfilment.	IHMS was associated with positive psychological and emotional outcomes for IHMS participants. Recipients expressed an instantaneous reduction in stress and anxiety on receiving of HM, whereas and donors highlighted a sense of pride and fulfilment from IHMS engagement.

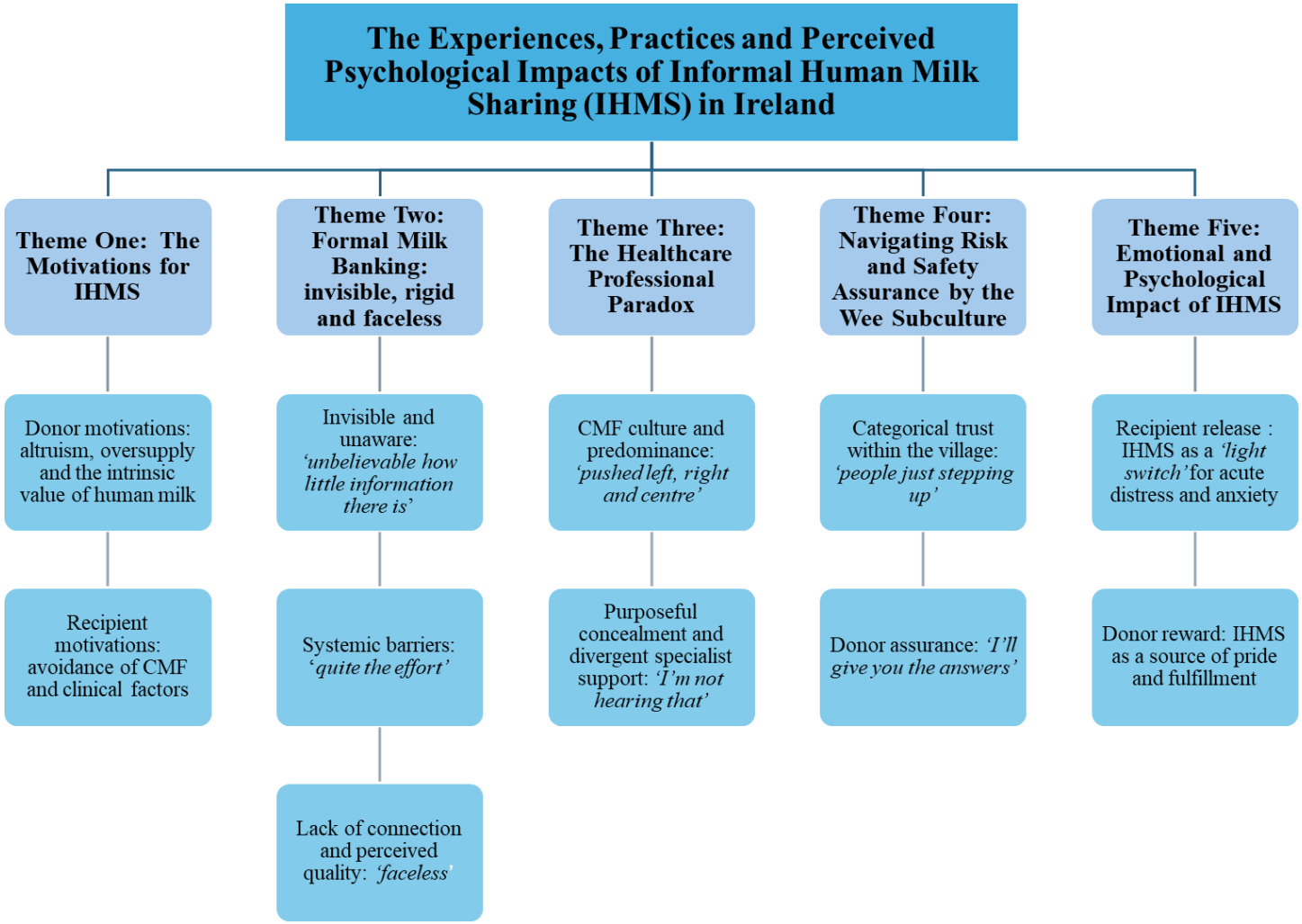


Figure 5.1 Visual Display of Themes and Subthemes

5.6.1 Theme One: The Motivations for IHMS

This theme underscores the imperatives of engaging in IHMS from both donor and recipient perspectives. These were underpinned by powerful personal imperatives that were interlinked with factors such as necessity, inherent values and practicality which propelled them to participate in IHMS.

5.6.1.2 Donor Motivations: Altruism, Oversupply and the Intrinsic Value of Human Milk

The central motivation for donors to engage in IHMS was articulated as a form of altruism: *'Wanting to help other mammies, parents, caregivers.. just wanting to help'* (Sinéad). One participant stated that her ability to donate stemmed from her own breastfeeding journey which transformed personal gratitude into an enabling imperative to support those struggling: *'Like I was just so happy that it worked for me, and then so much so that I was able to help other people with it'* (Rebecca). Another echoed this and also positioned the donation as a proud gift, stating*: 'Look! I felt great being able to help out. You know the little baby especially, you know, considering mammy wasn't there.. like… it is kind of like a gift to somebody..'* (Emma). Many reported they had an oversupply of milk which served as an important trigger to donate: *'…..when you have an oversupply like that, like you have to….. you have to share it..'* (Patricia). This was intertwined with a powerful desire to avoid wasting milk which was denoted as a *'valuable substance'* (Grace) and it would *be 'such a waste not to'* (Marie). A parallel, nuanced factor to donate was practical concerns. Specifically, freezers were full and milk was nearing its expiration date, translating their altruistic desire into an urgent requirement: *'It was just stacking up... I was like I need to look about spreading some of this around'* (Patricia).

5.5.1.3 Recipient Motivations: Avoidance of CMF and Clinical Factors

The avoidance of CMF was a key motive for all recipients often underpinned by their personal beliefs about the physiological impact of CMF on lactogenesis*: 'I really didn't want to give formula because I know it would impact my supply….'* (Shauna). Many were driven to provide *'the best thing'* (Shauna) for their infants highlighting *'the cold, hard truth of it without hurting anybody's feelings is…. There is nothing as good as breastmilk.. formula is second best'* (Caoimhe). Both maternal and infant factors were also key

motivators for recipients to seek DHM which primarily occurred when faced with challenges that necessitated the provision of urgent supplemental feeding. Infant factors including dehydration: *'he had, like the brick dust in his urine'* (Caoimhe) and admission to neonatal intensive care (NICU), '*he was very ill'* (Sinéad) motivated recipients to engage in IHMS. Maternal-related factors were also prominent and included insufficient milk supply, maternal illnesses and complex complications such as postpartum haemorrhage: '*I was clinging onto the walls…I was so dizzy...I felt so rotten after the bleed'* (Shauna). It was acknowledged that without IHMS recipients faced resorting to CMF: *'Because otherwise I had nothing at all like….'* (Deirdre).

5.6.2 Theme Two: Formal Milk Banking: Invisible, Rigid and Faceless

This theme specifically explores the perceived invisibility, lack of professional awareness of HMBs and pervasive barriers of the system that inhibited engagement by participants.

5.6.2.1 Invisible and Unaware: 'unbelievable how little information there is'

Several participants noted the significant lack of awareness and invisibility of the formal HMB, particularly among HCPs. Several participants highlighted that their General Practitioners (GPs) were unaware of the HMB, with one acknowledging: *'it's just unbelievable how little information there is..like the official milk sharing'* (Marie). Another commented that their GP: *'had never heard of the milk bank, and she was certainly like kind of rolling her eyes and saying, I don't know what that is, I want to have nothing to do with it'* (Siobhan).

5.6.2.2 Systemic Barriers: 'quite the effort'

Donors cited various barriers such as medication ineligibility, their milk already being frozen, or missing infant age eligibility windows required by the HMB. Some perceived the commitment to formal donation as a critical barrier: *'it was far too restrictive and demanding to be something I'd even consider'* (Aoife). Others noted the minimum volume requirement as inhibiting: *'they want X amount by a certain date, and I think that's a lot of pressure..'* (Emma). Further logistical factors were described by participants such as unsustainable efforts involving *'months of recording freezer temperatures'* (Siobhan), additional storage requirements where *'..milk needs to be stored separately'* (Fiadh) and strict protocols '*it is strict [HMB]…. You're not even allowed to use the sterilizer'*

(Sinéad). Conversely, IHMS had no *'hoops to jump through. There was no trying to schedule blood drawings on a Friday afternoon'* (Siobhan).

5.6.2.3 Lack of Connection and Perceived Quality: 'faceless'

Donors noted a significant omission in feedback regarding the use of their DHM. Despite the importance donors placed on knowing how their DHM was used, this was not provided by the HMB: *'It would have been nice to know… ohhh, that was used for I don't know 27 babies'* (Siobhan). Another highlighted that this information was once provided but now omitted due to data protection regulations: *'We used to get a wee note….your milk has gone to help 3 babies in the NICU….nowadays they don't even tell you that information'* (Sinéad). Several donors contrasted the perceived '*faceless'* HMB with the personal connection of IHMS: *'It was a wee bit faceless, whereas, like I do prefer this one'* (Patricia). This was mirrored by others noting: *'You know that a real human being has picked it up and used it'* (Siobhan). Some described a perceived superiority of IHMS, denoting an understanding that pasteurisation diminishes quality: *'When the milk goes up North [to the HMB], it's obviously pasteurized.. I know that it's not going to be as good'* (Aoibheann).

5.6.3 Theme Three: The Healthcare Professional Paradox

This theme refers to the perceived paradoxical role of HCPs who were described as significant barriers to breastfeeding and yet, in a rarity of cases, as vital facilitators of IHMS. Collectively, participant narratives described a CMF culture within maternity settings. Consequently, there was an intentional concealment of IHMS among participants in healthcare settings.

5.6.3.1 CMF Culture and Predominance: 'Pushed left, right, and centre'

A prominent finding was the perception of a pervasive CMF culture within the maternity settings where HCPs were perceived as being: *'so quick to offer formula… it just seems to be the solution for a lot of healthcare professionals'* (Aoibheann). CMF was the prominent narrative that participants highlighted was *'pushed left, right, and centre'* (Siobhan) and that *'it was all about formula from the start'* (Shauna). This was perceived by participants as a default option rather than the provision of specialist breastfeeding support in a multitude of situations including maternal exhaustion which was articulated

by one participant as a justification for HCP suggesting CMF in her experience: *'I really think you should give a bottle of formula because you're exhausted'* (Aoibheann). One recipient described a *'poor experience'* where she felt she was being *'really talked down to'* by staff who she described insisted, *'your baby is starving…. And you're still refusing formula'* leaving her in *'floods of tears'* (Shauna). Another shared this sentiment when their baby was in NICU and she described an experience of a HCP saying: *'he's starving, just give a bottle'* (Aoibheann).

5.6.3.2 Purposeful Concealment and Divergent Specialist Support: 'I'm not hearing that'

A common practice among this cohort was the intentional concealment or non-disclosure of IHMS with HCPs. One recipient claimed she had pumped the milk she received through IHMS *'because I don't think that they would approve of it'* (Grainne). Another *'completely lied'* about the source of her milk, reflecting that if she were honest, staff would be like *'Oh, don't… throw it in the incinerator'* (Deirdre). Another noted that despite having a *'supportive'* GP, she would not disclose IHMS as it would be *'opening a can of worms'* (Siobhan). When participants did choose to disclose, some were met with conflicting responses. One participant portrayed differing encounters within the same healthcare setting with different HCPs where the midwifery staff were *'very supportive'* yet, the medical team *'read us the riot act..'* (Caoimhe). Another recalled mentioning IHMS in the NICU only to be met with a refusal of engagement: *'they said… I'm not hearing that. I don't know about that'* (Cara). A paradoxical experience transpired for some participants where a minority of HCPs facilitated IHMS, namely LC's or midwives. One LC actively encouraged a recipient to use a friend's previously expressed colostrum, saying: *'Oh my god, get it!'* (Shauna). Another LC actively orchestrated the entry of informal milk into the maternity site: *'and so I did, I brought it in to the hospital'* (Aoibheann). This was also evidenced when a homebirth midwife acted as an intermediary for an exchange between her two clients. This direct request to the donor client by the midwife was met with an immediate *'Yeah, absolutely'* (Siobhan).

5.6.4 Theme Four: Navigating Risk and Safety Assurance by the 'Wee Subculture'

This theme relates to the architecture of navigating risk and safety in the context of IHMS in Ireland where risk was reportedly circumvented and safety was perceived as assured by the 'wee subculture' of mothers with shared beliefs and values.

5.5.4.1 Categorical Trust Within The Village: 'a huge trust network'

This subtheme exemplifies how safety is purposively anchored by an inherent trust among members of this *'support network'* (Sinéad) or *'little village in the background'* (Fiadh) which forms a *'little, tiny, niche part of their life'* (Caoimhe). The village is multidimensional in nature comprising many social layers where participants engage in IHMS with friends, acquaintances, family members, personal networks and connections made in online platforms. Collectively, this group is a *'wee subculture....a wee clique'* (Patricia) and belonging to this establishes *'a huge trust network'* (Sinéad). These social layers enable participants to attain a sense of safety through transparency, connection, and a shared moral code whereby *'everybody is very careful….the community is quite strong'* (Cara). At the crux of this symbolic village, trust also emanates from the collective understanding of the formidable value of HM. Participants portrayed HM as *'miraculous'* (Aoife), *'primal'* (Marie), and *'the most important thing'* (Cara) which is incomparable to *'anything else'* (Grainne). For many participants, an inherent safety assurance is that the donor is breastfeeding their own child*: 'I can feed my own kids…. How much harm can it do to feed someone else with that milk?'* (Siobhan). Trust is actively constructed through narrative exchanges, dialogue between online connections and face-to-face exchanges which establishes a *'good rapport'* (Rebecca), signifying that this dialogue and trust is a form of *'vetting'* (Sinéad, Deirdre).

5.6.4.2 Donor Assurance: 'I'll give you the answers'

This subtheme relates to how donors take a proactive role in facilitating transparency by providing contextual information about themselves and their milk. A prominent finding was that donors were aware of the sensitive nature of having to request milk and the *potential 'emotional state'* (Aoife) of the recipient. Donors understood that recipients might feel a *'sense of like beggars can't be choosers'* (Aoife) or fear that asking questions might imply a lack of gratitude: *'if I ask them questions.. they'll think I don't want their*

milk' (Sinéad). Donors circumvented this barrier by proactively *'giving the answers in case you're too embarrassed to ask me yourself'* (Sinéad). By providing information *'off the bat'* (Rebecca), they removed the burden of vetting from the recipient to alleviate *'anxiety'* (Rebecca). Information regarding diet, alcohol and medication was shared to *'leave the ball in their court'* (Caoimhe) so that the recipient could *'make a choice'* (Caoimhe) whether to *'accept or not'* (Sinéad).

5.6.5 Theme Five: Emotional and Psychological Impact of IHMS

This theme explains the perceived psychological and emotional impact of IHMS on donors and recipients. The exchange is acknowledged as *'symbiotic'* (Patricia) where both donors and recipients acquire positive emotional outcomes as a result of IHMS.

5.6.5.1 Recipient Release: IHMS As a 'light switch' for Acute Distress and Anxiety

Recipients described how the prelude to needing milk was often fraught with acute distress emanating from circumstances including the physiological sequelae of postpartum haemorrhage: *'I had a postpartum haemorrhage after the delivery….. I had like a really low blood pressure….a temperature of 39.2..'* (Shauna) or delayed lactogenesis following a caesarean section where it: *'takes extra time for the milk to come in'* (Caoimhe). These eventualities caused significant negative emotions, leaving participants *'absolutely, emotionally wrecked'* (Sinéad), *'overwhelmed'* (Deirdre) and *'so stressed and worried'* (Grainne). Subsequently, the provision of milk via IHMS created a pivotal transition in the psychological state of many recipients. Metaphorically, participants articulated the receipt of DHM as a *'light switch'* (Sinéad) which instantaneously resolved acute distress. One recipient observed the physiological influence of this relief, stating that once she had the *'buffer'* of DHM, her own supply *'just kept flowing, kept flowing, kept flowing'* (Sinéad). Another highlighted it provided: 'a huge sense of relief.. of calmness' (Grainne) Ultimately, recipients described this as an *'amazing'* bridge that *'got us over the hump'* (Shauna) and resulted in positive emotional sentiments including feeling *'proud'* (Shauna, Deirdre, Sinéad) and *'grateful'* (Grainne, Caoimhe).

5.6.5.2 Donor Reward: IHMS as a Source of Pride and Fulfilment:

Donors articulated powerful reflections regarding an intense feeling of pride where some were *'proud that I was able to make that milk and give it to them'* (Caoimhe), attributing

this affect to the *'hard work'* afforded to pumping (Emma). One donor likened IHMS to blood donation, elucidating the intrinsic pride derived from the body's ability to produce a life-giving substance: *'you're giving something that your own body has produced…. There's a certain pride'* (Siobhan). Donors conveyed that IHMS was such an *'emotional thing'* (Cara, Fiadh) that resulted in *'innate appreciation'* (Grace) and immense *'gratitude'* (Fiadh, Cara, Aoife). Symbolically, participants depicted the emotional aftermath *as 'a nice, warm, fuzzy feeling'* (Sinéad) that *'makes you feel so good'* (Patricia).

5.7 Discussion

This empirical study has elucidated the lived experiences, practices and perceived psychological and emotional impacts of IHMS in Ireland from both donor and recipient perspectives. Fundamentally, the belief in the inherent and superior value of HM engenders a deeply upheld desire to engage in IHMS. The altruistic desire of donors was underpinned by a deeply positioned, empathic and sensitive understanding of recipients' needs. The realities of an oversupply and excess milk accumulation, as well as an innate resistance to wasting HM prompted donors to engage with IHMS. These underpinnings align with conceptualisations of HM donation as a transcendence of intensive mothering and care work which are profoundly intertwined in maternal identity (Oreg, 2023). Explored extensively by Hays (1996), intensive mothering pertains broadly to ideology that motherhood is both instinctive and innate where mothers should selflessly afford substantive commitment and dedication to the upbringing of their child(ren). Recently, the commitment to this ideology is evident within breastfeeding discourses (Verniers, Bonnot, and Assilamehou-Kunz, 2022, Oreg, 2023). The notions of 'care work' epitomise the unpaid, often invisible and labour-intensive activities associated with motherhood including breastfeeding, expressing milk and donation (Carroll, 2015, Oreg and Appe, 2022). Consequently, it has been suggested that HM donation enables donors to extend their nurturing and mothering beyond their family. Similarly, our study revealed that recipients were motivated to seek milk via IHMS due to the deeply held desire to avoid CMF and provide HM which resonates with contemporary ideals of motherhood. Coupled with this, there were often complex clinical factors which necessitated urgent supplemental feeding. These motivations are now well-established and substantiated

drivers of IHMS within both the Irish and international literature (Vickers, Matthews, Paul, 2024;2025, Peregoy, 2021, Li et al., 2024, Mampane and Wolvaardt, 2024, Li et al., 2025).

Our findings depict an interesting discourse of the formal HMB system within Ireland which delineates pervasive barriers, professional invisibility and a 'faceless' experience when compared to IHMS. Indeed, multifaceted practical, logistical and regulatory barriers detracted from engagement with formal systems. In a recent survey of IHMS participants in Ireland, 87.6% considered donating to the HMB however only 30.1% progressed through the screening to attain an approved donor status (Vickers, Matthews, Paul, 2025). This current study augments this actuality and posits that prominent contextual barriers inhibit the engagement with HMBs. These barriers are comparable with findings from other empirical work which explored the barriers to HMB donation in the UK and US (Dos Santos et al., 2024). Analogous to this, is the affirmation that these pervasive barriers to HMB donation function as enablers to the engagement with IHMS which was asserted in a recent MMSR (Vickers, Matthews, Paul, 2024). A key finding in this study was a reported lack of awareness of the HMB among HCPs by participants which is consistent with previous work in other jurisdictions (Dos Santos et al., 2024, Mathias et al., 2023). This highlights the imperative to increase awareness of HMB among HCPs as it has been ascertained that HCPs play a fundamental role in shaping insights and an imperative role in promoting formal pathways (Adu-Kofi et al., 2025, Monti et al., 2024, Mahdikhani et al., 2025).

This study noted that some donors were propelled to engage in IHMS rather than a HMB due to the perception that mandatory pasteurisation in HMBs diminishes distinct and valuable properties of HM, a finding that has been previously elucidated by others (Perrin et al., 2016, Mathias et al., 2023). In this study, HMBs were depicted as 'faceless' and there was a preference for IHMS due to personal connection with recipients. This aligns with findings from a recent review which established this as a psychological barrier to donation to HMB (Monti et al., 2024). Importantly, perceptions of the HMB were consistent across geographical locations and did not differ between those residing in Northern Ireland or the Republic of Ireland.

Findings from our study describe a perceived CMF culture within maternity settings. This phenomenon has been previously documented within the study's geographical context where mothers described the emphasis on CMF in the maternity ward as pressuring and traumatic (Lawlor et al., 2023). In our study, participants consistently articulated that recommendations for CMF transcended medical necessity which is in direct contravention to national and global standards that assert that breastfed infants should not be provided with any food or fluids other than breastmilk, unless medically indicated (WHO, 2018, HSE, 2022). This is a salient finding due to the substantive evidence affirming that the introduction of CMF is a categorical risk factor for reduced breastfeeding duration and exclusivity (Pérez-Escamilla et al., 2022). Notably, another recent study evaluated local guidelines pertaining to medical indications for supplementation in breastfed infants in the nineteen maternity units and two tertiary neonatal units in Ireland and their findings confirmed that 43% of settings did not have guidelines in place and those that did were not in accordance with international recommendations (Almaiman et al., 2025). There was a notable preponderance of covert concealment and non-disclosure of IHMS to HCPs described by participants. This is corroborated by further evidence noting the absence of acceptance of, support for, or input from HCPs pertaining to IHMS (Vickers, Matthews, Paul 2024, Perrin et al., 2016, Onat and Karakoc et al., 2019, Vickers, Matthews and Paul, 2025).However, these findings are fundamentally divergent from recent scholarly work undertaken in New Zealand which found that IHMS is highly supported by HCPs (Harris, Bloomfield, Muelbert, 2024). It is argued that this variance may be attributed to the formalised recognition of DHM and IHMS by the New Zealand College of Midwives in their consensus statement on DHM and milk sharing which articulates that HM from a donor mother is a suitable substitute in the absence of MOM and provide guidance and practice recommendations to support women, HCPs and maternity services in informed decision making pertaining to ethical and safe milk sharing practices (New Zealand College of Midwives, 2019). This cross-cultural divergence suggests that the non-engagement or support for IHMS by HCPs is not a conclusive feature of IHMS globally and that geographical disparities exist as a consequence of local, cultural and health system factors. Indeed, with a lack of national policy or guidance pertaining to IHMS in Ireland, it is argued that the non-engagement by HCPs in IHMS is an expected eventuality

given the medico-legal constraints faced by HCPs in the absence of guidance. There are risks involved in IHMS, by virtue of the exchange of HM which is a complex bodily fluid. The significant risks asserted include the transmission of disease, contamination with unsafe substances, and bacterial contamination during expressing and handling (Blackshaw et al., 2021). A salient paradox to this widespread non engagement is the occasional HCPs, namely specialist LCs or midwives who functioned as facilitators of IHMS concurs with previous work (O' Sullivan et al., 2016, Perrin et al., 2016, Vickers, Matthews, Paul, 2024).

Trust and safety within this geographical context are inextricably embedded within a trust-based system, a 'wee subculture' which acts as the perceived safety net. Inherent to this, is the reality that donors in Ireland assume this role by proactively giving the information to recipients, an act which is deeply rooted in empathetic sensitivity and a finding consistent with recent scholarly work in Hong Kong (Li et al., 2025). This finding concurs with recent scholarly work in Hong Kong where it was ascertained that donors proactively provide information to recipients voluntarily (Li et al., 2025). Open dialogue and in-person exchanges are regarded as a substitute for the clinical screening processes associated with the formal HMB systems (McCloskey and Karandikar, 2018, Onat and Karakoc, 2019). These lay screening practices are in contrast to those in formal HMB systems. Consequently, IHMS has been conceptualised as a profound display of resistance to the medical discourses of HM that views expressed HM as a dangerous biosubstance and a potential biohazard that should not be shared (Palmquist, 2019). Contrastingly, for IHMS participants, HM was viewed as 'miraculous' with intrinsic value ascribed to this 'valuable substance', and so, the practice unequivocally transcends the simple exchange of HM to a deeply emotive and symbiotic experience for donors and recipients with significant trust. This resonates with Shaw (2019), who asserted that IHMS participants assign a substantive value to HM and the act of donation constructs networks of bio-intimacy evidenced in the establishment of relational and caring bonds through the sharing of this biological material. Importantly, the shared values, beliefs and experiences of IHMS participants facilitates a 'huge trust network' and collective solidarity in this 'wee subculture' . Indeed, it has been clearly articulated that milk exchange is symbolic of solidarity involving mutual recognition and a collective commitment to addressing

common concerns and enhancing health (Monti et al., 2024, Oreg, 2025).This can be conceptualised by drawing on Oreg's (2025) exploration of solidarity among donors and communities in HM banking who affirmed that shared experiences and shared identities rooted in motherhood fosters coalescence, unity and collaboration among its actors and thus the shared commitment to infant wellbeing is the underpinning for solidarity. By applying Oreg's (2025) lens to this study, it is evident that the collective solidarity within the IHMS participants is akin to those evidenced in formal systems. Indeed, the shared experiences, shared identities of motherhood, and the collective action of the key actors through the 'care work' of donating and similarly in the pursual of HM by recipients with the collective endeavour of enhancing the wellbeing of infants provides the foundation of solidarity in this context.

The emotional and psychological impact of IHMS on mothers is an evolving theme within the contemporary landscape of IHMS discourses and scholarship which has highlighted that psychological benefits can be attributed to the engagement with IHMS (McCloskey et al., 2019, Wagg et al., 2022). Hence, this study provides valuable insights into the profound impact of IHMS on the emotional and psychological wellbeing of IHMS participants in Ireland. Our findings portray the unambiguous influence IHMS had on recipients who journeyed a trajectory of acute distress and anxiety in the prelude to IHMS to a categorical release of these deleterious emotions and resolution of their distress. Fundamentally, the receipt of milk via IHMS was conceptualised as a 'light switch' release denoting the immediate resolution of distress. The instantaneous transition was palpable among all recipient participants and some noted that the receipt of milk enabled their own milk to flow. Indeed, this aligns with empirical evidence which affirms that heightened psychological distress can interrupt milk flow and subsequently impact milk supply (Skukri, Wells and Fewtrell, 2017, Nagel et al, 2022). Likewise, donors revealed resounding positive psychological impacts which were ascribed to IHMS such as pride, fulfilment, appreciation and gratitude. Collectively, IHMS was characterised as symbiotic which represents a mutual psychological gain for both donors and recipients.

5.8 Conclusion

This study represents the first qualitative exploration of IHMS donors and recipients in Ireland. Contextually, this research advances the scholarly understanding of the experiences and practices of IHMS within this national context and while broadening the global discourses of IHMS. Our findings purposefully illuminate the imperatives for IHMS in Ireland. IHMS is fundamentally enabled by a HMB system which is perceived as invisible and replete with obstacles to its engagement. Paradoxically, the perceptions of IHMS participants illuminate the intentional concealment of IHMS, and perceived CMF culture within maternity settings. Analogous to this disconnect, is the architecture of a 'wee subculture' where risk and safety are framed as actively assured through a trust-based system of connection and collective solidarity. Importantly, this study has revealed the significant psychological and emotional impacts for recipients where IHMS was associated with an immediate reduction in recipient distress and anxiety and a sense of pride and fulfilment for donors. Policy efforts should prioritise the pervasive barriers to the universality and accessibility of HMB for both donors and recipients. Simultaneously, the establishment of clinical frameworks for milk sharing must focus on mitigating risk and ensuring the practice is as safe as possible. Future research directions should explore HCP awareness, understanding and knowledge of HMBs and IHMS within Ireland and other underexplored geographical contexts.

5.9 Strengths, Limitations, Implications

This study possesses several notable strengths which makes a significant and novel contribution to the field of IHMS. Foremost, it represents the first qualitative exploration of IHMS conducted in Ireland offering a nuanced understanding of the practices and experiences of donors and recipients in Ireland. Methodologically, the incorporation of PPI and a pilot phase was a notable strength. The application of reflexive thematic analysis was a further strength which enabled a nuanced exploration and interpretation of participant lived experiences and subjective realities with interpretive depth. This study also has some limitations that necessitate consideration. Foremost, the sample were recruited online via platforms dedicated to IHMS. As a consequence, those who engage with IHMS outside of the channels were likely excluded. The participants in this study

articulated a profound and collective commitment to breastfeeding and had a shared belief in the value of HM. While their narratives provide deep insights in IHMS, their perceptions of CMF cultures may not be representative of the experiences ascribed to the maternity settings in the broader population of maternity care users. Additionally, the sample comprised a homogenous sample of predominately White Irish, highly-educated females. This homogeneity may have fostered the strong sense of trust and solidarity observed as a result of having shared cultural, ethnic and social identities which can enhance social cohesion and in-group trust (Holtug, 2025). Additionally, the high levels of trust may have shaped the findings relating to the positive psychological outcomes observed as high trust has been associated with enhanced psychological outcomes (Schneider et al., 2011). Furthermore, the specific geographical context of Ireland may limit the transferability of the findings to international contexts. However, this research from within the island of Ireland makes an important contribution to the wider evidence base on this emerging practice of infant feeding.

5.10 Summary

This chapter has presented Phase 3 of the research and the second strand of the sequential explanatory mixed methods study which facilitated the attainment of Objective 3 of this research which sought to explore and gain an in-depth understanding of the lived experiences and practices of IHMS among donors and recipients in Ireland. This objective was achieved through the collection and analysis of qualitative data derived from semi-structured interviews with donors and recipients (n=15) who had participated in the preceding phase of the sequential explanatory mixed methods study, namely the cross-sectional survey presented in Chapter Four. The findings from the reflexive thematic analysis identified five overarching themes associated with the lived experiences and practices of IHMS among donors and recipients. These overarching themes were divided into eleven subthemes and an overview of these are detailed in Table 5.3 and visually displayed in Figure 5.1. As previously described in Chapter Two, the purposeful integration of findings from disparate sources is both requisite and a defining characteristic of MMR. Indeed, the overall aim of this research necessitated the integration of findings in order to achieve the aim of the research and the final objective of this study.

To this end, the following chapter (Chapter 6) will present the integration of findings from the MMSR, quantitative and qualitative strands of the sequential explanatory mixed methods study to accomplish the final objective of the study which endeavoured to synthesize and integrate the findings of the MMSR, quantitative and qualitative phases to provide a deep, multidimensional and comprehensive understanding of IHMS.

Chapter Six: Integration of Findings; MMSR, Quantitative and Qualitative Data Sources Utilising the ePIP Framework

6.1 Introduction

This chapter presents the final phase of this research which comprises the synthesis and integrated analysis of the three data sources through the implementation of the extended Pillar Integration Process (ePIP). The rationale for the utilisation of the ePIP was previously discussed in Chapter Two. To reiterate, the ePIP was selected due to its capability to integrate more than two data strands which was necessitated in this study. The utilisation of this novel methodological integration framework enabled the purposeful, transparent and comprehensive integration of the MMSR, as well as the primary quantitative and qualitative data findings of this sequential explanatory mixed methods study. This phase was conducted in order to achieve Objective 4 of this study which sought to obtain an in-depth and inclusive understanding of IHMS in Ireland through the intentional integration of the findings from the three preceding phases of the study by the application of the ePIP.

6.2 Process of Integration of the MMSR, Quantitative and Qualitative Data Sources Utilising the ePIP Framework

As previously discussed in Chapter Two, the ePIP framework comprises a five stage process which involves completing the following stages: listing, matching, checking, development of overarching meta-themes and writing up (Gauly, Ulahannan and Grove, 2024). The ePIP is presented as a seven column visual display and is visually depicted in the context of this current research in Figure 6.1. The initial step in the ePIP process was the systematic organisation of the data from the MMSR. As previously documented, the MMSR included twenty-four studies and resulted in twenty three categories and ten integrated findings. Each finding and data substantiating the findings were documented on the first and second column on the left of the joint display. Initial meta-themes were

then documented in the pillar building column which is located on the first column on the right side of the joint display. The pillar building column exemplifies meta-themes which are analogous to meta-inferences (Guetterman, Molina-Azorin, Fetters, 2020). A defining characteristic of the ePIP framework is the iterative development of these aforementioned meta-themes. This represents a crucial methodological divergence from the original PIP where the meta-themes were developed at the final stage of the analytical process (Johnson, Grove and Clarke, 2019, Gauly, Ulahannan and Grove, 2024). Subsequently, the matching stage facilitated a multi-layered convergence where the findings from the quantitative survey were entered into the third and fourth column from the left. Any comparable findings to the MMSR were entered into the same row and for unrelated findings a new row was created. This process was repeated for the third data source, namely the qualitative semi-structured interview data and any findings that were iteratively aligned with the preceding data were entered into the same row and any new findings a new row was then created.

Throughout the listing of each data source, preliminary meta-themes were reviewed, further expanded and new preliminary meta-themes were added to the pillar building column when required. This dynamic process enabled a purposeful and continuous reflection on the associations between the findings of the three data sources (Gauly, Ulahannan and Grove, 2024). The checking stage comprised a detailed review of the completed data integration process which included a comprehensive review of the data source columns, pillar building column to ensure the integrated findings were representative, complete and accurate. This peer debriefing process was conducted with the author's supervisors and is an explicit component of the checking stage (Gauly, Ulahannan and Grove, 2024). The final stages involved the systematic reviewing of meta-themes which were then grouped into overarching meta-themes where clear relationships were identified.

The ePIP integration is displayed in the joint display format and presented as Table 6.1. Due to the expansive number of individual meta-themes within three of the overarching meta-themes, these were then purposefully clustered into thematic groupings denoted in bold in Table 6.1 to facilitate a coherent analytical discussion. The overarching meta-

themes, individual meta-themes, their constituent thematic groupings and the data sources from which the meta-themes are derived from are included in Table 6.2.

Data Source 1 MMSR Descriptive Findings	Data Source 1 MMSR Data Substantiating the Findings	Data Source 2 Quantitative Survey Descriptive Findings	Data Source 2 Quantitative Survey Data Substantiating the Findings	Data Source 3 Qualitative Interviews Descriptive Findings	Data Source 3 Qualitative Interviews Data Substantiating the Findings	Pillar Building Iteratively Developed Meta-Themes

Figure 6.1 Diagrammatic Visualisation of the Extended Pillar Integration Process (ePIP) Applied to This Research Study

Table 6.1 Joint display table for extended Pillar Integration Process (ePIP) encompassing Mixed Methods Systematic Review, Quantitative Survey and Qualitative Interviews

MMSR Descriptive Findings	MMSR Data Substantiating the Findings	Quantitative Survey Descriptive Findings	Quantitative Survey Data Substantiating the Findings	Qualitative Interviews Descriptive Findings	Qualitative Interviews Data Substantiating the Findings	Pillar Building Iteratively Developed Meta-Themes, thematic groupings and Overarching Meta-Themes
Altruistic motivation and value	Desire to help	Most common donor motivator was desire to help.	68.4% (n=54) of donors reported they wanted to help someone who needed milk	A central motivation for donors to engage was articulated as a form of altruism. Personal gratitude from their own successful journey transcended into an enabling imperative to help others.	'*wanting to help other mammies, parents, caregivers.. just wanting to help'* (Sinéad) *'I was just so happy that it worked for me, and then so much that I was able to help other people with it'* (Rebecca)	*IHMS donation is an altruistic imperative* *Donors have a underpinning desire to help* **The altruistic imperative and HM surplus** **THE BIOPSYCHOSOCIAL CONSTRUCTS OF IHMS**
Altruistic motivation and value	Excess/ surplus milk	Key donor motivators were to not waste milk, having a excess milk supply	44.3% (n=35) did not want their milk to go to waste, 46.8% (n=37) were motivated because they had an oversupply of breastmilk.	Many donors had an oversupply of milk.	*'When you have an oversupply like that, like you just have to..you have to share it'* (Patricia)	*Donors have a milk oversupply.* *A desire not to waste.* *Donors have an imperative to share.* **The altruistic imperative and HM surplus** **THE BIOPSYCHOSOCIAL CONSTRUCTS OF IHMS**

Altruistic motivation and value	Intrinsic value and significance of breastmilk	A key motivator for donors was a belief in the importance of human milk	50.6% (n=40) were motivated due to their belief in the importance of human milk.	A desire to avoid wasting the milk due to its significant personal value was prominent. HM was described as superior	HM was denoted as a *'valuable substance'* (Grace), and it would be *'such a waste not to'* (Marie) [engage in IHMS] HM was articulated as *'the best thing'* (Shauna) for infants. HM was described as *'miraculous'* (Aoife), *'primal'* (Marie), and *'the most important thing'* which is incomparable to *'anything else'* (Grainne)	*HM is significant.* *The superiority of HM is a collective belief of donors and recipients.* **The collective value of HM** **THE BIOPSYCHOSOCIAL CONSTRUCTS OF IHMS**
	Wanted to know where the milk was going			Donors noted the divergence between the HMB and IHMS and knowing where their milk went.	*'you know that a real human being has picked it up and used it'* (Siobhan) *'It was a wee bit faceless, whereas, I do prefer this one'* (Patricia).	*Donors' preference for IHMS by personification of recipient.* **The collective value of HM** **THE BIOPSYCHOSOCIAL CONSTRUCTS OF IHMS.**

Resistance to commercialisation and overcoming inaccessibility	Perceived deficits of CMF	CMF is perceived as deficient	21.5% (n=17) of donors perceived CMF as deficient 66.7% (n=20) of recipients reported a positive aspect of IHMS was avoiding the use of CMF	Participants wanted to avoid CMF due to its perceived inferiority to HM.	*'the cold hard truth of it without hurting anybody's feelings is.. there is nothing as good as breastmilk.. formula is second best'* (Caoimhe)	*Perception of CMF being deficient.* **The collective value of HM** **THE BIOPSYCHOSOCIAL CONSTRUCTS OF IHMS.**
	Donor HMB inaccessibility HMB restrictions and objections	A majority of donors considered donating to HMB but less than half initiated the screening processes. Common reasons for non-engagement with HMB screening were perceived time/expense and milk expression prior to donation and due to minimal volume requirements required for HMB.	84.5% (n=67) of donors considered donating to a milk bank, 41.7% (n=33) initiated screening and 27.8% (n=22) were approved. 20% (n=16) of donors did not proceed with screening as a donor due to perceived time/expense and 16% (n=16) stated that their milk was expressed before screening. 13% (n=10) cited reasons not listed and 9% (n=7)	Donors cited various barriers to the HMB such significant commitment and restrictions. Medication ineligibility, missing specific eligibility windows for donating, or milk had already been frozen were further notable barriers.	'*it was far too restrictive and demanding to be something I'd even consider'* (Aoife *'they wanted X amount by a certain date, and I think that's a lot of pressure'* (Emma) *'months of recording freezer temperatures'* (Siobhan) and HM	*Restrictions of HMBs were enabling factor to engage in IHMS.* *Low rate of progressing from considering HMB screening to approved donor.* *Ineligibility due to pre-donation criteria.* *Donors faced operational and unsustainable constraints of HMB.* *HMBs were perceived as faceless.* **HMBs restrictions, barriers and beliefs**

			reported the minimal volume requirement as a reason for not pursuing.	HMB donation had unsustainable constraints	needs to be *'stored separately'* (Fiadh).	**SYSTEMIC BARRIERS AND INVISIBILITY**
		Various reasons for not screening as a HMB donor were noted in the survey.	13% (n=10) donors cited 'other reasons' for not screening as a HMB donor.			
				HMB was perceived as *'faceless'*	*It was a wee bit faceless, whereas, like I do prefer this one'* (Patricia) [IHMS] *'We used to get a wee note.. your milk has gone to help 3 babies in the NICU…nowadays they don't even tell you that information'* (Sinéad)	
	Commerce free approach	This was selected by one participant as one of the motivations for seeking donor milk.	n=1 (3.3%) of recipients selected this as one of their motivations for seeking milk via IHMS.			*Non-commercial exchange* **The altruistic imperative and HM surplus** **THE BIOPSYCHOSOCIAL CONSTRUCTS OF IHMS**

Synergistic enablers: uniting digital and personal connectedness	Social media/internet Facilitating personal connections	Donor connections with recipients were predominately facilitated by online groups. Established relationships with their recipients also existed. In-person exchange was common.	Donors established connections with recipients through online groups (70.8%, n=56). 18.9%, n=15 had already had an established relationship with donor. Recipients were often online acquaintances they met in person (46.8%, n=37), online acquaintances who they did not meet in person (30.3%, n=24), or friends (16.4%, n=13). In person exchange of milk was common for donors (89.8%, n=71). Recipients generally connected with donors online via groups (79.1%, n=19), but some already knew their donor (16.6%, n=5). Direct exchange of milk from their donor to the recipient was common (66.6%,	Participants describe the social layers of IHMS which include engagement with IHMS with friends, acquaintances, family members, personal networks and connections made online. Collectively this group is a support network, described as a little village and a *'wee subculture'* . Narrative exchanges online enable the establishment of a rapport.	Participants articulated that IHMS is *'a little village in the background'* (Fiadh) which forms a *'little, tiny, niche part of their life'* (Caoimhe). Together it is a *'wee subculture.. a wee clique'* (Patricia). Online connections and face-to-face exchanges of milk establishes a *'good rapport'* (Rebecca) between donors and recipients.	*Digital infrastructure for IHMS connections.* *Social layers of proximity* *The physicality and personalisation of IHMS exchange* *The 'village' metaphor* **The digital and social layers of the village** **INHERENT TRUST AND THE 'WEE SUBCULTURE'**

			n=20) or someone else collected it for the recipient (36.6%, n=11)			
Lack of awareness and acceptance of IHMS in healthcare settings	Healthcare related barriers	The majority of participants did not discuss milk sharing with a healthcare professional (HCP). It was noted that HCP did not ask about milk sharing. Respondents felt there was not a necessity to discuss with HCP. There was apprehension regarding HCP approval or a perceived lack of understanding of milk sharing among respondents. There was a discomfort noted by respondents in broaching the subject and a perception of deficits in HCP education and awareness of milk sharing.	60%, n=69 of respondents did not discuss IHMS with HCP. The reasons for not discussing were: HCP did not ask (53.3%, n=32), not feeling a necessity to discuss it (25%, n=15), apprehension regarding HCP disapproval (18.3%, n=11), perceived deficits in HCP education on IHMS (11.6%, n=7).	Many participants did not discuss IHMS with HCPs. Intentional concealment of IHMS from HCP was a common finding in the study. Some described that although having supportive HCP they would avoid disclosing IHMS. Some participants were met with disapproval or refusal of engagement when attempting to discuss IHMS.	Intentional concealment *occurred 'because I don't think that they would approve of it [HCP]'* (Grainne). One recipient articulated that she *'completely lied'* as if she was forthcoming HCP staff would disapprove and say *throw it in the incinerator [donated milk]'* (Deirdre). One participant described that disclosing IHMS would be *'opening a can of worms'* (Siobhan). *'it's just unbelievable how little information there is..like the official milk sharing'* (Marie) The medical team *'read us the riot act'* (Caoimhe) when they discovered the	*IHMS is not discussed with HCP* *Perceived lack of awareness of milk sharing among HCPs* *Perceived lack of HCP education and awareness on milk sharing* *A belief that discussing IHMS with HCP is not necessary* *Apprehension to discuss IHMS due to HCP disapproval* *Intentional concealment of IHMS* *HCP reluctance to engage in IHMS conversations* *Avoidance of discussion with HCPs due to anticipated professional friction as IHMS is a non-normative practice.*

					expressed milk was donated via IHMS. Another was met with a refusal to engage when attempting to discuss IHMS where the HCPs were described as saying *'I'm not hearing that.. I don't know about that'* (Cara).	**Professional disconnect and intentional concealment** **SYSTEMIC BARRIERS AND INVISIBILITY**
				A prominent theme was the perception of a prominent CMF culture in the maternity hospitals which contrasted to the participants beliefs and desires to breastfeed and provide HM.	Participants describe that HCP were *'so quick to offer CMF'* (Aoibheann), it was described as being *'pushed left, right and centre'* (Siobhan).	*CMF culture in maternity settings* **CMF culture and professional inconsistency** **SYSTEMIC RESTRICTIONS AND BARRIERS**
Maternal or infant factors	Physical or physiological challenges	A high sense of urgency was reported in needed the milk. A high proportion of recipients had childbirth complications, a self-reported traumatic birth, and a caesarean	50% (n=15) and 22.3% (n=10) of recipients reported the need for milk was extremely urgent or urgent, respectively. 62.5% (n=15) of recipients had complications during labour,	Maternal and infant factors which transpired as challenges that required urgent supplemental feeding were described by recipients.	*'he had, like the brick dust in his urine'* (Caoimhe) *'he was very ill'* (Sinéad) *'I was clinging onto the walls.. I was so dizzy.. I felt so rotten*	*Acute challenges both maternal and infant drive recipient engagement .* *Urgent need for supplementation is predominant.* **Clinical necessity and supplemental demand**

	Return to school or work	section birth. Maternal low milk supply, and infant related factors were reported by recipients.	50% (n=12) reported their birth to be traumatic, 45.8% (n=11) had a caesarean section. Half of recipients (n=12/ 50%) had a low milk supply. Infant factors included: tongue tie (46.6%, n=14), insufficient weight gain/significant weight loss (21%, n=5), CMF intolerances (17%, n=4), infant was hungry after breastfeeding (50%, n=12).		*after the bleed'* (Shauna)	**THE BIOPSYCHOSOCIAL CONSTRUCTS OF IHMS**

Superiority and advantageous impact of human milk	Value of breast milk	There was a shared belief in the value of HM and the importance of the provision of HM to infants as the biological norm of infant feeding. Donors were happy their milk did not go to waste. MS was important for recipients to help them achieve their feeding goals.	HM was perceived as important (50.6%, n=40). 56.9%, n=45 of donors were happy their milk did not go to waste. 40%, n=12 of recipients viewed HM as the biological norm of infant feeding. 93.3% n=28 of recipients reported that IHMS was important in helping them achieve their feeding goals.	HM was described by donors and recipients as superior	HM was articulated as *'the best thing'* (Shauna) for infants. HM was described as *'miraculous'* (Aoife), *'primal'* (Marie), and *'the most important thing'* which is incomparable to *'anything else'* (Grainne)	*A shared belief that HM is the best for infants* **The collective value of HM** **THE BIOPSYCHOSOCIAL CONSTRUCTS OF IHMS**

	Avoidance of CMF	Avoidance of CMF was a positive aspect of IHMS for recipients. CMF was viewed as deficient.	21.5% (n=17) of donors viewed CMF as deficient. 26.7%, n=8 of recipients had concerns about CMF.	CMF was described as being inferior to HM'	*'the cold hard truth of it without hurting anybody's feelings is.. there is nothing as good as breastmilk.. formula is second best'* (Caoimhe)	*Avoidance of CMF as it is inferior* **The collective value of HM** **THE BIOPSYCHOSOCIAL CONSTRUCTS OF IHMS**
	Maternal mental health/wellbeing	IHMS resulted in reported reduced stress and anxiety for recipients.	70% (n=21) reported that IHMS resulted in significant reduction in stress and anxiety. 77.2% (n=61) of donors felt good about IHMS, and 44.3% (n=35) said it was personally rewarding and they felt good as a result (24.1%, n=19) and had a sense of pride 24.1% (n=19)	Recipients described the pivotal transition from acute stress/anxiety to the resolution of these states following the receipt of HM via IHMS. Donors articulated powerful reflections regarding an intense feeling of pride and that IHMS was a practice which resulted in positive emotional outcomes.	The receipt of HM via IHMS was metaphorically depicted as a *'light switch'* (Sinéad) which instantaneously resolved acute stress/anxiety. This provided a *'huge sense of relief.. of calmness'* (Grainne) *'proud that I was able to make that milk and give it to them'* (Caoimhe) It was described as such *'an emotional thing'* (Cara, Fiadh) that resulted in *'innate*	*Instantaneous resolution of acute stress and anxiety for recipients.* *Powerful feelings of donor pride and fulfilment.* **SYMBIOTIC EMOTIONAL RECIPROCITY**

					appreciation' (Grace), *'immense gratitude'* (Aoife), and a *'nice, warm, fuzzy feeling'* (Sinéad), that makes you feel *'so good'* (Patricia)	
	Donor milk bank related	The majority of recipients did not heat treat/ pasteurise the milk. A common reason was that they wanted to preserve the milk.	26.7%, n=8 of recipients did not heat treat milk to preserve the 'good things' in the milk.	Some described a perceived superiority of IHMS due to the perception that pasteurisation diminishes quality. Recipients were aware of the non-universality of DM from the HMB.	*'When the milk goes up North [to the HMB], it's obviously pasteurized. I know that it's not going to be as good'* (Aoibheann). *'I know that they save the colostrum from like the milk bank for the real… proper, premature babies'* (Deirdre)	*HMB is not universally available* *HMB diminishes quality* **HMBs restrictions, barriers and beliefs** **SYSTEMIC BARRIERS AND INVISIBILITY**
Human milk bank influences	Social media/internet	Donor connections with recipients were predominately facilitated by online groups. Established relationships	Donors established connections with recipients through online groups (70.8%, n=56). 18.9%, n=15 had already had an	IHMS connections comprise many social layers, with engagement among friends, personal networks, and connections	Narrative exchanges among donors and recipients establishes a *'good rapport'* (Rebecca) and this dialogue and trust is a form	*Digital infrastructure for IHMS connections.* *Social layers of proximity.*

		with their recipients also existed. In-person exchange was common.	established relationship with donor. Recipients were often online acquaintances they met in person (46.8%, n=37), online acquaintances who they did not meet in person (30.3%, n=24), or friends (16.4%, n=13). In person exchange of milk was common for donors (89.8%, n=71). Recipients generally connected with donors online via groups (79.1%, n=19), but some already knew their donor (16.6%, n=5). Direct exchange of milk from their donor to the recipient	made in online platforms. Collectively, this group forms a robust trust network with a shared moral code. Trust is constructed through narrative exchanges between online connections and face-to-face exchanges.	of *'vetting'* (Sinéad, Deirdre).	*The physicality and personalisation of IHMS exchange.* **The digital and social layers of the village** **INHERENT TRUST AND THE WEE SUBCULTURE** *Narrative exchanges build trust* **The architecture of trust and transparency** **INHERENT TRUST AND THE WEE SUBCULTURE**

			was common (66.6%, n=20) or someone else collected it for the recipient (36.6%, n=11).			
Digital connections and transparency	Trust and transparency	Heat treatment/ pasteurisation was rare primarily due to trust in milk safety. Half of recipients did not ask donors questions as a means of informal screening. To minimise any concerns recipients conducted various other actions such as appropriate temperature during transportation, ensuring the donor was	3.3% (n=1) heat treated the DM. 53.3% (n=16) did not heat treat due to trust in milk safety. 53.3% (n=16) of recipients reported not to ask donors questions as a means of informal screening. 56.7% (n=17) of recipients ensured adequate temperature during transportation, 36.7% (n=11) ensured donor was breastfeeding	Safety is purposively anchored by an inherent trust among donors and recipients. Trust is actively constructed through dialogue and narrative exchanges and shared values of HM. Donors take a proactive role and articulate how they are forthcoming with information relating to themselves and their milk which removes the burden of vetting from recipients.	Participants describe a *'huge trust network'* (Sinéad) among donors and recipients and that *'everybody is very careful..the community is quite strong'* (Cara). Dialogue and narrative exchanges establish a *'good rapport'* (Rebecca) and this dialogue and trust is a form of *'vetting'* (Deirdre). Donors give information and *'by giving the answers in case you're too embarrassed to ask me yourself'* (Sinéad)	*Narrative exchanges build trust.* *Transparency and a valued trust network.* *Proactive donor transparency.* **The architecture of trust and transparency** **INHERENT TRUST AND THE WEE SUBCULTURE**

		breastfeeding their child and researching the donor online. At connection donors and recipients engaged in discussions relating to donor and milk characteristics.	their own child, 36.7% (n=11) researched the donor online, 20% (n=6) took no specific action. 66.7% (n=20) discussed donor prescription drug use, alcohol and tobacco (56.7%, n=17), recreational drug use (53.3%, n=16) and age of milk (43.3%, n=13).		They provide information *'off the bat'* (Rebecca) to alleviate the burden of vetting and the recipients' *'anxiety'* (Caoimhe).	
Digital connections and transparency	Distinct healthcare professionals	A minority of distinct HCP facilitated the connection between donors and recipients.	6.66% (n=2) of recipient connections with donors were facilitated by midwife, doula, or lactation consultant. 13.3% (n=4) of recipients reported to	A minority of HCPs facilitated IHMS, namely lactation consultants or midwives.	A LC advised a recipient to get her friends colostrum '*Oh my god, get it!*' (Shauna).	*Distinct professional endorsement and facilitation*. **CMF culture and professional inconsistency** **SYSTEMIC BARRIERS AND INVISIBILITY**

			minimise concerns about IHMS by discussing it with a HCP.			
Professional and logistical implications	Healthcare related barriers Perceived donor milk supply Time-related barriers	Discussion of IHMS with HCPs was infrequent.	69% (n=60) of respondents did not engage with discussions relating to IHMS with HCPs	Intentional concealment of IHMS and non-disclosure of IHMS with HCPs was described.	Some recipients claimed they had pumped the milk themselves *'because I don't think that they would approve of it'* (Grainne). One donor said disclosing it to HCP would be *'opening a can of worms'* (Siobhan).	*Intentional concealment of IHMS* Professional disconnect and intentional concealment **SYSTEMIC BARRIERS AND INVISIBILITY** **Logistical inhibitors to IHMS**

Table 6.2 Overview Table for Informal Human Milk Sharing ePIP Overarching Meta-Themes, Preliminary and Grouped Meta-Themes and Identification of Data Source

Overarching Meta-Theme Name	Preliminary and Grouped Meta-Themes	MMSR Mixed Methods Systematic Review	Quantitative Survey	Qualitative Interviews
The Biopsychosocial Constructs of IHMS	**The Altruistic imperative and HM surplus**			
	IHMS donation is an altruistic imperative.	Identified	Identified	Identified
	Donors have an underpinning desire to help.	Identified	Identified	Identified
	Donors have a milk oversupply/excess HM.	Identified	Identified	Identified
	Donors have a desire not to waste HM.	Identified	Identified	Identified
	Donors have an imperative to share.	Identified	Identified	Identified
	Non-commercial exchange.	Identified	Identified	Not identified
	The collective value of HM			
	HM is significant.	Identified	Identified	Identified
	The superiority of HM is a collective belief.	Identified	Identified	Identified
	The formidable value of HM is a collective belief.	Identified	Identified	Identified
	A shared belief that HM is best for infants.	Identified	Identified	Identified
	Avoidance of CMF is a priority as it perceived as inferior.	Identified	Identified	Identified
	Perception of CMF being deficient.	Identified	Identified	Identified
	The value of HM.	Identified	Identified	Identified
	Donors' preference for IHMS by personification of recipient.	Identified	Not identified	Identified
	Clinical necessity and supplemental demand			
	Acute challenges (maternal and infant) drive recipient engagement.	Identified	Identified	Identified
	Urgent need for supplementation is predominant.	Identified	Identified	Identified
	Return to school or work.	Identified	Not identified	Not identified
Systemic barriers and invisibility	**HMBs restrictions, barriers and beliefs**			
	Restrictions of HMB's were enabling factors to engage in IHMS.	Identified	Identified	Identified
	Low rate of progressing from considering HMB screening to approved donor.	Not identified	Identified	Identified
	Ineligibility due to pre-donation criteria.	Identified	Identified	Identified
	Donors faced operational and unsustainable constraints of HMB.	Identified	Identified	Identified
	HMB's were perceived as faceless.	Not identified	Not identified	Identified
	HMB is not universally available.	Identified	Not identified	Identified
	HMB diminishes quality.	Identified	Identified	Identified
	Professional disconnect and intentional concealment			
	IHMS is not discussed with HCPs.	Identified	Identified	Identified

	Perceived lack of awareness and education of milk sharing among HCPs.	Identified	Identified	Identified
	A belief that discussing IHMS with HCP was not necessary.	Not identified	Identified	Identified
	Apprehension to discuss IHMS due to HCP disapproval.	Identified	Identified	Identified
	Intentional concealment of IHMS.	Not identified	Not identified	Identified
	HCP reluctance to engage in IHMS conversations.	Not identified	Identified	Identified
	Avoidance of discussion with HCPs due to anticipated professional friction as IHMS is a non-normative practice.	Not identified	Not identified	Identified
	Logistical inhibitors to IHMS			
	Perceived donor milk supply.	Identified	Not identified	Not identified
	Time-related barriers.	Identified	Not identified	Not identified
	CMF culture and professional inconsistency			
	Distinct professional endorsement and facilitation.	Identified	Identified	Identified
	A perception of CMF culture in maternity settings.	Not identified	Not identified	Identified
Inherent Trust and the Wee Subculture	**The digital and social layers of the village**			
	Digital infrastructure for IHMS connections.	Identified	Identified	Identified
	Social layers of proximity.	Identified	Identified	Identified
	The physicality and personalisation of IHMS exchange.	Identified	Identified	Identified
	The 'village' metaphor.	Not identified	Not identified	Identified
	The architecture of trust and transparency			
	Narrative exchanges build trust.	Identified	Not identified	Identified
	Transparency and a valued trust network.	Identified	Not identified	Identified
	Proactive donor transparency.	Identified	Not identified	Identified
Symbiotic Emotional Reciprocity	Resolution of acute stress and anxiety for recipients.	Identified	Identified	Identified
	Powerful feelings of donor pride and fulfilment.	Not identified	Identified	Identified

6.3 Findings of the ePIP Integration of the MMSR, Quantitative and Qualitative Data Sources

The final integration of the three data sources comprises four overarching meta-themes, nine thematic groupings and forty-four individual meta-themes. The overarching meta-themes and thematic groupings are visually displayed in Figure 6.2. The integration of the MMSR, quantitative and qualitative data sources provided a deep, rich and nuanced understanding of IHMS in Ireland. While significant alignment across the three data sources was observed, the integration also revealed nuanced points of divergence and analytical expansion which enabled a comprehensive and inclusive exploration of IHMS in the geographical context of Ireland. These findings will be discussed comprehensively, structured by each overarching meta-theme and where relevant within their respective thematic groupings.

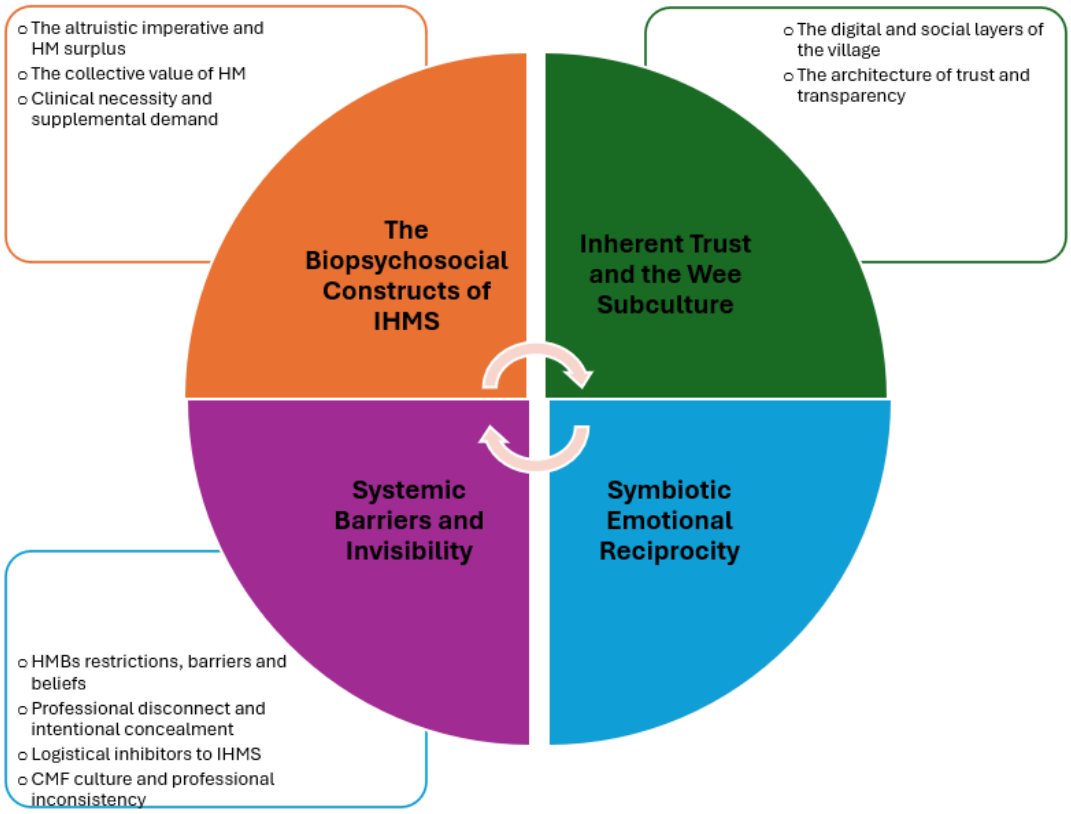


Figure 6.2 Visual Display of Overarching Meta-Themes and Thematic Groupings From the Application of The ePIP Integration Framework

6.3.1 Overarching Meta-Theme One: The Biopsychosocial Constructs of IHMS

The biopsychosocial constructs of IHMS overarching meta-theme encompasses the predominant motivations and personal values that underpin the engagement with IHMS in Ireland. This overarching meta-theme encapsulates the intersection of how altruistic drivers and the biological reality of surplus HM for donors coincide with acute physiological challenges for recipients necessitating an urgent need for supplementation. Inherent to this overarching meta-theme is the collective belief in the formidable and biological superiority of HM which was consistently articulated across the three data studies. Corresponding to this is the shared belief of the inferiority of CMF where it is explicitly noted that recipients prioritised its avoidance. This dualistic belief system in which the highly positioned value of the superiority of HM was held while simultaneously CMF was perceived as deficient was a predominant social perception corroborated by all data sources. The intersection of these denotes how biological, psychological and social constituents amalgamate and underpin the practice and the engagement with IHMS.

6.3.1.1 The Altruistic Imperative and HM Surplus

An overriding finding in this research was the altruistic imperative of donors across the extant literature in the MMSR which were also prominently noted in both the quantitative and qualitative findings. The desire to help was the primary motivator for donors in the MMSR which was noted in eleven of the included studies and within the quantitative survey with 68.5% (n=54) of donors citing that this was their most important reason for IHMS donation. Indeed, this was evidenced further within the qualitative narratives of donors who articulated this where they described *'wanting to help other mammies, parents, caregivers… just wanting to help'* (Sinéad). An interesting perception was the empathic reflection of donors on their own breastfeeding journeys which incited them to help mothers who needed milk: '*It just made me acutely aware of the fact that if there are mothers out there that need milk and can't access it through formal means, then I have the means to be able to give that, whether they've been in a psych ward, or whether they have been in a regular hospital ward for treatment or.. some other reason, you know?'* (Grace). This empathetic understanding of the potential challenges that recipients may face impelled a deeply held altruistic desire in the donors to support those in need. Indeed,

while the altruistic imperative was the primary driver which emanated from this psychological and emotive desire to help, the logistical ability for donors to engage was primarily dependent upon the biological reality of an oversupply of HM. This was notable within the MMSR as a key motivator for donors to engage in IHMS. This was corroborated within the survey where 70.8% (n=56) of donors reported to have an oversupply of HM. Many donors reflected on this important trigger in the qualitative interviews: *'when you have an oversupply like that, like you have to.. you have to share it'* (Patricia). Another compelling reason to engage in IHMS was the desire to avoid wasting their milk and this was evidenced in all three data sources as a key motivator to donate. It was cited as a key motivator in the MMSR as well as by almost half of the donors (44.3%, n=35) in the survey who reported that a primary reason for engagement with IHMS was to avoid wasting their milk. The interviews enabled this to be expanded further where donors described instances where: *'it [HM] was just sitting in my freezer, doing nothing….there was too much being produced for me to use it myself and I didn't want to dump it'* (Grace). An interesting divergence was noted in the MMSR where two of the studies included indicated that donors were compelled to donate via IHMS as they preferred a commerce-free approach which is, of course, is the foundational epitome of IHMS. Nevertheless, this was not reflected in the Irish context among donor participants. Moreover, the recipient motivation 'it was free' which emphasises the non-commercial exchange of HM was only selected by 3.33% (n=1) of the recipient cohort as a motivator for engaging with IHMS in the quantitative study which was the lowest ranking motivator identified. It is also important to note that within the qualitative component, there was an notable absence of any participant reporting that there was a financial exchange for DHM which reinforces the altruistic nature of IHMS practices.

6.3.1.2 The Collective Value of HM

A prevailing and dominant finding explicitly evidenced across the three data sources was the collective and inherent value of HM held by donors and recipients. Fundamentally, there was a resounding belief in the biological superiority and value of HM. In the MMSR, the beliefs about the exceptional value of HM held by donors was evidenced in six of the studies. This was a consistent perception which was noted in both the quantitative and

qualitative findings among donors and recipients. Indeed, more than half of donors (50.6%, n=40) were triggered to donate via IHMS as they believed that HM was important. Donor narratives expanded this by sharing their sentiments of their intrinsic beliefs of the value of HM: *'..miraculous like. It's the most amazing thing..'* (Aoife), *'it's fantastic… like it contains antibodies.. that is so invaluable'* (Emma) and *'the value of breast milk…you just can't quite put like a financial figure on that'* (Patricia). Recipients shared this view describing HM as *'the best thing'* (Shauna) and *'the best substance that's tailored for newborn babies'* (Deirdre). Interestingly, in the MMSR it was noted that the value of HM held by donors was evident in their motivation to seek information about the intended recipient and ascertain why the DHM was required as a form of a needs assessment which served as a stimulus for engagement with IHMS rather than HMBs. This was further evidenced within the qualitative findings whereby donors articulated their preference for IHMS stating: '*you know that a real human being has picked it up and used it'* (Siobhan) and '*It is nice to meet the person and know where it's going to*' (Emma). The personalisation of IHMS was interestingly contrasted to HMBs which were described by donors in the qualitative component *as 'a wee bit faceless'* (Patricia). Across the three data sources, it was noted that CMF was perceived as inferior to HM. In the MMSR, avoidance of CMF was a primary motivator for recipients to engage with IHMS. Correspondingly, this was mirrored in both the quantitative and qualitative findings among recipients. A majority of recipients (60%, n=16) cited the avoidance of CMF was a positive aspect of IHMS. Similarly, 21.5% (n=17) of recipients viewed CMF as deficient. Likewise, this was expanded further when the avoidance of CMF was a key motive for recipient interviewees to seek HM via informal means with a resounding belief that: *'there is nothing as good as breastmilk…. Formula is second best'* (Caoimhe). Likewise, this was echoed by donor cohorts within all three data sources. The MMSR identified that donors perceived CMF as inferior to HM and in Ireland 21.5% (n=17) donors viewed CMF as deficient. Collectively, this thematic grouping clarifies and portrays a collective belief and shared conviction that HM is unequalled and imperative source of nutrition for infants.

6.3.1.3 Clinical Necessity and Supplemental Demand

A key finding evidenced across the three data sources was the primary motivator for recipient engagement with IHMS, which predominately related to clinical necessity. In the MMSR, physical or physiological factors relating to the mother or infant were primary motivators for recipients to source DM. Similarly, in the quantitative survey the most common motivations cited were maternal or infant related, such as physiological challenges including insufficient maternal milk supply (46.7%, *n*=14) and infant related issues such as insufficient weight gain or significant weight loss (23.3%, *n*=18). These were further explicated in the qualitative narratives where recipients described maternal and infant physiological challenges that resulted in the necessity for supplemental feeds and thus their motivation for the engagement with IHMS, such as infant dehydration: *'he had, like the brick dust in his urine'* (Caoimhe) and infant admission to neonatal intensive care (NICU), '*he was very ill'* (Sinéad). Maternal-related factors included complex clinical scenarios such as postpartum haemorrhage: '*I was clinging onto the walls…I was so dizzy...I felt so rotten after the bleed'* (Shauna) and insufficient milk supply *'Because otherwise I had nothing at all like….'* (Deirdre). An interesting divergence was evidenced in the MMSR where a motivating factor for recipient engagement with IHMS was 'return to school or work'. This motivation for the engagement in IHMS was notable absent from both the quantitative and qualitative findings.

6.3.2 Overarching Meta-Theme Two: Systemic Barriers and Invisibility

This overarching meta-theme encapsulates the perceived pervasive inhibitors and beliefs surrounding HMBs which sometimes acted as enabling and propelling factors for donor engagement with IHMS. Moreover, it captures the substantive healthcare gaps, professional disconnect and apparent HCP inconsistency in the IHMS landscape in Ireland. A profound CMF culture was consistently depicted which instigated a significant and purposeful concealment of IHMS from HCPs.

6.3.2.1 HMBs Restrictions, Barriers and Beliefs

A prominent finding that was clearly demarcated in this research was the resounding consensus of the systematic barriers of HMBs which were prominent across all data sources. An interesting and ideological understanding which was primarily identified in

the MMSR was that HMB barriers were, in essence, enablers for engagement with IHMS with notable prohibitions and restrictions including donor ineligibility, logistical efforts and operational constraints noted. These were further elucidated in the quantitative and qualitative data sources. A significant finding in the quantitative survey was the high rate of consideration for HMB donation by the donor cohort where 84.5% (n=67) considered donation, yet only 27.8% (n=22) fully progressed through the process to be an approved donor. These indicators were further explained and expanded on in the qualitative interviews. Donors consistency articulated substantive inhibitors and barriers that categorically prevented engagement: *'I was on some medication for hypertension…they [HMB] didn't accept my application'* (Cara), and *'after a quick scan of the formal criteria, I knew immediately that I wasn't eligible'* (Grace), or deterred engagement: *'they want X amount by a certain date, and I think that's a lot of pressure..'* (Emma). Similarly, the logistical efforts required for HMB donation were also inhibiting factors that were articulated clearly in qualitative interviews: *'months of recording freezer temperatures'* (Siobhan) and *'I'd have to borrow someone else's freezer… which means… I need to say to them, you can't store any other food in there as this milk needs to be stored separately'* (Fiadh). A perceptible finding that was notably absent in the MMSR and not captured in the quantitative survey was the *'faceless'* (Patricia) perception of HMBs which was explained by donors in the qualitative interviews when the shared sentiments such as: '*we used to get a wee note and they used to say… your milk has gone on to help 3 babies in the NICU…nowadays they don't even tell you that information..*(Sinéad) Recipients also faced significant barriers to formal HMBs. As evidenced in both the MMSR and qualitative interviews, the nonuniversality of DHM from the HMB served as an impetus for recipients to engage in IHMS. This was affirmed in the MMSR and articulated by recipients in the interviews when they shared reflections such as: *'I know that they save the milk bank for the premature babies'* (Deirdre). Interestingly, the MMSR identified that financial obstacles were a notable barrier to engagement with HMBs for recipients, driven by the inability for them to sustain ongoing costs. This was not identified within the Irish context; however, this divergence is understandable given the HMB service in Ireland provides DHM exclusively to clinical settings and does not extend provision for access to DHM outside of this hospital-based channel. An interesting belief that was evidenced

across the three data sources was the perception that pasteurisation processes diminishes the quality of the HM. Some studies included in the MMSR noted that donors and recipients preferred IHMS as an alternative to DHM via the HMB as they believed it retained valuable properties that are diminished during the pasteurisation processes at the HMB. This was expanded in the qualitative interviews as one interviewee described: *'When the milk goes up North [to the HMB], it's obviously pasteurized.. I know that it's not going to be as good'* (Aoibheann). Correspondingly, in the quantitative survey the majority of recipients did not heat treat the DHM they received via IHMS (96.6%, n=29) with more than a quarter (26.7%, n=8) citing the reason for this was to preserve the 'good things' in the milk.

6.3.2.2 Professional Disconnect and Intentional Concealment

This thematic grouping relates to the professional disconnect characterised by a distinct absence of HCPs in IHMS discourses. The contextual data in Ireland delineates the nuances associated with the predominant reluctance and apprehension towards the disclosing of IHMS engagement and illuminates the strategic and intentional concealment of IHMS.

Across the three data sources, there was a resounding consensus among donors and recipients pertaining to the palpable avoidance of discussing IHMS with HCPs. In the MMSR, healthcare related barriers were prominent for both donor and recipient cohorts. The absence of HCP engagement or discussion was evident in some of the studies included in the review. Similarly, the quantitative survey noted that the majority of donors and recipients (69%, n=60) did not discuss IHMS with a HCP. Moreover, the most common reason for not discussing it was that HCPs never asked which was reported by more than half the respondents in the quantitative survey (53.3%, n=32). Qualitative findings offered a more granular insight into this disconnect where it was noted that when IHMS was introduced, HCPs often withdrew from conversations as one donor described: *'when we start talking about it..they say I'm not hearing that…. I don't know about that…. Like it's you can see the fear around it'* (Cara). This reinforces the palpable sense of reluctance of HCPs to initiate or engage in dialogue about IHMS. A notable commonality among the three data sources was also the apprehension felt by donors and recipients due to perceived

HCP disapproval. The MMSR elucidated that those who engage in IHMS are aware of the professional prohibitions faced by HCPs in the promotion and permitting of IHMS by organisations. Indeed, the survey noted that 18.3% (n=11) and 16.6% (n=10) did not discuss IHMS as they did not think HCPs would approve or they didn't feel comfortable discussing it with them, respectively. These understandings were evidently expanded on in the qualitative interviews to illuminate the absence of engagement as there was an anticipated professional friction: *'I wouldn't discuss milk sharing. I just feel you're opening up a can of worms..'* (Siobhan). Consequently, an emergent finding through the qualitative interviews was the strategic and intentional concealment of IHMS from HCPs and within healthcare settings as one recipient described: '*So yeah, I completely lied because I knew they wouldn't let me do that… and I'd do it again, and I would tell people to do it'* (Deirdre) and another similarly described telling HCPs that the frozen DHM she was providing to her infant in the maternity hospital which was received through IHMS was her own expressed milk and the HCPs responded: *'if that is somebody else's it could be cross-contaminated and I was like….no..no it's mine…it's mine'* (Sinéad). Ultimately, the intentional concealment was a strategic decision to avert any instances of disapproval or potential ramifications as one recipient noted: *'If I said I got this from a friend of a friend, they'd be like….. Oh, don't…throw it in the incinerator'* (Deirdre).

6.3.2.3 Logistical Inhibitors to IHMS

This thematic grouping pertains to the logistical challenges and barriers associated with IHMS, specifically regarding DHM supply and time-related barriers for recipients associated with the geographical distance of donors from them which were evident in the MMSR. Interestingly, these barriers were notably absent from the quantitative and qualitative findings in Ireland. The absence of these inhibitors within the data in Ireland suggest a potential divergence in the landscape of IHMS. Perhaps the smaller geographical scale of Ireland may have mitigated the travel-associated and logistical barriers which were evident within the international literature included in the MMSR. The perceived or actual reality of running short of DHM supply was also noted in the MMSR as a barrier to IHMS but evidently absent from the Irish findings. The qualitative interviews depicted that IHMS in Ireland is *'a wee subculture'* (Patricia) and metaphorically a *'little village in*

the background' (Fiadh). This denotes the closely tied social layers of the IHMS landscape in Ireland where, when someone is in need that *'people just step up to help'* (Fiadh). Consequently, the closely tied IHMS landscape may also alleviate anxieties regarding DHM supply as the perception of the supportive village provides reassurance that is perhaps absent in international IHMS networks.

6.3.2.4 CMF Culture and Professional Inconsistency

The final thematic grouping within this overarching meta-theme relates to a prominent paradox within the IHMS landscape. As previously aforementioned, the majority of HCPs were primarily disconnected from IHMS engagement and dialogue, however, parallel to this there was a minority of specific HCPs who assumed an enabling role in IHMS engagement. Alongside this paradoxical nuance, a pervasive culture of CMF permeated the narrative discourses of donors and recipients in the qualitative findings in Ireland. Across the three data sources, it was categorically affirmed that a minority of distinct HCPs act as catalysts for IHMS. In the MMSR, four of the studies elucidated that specific HCPs namely: breastfeeding specialists/lactation consultants, midwives, nurses and medical professionals were an enabling factor in the participation of IHMS. These findings were substantiated in both the quantitative and qualitative findings within the Irish IHMS landscape. The survey identified that 8.7% (n=7) and 16.6% (n=5) of donors and recipients initially came up with the idea of IHMS from a HCP, respectively. Moreover, it was also affirmed that 29.9% (n=9) of recipients cited that specific HCPs influenced their decision to receive HM via IHMS. The HCPs that were reported as enabling factors or influential figures in the engagement of IHMS in the Irish context were: lactation consultants, doulas, midwives, health visitors and Public Health Nurses. In the qualitative interviews, both donor and recipient insights to the engagement of HCPs in IHMS were described where lactation specialists and midwives acted as proponents and facilitators of IHMS engagement. One donor reflected on her experience whereby her home birth midwife invited her to share her own expressed milk with another client who was experiencing breastfeeding challenges. In essence, she acted as a key link in the proposal and connection of the IHMS exchange*: 'I actually was approached by my home birth midwife who knew that I was breastfeeding….and she had a client who had issues with feeding, and she had asked me.. Would you consider it [IHMS]? I mean, I obviously*

knew about it…. And I said, Yeah absolutely' (Siobhan). Another donor reflected on her experience of providing DHM to her friend in the maternity hospital where a lactation consultant was a key enabling factor : *'the lactation consultant said to my friend… this is unbelievable that you have a friend with colostrum sitting in the freezer… get that milk in straight away!!'* (Aoibheann). Similarly, a recipient had a comparable experience with a lactation consultant in the maternity setting: *'I was in the hospital I met the lactation consultant…. It must have been on the third day…. And I said, Oh, my friend offered me her breast milk and she was like… Oh, my God, get it!...and I was like, really? And she was like…Yeah, yeah, go get it!'* (Shauna). Nevertheless, HCP facilitation and support for IHMS was not consistent among the majority of the studies included in the MMSR, or in the findings from the survey or interviews within the Irish context. As previously described, the predominant stance of HCPs was one of absence from IHMS and the preponderance for intentional concealment from HCPs by donors and recipients. A notable finding unique to the qualitative interviews was the resounding perception of a pervasive CMF culture in the maternity hospitals which stood in stark contrast to the participants own values and beliefs regarding the superiority, importance and value of HM. This CMF culture was consistently articulated by donors and recipients who described clinical environments that were replete with instances of intense pressure to supplement with CMF. Participants described where CMF was the default option and CMF was *'pushed left, right and center'* (Siobhan). Mirroring this experience, others reflected on similar situations describing: *'Yeah.. it was all about the formula from the start'* (Shauna) and *'my experience has been that they're so quick to offer formula that just seems to be the solution for a lot of healthcare professionals'* (Aoibheann) and *'they kind of offer it as a solution in the hospital very quickly'* (Marie). Others provided sentiments where CMF was actually advocated in the absence of medical necessity: *'this midwife came in and was like… you're exhausted… I really think you should give a bottle of formula because you are exhausted'* (Sinéad) and *'would you not just give her the bottle and make your life easier'* (Fiadh).

6.3.3 Overarching Meta-Theme Three: Inherent Trust and the 'Wee Subculture'

This overarching meta-theme encapsulates the multi-dimensional infrastructure of the IHMS landscape that is conceptualised as a *'wee subculture'*. It illuminates how the IHMS

network or *'village'* functions as a vital support network which is underpinned by an innate trust and shared beliefs. Subsequently, the architecture of trust is then purposively scaffolded through narrative exchanges, open dialogue and proactive donor transparency.

6.3.3.1 The Digital and Social Layers of the Village

The first thematic grouping of this overarching meta-theme pertains to the multiplicity of layers that permeate and construct the IHMS landscape. Indeed, the IHMS landscape comprises many social layers that enable and propel its existence. An overriding finding in this research is the value of digital platforms and online connections for IHMS practices. Indeed, across the three data sources, it was consistently affirmed that digital platforms are an instrumental entity for IHMS engagement and participation. In the MMSR, digital and online platforms were prominent and key enablers for both donor and recipient engagement with IHMS which was evidenced in the majority of studies included. Analogous findings were evidenced in both the quantitative and qualitative findings in this current research. It was reported in the quantitative survey that 70.8% (n=56) of donors and 79.1% (n=19) of recipients initially connected with their respective recipients or donors through online platforms specifically dedicated to IHMS. The remaining respondents in the survey reported that they already knew the person who they shared HM with or they connected via a mutual friend. The qualitative findings reinforced the role of online platforms in the practice of IHMS. Many reflected on the ease of using and navigating the process of engagement via the online platform: *'So you message them. Tell them where you are and that you have milk to donate, and then they have other people messaging them… and straight away they popped it up, and I had like 2 people message me'* (Rebecca). One donor perceptively described that in the absence of online platforms for IHMS that: *'it [IHMS] wouldn't be possible.. you know? To share, to connect people in that way who are completely unrelated.. apart from through this..'* (Caoimhe). Mirroring this, another described: *'without the platform… it [HM] would be probably still sitting in my freezer'* (Grace). While online connections were most common, existing social relationships existed between donors and recipients which was also noted in the three data sources. An important finding which was also noted in the MMSR was the in-person exchange of HM. Comparably, the quantitative findings substantiated this, where

the majority of donors (89.8%, n=71) reported meeting their recipient in-person for the IHMS exchange. The qualitative interviews elaborated on how recipients often collect the HM from the donor following narrative exchanges online*: 'We kind of went back and forth and back and forth chatting and yeah…then the next day she came…the next morning to collect it'* (Rebecca). An inherent finding within the qualitative interviews was where participants described the landscape of IHMS in Ireland as *'a wee subculture'* (Patricia) and *'a little village in the background'* (Fiadh) which denotes the practice as a robust *'support network'* (Sinéad) sustained by personal connectedness. Many interviewees alluded to the IHMS landscape as a *'support network'* (Sinéad) irrespective of whether the connection was initiated online or through existing social ties.

6.3.3.2 The Architecture of Trust and Transparency

The second thematic grouping of this overarching meta-theme relates to how trust is purposively assured through narrative exchanges which subsequently facilitate personal connectedness and inherent confidence in IHMS. A pertinent actuality of the assurance of trust within the realm of IHMS is fundamentally and categorically divergent to trust within the formal HMB systems where rigorous donor screening, HMB pasteurisation processes and robust clinical oversight are mandated.

A prominent finding in the MMSR and qualitative interviews was that narrative exchanges between donors and recipients enabled the construction of trust. Indeed, it was affirmed that dialogue between donors and recipients was an enabling factor for IHMS engagement and continuation in seven of the studies included in the MMSR and these insights were elaborated and expanded on within the qualitative interviews. An interesting insight from the quantitative survey pertaining to recipients was that more than half 53.3% (n=16) reported they did not screen their donors by asking them questions. However, the qualitative findings provided a substantive complementary layer to this understanding which illustrated that the absence of recipient-led screening was not an absence of safety but as an outcome of the proactive approach that donors assumed.

Indeed, the donor interviews provided significant insights to this where they elucidated that they provided essential information relating to the DHM and themselves at the outset and thus assumed a proactive approach in disclosing important information and essentially

omitting this role from the recipient. Many donors portrayed a deep sense of empathy and reflected on their recipients *'emotional state'* (Aoife) and in essence, removing the burden of vetting to alleviate any *'anxiety'* (Rebecca) they may have felt. One donor described: *'…but I just wanted to offer the information in case she wanted it…and she felt anxious about asking…..and just to kind of let her know that I was really open to those questions as well…that was the main thing'* (Rebecca). Another donor mirrored this belief*: 'I'm one of those people that I would want to know that… so I offer it so that people don't feel awkward or don't feel like they have to ask. I'll say it upfront, and just be like…look, this is my lifestyle….. this is the way I do things. If that's okay with you, then the milks here'* (Patricia). Many donors had a deep sense of empathic understanding and were proactive in information and: *'giving the answers in case you're too embarrassed to ask me yourself'* (Sinéad). These findings reveal that while the quantitative survey showed that the majority of recipients did not screen by asking questions, it is perceptible from the qualitative findings that donors provided the information and, in essence the narrative exchanges and proactive donor transparency facilitated the establishment of a *'good rapport'* (Rebecca) and thus the assurance of trust. The concept of trust was further delineated in the quantitative findings where it was noted that the majority (96.6%, n=29) of recipients did not heat treat the milk which bolsters the understanding of trust. Furthermore, the majority of recipients (53.3%, n=16) stated the rationale for the non-heat treatment was they trusted the milk was clean/safe.

6.3.4 Overarching Meta-Theme Four: Symbiotic Emotional Reciprocity

This overarching meta-theme encompasses the emotional and psychological outcomes of IHMS that fundamentally transcend beyond the simple non-commercial exchange or transaction of milk between donors and recipients. Indeed, the integration of data portrayed intricate and psychological dimensions related to the engagement with IHMS.

The reduction of stress and anxiety was a finding that was demarcated across the MMSR, quantitative survey and qualitative findings. The MMSR established the foundational link between the receipt of DHM via IHMS and the alleviation of stress and enhanced psychological wellbeing for recipients. The quantitative findings correlated with these understandings when it was ascertained that more than half of recipients 56.6% (n=17)

reported that their stress or anxiety was significantly reduced as a result of IHMS engagement. Importantly, the survey also unequivocally illuminated the stark reality of recipients' postpartum experiences with significant levels of anxiety (62.5%, n=15), birth complications (62.5%, n=15) and perceived traumatic births (50%, n=12) reported amongst the recipients in Ireland. These quantitative findings provided the numerical indicators for the acute emotional strain further elucidated by recipients within the qualitative interviews. Indeed, the qualitative narratives further corroborated and exemplified these realities and experiences greatly. It was palpable within the sentiments shared by recipients that the barriers to the early establishment of breastfeeding were often triggered by significant postnatal clinical scenarios such a postpartum haemorrhage, delayed lactogenesis emanating from caesarean section mode of delivery, infant related issues and reported challenges. These specific situations caused significant acute emotional distress among recipients who described substantial negative emotions: *'I was crying at the time. I couldn't take it in like I was just absolutely, emotionally wrecked'* (Sinéad), *'I was so stressed and worried'* (Grainne), '*vulnerable'* (Shauna) '*quite upset..I was just so tired… overwhelmed'* (Deirdre). Nevertheless, the receipt of DHM via IHMS resulted in a profound resolution of acute stress and anxiety which was an eminent finding within the qualitative interviews. An undeniable resolution of the preceding negative emotional states were palpable amongst recipients. An interesting enhancement in our understanding of the emotional outcomes of IHMS were elucidated within the qualitative phase by recipients. As previously mentioned, the receipt of DHM was figuratively described as a *'light switch'* (Sinéad) release of the emotional stress. Other recipients mirrored this describing that receiving the milk resulted in a: *'relief of anxiety… it just released'* (Deirdre), and *'a huge sense of relief.. of calmness'* (Grainne), and *'it was such an emotional thing and mental thing that once I got the relief of having [DHM].. after that it just kept flowing, kept flowing'* (Sinéad). The integration of findings across the three data sources enrich our understanding of the significant emotional and psychological resolution of stress and anxiety as a result of IHMS engagement. Although the MMSR identified that IHMS resulted in enhanced psychological wellbeing and a reduction in stress, the integration of quantitative and qualitative findings portray the immediacy and magnitude of the resolution. What's more, both the quantitative and qualitative findings

emphatically illuminate the trajectory experienced by recipients from the deleterious and challenging scenarios which were perceptibly entrenched with negative portrayals to the instantaneous resolution of emotional distress and the restoration of psychological equilibrium.

The integration of findings also revealed significant emotional outcomes for donors as a result of engaging with IHMS. This finding was notably absent in the MMSR, however, the imminent need for further exploration and scholarly research investigating the psychological and emotional impacts of IHMS on donors was a core recommendation of the MMSR. As such, these understandings are derived from the integration of quantitative and qualitative findings whereby the positive emotional associations of IHMS are depicted. The quantitative survey provided the foundational indicators of the emotional dimensions for IHMS donors, where 77.2% (n=61) felt good and 44.3% (n=35) reported that IHMS was personally rewarding. These positive, emotional associations were further elucidated through the qualitative interviews which provided deeper insights into emotional and psychological outcomes related to IHMS engagement. Mirroring the recipient sentiments, donors portrayed IHMS as an emotional entity: *'an emotional thing'* (Siobhan). What's more, donors purposefully correlated IHMS as a *'symbiotic'* (Patricia) experience wherein both donors and recipients categorically attain significant emotive impacts from the experience. One donor described the emotional reciprocity of IHMS engagement which exemplified the feelings of gratification and thankfulness afforded by engaging: *'you're both thankful for each other in a way..they're thankful to me, and they think that I'm doing them a massive favour. But they're doing it for me too...like they're using my milk that I won't…. I'm thankful that they're doing that too.. So, it is symbiotic… and there's nothing like it…there is nothing like it'* (Patricia). The narratives depict positive affective states such as feeling good: *'I felt great'* (Emma), a deep sense of pride: *'proud of myself'* (Grace), happiness; *'I was just so happy'* (Aoibheann), among donors. One donor shared a reverberating portrayal of the emotional aftermath of IHMS engagement: '*it's a lovely feeling, of course.. That's your reward. You get the nice, warm, fuzzy feeling afterwards'* (Sinéad).

6.4 Summary of Integrated Findings of the ePIP

The purpose of the application of the ePIP framework was to methodically amalgamate the findings of this overall research inquiry comprising the MMSR, quantitative survey and qualitative interviews, with the intention of providing a rich, intricate and inclusive understanding of IHMS within the geographical context of Ireland. As such, the judicious application of the ePIP to the findings emanating from each constituent of this research has categorically enabled the explicit, comprehensive and extensive integration of evidence to reveal substantive insights and a novel understanding of the IHMS landscape within the Irish context.

The application of the ePIP yielded four overarching meta-themes: (1) The biopsychosocial constructs of IHMS denotes the multi-faceted intersection of biological, psychological and social components that align and in essence, are the foundational basis of IHMS engagement in Ireland. (2) The overarching meta-theme systemic barriers and invisibility represents the pervasive constraints, barriers and deterrents for engagement with formal HMB systems that unintentionally propel the engagement with IHMS. Moreover, it represents the notably absence of HCP and healthcare system involvement in the inhibitors and barriers to formal HMB systems that inadvertently motivate the engagement with IHMS. Additionally, it comprehensively depicts the substantive absence of HCP and healthcare system involvement in IHMS. Owing to a perception of pervasive CMF culture, the intentional concealment of IHMS is the habitual practice in Ireland which unreservedly portrays a landscape of IHMS that is predominantly devoid of clinical oversight, HCP dialogue and robust guidance. (3) The inherent trust and 'wee subculture' overarching meta-theme describes the nuances of how IHMS exists as a metaphorical 'village'. At the crux of this subculture or village, there is an inherent and robust understanding and belief in the collective support of its members which comprises both online and offline connections. It also encapsulates how trust is assured amongst donors and recipients through narrative exchanges and transparency. (4) The symbiotic emotional reciprocity overarching meta-theme exemplifies the emotional and psychological impacts and associated dimensions relating to donors and recipients of IHMS. Categorically, it expands our understanding of the intricate and psychologically entrenched emotional and

psychological aspects of IHMS in Ireland. What's more, it elucidates a clearer understanding of the symbiotic and reciprocity of this emotionally-associated phenomenon. Inherent in these findings, is the enhancement of the psychological aspects of IHMS.

6.5 Summary

This chapter has presented the integrated findings of this study that were achieved through the utilisation of the ePIP. The application of the ePIP framework to integrate the findings of the MMSR, quantitative survey and qualitative interviews of donors and recipients enabled an inclusive and in-depth understanding of IHMS within the geographical context of Ireland. The integrated findings comprise four overarching meta-themes, nine thematic groupings and forty-four individual meta-themes which are presented in joint display format in Table 6.2 and narrative format. The overarching meta-themes and thematic groupings are visually displayed in Figure 6.2. Prior to this investigation, there was an absence of empirical evidence relating to IHMS in Ireland. Consequently, this scholarly work provides foundational and robust empirical insights into IHMS in Ireland. The following chapter will present the concluding chapter of this research. This will comprise a critical overview and synthesis of the entire research project. Subsequently, a critical discussion of the integrated findings will be provided. Further, the significance of the research will be discussed, focusing on the contribution of this work to the understanding of the phenomenon of IHMS in the geographical context Ireland and the wider IHMS landscape. The strengths and limitations of the research will also be considered, as well as recommendations for policy and future research directions

Chapter Seven: Discussion and Conclusion

7.1 Introduction

The overall aim of this study entitled: *'A Mixed Methods Study of IHMS in Ireland'* was to explore the characteristics, practices and experiences of donors and recipients of IHMS. This concluding chapter presents a retrospective overview and synopsis of the body of the work detailed in the preceding chapters of this thesis. This enables a purposeful review of the summary of the trajectory of the research and the key findings originating from each distinct phase and consequently the portrayal of the overall attainment of the specified research objectives. Following this, the overarching meta-themes emanating from the integration of findings by the application of the ePIP will be critically discussed. Subsequently, the original contributions of this research from empirical, theoretical and methodological perspectives will be presented. The strengths and limitations of the research will then be outlined. Finally, the implications and recommendations emanating from this research in the domains of research, policy and practice will be explicated.

7.2 Retrospective Overview and Synopsis of The Research

In Chapter One, the critical introduction, background and context of this research inquiry was presented which detailed comprehensive and contextual insight into IHMS as an emerging, contemporary and proliferating infant feeding practice. As previously discerned IHMS is the non-commercial exchange of HM among donors and recipients which occurs independent of regulated HMBs. The absence of synthesized evidence relating to IHMS practices such as the factors associated with IHMS from donor and recipient perspectives guided the establishment of the body of work contained within this doctoral research study.

Chapter Two details the methodological approach to this study. The overall research design, philosophical underpinnings and methods are illuminated. Each successive phase of the research is presented as well as the rationale for the methodological choices implemented. Further, the ethical considerations, researcher positionality and reflexive practices are outlined.

Chapter Three of this thesis presented a convergent integrated MMSR of the factors associated with IHMS among donors and recipients. The MMSR was conducted in

accordance with JBI methodological guidance for the conduct of MMSRs (Lizarondo et al., 2020). The purpose of this review was to establish, synthesize and integrate the existing qualitative, quantitative and primary mixed-methods studies on the motivations, barriers and facilitators of IHMS among donors and recipients using a convergent integrated approach. The MMSR included twenty-four studies (four quantitative studies, three mixed-method studies and seventeen qualitative studies). The review established ten integrated findings: four pertaining to donors and six pertaining to recipients. This was the first MMSR to identify and synthesize the existing evidence on the factors associated with IHMS among donors and recipients. Notably, explicit recommendations arising from the MMSR included the categorical need for further empirical scholarly endeavours to investigate the factors associated with IHMS in other unexplored geographical contexts to purposively expand and enhance the understanding of IHMS globally. Furthermore, the MMSR identified an imperative and emergent finding pertaining to the psychological impact of IHMS on recipients' psychological wellbeing. The MMSR concluded that imminent research was required to investigate the potential impact of IHMS on maternal wellbeing. Accordingly, this current research aimed to execute the recommendations of the MMSR with the intention of providing novel contributions to the scholarly landscape of IHMS by conducting a sequential explanatory mixed methods study in Ireland. The completion of the MMSR achieved Objective 1 of this doctoral study which was to identify, evaluate, synthesize and integrate the qualitative and quantitative evidence on the factors associated with IHMS among donors and recipients.

The first phase of the sequential explanatory mixed methods study is presented in Chapter Four. A national cross-sectional survey was completed of donors and recipients in Ireland (n=103) using a modified version of a validated tool with the original developers' permission to adapt and use. As the first empirical investigation of IHMS in Ireland, it presented baseline insights into the characteristics, motivations, practices and experiences of IHMS donors and recipients who had engaged with IHMS in the preceding 18 months. Moreover, it provided instrumental data relating to childbirth, postpartum experiences, HMB insights, HCP engagement, IHMS experiences, and satisfaction with IHMS. This quantitative phase of the sequential explanatory mixed method study fulfilled Objective 2 of this study which was to

describe the profiles, motivations, practices and experiences of IHMS donors and recipients in Ireland.

Chapter Five presents second phase of the sequential explanatory mixed methods study which sought to explore and gain an in-depth understanding of the lived experiences, practices and the perceived psychological impacts of IHMS among donors and recipients. This was achieved through the semi-structured interviews of donors and recipients (n=15) who participated in the preceding phase of this research, the phase one quantitative survey. Through reflexive thematic analysis, five themes emanated which comprised: 1) Motivations for IHMS, 2) Formal milk banking: invisible, rigid and faceless, 3) The healthcare professional paradox, 4) Navigating risk and safety assurance by the wee subculture, 5) Emotional and psychological impact of IHMS. The completion of the second phase accomplished Objective 3 of this research which endeavoured to explore and gain an in-depth understanding of the lived experiences and practices of IHMS among donors and recipients in Ireland.

Chapter Six presented the integrated findings from the MMSR, quantitative and qualitative findings by the application of the ePIP. This enabled an extensive, in-depth and rich understanding of IHMS in Ireland from the perspectives of donors and recipients. The final integration resulted in four overarching meta-themes, nine thematic groupings and forty-four individual meta-themes. The emergent findings from the integration epitomises the pinnacle of this body of work that presents imperative insights pertaining to the IHMS landscape in Ireland. Indeed, these foundational insights provide detailed understandings, nuanced intricacies and vividly illuminates a comprehensive understanding of IHMS from the perspectives of donors and recipients in Ireland. In addition, the utilisation of the ePIP enabled the incorporation of the MMSR to facilitate the integration of the global synthesized evidence as well as the primary research components of the sequential explanatory mixed methods study in Ireland which provided novel understandings locally within Ireland and also enhanced essential insights for IHMS from a broader perspective. The integration of the disparate findings from the three data sources achieved Objective 4 of this research which was to synthesize and integrate the findings of the MMSR, quantitative and qualitative phases to provide a deep, multidimensional and comprehensive understanding of IHMS.

7.3 Critical Discussion of Integrated Findings

The application of the ePIP yielded four overarching meta-themes which contained nine thematic groupings and forty-four individual meta-themes. The biopsychosocial constructs of IHMS pertinently depict the complex, multi-faceted intersection of biological, psychological and social constituents that synergistically align and are the foundational underpinnings of the practice of IHMS in Ireland. As such, the existence and sustainment of IHMS is undoubtedly dependent on the interconnection of these. There was resounding consensus in all but two of the constituents for the engagement of IHMS which is evidenced in Chapter Six. One divergent motivation pertained to a donor motive of preference towards a commerce-free approach for their engagement with IHMS which was evidenced in the MMSR but not in the findings of the survey or the qualitative interviews in the Irish context. Therefore, it is postulated that this divergence reflects the non-commodified status of the HMB system within Ireland where the HMB is a not-for profit organisation. Indeed, there has been a recent emergence of transnational private milk companies (PMCs) that sell HM and HM products for financial gain (Shenker et al., 2024, Newman and Nahman, 2022, Rusi et al., 2024). These companies sell pasteurised HM and HM products to healthcare organisations as well as the general public for profit. Therefore, it is assumed that while this finding emanated within the MMSR and not within the Irish findings, it is a direct result of the absence of for-profit PMCs within Ireland. Consequently, the commerce-free nature of milk sharing both in IHMS and the HMB system is an inherent characteristic within Ireland compared to jurisdictions with IHMS, for-profit PMCs as well as not for profit HMBs.

Another divergent finding that was identified within this overarching meta-theme was the recipient motive of ‘return to school or work’ that was perceptible in the MMSR and notably absent within the findings in Ireland. A feasible rationale for this divergence could stem from the geographical variances in the studies included in the MMSR compared to the geographical context of Ireland relating to paid maternity leave. In Ireland, maternity leave is a statutory entitlement comprising a minimum of 26 weeks paid leave and an optional 16 weeks unpaid leave (Government of Ireland, 2026). This stands in contrast to other jurisdictions included in the MMSR and most notably the US where the majority of the studies (n=18) included in the review emanated from. The US does not have a national policy which guarantees paid maternity leave to women who are employed (Jou et al., 2018).

Indeed, scholarly evidence has confirmed that there is a positive relationship between maternity leave length and breastfeeding duration (Navarro-Rosendolatt and Garmendia, 2018). These findings were corroborated in a recent systematic review which ascertained that a longer maternity leave was associated with a longer duration of breastfeeding (Wicklund et al., 2024). Moreover, another recent systematic review of US working mothers affirmed that earlier breastfeeding cessation was strongly associated with maternal employment (Cunningham et al., 2024). Ironically, despite Ireland having robust maternity leave entitlements which most likely mitigated the recipient motivation of a return to school or work, Ireland's breastfeeding rates are notably lower than the US. Further, the return to school or work was also denoted as prominent motivator for IHMS engagement among recipients in Hong Kong in a recent qualitative exploration of IHMS (Li et al., 2024). Analogous to the US, statutory maternity leave in Hong Kong is significantly shorter than the entitlements within the geographical context of Ireland. For insight, US statistics report a breastfeeding initiation rate of 85.7% and 62.1% at six months postpartum (CDC, 2026) and Hong Kong's statistics are 84.7% breastfeeding prevalence at hospital discharge, 52.7% and 42.3% at four months and six months, respectively (Family Health Service, the Department of Health, 2024). In 2024, breastfeeding rates in Ireland were 61.9% at the first PHN visit which is conducted within 72 hours of discharge from the maternity services, and 44% at three months postpartum (HSE, 2025). Breastfeeding statistics at six months are currently not collected within the geographical context of Ireland (Mulcahy et al., 2025). Nevertheless, it is perceptible from the reported information that there are striking differences between Irish and international breastfeeding outcomes in terms of breastfeeding continuation rates. Paradoxically, it is assumed that while maternity leave protection in Ireland mitigates the necessity to seek DHM for a return to school or work, it is comprehensible that other factors significantly impact the breastfeeding rates in Ireland such as the CMF culture that was evidenced in these findings.

These findings highlighted resounding perceptions of a CMF culture within maternity settings. This is congruent with further empirical research within the Irish context which likewise illustrated a substantive CMF culture within maternity settings as depicted by postnatal mothers in a study investigating women's experiences of perinatal breastfeeding support in Ireland (Lawlor et al., 2023). More recently, another Irish study highlighted that

some postnatal mothers in their study experienced negative interactions with HCPs relating to breastfeeding whereby CMF was actively encouraged (McEvoy et al.,2025). Indeed, it is acknowledged, that within Ireland CMF is the cultural norm (Leahy-Warren et al., 2017, World Breastfeeding Trends Initiative WBTi, 2023). Importantly, it has been empirically affirmed that early supplementation with CMF is associated with shorter breastfeeding duration (Li et al., 2023) and lower breastfeeding exclusivity (Liu et al., 2023). Contrarily, scientific evidence has established that supplementation with DHM via a HMB preserves breastfeeding exclusivity compared to supplementation with CMF (Romano-Clarke et al., 2025, Kamianowska et al., 2026). Perhaps, a contributing reason for this CMF centric culture continuing to permeate as evidenced in the findings in Ireland is the actuality that the International Code of Marketing of Breastmilk Substitutes is not yet enshrined into Irish Law. While specific regulations to the marketing and endorsement of CMF are existing, this only pertains to CMF for infants aged 0-6 months and not beyond. Therefore, enabling the extensive advertising of CMF and related products through a multitude of channels which is prevalent within Ireland (WBTi, 2023). Of concern, is the verity that CMF sales are propelled by substantially funded marketing tactics, aimed strategically at parents using unsubstantiated claims that their respective products reduce or omit infant related feeding challenges, which undeniably undermines breastfeeding (Rollins et al., 2023). Owing to a significant perception of pervasive CMF culture evidenced in this study, the intentional concealment of IHMS was the habitual practice of donors and recipients in Ireland which illuminates the reality of an IHMS landscape that is primarily devoid of clinical oversight, HCP dialogue or guidance.

The practice of IHMS devoid of HCP oversight and guidance is congruent with recent research in Belgium (Present, Driessen and Kuipers, 2026). This professional disconnect impedes vital opportunities to offer evidenced-based information, explore feeding options, and facilitate informed decision-making including potential risks, risk reduction strategies and associated benefits of infant feeding options, including IHMS (Kulmann et al., 2022, Wagg, Hassett and Callanan, 2022). Importantly, it has also been opined that from the biomedical ethical perspective HCPs cannot ‘ignore, dismiss, discount, or demonize peer sharing without acting unethically’ (Gribble, 2011, p.111). The findings depict that in most instances of potential or actual engagement or dialogue about IHMS with HCPs, the

perceived or actual outcomes were dismissal and discontentment. Nevertheless, patient safety and risk mitigation are imperatives to contemporary healthcare landscapes (Riaz et al., 2023). Consequently, clinical decision making practices are founded on evidence-based information in order to maintain high-quality standards expected within healthcare systems (Challinor et al., 2025). As such, it is perceptible that the discursive silence of HCPs within the participant narratives in this study can be comprehended. Ultimately, with an absence of national or local policy and in Ireland to support HCPs to engage in IHMS discourses, this reality is expected. Comparably, the nonexistence of IHMS in infant feeding policies was recently confirmed across the UK (Wagg, 2025). Moreover, it was noted that IHMS is not a topic that HCPs routinely discuss with parents in the UK (Wagg, 2025).

Coinciding with the prevalent HCP and HCP system disconnect, the findings portrayed pervasive and systemic barriers to the formal HMB system that inadvertently motivated the engagement with IHMS and these were affirmed across the three data sources. Barriers to HMB engagement were replete, spanning individual, logistical and operational domains. For recipients, the nonuniversality of DHM via the HMB was an established understanding among Irish donors and recipients. Receiving DHM from the HMB is prioritised for vulnerable infants in the hospital setting and it is not universally available for all infants who require supplemental feeds. This finding concurs with the broader scholarship where it is affirmed that DHM is not universally available for all infants (Gribble, 2014, McCloskey and Karandikar, 2018, Klotz et al., 2022, Mathias et al., 2023). In Europe, HMB organisations are unevenly spread and accessibility of HM via the HMB is limited to vulnerable infants (Klotz et al., 2022). As such, it can be perceived that IHMS is therefore the default option, in essence, a necessity for those who desire to provide HM to their infant in the absence of MOM and for those who are ineligible to receive DHM from the HMB. This is congruent with recent research in Hong Kong and New Zealand where IHMS is desired due to the perception that DHM is a better alternative to CMF and thus in the absence of formal DHM, IHMS is an imperative conduit which enables the unrelenting desire held by parents to provide HM to infants (Li et al., 2024, Harris, Bloomfield and Muelbert, 2024).

For donors, the findings depicted a multitude of logistical barriers, operational constraints and prohibitions which rendered them either ineligible to donate or deterred them from engaging with the formal donation pathways and this was consistent across the three data

sources. Indeed, comparable barriers to HMB donation have also been identified in further research in the UK and US in a recent study which surveyed HMB donors on the barriers, enablers and predictors of HMB donors (dos Santos et al., 2024).These findings are also congruent with a recent systematic review which confirmed the existence of significant barriers to formal HMB donation (Monti et al., 2024). Of importance, recent research exploring the reasons for not proceeding to donation in a sample of those who considered formal HMB donation but did not progress to donate ascertained that many cited barriers were modifiable (Brown et al., 2024). A divergent finding that was articulated within the qualitative interviews but absent within the MMSR and survey was the faceless nature of the HMB. A recent systematic review exploring HMB donation barriers identified that the anonymous nature of HMB donation was a barrier to donating to HMB systems (Monti et al.,2024). Another finding that was evidenced in both the MMSR and qualitative findings was a preference for IHMS rather than HMB donation due to the perception of reduced quality of HM from HMBs due to the pasteurisation processes that are requisite in formal systems. Scientific evidence has ascertained that holder pasteurisation which is the most commonly utilised method for pasteurisation in HMB retains many valuable bioactive constituents while acknowledging that some bioactive components are reduced (Moro et al., 2024). Another important finding in this study was the rate of donor intention to donate to a HMB (85.4%, n=67) compared to progression to approved donor (27.8%, n=22) which affirms the significance of these substantive barriers existing for donors in Ireland. The barriers and inhibitors are of vital importance to address given the categorical imperativeness of DHM from HMBs which is the globally recommended supplemental feed when MOM is unavailable (Israel-Ballard, LaRose, and Mansen, 2024). Notably, there are a multitude of contextual barriers and inhibitors to HMBs which are of utmost importance to address. Further, HMBs must examine, navigate and uphold imperative religious and cultural principles to ensure the acceptance and success of HMBs across diverse populations (Gribble et al., 2025). Indeed, it has been affirmed that cultural and religious influences categorically shape attitudes towards HM donation (Lahar and Harison, 2025). This is evidenced within milk sharing discourses such as the concept of milk kinship which is an Islamic belief that posits that the sharing of HM fosters a connection and a relationship between the donor and recipient infants called ‘rada’ which prohibits marriage between the donor and recipient families which highlights the complexities associated with formal HMB systems (Subudhi

and Sriraman, 2021). While these barriers were not evident within the findings in Ireland, it is of importance to ensure that policy, standards and associated guidance encompass these to ensure that social, cultural and religious factors are considered in HMB systems. However, from a worldwide perspective, there is an absence of global policies and standards for HMBs which has also been criticised as an imperative barrier for the necessitated scale up of HMBs globally (Israel-Ballard, LaRose, and Mansen, 2024). Comparably, from a European standpoint, national HM policies are non-existent in many countries (Klotz et al., 2022), including Ireland. There are widespread calls for strengthening global HMB systems and infrastructures, through legislation, governance, standardised practices to protect breastfeeding and enabling equitable access of DHM to all infants (Livias-Moya and Escobar-Díaz, 2025, Israel-Ballard et al., 2019). Importantly, there has also been a call for action for the development of public health policy to increase availability of DHM via HMBs and promote awareness of its importance particularly in jurisdictions with low breastfeeding rates (Israel-Ballard et al., 2019). A key recommendation in the recently published guidance document for creating an all-island preparedness plan for infant and young child feeding in emergencies on the island of Ireland was the establishment of further HMBs in Ireland which would strengthen the HMB system, enhance DHM accessibility and equity (Infant and Young Child Feeding in Emergencies Ireland Working Group, 2025).

The findings portray that IHMS in Ireland exists as a 'wee subculture' or a metaphorical 'village' comprising online and offline connections and at the crux of this, are shared beliefs, values and a robust support for its members. Resoundingly, digital platforms for IHMS were vital enablers of IHMS connections and exchanges in the findings across the three data sources. This understanding continues to be evidenced in more recent empirical investigations in other jurisdictions pertaining to the importance of digital platforms for the engagement with IHMS (Khuan et al, 2025, Present, Driessen and Kuipers, 2026). Indeed, there is a proliferating body of evidence acknowledging the supportive role of digital and online peer communities in the breastfeeding and lactation domains that offer safe, open and supportive spaces for individuals with shared beliefs and values (Reicher and Spatz, 2024, Mila, Tympa and Karavida, 2025, Morse and Brown, 2022, Orchard and Nicholls, 2022). Importantly, the architecture of trust in the findings was constructed through narrative exchanges, shared values and proactive donor transparency. Recently, it has been

corroborated that transparency among donors and recipients cultivates trust and assurance of safety (Akma Jamil, 2026). Indeed, almost all (96.6%, n=29) recipients in the study did not engage in heat treatment of the DHM which quantitatively authenticates the inherent understanding of trust in DHM via IHMS. This is in stark contrast to the way in which safety is fostered in HMBs which includes robust procedures to reduce contaminants, regular quality appraisals, security measures, data management procedures, staff training and mandated compliance with relevant policies (Israel-Ballard, LaRose, and Mansen, 2024). Nevertheless, recently it has been argued that IHMS and HMBs should not be viewed as oppositional practices as their intrinsic purpose is equivalent. Indeed, they should be perceived as complementary components of a spectrum with a shared goal of HM provision to infants (Akma Jamil, 2026).

Indeed, the provision of HM to infants is the collective and resounding imperative of both formal HMBs and IHMS practices. However, the findings confirm that IHMS functions beyond the transaction or simple exchange of HM and extends to symbiotic emotional reciprocity between donors and recipients. Ultimately, it encompasses inherent psychological dimensions including pride, happiness and fulfilment for donors, and the profound and instantaneous resolution of acute anxiety for recipients. The findings evidenced high rates of reported traumatic births, anxiety and significant articulations of acute anxiety shared by recipients. It can be argued that the categorical shift and restoration of psychological equilibrium following the receipt of HM via IHMS portrays the significance of IHMS for restoration of maternal psychological wellbeing. This is a salient finding given that postpartum maternal anxiety is linked with negative breastfeeding outcomes in terms of breastfeeding duration (Dagla et al., 2025). In addition, a recent systematic review and meta-analysis found that there were positive correlations evidenced between postpartum maternal anxiety and delayed lactogenesis (Chen et al., 2026). Delayed lactogenesis is a prominent factor negatively affecting exclusive breastfeeding (Li et al., 2024). The instantaneous resolution of maternal anxiety as demonstrated in this research following the receipt of DHM via IHMS is noteworthy considering the associated negative breastfeeding outcomes associated with postpartum maternal anxiety. Additionally, the resolution of anxiety enabled the physiological process of lactogenesis as described by one participant: '*once I got the relief of having [DHM].. after that it [MOM] just kept flowing, kept flowing'* (Sinéad). Of

significance is the acknowledgement that postpartum maternal anxiety is a leading cause of maternal morbidity (Whei et al., 2025). Consequently, the resolution of acute anxiety and distress by IHMS as evidenced in this study is of importance to the broader context of maternal mental health and wellbeing. Additionally, a recent longitudinal study conducted in Ireland identified that ever breastfeeding, exclusive breastfeeding and a cumulative lifetime duration of 12 months was associated with reduced maternal depression and anxiety diagnoses over a 10 year period in parous women (McNestry et al., 2026). This underscores the potential for enduring advantageous outcomes in terms of preservation of breastfeeding and maternal psychological wellbeing as a result of IHMS. Ultimately, IHMS and the 'wee subculture' in Ireland exists as the only mechanism for those who desire to provide HM in instances where infants require supplemental feeds in the absence of optimal MOM and who are ineligible for DHM via the HMB. Ultimately, it is claimed that IHMS is a silent lifeline (Akma Jamil, 2026).

7.4 Original Contribution of the Research

7.4.1 Empirical Contribution

This research makes important empirical contributions which will be outlined. Prior to this research undertaking, there was a distinct absence of scholarly evidence pertaining to IHMS in Ireland. Accordingly, this is the first empirical investigation on the subject of IHMS in this geographical context and thus establishes the foundational body of baseline empirical evidence denoting the existence, the practices and experiences of donors and recipients of IHMS in Ireland. Therefore, this research offers comprehensive and novel insights into this globally proliferating phenomenon. Specifically, it confirms that IHMS is a contemporary infant feeding practice in Ireland, existing within a subculture comprising many social layers and is symbolised as a 'village' or 'wee subculture' where trust and transparency are assured by shared understandings, narrative exchanges and proactive donor transparency. This research contributes significantly to the delineation of the challenging trajectory recipients experienced in the need for and pursual of DHM. The findings of this research have affirmed that the pursual of DHM via IHMS is most often subsequent to complicated or traumatic births, substantive postpartum morbidities or clinical scenarios mandating urgent supplemental feeds. Strikingly, this research has affirmed that often this critical period is characterised by substantive levels of reported maternal anxiety. The findings of this study

have depicted the landscape of IHMS in Ireland as one that is unquestionably devoid of HCP engagement, dialogue or healthcare system oversight. This research contributes an important empirical contribution wherein those who engage with IHMS often practice the intentional concealment of IHMS from HCPs. It is claimed that this strategic concealment is predominantly as result of a resounding and pervasive CMF culture in maternity settings that were described in this research. A further and noteworthy empirical contribution of this research is the significant disconnect from the high levels of initial donor interest in HMB donation to the low rates of successful progression to approved donor status in Ireland. Moreover, it identifies that systemic barriers to formal HMBs exist within our geographical context. A key empirical insight of this research is that the existence of these substantive barriers inadvertently enable the evident engagement with IHMS.

A key contribution of this research is the addition and advancement of preexisting research in the broader IHMS landscape which has delineated the foundational underpinnings or the 'why' of IHMS engagement. Rather than viewing the motivations as separate or siloed constituents, this research has ascertained that IHMS in Ireland is catalysed by a collective of intersecting biopsychosocial constructs that are requisite to the existence of IHMS. Importantly, it was ascertained there was a resounding consensus across the broader data in the MMSR, and quantitative and qualitative findings in Ireland pertaining to this and so, this empirical contribution transcends our geographical context to include a broader scope.

This research also offers a primary empirical contribution to the psychological dimensions of IHMS engagement from donor and recipient perspectives. While the MMSR identified an emerging concept in the literature relating to the reduction of anxiety and stress associated with the receipt of DHM via IHMS, the integration of findings of this research purposively enhance our understanding of the magnitude and immediacy of this psychological resolution. Quantitatively more than half of recipients identified the resolution of stress and anxiety upon receipt of DHM via IHMS and figuratively this was depicted as a 'light switch' release. Accordingly, this research established an empirical link between the receipt of DHM via IHMS and the immediate transition in maternal psychological wellbeing. Moreover, it also identifies positive emotional impacts of IHMS on donors within this geographical context whereby the integration of findings affirmed that donors experienced positive emotional impacts from engagement with IHMS.

This research demarcates the empirical reality of the infrastructure of IHMS in Ireland which is metaphorically described as a 'wee subculture'. Ultimately, this comprises a multiplicity of social layers, both digital and personal, where trust is assured through narrative exchanges and in-person exchange of IHMS. An empirical insight of this work is the nuanced understanding of screening practices. While the quantitative finding in this research denoted that more than half of recipients did not screen donors by asking questions, the qualitative findings explained that this was due to the proactive provision of information by donors which consequently removed the burden of vetting from the recipients.

7.4.2 Methodological Contribution

A key methodological contribution of this research is the further application and demonstration of the ePIP (Gauly et al., 2024). Specifically, this research presents an innovative implementation of the ePIP through the integration of the MMSR along with the quantitative and qualitative data sources in the sequential explanatory study. Consequently, this research demonstrates the utility of the ePIP in systematically integrating the global evidence from the MMSR with the contextual findings from the quantitative and qualitative findings from the sequential explanatory study in Ireland. Ultimately, this enabled the generation of integrated meta-themes that capture the intersection of global synthesized evidence and the local contextual findings from Ireland. Consequently, it purposively enabled a transparent and rigorous process to ascertain divergences, congruencies and a more nuanced understanding of IHMS both globally and locally.

7.4.3 Theoretical Contribution

Theoretically, this research proposes that the motivations for IHMS engagement represent the amalgamation and distinct intersection of biopsychosocial constructs and thus, it is claimed that this provides a comprehensive framework through which the motives for IHMS engagement can be identified, recognised and comprehended. The innovative and comprehensive integration of synthesized evidence in the MMSR along with primary research from Ireland in this sequential explanatory mixed-methods study through the application of the ePIP enabled the development of this theoretical construct. As evidenced in Chapter Six (Table 6.1), there was resounding consensus across the global and Irish findings pertaining to these motivating factors. Of note, the singular finding pertaining to the MMSR and absent from the findings in Ireland was the return to work or school motivation

for recipient IHMS engagement. Consequently, this illustrates the ability of this framework to identify, compare and comprehend IHMS in various geographical contexts. Ultimately, it provides an adaptable framework for mapping and understanding IHMS that could be utilised in future empirical endeavours to facilitate the representation of IHMS constructs in their respective jurisdictions.

7.5 Strengths and Limitations of The Research

There are noteworthy strengths associated with this body of work. While each empirical chapter has presented individual strengths and limitations of the associated research components, this section will revisit these as well as considering the overall strengths of this doctoral study. Foremost, a preliminary and inherent strength of this work is evidenced by the inclusion of both donors and recipients of IHMS as the study population. Indeed, it was considered vital to include both cohorts to ensure comprehensive, intricate and deep understandings of the IHMS landscape within this unexplored geographical context. It is postulated that this strength is explicitly evidenced throughout each empirical phase of this research and with the presentation of integrated findings of this research. By investigating both donors and recipients, it has enabled the revelation of inclusive insights, interconnected understandings and the advancement of original theoretical and empirical contributions to the IHMS landscape. A notable strength of this research was also the choice of research design, an explanatory mixed-methods study which was both appropriate to meet the overall aim of the research as well as enabling detailed, comprehensive and in-depth insights that a singular method would not have attained. This research commenced with the completion of a MMSR which is an undeniable strength underpinning this work. Indeed, it has been opined that the integration of qualitative and quantitative evidence, which are the defining characteristics of MMSRs provide comprehensive and inclusive evidence with indisputable value (Stern et al., 2020, Lisarondo et al., 2022). Moreover, it has been asserted that MMSRs provide more detailed foundations informing complex decision-making processes when juxtaposed to single level synthesizes (Stern et al., 2020). Consequently, the planning, conduct and incorporation of a MMSR was a formidable strength of this research. Prior to its execution, a MMSR protocol was registered and underwent rigorous peer review processes which categorically enhanced the quality of the MMSR. Indeed, it has been ascertained that these robust processes increase transparency and overall quality of systematic reviews (Van

de Braak et al., 2022). To ensure transparency, quality and robustness, the conduct of the MMSR was meticulously guided by the JBI methodology for conducting MMSRs utilising a convergent integrated approach which was appropriate to address the proposed research question.

The initial quantitative phase of this sequential explanatory mixed-methods study utilised a previously validated measurement instrument with permission from the original author which was subsequently piloted and adapted to be contextually relevant and explicitly align with the specific research objectives of this study. The incorporation of an existing tool that had undergone prior robust validation processes by the original developer is a notable strength. Similarly, the pilot phase was an instrumental component which included representatives from the population cohort who had previous engagement with IHMS, IBCLCs and academics to ensure relevance, rigor and contextual validity. Indeed, it has been articulated that pilot studies are a necessity to ensure feasibility and to attain the specific objectives (Bujang et al., 2024). The subsequent phase of this sequential explanatory mixed-methods study utilised a descriptive, inductive methodology to gain comprehensive insights into the experiences of donors and recipients. The incorporation of reflexive thematic analysis was an integral strength. Additionally, the interview protocol was devised based on the statistical analysis of the preceding survey. In addition, the study embedded PPI involvement and engagement to leverage the imperative strengths of engagement such as enhanced quality, impact and significance (Mah et al., 2025). Moreover, involvement of PPI representatives in the refining of the interview guide/protocol ensured that interview questions outlined were resonant, meaningful and aligned to the lived experiences of IHMS donors and recipients.

An imperative focus throughout this research was ensuring high quality, a strength which is further evidenced in the utilisation of relevant reporting guidelines including the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRIMSA), the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) and the Standards for Reporting Qualitative Research (SRQR) guidelines which enabled transparency, rigor and strengthened the methodological quality and transparency of each phase. Indeed, it has been asserted that the pinnacle of scholarly endeavours are to pursue new knowledge, seek answers and enhance understandings yet these anticipated outcomes are only attainable if reported research is transparent and precise (Grech and Eldawlatly, 2024). Finally, another prominent

strength of this research was the use of the ePIP in the integration of evidence from the MMSR, quantitative and qualitative phases of this research. This innovative and robust process of integration which is visually depicted and described in chapter five facilitated the development of meta-themes that transcend individual data sources and categorically provides substantive insights, novel understandings and important contributions to the IHMS landscape.

While this research offers substantive strengths, it also has some limitations that warrant consideration. Foremost, this study recruited participants online using convenience sampling via two specific Facebook pages dedicated to IHMS and one dedicated to breastfeeding in Ireland. It is a feasible consideration that there may be individuals who engage with IHMS who do not participate in digital or online social media platforms, thus it has the potential risk of sampling bias. The sample size in the qualitative phase was small (n=15). However, there is no preexisting baseline data regarding IHMS in Ireland and by recruiting participants directly from the initial quantitative phase (n=103) ensured that the qualitative insights and experiences were grounded in the broader quantitative findings. Additionally, the recipient cohort was significantly smaller than the donor cohort, however this aligns with recent empirical research in the IHMS field (Peregoy et al., 2022, Li et al., 2024, Harris, Bloomfield and Muelbert 2024, Present, Driessen and Kuipers, 2026). The estimation of the prevalence of IHMS in Ireland is unknown and therefore, it is not possible to determine if the findings of this study represent the perspectives of the broader population of IHMS individuals in Ireland. This is a notable limitation and thus it is acknowledged that while the findings of this study provide foundational and important insights to IHMS in Ireland, generalisability of these findings is not possible due to the challenge of objectively quantifying prevalence estimates of IHMS and thus the findings are limited to those who participated in the study. A final limitation is the study cohort comprised a sample of white, married, employed and highly educated women. The lack of demographic diversity is a notable feature of the broader IHMS scholarship (Palmquist and Doehler, 2015, Paynter and Goldberg, 2018, Peregoy et al., 2022, Oreg and Negev, 2023, Li et al., 2025, Present, Driessen and Kuipers, 2026). Indeed, while this depicts a consistent sociodemographic profile in IHMS, it also underscores the necessity for research to explore underrepresented populations absent from IHMS discourses. Recent empirical

evidence confirms the significant associations between social sociodemographic factors and enhanced breastfeeding outcomes (Van Neste et al., 2025, Kalhor et al., 2025). Importantly, higher maternal education and improved family economic conditions are associated with higher exclusive breastfeeding outcomes (Kalhor et al., 2025). Conversely, contemporary scholarship illustrates that economically marginalised mothers experience disproportionately higher rates of maternal mental health challenges and unmet needs that result in poorer outcomes (Obiakor et al., 2024).

7.6 Implications of The Research

This study has explored the characteristics, practices and lived experiences of IHMS from the perspectives of donors and recipients in Ireland. Drawing on the key findings of the research, this section will outline the implications of this research and offer strategic recommendations in terms of policy, practice, and research.

7.6.1 Implications for Policy Makers

The evidence generated through this research has important implications for policymakers within Ireland. This research confirms that IHMS is a contemporary infant feeding practice within Ireland. Nevertheless, there is currently an absence of public health information or guidance relating to IHMS in Ireland. A primary recommendation from this research is the imminent necessity for the development of evidence-based guidance and information to support safe IHMS practices, including potential risks and recommended practices to mitigate potential risks associated with IHMS. This guidance is required to support parents informed decision-making relating to infant feeding and reducing potential risks for those who choose to engage in IHMS. Moreover, it will enable parents to navigate these complex decisions with requisite, evidence-based information required to support them in making informed choices. Indeed, while it is acknowledged that public health organisations and HCPs at present cannot endorse IHMS, a comprehensive approach to outlining potential risks and risk reduction strategies is necessitated. Furthermore, this research has expounded a substantive absence of HCP input in IHMS dialogue and practices. Ultimately, this is expected given the lack of policy in Ireland to support HCP engagement with IHMS. The Food Safety Authority of Ireland (FSAI) (2026) in their online consumer advice relating to bottle feeding and expressed HM categorically discourage the selling or sharing of HM via

online digital platforms, citing that IHMS through websites and online platforms are devoid of regulations to maintain safety (FSAI, 2026). It is postulated that these explicit recommendations give credence to the lack of HCP engagement in IHMS discussions. Importantly, there are distinct complexities associated with HM governance due to its conceptualisation as a food, a shared bodily fluid and as a medicine (Paynter and Hayward, 2018). Consequently, there is an urgent need to enhance the legislative and regulatory governance of HM (Paynter and Hayward, 2018). Accordingly, it is recommended that a judicious review of HM should be urgently prioritised in Ireland. Subsequently, it is recommended that public health policies and guidelines should be developed to ensure HCPs are supported and educated to provide evidence-based information to parents on IHMS. Further, financial support for policy implementation processes are recommended to enhance the successful implementation and attainment of policy objectives. Indeed, implementation support programmes are recognised as instrumental factors in strengthening and supporting successful implementation of policy, particularly for complex policy areas (Peckham et al., 2022). Moreover, the findings of the study identified systemic barriers to formal HMB engagement for donors and recipients in Ireland. Consequently, these understandings reinforce the aforementioned recommendations pertaining to the enhancement of HMB systems including the development of a national milk policy, enhancing HMB infrastructure and services on the Island of Ireland. Efforts to expand HMB infrastructure in Ireland could draw on successful models in other countries with robust HMB systems. In Brazil, the HMB model is a 'process-focused' system, encompassing robust lactation support within the HMB system and focusing on the optimisation of HM provision through dedicated lactation support and safe DHM (Perrin et al., 2022). The successful implementation of this model has been incorporated into other jurisdictions, evidenced by a significant increase in HM feedings (Perrin et al., 2022). Finally, the intentional concealment of IHMS from HCPs coupled with a perceived CMF culture within maternity settings suggested that a national policy and associated national guideline on the use of breastmilk substitutes in maternity, paediatric, and community healthcare settings should be developed. These should align with evidence-based practices to support, protect and promote breastfeeding.

7.6.2 Implications for Healthcare Professionals

The findings of this study underscore significant issues that have several implications for HCPs. The findings of this study depicted high levels of self-reported anxiety, traumatic births and subsequent clinical scenarios that necessitated urgent supplemental feedings. Therefore, it is recommended that HCPs supporting maternal postnatal mothers should identify these specific situations and prioritise the referral to and provision of robust lactation and psychological support by relevant HCPs to enhance breastfeeding outcomes and enhance maternal wellbeing. It is recommended that HCPs should engage in open dialogue with postnatal mothers relating to their infant feeding preferences and choices. HCPs should be facilitated to engage in these through evidence-based policies and associated guidelines to support them in their practice. Further, HCPs should receive education on the practice of IHMS. Breastfeeding curricula for HCPs should include indicative content on milk sharing including formal HMB and IHMS so that HCPs are informed and educated in relation to these infant feeding practices.

7.6.3 Research Implications

The findings of this study offers strategic priorities for future research in the IHMS domain. Due to a lack of empirical data relating to prevalence estimates of IHMS in Ireland, future research studies could attempt to quantify and characterise IHMS activity in Ireland by conducting an analysis of social media platforms dedicated to IHMS or breastfeeding in Ireland to capture data relating to online activity of IHMS engagement which could provide important insights relating to IHMS engagement and practices in Ireland. This could include the collection of objective data such as the number of posts on social media sites offering HM and requesting HM. This could be conducted over an extended period of time to gain insights into trends and patterns relating to IHMS engagement over time. Additionally, a national survey of parents in Ireland could be conducted to investigate IHMS engagement in this population. This could provide important insights into IHMS prevalence in Ireland. Future research should explore short and long-term infant outcomes following IHMS. Notably, there is an absence of empirical evidence investigating infant outcomes following the provision of DHM via IHMS. Therefore, there is an imminent need for future focused research to comprehensively investigate these. Longitudinal studies could be designed to explore these, such as the collection of objective health data of infants including: growth

trajectories, developmental outcomes, rates of allergies, illnesses, medical interventions/hospitalisations and adverse events following the provision of DHM via IHMS. Further studies could be conducted to measure the health outcomes of infants who have received DHM compared to CMF or DHM from a HMB. Studies should investigate the breastfeeding outcomes of infants who have received DHM via IHMS compared to CMF and DHM from a HMB. The objective core outcomes could include: breastfeeding exclusivity, breastfeeding duration, maternal milk supply, and maternal breastfeeding satisfaction. Future research is also warranted to investigate the role of IHMS on maternal wellbeing including psychological health outcomes. These should include both subjective and objective measurements of PPD and anxiety through the utilisation of validated tools. Furthermore, as there is a notable absence of empirical evidence pertaining to HCPs perspectives on IHMS and HMBs in Ireland, a future focus of research should investigate HCP's knowledge, attitudes, barriers and perspectives of IHMS and HMBs in Ireland.

7.7 Concluding Statement

In conclusion, this research provides a foundational empirical body of research exploring IHMS in Irish context from the perspectives of donors and recipients. Critically, this research was designed to provide comprehensive and all-inclusive insights into this previously, empirically unexplored phenomenon in our geographical context. Accordingly, this research has provided important baseline evidence that illustrates that IHMS is a contemporary infant feeding practice existing in Ireland. This research has established that IHMS in Ireland is underpinned by the collective intersection of biopsychosocial constructs that synergistically collide and interlink. Prominently, this research underscores that IHMS exists as a practice that is devoid of HCP or healthcare system engagement or oversight, accompanied by a reported CMF culture which subsequently incites an intentional concealment of IHMS from HCPs. Paradoxically, pervasive barriers to the engagement with formal HMB systems for donors and recipients enable the engagement with IHMS. This research illustrates that IHMS exists as a 'wee subculture' where trust and safety are assured through narrative exchanges and transparency which are in contrast to the robust safety measures embedded in formal HMB systems. While the juxtaposition of the safety measures between formal and informal pathways espouses an opposition, these systems have a collective goal which is the provision of HM to infants.

This research has affirmed that the engagement with IHMS is a symbiotic practice which is associated with positive psychological outcomes, depicted as a 'light switch' release of acute maternal stress and anxiety for recipients and a 'nice, warm, fuzzy, feeling afterwards' for donors. Ultimately, this research has demonstrated that IHMS transcends beyond the simple transaction of HM between donors and recipients. It illustrates the formidable strength and resilience of this 'wee subculture' that exists with an unwavering resolve to provide HM to infants as the imperative goal and is associated with advantageous outcomes for donors and recipients. Indeed, their aspiration aligns with those of global health organisations who convey that the provision of HM to infants is a global public health imperative (Meek and Noble, 2022, Roghair, 2024). Despite this, IHMS exists covertly, as a parallel existence to a regulated system that is predominantly unreachable for IHMS donors and recipients in Ireland. With the imminent publication of the whole of government breastfeeding strategy in Ireland and a contemporary national Maternity strategy which are committed to enhancing support for breastfeeding (Department of Health, 2026), it is hoped that these strategies will include awareness and risk reduction guidance for milk sharing practices, including IHMS.

There are also vital opportunities to enhance HMB infrastructure, explore and ameliorate pervasive barriers, enhance legislative frameworks to protect breastfeeding and elevate the national breastfeeding rates in Ireland. Ultimately, the goal of enhancing breastfeeding rates is a vital imperative that has vast, multidimensional and enduring outcomes spanning health, planetary, societal, environmental and economic domains. Indeed, breastfeeding has been positioned as a strategic One Health intervention by portraying the importance of breastfeeding across human health, social determinants and environmental impact (Machado et al., 2025). As such, breastfeeding or the provision of HM are increasingly articulated as crucial solutions to enabling a better future for all, aligning with many of the Sustainable Development Goals (Basrowi et al., 2024 Machado et al., 2025).

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Appendices

Appendix A: Mixed Methods Systematic Review Protocol

This work presented has been published on HRB Open Research:

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As per DCU Guidelines for candidates, supervisors and examiners on the 'PhD by Publication' format, the PDF versions of published works for the publication outlet cannot be included in the PhD thesis, and all published work should appear in manuscript/thesis format. The content presented in this thesis is correspondent with the content of the published papers, with the exception of minor formatting variations.

Authors:

Niamh Vickers- PhD student, School of Nursing, Psychotherapy and Community Health, Glasnevin Campus, Dublin City University, Dublin 9, D09Y8VX. niamh.vickers3@mail.dcu.ie (corresponding author)

Dr. Gillian Paul, Assistant Professor in Public Health and Health Promotion, School of Nursing, Psychotherapy and Community Health, Glasnevin Campus, Dublin City University, Dublin 9, D09Y8VX.gillian.paul@dcu.ie

Professor Anne Matthews, Full Professor of Nursing, School of Nursing, Psychotherapy and Community Health, Glasnevin Campus, Dublin City University, Dublin 9, D09Y8VX. anne.matthews@dcu.ie

Title:

Perspectives and factors associated with IHMS: a mixed-methods systematic review protocol

Abstract:

Background: The practice of IHMS is a relatively new phenomenon and poses significant questions in the domain of infant feeding. IHMS is a means of donating human milk from another lactating individual who is not the child's biological parent, in a casual manner, that is, without the involvement of health professionals or agencies. The advent of digital technology has facilitated the donation and receipt of human milk through digital online platforms and thus has amplified this modern practice. This research aims to comprehensively examine and synthesize evidence about the motivations, barriers, facilitators and perspectives of individuals who both donate (donors) and the primary care givers of the infants who receive (recipients) human milk informally to provide to infants.

Methods: A mixed-methods systematic review will be undertaken. This review will consider qualitative, quantitative and primary mixed-methods studies which report on the factors associated with informal milk sharing, and on donors and recipients' perspectives of the practice. Primary mixed-method studies will be included if the individual qualitative and

quantitative components can be extracted. Three databases will be searched for studies on IHMS published from inception of the database. Study quality will be evaluated using the standardized JBI critical appraisal tools, selected based on the methodology in each individual study. Data extraction will be conducted using the JBI mixed methods data extraction form followed by data transformation, synthesis and integration. This mixed-methods systematic review will follow a convergent integrated approach in accordance with JBI guidance.

Discussion: IHMS is a novel practice in the domain of infant feeding. This review will enable a thorough understanding of this practice from both the donors and recipients' perspective and will have implications for healthcare professionals, policy and future clinical decision-making.

Protocol registration number: PROSPERO CRD42023405653

Keywords

IHMS, peer milk sharing, donor breastmilk, online milk sharing, mixed methods systematic review.

Introduction:

Breastfeeding is one of the most beneficial public health endeavours to optimize child health and survival (North *et al.*, 2022). The World Health Organization (WHO) advocates the early initiation of breastfeeding at birth, exclusive breastfeeding until 6 months and the continuation of breastfeeding along with complimentary foods until 2 years of age and beyond (WHO, 2021). Breastfeeding is an integral component of many of the Sustainable Development Goals (SDGs) which are espoused by all member states of the United Nations (UN). The SDGs comprise of 17 interlinked global goals intended to create a healthier and more sustainable world. It has been affirmed that breastfeeding is crucial to achieving many of the SDGs which aspire to end poverty, protect the planet and ensure peace and prosperity for all (United Nations, 2022, Holden, Linnerud and Banister, 2017). Breastfeeding has numerous recognised benefits which span individual, societal, environmental and economical domains. Human milk itself is a complex, individual-specific bodily fluid which

is dynamic. It is characterised by vast individual variability pertaining to nutritional composition and bioactive constituents (Mosca and Giannì, 2017). Correspondingly, scientific research has confirmed that human milk is the perfect, unparalleled source of nutrition for infants. Therefore, the need to position breastfeeding as a global public health priority is acknowledged. Globally, only 44% of infants aged 0-6 months are exclusively breastfeed (WHO, 2021), which is suboptimal given the multiplicity of benefits derived from breastfeeding. Notably, there is often a disparity between the intention to breastfeed and the actuality as often the barriers to breastfeeding transcend beyond individuals and encompass social, cultural and political tiers (Brown, 2017).

It is widely acknowledged that there is no one universally accepted definition or explicit meaning of the term 'breastfeeding'. Breastfeeding is a complex process and comprises a multitude of meanings and dimensions. Notably, it has been articulated that there is a lack of accuracy and consistency in uniformly defining breastfeeding (Labbok and Krasovec, 1990). Consequently, the term 'breastfeeding' alone falls short of adequately describing and defining the many infant feeding behaviours which incorporate the provision of breastmilk to an infant. However, the term 'breastfeeding' is typically recognised as being direct feeding of an infant at the breast (Rosenbaum, 2022). Nevertheless, this term can also pertain to a variety of other practices which can include: combination feeding which is also recognised as non-exclusive feeding where an infant receives both breastmilk and CMF, and exclusive breast milk pumping whereby the infant receives only breastmilk expressed from their mother. More than three and a half decades have elapsed since it was acknowledged that the term 'breastfeeding' alone was inadequate to precisely depict the multitude of breastfeeding behaviours that are recognized within the domain of 'breastfeeding' (Labbok and Krasovec, 1990). At this juncture, The Interagency Group for Action on Breastfeeding devised specific categories where standardised and consistent terminology relating to defining and categorising breastfeeding (Labbok and Krasovec, 1990).

It has been stated that when breastfeeding is unsuccessful or cannot be undertaken, parents may choose to exclusively pump or provide CMFs (Rosenbaum, 2022). Some infants in paediatric or neonatal intensive care units (PICU/ NICU) may receive donated human milk which is medically prescribed and provided by a milk bank when a mother's own milk (MOM) is not available. Human milk banks (HMB) play a fundamental role in the provision

of donor human milk (DHM) to infants who cannot otherwise receive their mother's own human milk (MOM) (Haiden and Ziegler, 2016). DHM is predominately reserved for infants born preterm where it has been widely affirmed that DHM as a substitute for MOM has instrumental benefits including improving clinical outcomes and reduction in the two central causes of mortality in this vulnerable cohort, namely sepsis and necrotising enterocolitis (Cortez *et al*., 2018; Patel and Kim, 2018; Tran, Nguyen and Mathisen, 2020; Miller *et al*., 2018). HM is beneficial for the health of infants as clinical practices have demonstrated that numerous beneficial components are preserved following pasteurisation of the human milk (Peila *et al.*, 2016). What is more, the provision of human milk to infants reduces the risks associated with CMF feeding such as otitis media, asthma, types 1 and 2 diabetes, atopic dermatitis, and infant hospitalisation secondary to lower respiratory tract diseases (McNiel, Labbok and Abrahams, 2010). There is global agreement that MOM is the preferred source of nutrition for infants and if not available pasteurized donor human milk (DHM) from an established milk bank is the preferable choice (Daniels *et al.*, 2017; ESPGHAN Committee on Nutrition *et al.*, 2013; Pound, Unger and Blair, 2020; WHO, 2011). In recent years, an alternative means of providing human milk to an infant is when parents undertake the practice of IHMS (IHMS) which comprises receiving donor human milk in an informal means without the use of a milk bank (Rosenbaum, 2022).

The practice of human milk sharing is not a new entity and has origins in antiquity. Accordingly, this practice has evolved from an alternative feeding practice for 'need', whereby this practice was essential for infant survival to contemporary times where substitutes are available, such as CMFs and donated non-maternal human milk. The sharing of milk derived from the practice of 'wet nursing' whereby infants were breastfed by a lactating woman who was not the biological mother of the infant. This ancient practice and alternative means of feeding has evolved considerably from being a necessity (2000BC) for infant survival, to a substitute of choice (950BC to 1800AD) (Stevens, Patrick and Pickler, 2009). This phenomenon of human milk sharing has progressed further and diffused from the practice of wet nursing to the sharing and receiving of pumped breastmilk via milk banking, and further again to involve the practice of informal, 'peer-to-peer' human milk sharing. The interchangeable terms for human milk sharing are noted as 'peer to peer milk sharing' and 'IHMS' as this practice is dependent on the donors and recipients to collaborate

and agree the specific terms of the exchange (Palmquist *et al.*, 2019). Human milk sharing is described in the literature as the voluntary, altruistic and commerce-free trading of human milk for infant feeding, outside of the milk banking system (Peregoy *et al.*, 2022). In recent years, 'for-profit' human milk banks have been established. These private entities operate a business where breastmilk is purchased from a lactating woman and then processed and sold to hospitals (UNICEF, 2021). Additionally, various online platforms and internet sites facilitate the commercial sale of human milk by individuals who are expressing milk and can advertise specific details such as images and the cost of human milk per volume (Steele *et al.*, 2015).

The advent of digital technology and advancement of social media has had an explicit influence on informal milk sharing among people in online communities, where more information relating to this practice has become available in recent years (Akma Jamil *et al.*, 2021). Additionally, parallel advancements in relation to refrigeration and high-quality, double electric breast pumps have also facilitated the increased impetus in this modern practice (Peregoy *et al.*, 2022). Consequently, over the past decade, research into the practice of online breastmilk sharing has become more prevalent corresponding with the advancement in digital and online networks, internet enabled smart phones and social networking apps (Akma Jamil *et al*., 2021; Noyes, 2020).

In recent years, there has been an increasing number of studies exploring various areas relating to the practice of IHMS (IHMS), but at present, there is no existing or ongoing mixed-method or individual systematic review on the subject. Preliminary searches of CINAHL (EBSCOhost), Scopus (Elsevier), and MEDLINE have been undertaken and no systematic reviews on the topic were identified. There have been two recently published scoping reviews which have mapped the existing literature on the practice of IHMS in the US and globally, respectively (Kullmann, Adams and Feldman-Winter, 2022; Akma Jamil *et al*., 2021). These prominent reviews in the field of IHMS have provided the impetus to enrich the breadth and depth of understanding of this contemporary practice. Thus, there is a justification for undertaking a MMSR on this subject to efficiently integrate the existing evidence with the intention of providing explicit information including whether findings are consistent within the literature and can be generalized across settings and populations, as well as informing healthcare decision making in the future (Büchter, Weise and Pieper, 2020)

(Mulrow, 1994). This MMSR will provide a comprehensive and methodological synthesis of the broader topic of IHMS and more specifically include the perspectives of donors and recipients and the factors associated with the practice. This review will also guide future research on the topic of IHMS.

Study aim and review questions:

A mixed-methods systematic review (MMSR) is proposed to evaluate the quantitative, qualitative and primary mixed-method studies pertaining to the practice of IHMS. The following questions aligned to the review question are:

•What are the factors (motivations, barriers and facilitators) associated with the practice of IHMS?

•What are the perspectives of recipients and donors on IHMS?

The findings of this review will be of value to researchers, healthcare professionals and policy makers. It will develop a richer understanding of the factors which are associated with this practice and it will enrich our understanding of the subjective perspectives of both donors and recipients of IHMS.

Methods:

Inclusion criteria

This MMSR protocol has incorporated a PICo framework (Population, phenomenon of Interest, Context) as recommended by JBI for (MMSR) (Stern *et al.*, 2020), and this is visually represented below. The PICo framework (Table 1) facilitated the identification of the defining characteristics for the inclusion criteria for the MMSR.

Table 1: PICo framework:

Population: donors and recipients of IHMS
Interest: motivations, barriers, facilitators, perspectives of informal milk sharing

Context: globally

Population: The review will consider studies that include donors and/or recipients of IHMS. While the recipient of the human milk will be an infant, for the purposes of this MMSR the term recipient refers to the individual who sourced the human milk for the infant and in most studies this will be a mother, father, primary care giver, or biological/ non biological parent. Studies which include donors and/or receivers of human milk via milk banks will not be included. Additionally, studies which incorporate other means of milk sharing, specifically: formal and or/informal milk sharing with financial compensation will not be included as well as studies which include other means of milk sharing such as wet nursing. Studies that look at clinical outcomes of infants who are provided with human milk either from milk banks or by an informal means will not be included. Additionally, research which documents an exploration of perspectives from individuals other than recipients or donors of human milk will not be included.

Phenomena of interest: This review will consider studies which report on the concept of IHMS, specifically on donors' and recipients' human milk via an informal means and the factors associated with this practice, including the motivations, facilitators and barriers to this practice.

Context: This review will consider studies from any geographic location globally.

Type of studies: This MMSR will consider qualitative, quantitative, and primary mixed-methods study designs for inclusion. Primary mixed-methods studies will only be taken into consideration if it is possible to explicitly extract the data from the quantitative or qualitative components (Lizarondo *et al.*, 2022). The justification for this is founded on the JBI methodological guidance for MMSR which proposes that the disaggregation of quantitative data will need to be completed in primary-mixed methods studies (Stern *et al.*, 2020). In this instance, the disaggregated quantitative data will then be qualitized in order for the integration to occur. If primary-mixed methods studies are presented already in an integrated format and disaggregation cannot be conducted, these studies will be excluded. Included studies will comprise of peer-reviewed, published, full text articles and grey literature

sources. This MMSR will consider all languages and year of publication. The reference lists of articles attained will be manually searched for additional, pertinent papers.

The justification for conducting a MMSR is to develop contextual understanding on the topic and to enhance credibility through the amalgamation of diverse categories of evidence (Hong *et al.*, 2018). Additionally, conducting a MMSR will enable the enhancement, depth and richness of comprehension to facilitate an inclusive understanding of the evidence (Hong *et al.*, 2018). It will enable a comprehensive insight into the practice as well as ascertaining if the findings and evidence from the literature confirms, supplement or contradict one another, thus facilitating a rich and broad perspective on the subject of IHMS from a global perspective.

This proposed MMSR will be conducted in accordance with the JBI methodology guidance for conducting MMSRs as outlined in Chapter 8: Mixed methods systematic reviews in the JBI Manual for Evidence Synthesis (Aromataris and Munn, 2020). The protocol has been submitted and accepted for registration on International Prospective Register of Systematic Review PROSPERO CRD42023405653 . This MMSR will employ a convergent integrated approach as articulated in JBI guidance which includes data transformation and enables reviewers to merge quantitative and qualitative data (Stern *et al.*, 2020). This is the preferable approach, as the review question can be addressed by both research paradigms. This MMSR will follow the recommendations from JBI for reviewers following a convergent integrated approach which is the qualitisation of quantitative data, where quantitative data will be transformed and converted into textual descriptions (Aromataris and Munn, 2020). This will enable the converted data to be compiled together and thus facilitate integration (Stern *et al*., 2020).The mixing of data by the means of integration is a distinguishing feature of a MMSR and the appropriate integration is an instrumental defining characteristic of this type of systematic review (Stern *et al.*, 2020).

Search strategy

A comprehensive search strategy will aim to discover both published and unpublished studies. A three-phase process will be utilized for the search strategy as recommended by JBI. First, a preliminary search of CINAHL (EBSCOhost), Scopus (Elsevier), and

MEDLINE was undertaken incorporating key terms. These databases were selected due to their dependability and availability across an extensive range of subject areas. Following this, an analysis of key words/terms in the titles, abstract and index terms used to describe the articles obtained in initial preliminary search will enable a more comprehensive search strategy to be developed. The following databases will be searched from inception to date: CINAHL (EBSCOhost), , Scopus (Elsevier), MEDLINE and Embase (OvidSP). Subsequently, the reference lists for all studies selected will be manually examined for additional studies which may be included. Boolean operators and controlled vocabulary terms will be used as required for each database search. An additional search of grey literature will be completed based on the key terms used for the database search. This will include searching Google Scholar, Web of Science, Open Grey, Dissertation Abstracts International. It has been acknowledged that the inclusion of grey literature is vital to ensure a fully comprehensive systematic review.

Study selection

Following the search, all identified citations will be loaded into Zotero Citation Management System version 6/2022. These will be imported to Covidence. JBI recommends the incorporation of Covidence (reviewed in the October 2018 issue of the Journal of the Medical Library Association) for the screening process and then uploading the final studies into SUMARI for the continuation of the review process. Titles and abstracts will then be reviewed in Covidence by two independent reviewers for assessment against the inclusion criteria for the review. The full text of selected citations will be assessed in detail against the inclusion criteria by two independent reviewers. Each full text study which is excluded will be documented and reported in the systematic review. Any discrepancies that develop between the reviewers will be settled through discussions or with the help of a third independent reviewer where this cannot be resolved (Aromataris and Munn, 2020). The results of the search will be reported in full in the final review and presented in a Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRIMSA) flow diagram (Page *et al.*, 2021). The contemporary 27-item PRISMA checklist updated in 2020 and published in 2021 will be used (Page *et al.*, 2021).

Assessment of methodological quality

The final studies included will be appraised and evaluated for methodological quality. Quantitative and qualitative and the relevant components of mixed-methods studies which are selected for retrieval will be assessed by two independent reviewers for methodological quality using standardised critical appraisal instruments from JBI SUMARI, dependent on study design (Aromataris and Munn, 2020). Using the appropriate standardized critical appraisal tools from JBI SUMARI, the methodological quality of mixed-methods studies will be evaluated in connection to the qualitative components and quantitative components. If required, relevant authors of papers will be contacted to seek clarification or to request any missing data (Aromataris and Munn, 2020). Any disagreements that may transpire between the reviewers will be resolved through discussion or in consultation with a third reviewer. Following the critical appraisal, the results will be documented in descriptive format and visually presented in table format. Data extraction and synthesis will be performed on all studies, regardless of the results of their methodological quality results, where feasible (Aromataris and Munn, 2020). Grey literature will be appraised and evaluated by using the (Authority, Accuracy, Coverage, Objectivity, Date, Significance) AACODS checklist which was developed specifically for use with grey literature resources (Tyndall, 2010).

Data extraction

Quantitative and qualitative data will be extracted from all studies included in the review by two independent reviewers using the standardised JBI data extraction form for MMSR following a convergent integrated approach (Aromataris and Munn, 2020). Data extraction forms are the fundamental connection between the primary research studies and the systematic review and therefore a preliminary pilot test by two reviewers will be undertaken prior to the full systematic review (Büchter, Weise and Pieper, 2020). Specific information about the populations, research techniques, phenomena of interest, context, and results relevant to the review questions will all be included in the data that is extracted. The following information will also be included in the data extraction process: study design, methods, sampling technique, inclusion and exclusion criteria, study setting, geographic location, and significant findings aligned to the research questions. The quantitative data will be the results of statistical tests undertaken, which will be either descriptive and/or inferential, depending on data (Aromataris and Munn, 2020).The degree of credibility of qualitative data will be determined by how closely the findings match the themes and/or subthemes and the

corresponding illustrations (Aromataris and Munn, 2020). JBI guidance recommends three levels of credibility: unequivocal, credible and not supported (Aromataris and Munn, 2020). The foundation for evaluating, exploring, summarising, and elucidating the body of evidence is foremost initiated by data extraction forms, which are the vital link between primary original research and systematic reviews (Büchter, Weise and Pieper, 2020). As a result, their creation, trial testing, and use are fundamental steps in the process of conducting systematic reviews.

Data transformation

Following extraction, quantitative data will then be transformed into 'qualitized' data. This process will involve the transformation of quantitative data into textual descriptors or narrative interpretation of the quantitative results, so as to respond directly to the review questions. This process is recommended by JBI as it is less error-prone than assigning numerical values to qualitative data, termed quantitization (Stern *et al.*, 2020).

Data synthesis and integration

This review will follow a convergent integrated approach in accordance with the JBI methodology for MMSRs (Aromataris and Munn, 2020). This will comprise the assembling of the transformed, qualitized data with the qualitative data. Following this, the assembled data are then categorised and combined and integrated together based on similarities in meaning to create a set of integrated findings in the form of line of action statements.

Study status

This MMSR protocol has been developed and registered on PROSPERO (CRD42023405653). We are currently completing the systematic search which will be followed by screening, data extraction, data synthesis and integration as outlined above.

Discussion:

IHMS is a novel practice which is gaining momentum in recent times. This MMSR will facilitate a comprehensive understanding of this practice from both the donors and receivers of human milk carried out in an informal manner. This MMSR will help us gain a deeper

understanding of the factors that contribute to this practice as well as the perspectives of both donors and receivers of IHMS. It has been documented that MMSRs can augment the capability of findings and contribute to policy and clinical decision making (Stern et al., 2020). It is anticipated that the findings from this MMSR will be beneficial to healthcare professionals, researchers and policy makers, as well as providing a robust and comprehensive understanding of this practice from various perspectives.

Dissemination:

This MMSR will be submitted for publication in scientific journals and will be made publicly available as open access.

Data availability:

Underlying data
No data are associated with this article.

Reporting guidelines

Zenodo: Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) checklist for "Perspectives and factors associated with IHMS: a mixed-methods systematic review protocol". DOI 10.5281/zenodo.7790311 (Vickers et al., 2023).

Data are available under the terms of the Creative Commons Attribution 4.0 International License (CC-By 4.0).

Competing interests:

No competing interests were disclosed.

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Appendix B: Informal Human Milk Sharing Discussion Paper

This work presented has been published in the Journal of the European Lactation Consultants Alliance:

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As per DCU Guidelines for candidates, supervisors and examiners on the 'PhD by Publication' format, the PDF versions of published works for the publication outlet cannot be included in the PhD thesis, and all published work should appear in manuscript/thesis format. The content presented in this thesis is correspondent with the content of the published papers, with the exception of minor formatting variations.

Authors Vickers N, Matthews A, Paul G.

Abstract

Informal human milk sharing (IHMS) involves lactating women donating their own human milk for several reasons including oversupply or perinatal loss. Although there are risks involved, parents may seek donor milk for their baby in a range of scenarios such as breastfeeding challenges. IHMS is known to occur between friends, relatives and acquaintances, but more recently with the advent of social media the prevalence of online IHMS among strangers has increased. Many professional and healthcare organisations advise against IHMS. There is consensus in the literature that guidelines are required to educate health professionals and parents so that parents can make informed decisions around donating and receiving milk through informal means.

Introduction

The World Health Organization (WHO) recommends that babies are breastfed exclusively for the first six months of life and up to the age of two years in combination with complementary foods (WHO, 2018). Exclusive breastfeeding and exclusive human milk play an important role in child survival, optimal health and development (Sriraman et al 2018;1; Victoria et al, 2016). The advantages of breastfeeding transcend beyond individual benefits, encompassing positive outcomes in societal, environmental and economic domains (Vickers, Matthews, Paul 2023).

In recent years informal human milk sharing (IHMS) has become more common. Despite the risks involved in the IHMS, parents may seek donor milk for their baby in a range of scenarios such as breastfeeding challenges or if a mother is forced to cease breastfeeding for a medical reason. Therefore, the practice is very relevant to International Board Certified Lactation Consultants and health professionals caring for mothers and babies. This article provides insight into the practice, in particular the mechanisms of informal milk sharing, international evidence and guidelines and sources of information on IHMS.

Informal Human Milk Sharing

The practice of human milk sharing has deep historical roots and is not a contemporary phenomenon. It can be traced back to the tradition of wet nursing, wherein a lactating woman, who is not the biological mother, breastfeeds an infant. This practice, also termed as cross-nursing, has been documented in various cultures throughout history (Wagg, Hassett, Callanan et al, 2022). This phenomenon has progressed significantly since its inception owing to a multitude of factors such as the availability of breast pumps and the capability to store expressed human milk has significantly enhanced the viability and practicality of human milk sharing (O' Sullivan, Geragthy and Rasmussen, 2016).

'Human milk exchange includes human milk banking, human milk sharing, and markets in which human milk may be purchased or sold by individuals or commercial entities' (Palmquist et al, 2019;453). Human milk sharing is also known as peer-to-peer, informal, casual, or private-arrangement milk sharing (Palmquist et al 2019). IHMS refers to the practice of the voluntary and commerce free (i.e. not bought/ sold) exchange of human milk outside of the formal milk bank system (Peregoy et al., 2022). IHMS involves lactating women donating their milk for various reasons such as they have an oversupply, they have milk that is not suitable for their baby due to infant illness, or they have experienced perinatal loss (Sriraman et al 2018;1). The practice has become more common in recent years (Akma Jamil et al 2021, Sriraman et al 2018).

Mechanisms of Informal Human Milk Sharing

IHMS is facilitated via friends, relatives and local communities, and online through social media (Palmquist et al 2019). International research has identified an increase in the practice of IHMS in recent years linking it to the advent and growth in use of social media (Akma Jamil et al 2021; Sriraman et al 2018), with the practice currently being commonly facilitated through websites and social networks. The first internet-based milk sharing organisation Eats on Feets was established in 2010 (Akma Jamil et al 2021), and along with Human Milk 4 Human Babies they are the "two primary organizations that facilitate the bulk of online IHMS by hosting region-specific Facebook groups, providing fora for donors and recipients to connect." (Peregoy, 2022;3).

International Evidence on Informal Human Milk Sharing

There has been increased research and scholarly attention on the practice of IHMS in recent years across various geographical contexts. This includes two scoping reviews mapping the existing literature on IHMS globally (Akma Jamil et al, 2021) and in the United States of America (Kullmann et al., 2022). A recent mixed-methods systematic review undertaken by Vickers, Matthews and Paul (2024) provided explicit insights into the factors that motivate, facilitate and impede donors and recipients of IHMS. Donor milk bank inaccessibility has been identified as a key motivator for recipient parents to source donor milk informally. Correspondingly, it has also been cited as an enabler to IHMS where various limitations or restrictions of donation to milk bank systems has enabled the sharing of milk informally (Vickers, Matthews, Paul, 2024). A further recent study by Harris et al (2024) reports that IMHS is common in New Zealand both in clinical and community settings, attributing the increase in popularity in the practice to the limited access to Human Milk Banks (HMB).

O'Sullivan et al (2016) report that women's motivations for donating milk are predominantly altruistic, and reasons parents may seek out donor human milk for their baby include the mother experiencing low milk supply and other breastfeeding challenges. In a national survey of 456 US mothers, 94% had heard of an infant being fed human milk from another mother, 12% had informally shared her milk and 7% had received milk from another mother (O'Sullivan, 2018). The most common source of milk was from a friend or a person the mother knew. In their review which included twenty-four studies, seventeen of the studies reported that the exchange of human milk via digital (social media) platforms was frequent (Vickers, Matthews, Paul, 2024). Several studies have noted that recipients often employ informal or lay methods for screening potential donors (rather than formal processes which are requisite for formal milk donation) before accepting donor human milk via an informal means. The most cited areas of lay screening include asking about the donor's use of alcohol, medications and smoking. Open communication between donors and recipients does foster reassurance, comfort and trust (Vickers, Matthews, Paul, 2024).

Guidelines and Sources of Information on Informal Human Milk Sharing

While the desire to give a baby human milk is important to many families, there are risks for the baby associated with consuming informally shared human milk such as the potential exposure to infectious diseases and contamination from chemicals such as illegal drugs, some prescription drugs and bacteria (US Food and Drug Administration, 2018). In view of these risks a number of national and professional organisations advise against IMHS including the US Food and Drug Administration (2018), the European Milk Bank Association and the Human Milk Banking Association of North America (2015) and the American Academy of Pediatrics (2022).

There is consensus in the literature that parents must be educated about the risks as well as the benefits of IHMS in order to make an informed choice. However, there is widespread concern regarding the accuracy and reliability of online sources information about IHMS (American Academy of Nursing on Policy, 2016) and both parents and health professionals have called for the development of guidelines to support the safe sharing of human milk (Harris et al 2024).

The Academy of Breastfeeding Medicine Policy Statement of Informal Breast Milk Sharing for the Term Healthy Infant provides detailed guidance for healthcare professionals on educating parents on the benefits and risks of IHMS including screening donors and safe milk handling practices (Sriraman et al, 2017). They strongly discourage internet-based IMHS particularly if the milk is being sold (Sriraman et al, 2017).

Conclusion

Human milk constitutes the primary and unparalleled source of nutrition for infants. IHMS represents a contemporary and rapidly evolving practice. Whilst there is some literature on IHMS further evidence is required regarding the extent of the practice, the risks and benefits involved, and risk reduction strategies. This is supported by Azad et al (2021) who identify the study of alternative modes of human milk feeding such as milk sharing as one of the key

priorities in future breastfeeding, human milk and lactation research. As the practice of IHMS becomes more common, professionals involved in breastfeeding support must possess the necessary evidence and skills to engage in these conversations effectively to empower mothers in making informed choices (Wagg, Hassett, Callanan et al, 2022).

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Appendix C: Expression of Interest Form For Qualitative Interviews Provided at the End of the Quantitative Survey

Thank you so much for taking the time to complete our anonymous survey and participating in this study. This is the final page of the survey. In order to submit your response, you must click 'Next' at the bottom of this page.

Expression of Interest Form

When you click 'Next', you will be automatically redirected to an information page about Phase 2 of the study. If you are interested in participating in Phase 2 of this study (online interview), you will then be asked to read the information and confidentially provide your name and email address so that the lead researcher can contact you to arrange an online interview

Appendix D: Synthesis, Integration and Qualitization of Motivations, Enablers and Barriers of Donors Associated with IHMS

Donor motivations **1: Desire to help (Altruistic motivation and value)**	
Author, Year	**Findings (Sample Excerpts)**
Keim *et al.*, 2014	'stated reason for providing milk included to help someone in need'
Perrin *et al.*, 2016	I mean it made me feel really good that I was able to not only supply the nutritional value to my son, but to help out another child that could use it'
	'I struggled to breastfeed, but then to find out that you're not able to exclusively breastfeed your baby must feel so disheartening. So I was really excited to do that for them and also I felt so fortunate to have so much extra milk because I know that there were other mothers who were going back to work and weren't able to breastfeed as long because they couldn't pump much at work and then they lost their supply. I obviously had no issue with that so I felt really lucky to be able to do that for other moms'
	'I mean it made me feel really good that I was able to not only supply the nutritional value to my son, but to help out another child that could use it'
Wilson (2018)	'There is nothing better to give your baby than breastmilk and to be able to give it to another baby and knowing I am helping them grow is phenomenal. It is amazing.
Thorley, 2009	

	[I was] very proud to be able to help this mother and father achieve their goal of not having to give baby any milk other than human milk before her repair surgery
Thorley, 2012	'Happy to help a baby who needed milk for one reason or another to help a mother in need'
Obeng *et al.,* 2019	'I was engorged. And she wasn't producing enough to feed her child but was determined to stick to the 6 months rule'
Papanicolaou, 2013	'I thought it was a great way to help someone who [was unable to] feed their baby breast milk for whatever reason…I wanted to help someone else…you are giving the baby the best start possible'
Gribble, 2018	'I love being able to see her son grow and to know that I contributed to his health. I would not want it any other way'
Brezzler *et al.,* 2020	We all just help one another, we felt by doing this we were giving ourselves over to Him. It was more than actually helping the child it was providing hope for the parents and family'
Gribble, 2014	'I had a very easy time producing breastmilk and wanted to help out'
Donor motivations 2: Excess/surplus milk (Altruistic motivation and value)	
O' Sullivan et al., 2016	'It was like 30 bags I just donated to some moms [through the Internet] because I just realized I had way too much in the freezer that I was probably not going to be able to use' '[My friend] called me and asked if she could have this, all the milk that I had stockpiled, and so I gave her like hundreds of ounces of milk'

Papanicolaou, 2013	I have been cursed and blessed with an abundant supply. If (daughter's name) decides to skip one feeding a day, I can totally tell and it is something that I always have to work on… I remember talking to a lactation consultant at the very beginning saying you know when am I going to stop leaking all over the place? And she said oh, like when your body adjusts…I still leak all over the place. 'I just gave it [reference to human milk] away because I literally had so much… We had it in everybody else's freezer; we had to get it out of everybody else's freezer. So once we emptied the first freezer load, then we could go collect it from the [other] houses [where] we had it [stored]'
Thorley, 2009	'I was honoured that she would use that from me as obviously it was bodily fluid. I was [pleased] it wouldn't go to waste'
Gribble, 2014a	'I was not able to throw that precious milk away' 'I have an oversupply'
Brezzler et al., 2020	'Somebody posted that they needed milk for a sick baby in a social media group that I am a part of, many mothers had commented on the posts so I felt safe to say that I had a freezer full and I could help'
Wilson, 2018	'In case I do [need milk], I always have it in the back of my mind, "What if my supply drops again?" Or if something happens, and then I'm not able to produce. I always want to make sure I'm fully stocked more than enough, and then if I have the surplus and then go ahead and donate'

Donor motivations 3: Milk bank restrictions and objections (Resistance to commercialisation and overcoming inaccessibility)	
Gribble, 2013	'The tests, rules, and how they treated my milk put me off. I hated the idea of sending my milk somewhere and have it treated like a specimen instead of the life force it is. I hated not knowing where my milk was going. I also hated the idea of my milk being sold to another family when it didn't need to be' 'I like that my milk isn't fully processed when I share it with the family I donate to- all the good antibodies and cellular components etc are retained and able to be used instead of lost in the "cleaning" process that milk bank milk undergoes' 'I prefer to donate directly to the mother because I know exactly where my milk goes, I know it won't be pasteurized and I know it's free of charge to the mother in need' 'I would not donate to a milk bank because I don't support the way they charge exorbitant amounts of money to families who are obviously in need'
Papanicolaou, 2013	I did think about [donating to] a milk bank but it was out in [province in Canada]…so the idea of like shipping it…Kind [of] made me think mmm no, you know, I [will] just hold on to it and then I came across the other option[reference to the online sharing of human milk utilizing a commerce-free approach].

Gribble, 2014a	It was noted that donation for some to a milk bank was not possible, practical, or acceptable to them
Perrin *et al.,* 2016	'…they required that you go in for blood testing and do an interview and with a 12-week-old, and a full-time work schedule, I knew I didn't have the time to go through the protocols that they would require. I' m not sure exactly what it is, but I know that it's very cost prohibitive for people if their insurance doesn't cover it and even though it's a nonprofit, I don't believe that somebody is not getting rich off of mothers donating their milk and I don't like that. . . . Yeah, I mean the people who work there are certainly making money. Just like all of these other nonprofits that you hear of where the CEOs have ridiculous salaries." 'From what I understood it was basically just mixed with everyone else's milk that was donated and then all pasteurized and then sold to different moms or people who wanted it for their kids. I'd heard that sometimes it was donated to preemies, but most of the time it was a money thing, which I wasn't super pleased about.
Donor motivations **4: Wanted to know where the milk was going (Altruistic motivation and value)**	
Perrin et al., 2016	'I wanted to hear why they needed the milk a little bit more to make it more personal for me'
Gribble, 2018	'It's very important also so I can be sure the milk is being used as intended to be used when I donated it'
Donor motivations **5: Commerce free approach (Resistance to commercialisation and overcoming inaccessibility)**	
Gribble, 2013	'I know it's free of charge to the mother in need' 'I hated not knowing where my milk was going. I also hated the idea of my milk being sold to another family when it didn't need to be'

Donor motivations 6: Intrinsic value and significance of breastmilk (Altruistic motivation and value)	
Perrin *et al.,* 2016	'I actually even still to this day, I'll look at my son just amazed that not only did he grow inside of me, but for the first part of his life where he wasn't eating other foods, he was solely sustained just on what my body created and made for him and it's just an awe'
Wilson, 2018	'the healthiest thing that [babies] can eat' 'There is nothing better to give your baby than breastmilk and to be able to give it to another baby and knowing I am helping them grow is phenomenal. It is amazing. The fact that they are getting the vitamins and nutrition that they need and it is ready-made …. You have it so that they can have it. That is the reason why God gave it to you …. It was a rewarding experience because it was something that my body can actually do.
Thorley, 2009	I was honoured that she would use that from me as obviously it was bodily fluid. I was [pleased] it wouldn't go to waste.
Papanicolaou, 2013	I think when you are in community with breastfeeding women; I think you understand the power of breast milk. So, it is something that resonates with all of us. It is the healthiest for them. Healthy for mom and healthy for baby

	'I think that breastmilk is an extremely important part of the growth and development of a child and every parent should have the option.to provide this to their infant.'
Gribble, 2014a	More than half of respondents donated expressed breastmilk that their infant did not require, and most did so because they did not want milk to be wasted.
Brezzler *et al.*, 2020	This (my milk) is one of the most powerful things that God has created…
Donor motivations **7: Perceived deficits of formula (Resistance to commercialisation and overcoming inaccessibility)**	
Wilson, 2018	'Why would you want to buy formula, when I have all of this frozen milk?' 'The fact that they are getting the vitamins and nutrition that they need and it is ready-made'
Thorley, 2009	'I was very proud to be able to help this mother and father achieve their goal of not having to give baby any milk other than human milk before her repair surgery'
Gribble, 2018	'The baby I donate to has been able to stay on exclusively breastmilk for a long time now …. Since being on breastmilk exclusively, he is growing and thriving and experiences none of that discomfort'
Donor Enablers **1: Social media and internet (Synergistic enablers: uniting digital and personal connectedness)**	
Papanicolaou, 2013	'I went home and Googled share milk and I found it on Facebook. That is how I found it. So, that is how it started and I just found somebody, I found the [name of organization], so I just posted it on there' 'You know we have kept in touch a little bit and if I do have extra milk, I will just email her and say next time you are in [the area], you can come and get more'

Gribble, 2018	Internet-based peer-to-peer milk sharing is facilitating not only the most personal of exchanges but also the development of real relationships
Brezzler *et al.*, 2020	Somebody posted that they needed milk for a sick baby in a social media group that I am a part of, many mothers had commented on the posts so I felt safe to say that I had a freezer full and I could help. It was very easy to do because all the instructions are online, I learned how to make my body make more milk, so I still had enough for my baby at home. The women were all supportive and encouraging online it was like one big family working together to care for our community. I looked online to see if there were any other families in need to begin the process again.
Perrin *et al.*, 2016	'I came across an article about milk sharing and so I kind of started, you know how they have links and stuff, clicking through the links and realizing that I could donate all this excess that I have just been dumping down the sink and I was really excited about that because it felt like such a waste, you know."
Donor Enablers **2:Donor milk bank inaccessibility (Resisting commercialisation and overcoming inaccessibility)**	
Perrin *et al.*, 2016	'..my first thought was to go through a milk bank, but when I looked into it and the closest milk bank was like 45 minutes away and they required that you go in for blood testing and do an interview and with a 12-week-old, and a full-time work schedule, I knew I didn't have the time to go through the protocols that they would require."
Gribble, 2013	"I didn't want to deal with the hassle of packing/shipping or taking milk to a milk bank. Also, I didn't want to have to get blood tests each time like I've read many milk banks ask you to. It's time consuming," and "I would have had to pump at least 300oz within one month to qualify to donate.

	I'm not permitted to donate to U.S. milk banks as I lived in the UK and I'm considered a risk for transmitting mad cow disease. 'I had enquired into donating to a milk bank and was told that they were not taking any more donations due to financial reasons' 'I wanted to donate milk to a milk bank and attempted to contact the one closest to me but never got a response' "[I had milk in my freezer to donate but] I was told I would have needed to be pre-screened before I started pumping
Gribble, 2014	A few respondents noted that donation to a milk bank was not possible, practical, or acceptable to them
Papanicolaou, 2013	I did think about [donating to] a milk bank but it was out in [province in Canada]…so the idea of like shipping it…Kind [of] made me think mmm no, you know, I [will] just hold on to it and then I came across the other option[reference to the online sharing of human milk utilizing a commerce-free approach].
Donor Enablers **3: Facilitating personal connections (synergistic enablers: uniting digital and personal connectedness)**	
Gribble, 2013	'I prefer to donate directly to the mother because I know exactly where my milk goes' 'I think it was very important to know why that mother needed milk. I feel like I was giving a part of myself away, so I wanted it to go to someone who truly needed it," and "I did want to know the circumstances so that I was sure it was not going to be wasted or sold on" is very important to me to make sure the milk that I have expressed will be used to provide nutrients for a baby in need.

Gribble, 2018 **Papanicolaou, 2013**	It is a sacrifice and if I know the situation it is motivational for me to sit with pumps attached to me multiple times a day. I do this because I know the mother and baby I donate to, and truly care for them. Knowing where the milk is going It's very important also so I can be sure the milk is being used as intended to be used when I donated it. The baby I donate to has been able to stay on exclusively breastmilk for a long time now …. Since being on breastmilk exclusively, he is growing and thriving and experiences none of that discomfort You feel a little bit like you are judging these people based on their stories and you [are] judging the need almost. How do you say that one person needs it more than another?...I would probably say I, rightly or wrongly, I did look at the circumstances…I would prefer to give my milk to someone who I felt in my opinion needed it more. So, again rightly or wrongly.
Donor barriers **1: Healthcare related barriers (Lack of awareness and acceptance of IHMS in healthcare settings)**	
Perrin *et al.*, 2016 **Brezzler *et al.*, 2020**	Most participants reported that they received no information about milk exchange options and considerations from health care professionals I didn't even really bring it up with the doctors and they never brought it up to me. I think it was mostly me just looking stuff up on my own without any outside professional input on the matter Conversations about milk exchange that were initiated by health care professionals were rare, but when they did happen, it was most often initiated by a midwife, doula, or lactation consultant.

Papanicolaou, 2013	The hospitals have so many rules, I don't want to say anything wrong and mess things up where the baby won't be able to receive any more donor milk. Things are kept very private. I don't know who else may have been involved, we just did what we believed without thinking whether we were allowed or not, like with hospital protocols It still felt like I was doing some kind of back alley black market deal, like there was something, you know, wrong about it because [it] was [not] Government regulated…it does feel like you [are] some kind of secret society.
Donor Experiences **1: Desire to assist (Selfless acts with conceptual significance)**	
Papanicolaou, 2013	I feel happy. I am doing something good for someone else, someone that I do [not] even know…I think those kinds of things [provide] you [with] some…soul, happiness, and peace. (Mrs. Grant)It [is] the same feeling you would get through any altruistic act, you get happiness, [a] sense of purpose [and] a sense of well-being. It makes you feel good
Gribble, 2018	I love being able to see her son grow and to know that I contributed to his health. I would not want it any other way. [D55]- that baby got human milk, the health impact of milk on the baby
Gribble, 2013	'It's gratifying to hear a story of a child in need and know that I am able to help'
Perrin *et al.,* 2016	'I mean it made me feel really good that I was able to not only supply the nutritional value to my son, but to help out another child that could use it'
Wilson, 2018	'There is nothing better to give your baby than breastmilk and to be able to give it to another baby and knowing I am helping them grow is phenomenal. It is amazing.
Thorley, 2009	'I was very proud to be able to help this mother and father achieve their goal of not having to give baby any milk other than human milk before her repair surgery'

	'I was honoured that she would use that from me as obviously it was bodily fluid. I was [pleased] it wouldn't go to waste.
Thorley, 2012	'Happy to help a baby who needed milk for one reason or another to help a mother in need'
Brezzler et al., 2020	'We all just help one another, we felt by doing this we were giving ourselves over to Him. It was more than actually helping the child it was providing hope for the parents and family'
Gribble, 2014	'I had a very easy time producing breastmilk and wanted to help out'
Keim et al., 2014	'stated reason for providing milk included to help someone in need'

Qualitization of quantitative data relating to donor motivations, barriers and enablers

Study	**Quantitative findings**	**Quantitative transformation/ qualitized data**	**Emerged Category**
Onat and Krackoc (2019)	83.3% desired to help someone	Desire to help someone	1 Motivation- desire to help (Altruistic motivation and value)
Onat and Krackov (2019)	83.3% reported excess milk production	Almost all had an excess/surplus of milk	2 Motivation- excess/surplus milk (Altruistic motivation and value)
Onat and Krackov (2019)	68.8% did not need the milk they expressed	The majority had an excess/surplus of milk	2 Motivation- excess/surplus (Altruistic motivation and value)
Onat and Krackov (2019)	68.8% did not pass the predonation screening	Did not pass formal milk donation screening/milk bank inaccessibility	3 Motivation- Milk bank restrictions and objections (Resistance to commercialisation and overcoming inaccessibility)

Onat and Krackov (2019)	67.1% generally asked about the reason for accepting donated milk	Donors wanted to know the source of the recipient and reason for receiving	4 Motivation- Wanted to know where the milk was going (Altruistic motivation and value)
Onat and Krackov (2019)	100% of donors received no payment	Commerce free approach	5 Motivation- Commerce free approach (Resistance to commercialisation and overcoming inaccessibility)
Onat and Krackov (2019)	60.4% donated through the internet on milk sharing sites	Social media and internet sites are the most common means of milk sharing	1 Enabler- Social media and internet (Synergistic enablers: uniting digital and personal connectedness)
Onat and Krackov (2019)	68.8% did not pass the predonation health screening	The majority did not pass formal donation screening/milk bank inaccessibility enabled informal sharing	2 Enabler- Donor milk bank inaccessibility (Resisting commercialisation and overcoming inaccessibility)
Onat and Krackov (2019)	83.3% deliver milk face-to-face	Almost all meet the recipient in person enhancing personalisation of the exchange	3 Enabler- Facilitating personal connections (synergistic enablers: uniting digital and personal connectedness)
Palmquist and Doehler (2016)	96.2% donate milk face-to-face	Almost all meet the recipient in person enhancing personalisation of the exchange	3 Enabler- Facilitating personal connections (synergistic enablers: uniting digital and personal connectedness)
O' Sullivan *et al* (2018)	Of those who provided their HM to another, most, 60%provided it to a friend or other person they know	A majority know the recipient personally	3 Enabler- Facilitating personal connections (synergistic enablers: uniting digital and personal connectedness)

Onat and Krackov (2019)	85.4% of donors stated that healthcare workers did not recommend milk donation	The majority of healthcare workers do not support milk donation	1 Barrier- Healthcare related barriers (Lack of awareness and acceptance of IHMS in healthcare settings)

Synthesis, Integration and Qualitization of Motivations, Enablers and Barriers of Recipients Associated with IHMS

Synthesis and Integration of Recipients

Recipient motivations **1: Physical or physiological challenges (maternal or infant factors)**	
Author, Year	**Findings (Sample Excerpts)**
Papanicolaou, 2013	'I was domperidone. I was on the herbs. I was nursing, I was trying to use a SNS[supplemental nursing system]. I was doing everything I knew how and I still just was not producing after a number of weeks. I was just not producing a lot of milk'
Gribble, 2014	'I tried EVERYTHING to increase my milk supply this 3rd time [I had previously tried everything my lactation consultants told me, but while I was pregnant w/#3, I immersed myself in finding information about how to overcome and keep nursing despite [having insufficient glandular tissue]…' 'I have never been able to make enough milk to sustain any of my children' 'I was unable to produce enough milk for my daughter'

McCloskey and Karandikar, 2019	'Baby was not gaining weight, after many months of effort to gain a sufficient supply of milk 1 looked into other options' ‘An IBCLC that I saw through the hospital we were being treated at [diagnosed me]. The diagnosis was made by assessing our history (we were in SCU at day 5 due to severe dehydration in baby) and a physical examination (wide set, tubular breasts)’ ‘I was unable to breastfeed due to a lack of production. No one has been able to identify a cause or come up with a cure' ‘Our... child had four tongue clippings... Mother could no longer breastfeed due to pain and nipple damage from baby Even after the medical procedures were completed, breastfeeding pain never ceased’ ‘My daughter was born 5 weeks prematurely and had a very poor suction reflex. She was unable to latch for breastfeeding until she was 7 weeks old’ ‘I wanted her to have the nutrition of breast milk, but wasn’t really capable to produce myself. I know it’s [inducing lactation] possible, but that looked pretty overwhelming in this situation [adoptive parent]. So, when I found out, you know, that I could have the benefits of breast milk through a donor’ ‘The benefits were really specific for us because of [son’s name] disease. I didn’t want to put a shock to his system of trying formula, of which he’s never had before and I wouldn’t know the consequences without trying it. So, formula, or anything like that wasn’t really ever an option’ (n=1) struggled with flat nipples, her son’s inability to latch, a subsequent tongue-tie diagnosis, (n=1) difficulty inducing lactation for adopted child, (n=1) low milk supply.
McNally and Spratz, 2020	‘We needed my son’s weight gain to get up there so he could, you know, have the energy to learn how to nurse properly, and I needed to heal because my nipples were destroyed at that point’

O' Sullivan et al, 2016	(n=2/3) of the participants in the study had low milk supply Motivations described for receiving HM included experiencing a delayed onset of lactogenesis II, delivering a premature infant, taking medications that are contraindicated while at-the-breast feeding, having an inability to pump sufficient HM during maternal–infant separation, having a low milk supply, assessing a problem with at-the-breast feeding, or providing HM for a fostered or adopted infant
Perrin *et al*, 2014	69.4% of recipients cited lactation problems for the reason for seeking donor milk. 'My daughter is 9 days old and my milk has not (and I fear, may not) come in' 'We have had many issues breastfeeding and I have unfortunately dried out' 48.5% of recipients sought milk for reasons relating to child health: 'She needs breastmilk to help her immune system through these next two surgeries' 'Had a very hard go of it in the NICU after contracting NEC' 'Because of the medication I'm taking I won't be able to Breastfeed' 'Cancer survivor mother in need of any amount…due to double Mastectomy' 'If you are desperate you would take any means that were necessary for your child. I don't like formula milk. I had a prem, at 26 weeks. When I brought him home at over four months, another mother expressed for me'

Thorley, 2009	'My baby] had serious breast attachment issues for the first six months of her life. In this period we were fortunate to meet a beautiful woman who provided breast milk for us. My daughter was fed this EBM through a supply line … for 4 months. At six months my daughter's attachment improved to the point that we did not need the EBM or supply line' Various reasons for seeking donor milk were cited within, including: difficulty establishing lactation, bridged a gap with initial breastfeeding challenges, maternal and infant anatomy or medical issues, insufficient milk supply
Thorley, 2012	'Midwife has recommended that I express every other feed but top up if he is unsettled. Basically, it's my low supply that's causing the issues, so I'm feeling a little fragile'
Wagg *et al.*, 2022	'So I didn't expect it to be as hard or even not produce milk to be able to feed my baby that was just a bit of a shock, that I didn't have any milk. Yea I wasn't expecting that'
Recipient motivations 2: Value of breastmilk (superiority and advantageous impact of human milk)	
Papanicolaou, 2013	'I think when you are in community with breastfeeding women; I think you understand the power of breast milk. So, it is something that resonates with all of us' 'It is the healthiest for them. Healthy for mom and healthy for baby' 'I really did [not] want (daughter's name) to suffer for what was happening to me, like you know. So, I wanted to give her the best kick at the can…that is why we wanted [her] to have breast milk'

Gribble, 2014b **McCloskey and Karandikar, 2019** **Wilson, 2018** **McNally and Spratz, 2020** **Wagg *et al*., 2022** **Keim *et al.,* 2014**	‘There are lots of benefits to breastmilk. Breast milk is easier to digest for them and it is customized for them. BM changes as they grow’ ‘I wanted [my child] to have the benefits of breastmilk' ‘Breastmilk truly is the best gift for a child. When I realized my body can't make it, I really wanted a better alternative than formula' ‘I really wanted to have all the nutritional benefits of breast milk, all of the antibodies in breast milk that sort of thing. The baby gets the benefit of having the antibodies and um, that perfect nutrition from breast milk’ ‘The immune benefits that they get from breast milk far outweigh any potential risk. And it’s really what I wanted her to have. It’s what babies are supposed to have and it wasn’t something I could provide for her’ Milk sharing is “responsibility” and a good mothering “choice. ‘We knew at that moment the best option for her would be human milk’ ‘breastmilk is precious and shouldn’t be wasted’ All of those who received donor milk reported one or more benefits to their infant (e.g., better tolerance, immunity)
Recipient motivations: **3: Avoidance of commercial milk formula (superiority and advantageous impact of human milk)**	
Papanicolaou, 2013	‘I do [not] like what [is] put in formula, the artificial nature of it and just the combination of ingredients that are in there. [The ingredients] are [not] something that I would like my children to eat’ We just kind [of] went through the thought process of well, which is going to be more beneficial to her?...Breast milk even though it is not mine or artificial formula? So, we kind [of] were willing to accept the risks of donor milk and go that route rather than artificial, you know rather than formula

Gribble, 2014c	I know in my mind that it [is] better [reference to DHM], you know especially when you look at like the World Health Organization. You know, it is best to give milk at the breast first, then second is milk from the mother, from the mother in a bottle, and then third is you know, donated milk and then it is formula…I am giving my baby something better than formula 'When I realised my body can't make it, I really wanted a better alternative than formula. Knowing the inferiority of formula was a huge factor' We tried every formula on the market, including prescription formulas, but none of them worked for our girls without making them in constant pain and miserable' 'My first child still suffers from dry, itchy skin and constipation. I believe much of that is from the formula he had to eat in his first few days of life... When I heard about this option I... got donor milk as soon as I could'
Keim *et al.,* 2014	One woman sought milk from friends because her infant would not tolerate formula; she received 1,000–1,500 oz over 4 months from three Friends.
McNally and Spratz, 2020	One donor recipient reported that her infant never had infection in first year of life which she attributes this to using donor milk and not using formula. One recipient respondents infant did not do well on formula and often got so constipated she had bloody stools. A switch to hypoallergenic formula resulted in colic, and she said 'We knew at that moment the best option for her would be human milk'
McCloskey and Karandikar, 2019	'When the moment came when I couldn't [breastfeed], it was very, it just felt like a crisis. And so, breast milk seemed, you know, donor milk seemed like such a better option to me than formula..... from researching I was really concerned about the sugars and other things in American formula.

Thorley, 2009	'I mean, the number one benefit is that your baby is getting breast milk as opposed to formula. I felt like there is more of a risk for her to develop allergies or symptoms from taking formula. For me, it's a last resort. I was like, she was gagging now on formula.. yeah, so she wasn't taking the formula very well.so I wanted to give breast milk and not do the formula thing. .my first daughter was formula fed and she was constantly sick .had rashes, always had, had pneumonia a couple times, had tubes put in her ears right before she turned 2—always had ear infections. I was very worried that it [formula] would compromise my new daughter's immune system. I gave one bottle of formula before finding someone to get donated milk from and my baby immediately threw it up and I knew that I could not do that to her. She's has had no adverse reactions to any of the breast milk' …If you are desperate you would take any means that were necessary for your child. I don't like formula milk…' '..So long as my child was receiving EBM from a reliable source, but not necessarily screened, I would be happy that they were receiving BM [breastmilk] over ABM...'
Thorley, 2012	A responded received donor expressed milk to meet her desire of avoiding formula milk 'It was kind of a personal choice that I would rather use human breastmilk than formula. And that is my own choice to do that as far as she is concerned … I am not expecting to put any formula in the home. Not samples. No bottles, nothing'
Wilson, 2018	One recipient protects her children from factory contamination and from cold, profit-driven, patriarchal biomedicine. Her thinking is progressive instead, rejecting anything too commercial (such as formula) or needlessly interventionist (such as milk banks)

Wagg *et al.*, 2022 **Gribble, 2014**	'….we haven't got to use that formula, he won't get belly ache any longer because he was really struggling with constipation and I was like this formula isn't working and he can have breastmilk, I can keep breastfeeding him…' Recipient respondents identified a large number of risks associated with formula feeding which played a role in the decision to use peer-milk sharing
Recipient motivations **4: Maternal mental health/well-being (superiority and advantageous impact of human milk)**	
Gribble, 2014 **McCloskey and Karandikar, 2019**	'It also made me feel depressed every time I had to supplement him and I hated seeing that can of GoodStart [infant formula] sitting on the table. I knew there had to be something better' So when I found this [milk sharing] was available, it really gave me piece of mind. Like I can still give her that quality without stressing myself out, you know? 'I felt like I could breathe. There's this stigma of once you use the formula that it was kind of a slippery slope and I didn't want to go down that. It was just a stress relief 100% that I had that option' 'It's been, it's helped me so much .And after I received donated milk it was easier on me because stress does affect, you know, your milk supply. So I was a little more relaxed. I started noticing that my supply was being affected in a positive way' 'Looking back I probably was not in a great mental state, honestly breast milk sharing alleviated some of the stress of feeding her. I think if I had switched her to formula or started supplementing with formula, I was really worried about losing my supply completely if I did that. So, I think

Wagg *et al.*, 2022	that would've really depressed me and made me feel like I failed her, at least at the beginning it's hard to say what would've happened if I hadn't. But, I think it was positive' Many participants suggested that utilizing donated human milk may have supported positive mental health and even protected them from and/or alleviated some symptoms of PPD and anxiety. All participants reported a reduction in perceived stress as a result of using donated breast milk from a peer 'Just amazed, just... I was amazed that people do that for other people, amazed about it but also gutted that I didn't know about it for my other children because it would have made such a difference to how I felt after. Because I was diagnosed with postnatal depression, I think it would have really helped me feel not as low as I did in those times, because I would have still given them breastmilk which to me is preference over formula' '…Um, it saved my sanity and my mental health, yea I was overjoyed completely overjoyed, overwhelmed, overwhelmed by somebody else's kindness, and it means my baby is healthy and thriving and happy'.
Recipient motivations **5: Donor milk bank related (Human milk bank influences)**	
Gribble, 2014	'…I didn't make enough milk and the milk banks said they could not sell me any milk [it was too expensive anyway]'
Gribble, 2013	'I contacted a milk bank, but they stopped responding to me after my first email. My daughter does not have a 'medical need''. 'I had looked into obtaining milk from a human milk bank . . . but it seemed to be only available for preterm or sick babies and even if I could obtain it, it was very expensive'

McCloskey and Karandikar, 2018	'I knew that we could not afford milk banks as I had looked into this with my preemie [previous child] and at $4/oz that was way beyond what we could afford' 'There is no local milk bank in our area' 'I looked into and I think the idea is good, but in practice . . . they [milk bank] told me that my daughter was too old to receive milk. . . . They were charging about 4 dollars. . . . Milk banks also tend to pasteurize the milk and that kills a lot of the good proteins that are in it' 'I'm in a very rural area and the closest milk bank is approximately 5 hours away' 'I mean I had heard of it [milk bank] before. But . . . it [peer-to-peer HM sharing] made me less hesitant than a person that I didn't know' And so also for a short period of time, I bought some milk . . . from the milk bank. . . . But, it was like 20 dollars for 4 ounces. So I didn't do that for very long because it was very quickly, not sustainable.
McNally and Spratz, 2020	'Cost of human milk banks and the difficulty of inducing lactation, however, made these two options unfeasible'
Wilson, 2018	One participant rejected anything too commercial (such as formula) or needlessly interventionist (such as milk banks)
Wagg *et al.*, 2022	'I'm using donor milk from a local friend but running low so will probably need to use formula again soon bit it made him horribly constipated before. We have started the process of applying to the milk bank, but I doubt I will get funding or accepted as we are low on the order of need'
Recipient motivators 6: Return to work/ School (Maternal of infant factors)	

Gribble, 2014	'I returned to work when my daughter was 7 months and I was not able to pump enough during the day. When I am with her I am able to feed fine. It was just that I am not responding to the pump'
Perrin et al, 2014	'I was not able to pump more than 8 minutes while at work 2x a day'
Recipient enablers 1:Social media/ Internet (Digital connections and transparency)	
Gribble, 2018	'We catch up every now and again and keep up with how our kids are going. Sometimes chat on facebook'
Papanicolaou, 2013	'It is funny because the Internet brought us together but yet we are doing something [reference to sharing human milk] that you know people have done since the beginning of time. So, it is kind [of] a neat full circle that happened' 'It is easy, you can access it [reference to organization's Facebook site] from virtually anywhere that there [is] a signal' 'It [is] hard to find people, it is a very small subset of people who would be willing to do that [reference to sharing human milk] and I think that the Internet really allows you to connect with those few people who are out there'
Wagg *et al.,* 2022	'I suppose it's, it is social media that has made it more, more like, accessible to me, I thought in our area it was just for NICU and new babies … because it's there all the time, someone to encourage to say keep going you're doing well, which in the middle of the night is vital'
Gribble, 2014	'I made connections with my donors and got to know them on a personal level before accepting milk, the more I messaged them and talked to them the more comfortable I became.
Recipient enablers: 2: Trust and transparency (Digital connections and transparency)	

McCloskey and Karandikar, 2018	'Um, so they're kind of unspoken rules . . . they often will say, "I don't smoke. I only take vitamins. You know, I don't drink milk. This is lactose free or whatever." Um, and even when I, I'm like . . . "I hate to ask this because I'm begging for your milk, but are you healthy?" [laughs] . . . everybody's been, "no, it's totally fine. You need to ask that. You're the mother. You need to be protected'
Gribble, 2014	I trusted her. She was already an acquaintance of the family. Her son she was still breastfeeding was very healthy. She knew my midwife 'The amount of information they were willing to provide me regarding their health and the health of their child' 'They are all breastfeeding moms in our community, who seem very sincere in wanting to donate their extra milk to help another mom/baby. Many have disclosed freely if they are taking any kind of medications or even if they drink a glass of wine occasionally they seem very honest' 'I got to know the moms and got copies of their bloodwork results' 'I made connections with my donors and got to know them on a personal level before accepting milk .the more I messaged them and talked to them the more comfortable I became' The reasons for rejection (in order of frequency) included that: the donor was consuming a drug or medication; the recipient had a bad feeling about the situation; there was difficulty communicating with the potential donor or arranging milk pick up
Gribble, 2018	'I think it's important if only so you can build trust with someone you are consistently getting milk from'
Thorley, 2009	'As long as we have a consensual agreement – if some kind of crisis. I would prefer to know beforehand and have some kind of arrangement. [I wouldn't] if they are not in my friendship circle, a drug-taker, imbibing something'

Thorley, 2012	Although no formal screening was conducted, it was clear that the women informally screened those with whom they shared their milk. Donors would be acceptable 'if I or my midwife knew their medical status', so 'where [the milk] is not pasteurized, I would want that personal connection'
Wagg *et al.*, 2022	'We talked before and she was very open about everything that she had been through um how many children she had and the whole background which made me feel happier about doing, about accepting the milk. I suppose if somebody wasn't very open or preferred not to discuss certain areas that I did ask about, like smoking and drinking. Because those things would put me off because I don't do those things, or if they were on lots of medications, I think at the start that would have put me off'
Papanicolaou, 2013	'I do ask questions of each donor. You know, did they receive regular prenatal screening, including HIV [human immunodeficiency virus]. I know that you [cannot] possibly be screened for everything that can be but [I ask] what is their general health and if they take any medications' 'I want to know what their lifestyle is like and what, do they smoke and do they drink? And even not smoking and drinking but do they eat healthy?' 'I think the criteria for me would revolve around their lifestyle, you know health, diet, choices, any consumption of alcohol, drugs [or] cigarettes' You feel awkward asking, you know, are you on any medications and do you have health issues that you are aware of? And you know, but these are questions that you need to ask. Do you drink alcohol? Do you smoke? …You know you feel intrusive asking those questions especially for someone who is willing to give you something. 'If we went to pick it [up] [reference to DHM], we would often sit and chat for a while…then I would, I offer for them to see [daughter's name] and stuff, just to see where it is going to'

	'I guess there is a little bit of comfort in knowing that if a mom is providing it to her own child that chances are, you know it [is] okay for my child as well' 'I thought, okay, if someone is taking the time to pump, they are probably a mom like me. They are not someone who is trying to hurt my kid and spike the milk and all of this kind of stuff. So I was like okay. I went on and I put in my request that I was looking for it'
Recipient enablers: **3: Distinct healthcare professionals (Healthcare professional facilitation of IHMS)**	
McCloskey and Karandikar, 2018	Some mothers reported that lactation consultants, nurses, and other professionals supported and/or helped facilitate HM sharing from a peer I think that the fact that the nurse at the hospital supported it so much and helped me make those connections really helped increase my positive perspective on the milk sharing . . . the nurse at the hospital really helped make it feel like this is normal 'My midwives just kind of jumped to it and were like, "look, we have . . . other mums that we know well and, we know their health history, so they are good and safe and, you know, we'll ask them" and they went and got the milk for me 'cause I literally, had just given birth' 'He's [child's pediatrician] pretty open-minded so he's been actually helpful with it. Some of his patients have donated' 'We've written you guys a temporary policy so that you guys are fine [and can use the donor milk in the hospital]. And we are going to rewrite our hospital policy so that this doesn't happen again'
O' Sullivan *et al.*, 2016	'So the lactation consultant was at our house and so she called the

McNally and Spratz, 2020	midwife that knew the donor and, and then the midwife just immediately called the donor, and within . . . 10 minutes, they called back and said, "Yeah, she's got tons of milk; just come over." At her final meeting with a lactation consultant, a recipient was introduced to informal milk sharing.
Recipient barriers 1: Healthcare related barriers (Professional and logistical implications)	
McCloskey and Karandikar, 2018	'I'd finally had the guts to ask her [lactation consultant] . . . what do you think about donated breast milk from moms in a Facebook community? And she's like, "Well, legally I can't, um tell you what to do or, or I can't tell you to do that because that's not what we're supposed to suggest it to people' You don't really see that [education about donor milk] as much just in the hospital world of "here's formula. Here's formula." There's no suggestions of like, "hey, what about milk sharing?" . . . So that would be the number one thing I'd change, just knowing about it before I struggled' 'Many mothers reported that formal and informal rules prohibit healthcare professionals and/or organizations from recommending or permitting the use of HM from a peer 'And, actually, we, in the hospital, we were asked not [emphasis] to give the donated milk because they treat milk a medicine. And they were saying they can't guarantee where it was from, who the donor was, and what we were giving him'
McNally and Spratz, 2020	One such challenge was the lack of support from a pediatrician, who the couple felt tried to insinuate that a donor recipient was making the wrong decision [Our pediatrician] was completely in the dark. I was schooling her…She had absolutely no idea about donor milk
Recipient barriers 2: Perceived donor milk supply (Professional and logistical implications)	

Gribble, 2018	Other negative repercussions were identified by recipients infrequently included worrying about running low on milk
McCloskey and Karandikar, 2019	'When we get a little bit low, like right now, I am a little bit stressed out. I know we have formula as a backup, but it helps to have a lot of extra breast milk in the deep freezer just so we are set'
McNally and Spratz, 2020	One participant reported that her biggest challenge was running dangerously low on her donor milk supply
Wagg *et al.*, 2022	'I'm using donor milk from a local friend but running low so will probably need to use formula again soon bit it made him horribly constipated before. We have started the process of applying to the milk bank, but I doubt I will get funding or accepted as we are low on the order of need'
Recipient barriers **3: Time-related barriers (Professional and logistical implications)**	
Papanicolaou, 2013	'….We [are] already traveling back and forth, but we do make a point to stop and sometimes we go out of our way, sometimes we have gone significantly out of our way, an hour, an hour and a half outside of our way in order to get [the DHM]'
McCloskey and Karandikar, 2018	'It is exhausting. I'm not going to lie [laughs]. I've driven over an hour, especially when my little girl doesn't like the car seat, it takes dedication to meet people and work our schedules around their schedules and around work and whatever'
McCloskey and Karandikar, 2019	'One of my donors in the beginning was 45 minutes to drive one way. So that's a long time for a little baby to be in the car on a regular basis. Even for me as a new mom, I was so tired sometimes. So the driving is an aspect too'
McNally and Spratz, 2020	

	One donor recipient received milk from about 10 donors and drove up to 2 hours to obtain it
Recipient experiences: 1: Grief and disappointment (the emotive and transformative power of IHMS)	
Papanicolaou, 2013	'There was a deep sadness for me. I had to grieve the loss because it was a loss for me. I had always anticipated that I would nurse all of my children'
	"We have had many issues breastfeeding and I have unfortunately dried out"
Perrin et al., 2014	"If you are desperate you would take any means that were necessary for your child"
Thorley, 2012	"…Basically, it's my low supply that's causing the issues, so I am feeling a little fragile.."
Wagg et al., 2022	So I didn't expect it to be as hard or even not produce milk to be able to feed my baby that was just a bit of a shock, that I didn't have any milk. Yea I wasn't expecting that.
McCloskey and Karandikar, 2019	"When the moment came when I couldn't [breastfeed], it was very, it just felt like a crisis…"
Gribble, 2014	"It also made me feel depressed every time I had to supplement him…."
Recipient experiences: 2: Reduced stress and increased comfort (the emotive and transformative power of IHMS)	
McCloskey and Karandikar, 2019	"So when I found this [milk sharing] was available, it really gave me piece of mind. Like I can still give her that quality without stressing myself out, you know?"
	"I felt like I could breathe…. It was just a stress relief 100% that I had that option"

Wagg et al., 2022	"Looking back I probably was not in a great mental state, honestly breast milk sharing alleviated some of the stress of feeding her" All participants reported a reduction in perceived stress as a result of using donated breast milk from a peer "… but also gutted that I didn't know about it for my other children because it would of made such a difference to how I felt after. Because I was diagnosed with postnatal depression I think it would have really helped me feel not as low as I did in those times…." "….Um, it saved my sanity and my mental health…."

Qualitization of quantitative data relating to donor motivations, barriers, enablers

Study	**Quantitative findings**	**Quantitative transformation/ qualitized data**	**Emerged Category**
Onat and Krackoc (2019)	Milk insufficiency was reported as the primary cause of feeding an infant with donor milk, and 87.5% of the recipients participated in milk sharing because of this reason	Maternal milk insufficiency was the predominant reason for engaging in informal human milk sharing	Motivation 1- Physical or physiological challenged (maternal and infant factors)
Onat and Krackoc (2019)	The other most common reason related to milk sharing were to prevent the use of formula at the rate of 62.5%	Preventing the use of commercial milk formula was a significant reason for engaging in informal milk sharing	Motivation 3-Avoidance of commercial milk formula (superiority and advantageous impact of human milk)
Onat and Krackoc (2019)	Donor milk is the most natural way to feed an infant when	Breastmilk is viewed as the optimal means of providing milk to infants when mothers milk is unavailable	Motivation 2- Value of breastmilk (superiority and advantageous impact of human milk)

	mother's own milk is absent at the rate of 62.5%		
Onat and Krackoc (2019)	62.5% found donor milk through sharing sites on the Internet	Social media is the most common means for recipients to source donor milk and enables the practice	Enabler 1- Social media/Internet (digital connections and transparency)
Cassar-Uhl and Liberatos (2018)	57.2% of recipients sourced donor milk from a milk sharing organisation 44.2% of recipients sourced donor from online social network	Social media is the most common means for recipients to source donor milk and enables the practice	Enabler 1- Social media/Internet (digital connections and transparency)
Onat and Krackoc (2019)	81.3% asked their donor mothers about cigarette and alcohol use, 75% queried the drugs used continuously, and 62.5% inquired about compliance with hygiene rules while expressing milk. Recipients were concerned about: 50%-disease transmission, 68.8%-potential drug, cigarette, and alcohol use 37.7%-exposure to environmental toxins. 37.5% side effects or disease transmission, and 62.5%- about the risks	The majority of recipients undertook informal screening by means of asking questions relating to cigarette, alcohol, drugs and hygiene practices with milk expression. Concerns relating to hygiene practices, disease transmission, potential drug, cigarette or alcohol use was common among recipients. Almost all milk sharers did not enter into a written	Enabler 2- Trust and transparency (digital connections and transparency)

	pertaining to hygiene, storage, and transfer conditions 75% of the recipient mothers and 85.4% of the donor mothers did not enter into any written agreement	agreement for the exchange.	
Cassar-Uhl and Liberatos (2018)	83.8% of women who received donor milk reported the reason for choosing this option was because it was the healthiest option	Most women who chose donor milk as a supplemental choice did so because it was the healthiest option	Motivator 2- Value of breastmilk (Superiority and advantageous impact of human milk)
Cassar-Uhl and Liberatos (2018)	45% of women who engaged in donor milk sharing because they were concerned of the health risks of other options	Almost half of participants who engaged in informal milk sharing were concerned about the health risks with other choices	Motivator 3- Avoidance of commercial milk formula (Superiority and advantageous impact of human milk)
Palmquist and Doehler (2016)	57.8% of recipients sourced donor milk due to an infant related issue	A majority of recipients sought donor milk due to an infant related issue	Motivator 1- Physical or physiological challenges (Maternal or infant factors)
Schafer *et al.,* 2018	68.2% reported a low milk supply	Maternal milk insufficiency was the predominant reason for engaging in informal human milk sharing	Motivator 1- Physical or physiological challenges (Maternal or infant factors)
Schafer *et al.,* 2018	Emotions related to recipients' decisions to feed donor milk considered the positive and negative affect. Positive affect reported:	Recipients generally felt positive emotions relating to their decision to feed donor human milk including: relief, happy, informed and empowered. Respondents rarely felt	Motivator 4- Maternal mental health/well-being (Superiority and advantageous impact of human milk)

	Empowered 3.19 (1.10), 0.00–4.00 Relief 3.78 (0.54), 0.00–4.00 Happy 3.60 (0.73), 0.00–4.00 Confident 3.46 (0.89), 0.00–4.00 Informed 3.60 (0.65), 0.00–4.00 *Mean positive affect 3.53 (0.61), 1.20–4.00* Negative affect reported: Sad 1.01 (1.07), 0.00–4.00 Inadequate 0.86 (0.97), 0.00–4.00 Anxious 0.86 (0.97), 0.00–4.00 Confused 0.29 (0.60), 0.00–3.00 *Mean negative affect 0.96 (0.80), 0.00–3.75* *Netpositive (N = 205, outcome)* *2.57 (1.23), −2.15-4.00*	negative emotions relating to their decision to feed donor milk.	
Palmquist and Doehler (2016)	64.1% of recipients received milk from online acquaintance that they met in person 36.4% of recipients received milk from online acquaintance that	Online platforms enable the practice of informal human milk sharing. The majority of recipients use online platforms as a means of facilitating the sharing of milk. The most predominant category is	Enabler 1- Social media/Internet (Digital connections and transparency)

	they had not met in person	receiving milk from an online acquaintance that they have met in person.	
Cassar-Uhl and Liberatos (2018)	Recipients reported the source of where donor milk was identified. The category with the lowest responses was healthcare professional. Results: (n=138, total) Medical professional 25/18.1% Breastfeeding specialist 28/20.3% Breastfeeding support group 11/8.0	One in five reported finding their donors through medical/ breastfeeding professionals or breastfeeding support groups. This was the lowest scoring category but implies some healthcare professionals enable milk sharing.	Enabler 3- Distinct healthcare professionals (Healthcare professional facilitation of IHMS)
Perrin et al (2014)	18/7.7% of respondents requested donor milk due to work/school commitments	The return to employment/ school is a motivator for recipients to engage in IHMS	Motivator 6- Return to school or work (Maternal or infant factors)

Appendix E: Informal Human Milk Sharing Survey

IHMS Survey Modified and Adapted from Peregoy (2022) Milk Sharing Practices Survey with Permission
Sociodemographic Questions
1. What gender identity best describes you?
2. How old are you?
3. What county do you live in?
4. What is your ethnic group/background?
5. What is your marital status?
6. What is your religion, if any?
7. What is the highest level of education that you have completed?
8. What is your current employment status?
Childbirth and Postpartum Experiences
9. How many children have you given birth to?
10. Were there any complications during labour and delivery of your youngest child(ren)?
11. Do you consider the birth to have been a traumatic experience?
12. Did you ever experience postpartum depression, either clinically diagnosed or self-diagnosed?
13. Did you ever experience postpartum anxiety, either clinically diagnosed or self-diagnosed?
14. Referring to your youngest child(ren): at what gestational age was the child(ren) born?
15. How was the child(ren) born? If there were more than one mode of delivery in the case of multiple births, please tick all that apply
16. Are you the breastfeeding parent to your child?
Motivations, Perceptions, Practices, Experiences and Healthcare Related Perceptions
17. Have you ever donated your breastmilk?
18. Did you ever look into donating your milk to a milk bank?
19. If Yes, did you go through the donor screening process?
20. If Yes, what was the outcome?
21. Why didn't you consider getting screened as a milk bank donor? Select all that apply
22. Have you ever donated your breastmilk informally?
23. Where did you initially come up with the idea of donating your milk informally? Select all that apply?
24. With your youngest child, did you have a supply of frozen expressed breast milk stored?
25. How many different families did you donate your breast milk to?

26. Out of those recipient families, to how many did you give repeat or ongoing milk donations?
27. What type of milk did you donate?
28. Giving your best estimate, how many ounces or millilitres of your expressed breast milk did you donate in total?
29. How did you initially connect with families who were looking for donated milk? Select all that apply
30. Did you ever use online resources to find a milk sharing recipient? Examples include Eats on Feets or HM4HB Facebook group, Facebook group for breastfeeding in Ireland etc.
31. Did you actively offer / post your milk, or did you respond to someone who was asking for donated milk?
32. Who did you donate your milk to?
33. Has any health care provider ever suggested that you consider donating your breast milk to a milk bank? Select all that apply.
34. Would you consider yourself to be an "oversupplier"? This means that you make more breastmilk than your baby needs
35. What were your most important reasons for deciding to donate your breast milk directly to another family?
36. How did you exchange milk with your recipients?
37. When contacting a milk sharing recipient for the first time, did you ever discuss any of the following issues about yourself?
38. Overall, how do you feel about your experience of donating milk?
39. What were the positive aspects of donating milk that were important to you as a donor?
40. Referring to your most recent milk donating experience: at the time you began donating milk, how old was YOUR child (the one who you were producing milk for)?
41. Where did you store your expressed breastmilk that you donated?
42. Have you ever received breastmilk which was shared informally?
43. What best describes the relationship between you and the child(ren) who received donated milk?
44. Are you the breastfeeding parent to this child?
45. How old was the child when you began receiving milk? Please write in weeks of age
46. Where did you initially get the idea of receiving donated milk as a way to feed your child? Please select all that apply
47. When you began receiving milk, how urgent was your need for donor milk?
48. While receiving milk, approximately how much of the child's milk intake was comprised of donated milk?
49. While receiving milk, was the baby still receiving any of your own milk, either breastfeeding or your expressed milk?
50. Does the child have any health issues?
51. Was the child ever diagnosed with a tongue tie or lip tie?
52. Before deciding to source donor milk (as a recipient), what other options did you consider?

53. Please select the top people or resources that most influenced your decision to receive donated milk.
54. There are many different reasons that individuals might decide to receive donated milk. What were your most important reasons/ motivations for deciding to source donated milk as a recipient?
55. When contacting a new donor did you ever discuss any of the following issues?
56. How did you initially connect with parents who were looking to donate their milk?
57. Did you ever receive donated milk from the following individuals?
58. With the child for whom you most recently gave donated milk, how many different donors did you get milk from? Please give your best estimate and only count repeat donors once.
59. How many of those donors were repeat or ongoing donors?
60. Giving your best estimate, for the child for whom you most recently shared milk, how many ounces or millilitres of milk did you obtain in total?
61. With the child for whom you most recently gave donated milk, how did you receive the milk from the donor?
62. When you received the milk was it fresh or frozen?
63. Did you ever heat treat the milk before feeding it to your child? This would include techniques such as scalding, holder pasteurisation, flash pasteurisation etc.
64. What kind of heat treatment technique did you use? Select all that apply
65. How often did you heat treat the milk?
66. Why did you choose to heat treat the milk?
67. Why did you choose not to heat treat the milk?
68. Some parents screen potential milk donors by asking personal questions of them. With the child for whom you recently gave donated milk, did you screen?
69. In addition to the methods already mentioned, did you do anything else to minimise your concerns about receiving donated milk? Select all that apply.
70. How important was receiving donated milk as a strategy in helping you reach your infant feeding goals?
71. Overall, how do you feel about your experience as a milk sharing recipient?
72. Would you recommend milk sharing to a friend who was experiencing breastfeeding challenges?
73. Would you milk share again in the future if you found yourself in a situation where you needed to supplement your child?
74. What were the positive aspects of milk sharing that were important to you as a recipient?
75. Have you ever spoken to a health care provider about milk sharing? Please select what health care provider you have discussed milk sharing with. Select all that apply
76. If there was ever a time when you withheld information from or avoided discussing milk sharing with a health care provider, what were your reasons for doing that? Select all that apply

Appendix F: Semi-Structured Interview Guide and Protocol for Qualitative Interviews

Donor and Recipient Experiences of IHMS in Ireland

Site	**Interviews held via Zoom online platform**
Site dates	**Remote-scheduled based on what suits participant**

PREPARATION FOR INTERVIEWS		
Time to interviews	**Action**	**Responsibility**
2 weeks before	Email potential participants who have provided their email address on the anonymous google form link during phase one (survey phase). Send an email thanking the potential participant for providing their email and at this point resend the participant information leaflet to the participant which was provided at phase one along with a consent form. The potential participant will be asked to read this and consent to phase two (interviews) by completing the consent form attached to the participant information leaflet . If a potential participant declines, their email address details will be immediately deleted from the google form file. If a participant accepts the invitation and consents, a date for conducting the interview will be proposed that is suitable for the participant.	NV
At least 1 week before	Email to potential participants confirming participation and send Zoom invite.	NV
Day before interview/morning of the interview	Organise items for interview: PIL (to be read again at beginning of interview to ensure participant has fully read and understands) Log on details for Zoom Headphones Charger Notebook	NV

AT INTERVIEW	
Immediately before interview begins	**Introductions and general conversation.** Summary of study, aim of interview and opportunity to ask questions and check consent has been completed, signed, and returned. **<u>Zoom interview</u>:** begin recording now. Read PIL and ask if they agree to all and confirm verbally consent. Reiterate privacy and confidentiality and reiterate the opportunity to discontinue the interview at any point without any consequences. **Document:** <u>DEMOGRAPHICS: (provide reassurance that details will remain anonymous)</u> Are you a donor or recipient? When did you last milk share? What is your age? What is your gender? How many children do you have? What is your ethnic background? What is your highest level of education? What is your marital status? What county do you live in? What is your current employment status? **<u>QUESTIONS TO GUIDE INTERVIEW:</u>** Where did you hear about milk sharing? What were your motivations for milk sharing informally? Tell me about your experiences of milk sharing…. Practices, experiences, connecting, exchanging etc. Tell me about the process of milk sharing… Did you every discuss milk sharing with healthcare professionals? If so, who? And if not, why? Did milk sharing help you reach your infant feeding goals and do you think milk sharing is an important strategy in helping people achieve their breastfeeding goals? What are you attitudes towards commercial infant formula?

	What are your attitudes towards breastmilk? There is very little known on the psychological impact of sharing milk? Do you feel sharing milk impacted you (positively or negatively or had no impact)? Would you share milk again in the future? Is there anything else you would like to add? **Probing and interpreting questions:** Can you elaborate on what you mean by…..? Could you give more detail on that? Do you have examples of that?
End of interview	Thank participant for taking the time to share their experiences and providing invaluable information on milk sharing in Ireland. Ask the participant if they have anything else to add or further comments. Advise that interview recording will now be stopped and reassure that no identifying details will be published.

Appendix G: Study Recruitment Flyer



Appendix H: Copy of Dublin City University Research Ethics Committee Ethical Approval

Ollscoil Chathair Bhaile Átha Cliath
Dublin City University

Niamh Vickers
School of Nursing, Psychotherapy and Community Health

21st May 2024

REC Reference: **DCUREC/2024/083 (Expedited Review)**

Proposal Title: A mixed methods study of informal human milk sharing (IHMS) in Ireland

Applicant(s): Niamh Vickers, Dr Gillian Paul, Professor Anne Matthews

Dear Colleague(s),

Thank you for your application to DCU Research Ethics Committee (REC). Further to its review by the committee and resting on the assumption of information accuracy and completeness, DCU REC is pleased to issue ethical approval for this research project. Please include reference to this approval in all materials used to recruit research participants.

Researchers are responsible for ensuring that the research project to which this ethical approval refers is carried out as specifically described in the application form. Should modifications to the research project be required at a later stage, researchers must submit a research amendment application form to REC for approval, prior to the implementation of modifications.

Please note that it is the responsibility of the PI to ensure that any other DCU compliance requirements relevant to the research project, such as those related to data protection, insurance, health and safety, or legal issues, are fully met in advance of initiating the project.

As part of DCU REC's ongoing monitoring process, a research progress report may be required. DCU REC will request this report from the PI as appropriate.

DCU REC wishes you every success in your research.

Yours sincerely,

DCU Research & Innovation

Taighde & Nuálaíocht Tacaíocht
Ollscoil Chathair Bhaile Átha Cliath,
Baile Átha Cliath, Éire

Research & Innovation Support
Dublin City University,
Dublin 9, Ireland

T +353 1 700 8000
F +353 1 700 8002
E research@dcu.ie
www.dcu.ie

Dr Melrona Kirrane
Chairperson
DCU Research Ethics Committee

Note: Please retain this approval letter for future publication purposes.
Research students should include this letter as a thesis appendix.

Appendix I: Participant Information Leaflet (Quantitative Survey)

Participant Information Leaflet

Quantitative Survey

Phase 1

A mixed methods study of Informal Human Milk Sharing (IHMS) in Ireland

This is a mixed methods study of IHMS in Ireland which is being conducted at the School of Nursing, Psychotherapy and Community Health, Dublin City University by researchers Niamh Vickers (PhD student), Dr. Gillian Paul and Professor Anne Matthews.

What is this research about?

This research is exploring the experiences of those who share milk via an informal means on the island of Ireland (Republic of Ireland and Northern Ireland). IHMS is a new practice which is rapidly growing and evolving over time. This study is being completed in two phases. This phase, Phase 1, is an anonymous, online survey of donors and recipients who have shared milk via an informal means (not through a milk bank) in Ireland over the past 18 months.

Why is this research being conducted?

There is no literature that examines the experiences of those who carry out this practice in Ireland. This research is needed to gain a deeper understanding of the experiences of donors and recipients in Ireland.

Why have you been invited to take part?

You have been invited to take part if you have shared milk informally, either through donating and/or receiving over the past 18 months in Ireland.

What will happen if you decide to take part in this research study?

Phase 1 of this study will require you to complete an online survey which will take approximately 20-30 minutes depending on whether you have received and/or donated milk. At the end of the survey, you will have an option of volunteering to participate in Phase 2 of the study, an interview with the researcher. If you choose this option, you will be asked to provide your name and email address. Your name and email address will be stored confidentially by the researchers.

Do I have to take part?

No, you do not have to take part. Participation in this study is on a voluntary basis. You can decide to participate only in Phase 1 (the survey) , or both Phase 1 and Phase 2 (online interview).

How will your data be used?

All anonymised data (online survey data) will be stored until the 31st August 2028, the completion date of the student's PhD. All names and email addresses which are collected through the Google Form link for the purpose of arranging an interview will be deleted immediately after the interview, or if an individual decides that they do not want to partake in the online interview. This Google Form will be password protected and only the members of the research team will have access to this. All participants have the right to access their own personal data (name and email address if submitted for Phase 2) relating to this study and if you participate and would like access to your own personal data or if you have any data protection concerns arising from the research, you can contact the DCU Data Protection Officer, Mr. Martin Ward (data.protection@dcu.ie or phone 017005118/017008257) or alternatively contact the lead researcher and data controller, PhD Student Niamh Vickers (niamh.vickers3@mail.dcu.ie). All individuals have a right to lodge a complaint concerning the use of personal data with the Irish Data Protection Commission.

How will your privacy be protected?

All survey data collected are anonymous- individual responses will be grouped and reported as an overall summary. No information which could identify participants is sought within the survey of Phase 1. If participants of Phase 1 would like to participate in Phase 2, they will be able to provide their contact name and email address as outlined above. No data will be stored on laptops or any mobile storage device. The data and the results of the study will be stored securely on DCU's secure drive which has a multi-factor authentication. This means that the user (research team) is only granted access to the online application after successfully presenting two or more pieces of evidence for authentication. Please note that confidentiality of information can only be protected within the limitations of the law - i.e., it is possible for data to be subject to subpoena, freedom of information claim or mandated reporting by some professions.

What are the benefits of taking part in this research study?

There are no direct benefits to taking part in the research study. Sharing your personal experiences and insights will contribute to a greater understanding of IHMS in Ireland

What are the risks of taking part in this research study?

No risks have been identified by the research team.

Can you change your mind at any stage and withdraw from this study?

You can withdraw from participation from Phase 1 at any point before submitting your responses. If you submit your responses to the anonymous survey, it will not be possible to withdraw your responses after this point as it will not be possible to identify your responses due to the anonymous nature of the survey. However, you can withdraw at any point prior to this.

How will you find out what happens with this project?

It is anticipated that the results of this study will be published in scientific journals and presented at conferences and shared with the milk sharing community and social media. The results will be included in a PhD thesis of the lead researcher (PhD Student- Niamh Vickers).

Who can I contact for further information?

If you would like more information on this study, please contact the lead researcher, Niamh Vickers (niamh.vickers3@mail.dcu.ie). If participants have concerns about this study and wish to contact an independent person, please contact: The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000, e-mail rec@dcu.ie.

If you wish to participate in the survey, please click next to participate in the survey.

Appendix J: Participant Information Leaflet (Qualitative Interviews)

Participant Information Leaflet

Qualitative Interviews

Phase 2

A mixed methods study of Informal Human Milk Sharing (IHMS) in Ireland

You are being invited to take part in our research study *'A mixed methods study of Informal Human Milk Sharing (IHMS) in Ireland'* which is being conducted by the School of Nursing, Psychotherapy and Community Health, Dublin City University by researchers Niamh Vickers (PhD Student), Professor Anne Matthews and Dr. Gillian Paul.

What is this research about?

This research is exploring the experiences of those who milk share within Ireland via an informal means. IHMS is a new practice which is rapidly growing and evolving over time. This study is being completed in two phases. Phase 2 is individual interviews with donors and recipients to uncover their lived experience of milk sharing in Ireland.

Why is this research being conducted?

Within our geographical context, there is no literature that looks at the experiences of those who carry out this practice. This research is needed to gain a deeper understanding of the experiences of donors and recipients in Ireland.

Why have you been invited to take part?

You are invited to participate as you completed Phase 1 (online survey) of this study and provided your email address on the Google Form at the end of the survey to be contacted for an interview on your experience of IHMS, which is the current phase of the research study, Phase 2.

What will happen if you decide to take part in this research study?

Phase 2 will require you to participate in an online interview (on Zoom platform) with the lead researcher (PhD Student- Niamh Vickers) to discuss your overall experience of IHMS. Phase 2 will enable the lived experiences of donors and recipients of milk sharing to be shared.

Do I have to take part?

No. Participation in this study is on a voluntary basis.

How will your data be used?

All anonymised data (interview transcripts) will be stored until the 31st August 2028 and then erased/deleted. Recordings of interviews will be deleted immediately once transcribed which will be within 48 hours of the recording taking place. Any email addresses which were collected through the Google Form link will be deleted immediately after the interview or if an individual decides at a later date that they do not want to partake in the online interview. All participants have the right to access their own personal data relating to this study and if you participate and would like access to your own personal data or if you have any data protection concerns arises from the research, you can contact the DCU Data Protection Officer, Mr. Martin Ward (data.protection@dcu.ie or phone 017005118/017008257) or alternatively contact the lead researcher and data controller, PhD Student Niamh Vickers (niamh.vickers3@mail.dcu.ie). All individuals have a right to lodge a complaint concerning the use of personal data with the Irish Data Protection Commission (www.dataprotection.ie).

How will your privacy be protected?

Confidentiality and anonymity will be maintained. All data collected is anonymous- individual responses will be grouped and reported as an overall summary. No information which could identify participants is sought at any point. The results of the study will be stored securely on the Universities IT system which has a multi-factor authentication. This means that the user (research team) is only granted access to the online application after successfully presenting two or more pieces of evidence for authentication. Please note that confidentiality of information can only be protected within the limitations of the law - i.e., it is possible for data to be subject to subpoena, freedom of information claim or mandated reporting by some professions.

What are the benefits of taking part in this research study?

- Sharing personal experiences and insights will contribute to the understanding of IHMS in Ireland and/or Northern Ireland.

- Participants may gain a sense of empowerment by having their voices heard and contributing to research that explores an important but understudied topic.

- By participating, individuals can contribute to the development of knowledge and research in the field of IHMS, potentially leading to improved support systems and policies in the future.

- Findings from the study will help raise awareness about the benefits, risks and challenges associated with IHMS, leading to enhanced education and guidance for individuals who choose to engage in this practice.

- Increased understanding of IHMS can help healthcare professionals and policymakers develop guidelines and support systems that ensure the safety and wellbeing of donors, recipients and infants involved.

What are the risks of taking part in this research study?

No risks have been identified by the research team.

Can you change your mind at any stage and withdraw from this study?

You can withdraw from participation in Phase 2 at any point up until the data analysis has been conducted.

How will you find out what happens with this project?

It is anticipated that the results of this study will be published in scientific journals and presented at conferences. The results will be included in a PhD thesis of the lead researcher (PhD Student- Niamh Vickers).

Who can I contact for further information?

If you would like more information on this study, please contact the lead researcher, Niamh Vickers (niamh.vickers3@mail.dcu.ie). If participants have concerns about this study and wish to contact an independent person, please contact: The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000, e-mail rec@dcu.ie.

Qualitative Interviews

Informed Consent Form:

Please read the accompanying Participant Information Leaflet for Phase 2 and complete the following form and return it to niamh.vickers3@mail.dcu.ie if you are happy to proceed to participate in Phase 2 of the study.

Participant – please complete the following (Circle Yes or No for each question)

I have read the Participant Information Leaflet attached (or had it read to me)
Yes/No

I understand the information provided
Yes/No

I have had an opportunity to ask questions and discuss this study
Yes/No

I have received satisfactory answers to all my questions
Yes/No

I am aware that my interview will be recorded for transcribing purposes
Yes/No

I understand that involvement in this research study is on a voluntary basis and I can withdraw from participating in the interviews at any point up until the time of analysis of the interviews. I understand that recordings of interviews will be deleted once transcribed by the lead researcher (PhD Student). My email address which was collected through the Google Form link will be deleted immediately after the interview or if I decide at a later date that I do not want to partake in the online interview. I understand that no information which could identify me is sought at any point. The results of the study will be stored securely on the Universities IT system which has a multi-factor authentication. This means that the user (research team) is only granted access to the online application after successfully presenting two or more pieces of evidence for authentication. I understand that confidentiality of information can only be protected within the limitations of the law - i.e., it is possible for data to be subject to subpoena, freedom of information claim or mandated reporting by some professions. The data relating to this study will be deleted upon the completion of the lead researchers PhD (Niamh Vickers).

Signature:

I have read and understood the information in this form. My questions and concerns have been answered by the researcher, and I have a copy of this consent form. Therefore, I consent to take part in this research study.

Participant's Signature:_____

Name in Block Capitals:_____

Appendix K: Contact Details of National Support Services for Mental Health Provided at the End of the Survey

If completing this survey has caused you any distress or upset, please consider contacting your General Practitioner (GP) for support or guidance.

Postnatal depression affects 10-15% of women within the first year of giving birth. If you experience any feelings of concern or distress, please consider contacting your General Practitioner (GP) for support and to discuss how you are feeling. Here are some additional resources that may be helpful to you:

Postnatal Depression Ireland- ***is a non-profit organisation that provides free information, support, and friendship to women with postnatal depression. They also host coffee mornings and support meetings.***
Contact phone: 021-4922083/ 086-7872107
Email: support@pnd.ie
Website: www.pnd.ie

AWARE- the Aware Support Line is a free helpline for anyone aged 18 and over. If you need support and information about your mood (or the mood of a friend or family member),
Contact freephone: 1800 80 48 48

Email: supportmail@aware.ie
Website: www.aware.ie

AWARE-NI- ***is the depression charity for Northern Ireland.***

Contact phone: 028-71260602 (Derry)
Contact phone: 028-90357820

Appendix L: PRISMA Checklist for Mixed Methods Systematic Review

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	2
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	4-5
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	5
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	8-9
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	9

Section and Topic	Item #	Checklist item	Location where item is reported
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	S2 File
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	9
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	9
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	9
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	9
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	11
Effect	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used	Not conducted

Section and Topic	Item #	Checklist item	Location where item is reported
measures		in the synthesis or presentation of results.	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	12
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	12
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	12 (S4 file, S5 file)
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	12 (S4 file, S5 file)
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/A
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	N/A
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	NA

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	10, Fig.1
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	10, Fig. 1
Study characteristics	17	Cite each included study and present its characteristics.	13, S1 Table
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	11, S3 File
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	S1 Table
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	S3 File
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Not conducted-convergent integrated approach applied

Section and Topic	Item #	Checklist item	Location where item is reported
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	13-26
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Not conducted
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/A
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	13-26
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	26-29
	23b	Discuss any limitations of the evidence included in the review.	29-30
	23c	Discuss any limitations of the review processes used.	29-30
	23d	Discuss implications of the results for practice, policy, and future research.	30
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	2
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not	2

Section and Topic	Item #	Checklist item	Location where item is reported
		prepared.	
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Provided via submission
Competing interests	26	Declare any competing interests of review authors.	Provided via submission
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	All relevant data included in manuscript or supporting files

Appendix M: Search Strategy for Mixed Methods Systematic Review

CINAHL (Cumulative Index to Nursing and Allied Health Literature

Searches	Number of hits
1. (MH "Milk, Human+")	7679
2. breastmilk	5499
3. Mothers milk	5951
4. 1 OR 2 OR 3	9091
5. Peer sharing	276
6. Peer-to-peer	2127
7. Informal sharing	91
8. Unscreened sharing	3
9. Unregulated sharing	3
10. "breastmilk donation"	5
11. 5 OR 6 OR 7 OR 8 OR 9	2,450
12. Practices	776,522
13. Perceptions	189,701
14. Perspectives	166,983
15. Views	116,435
16. Attitudes	396,864
17. Opinion	52,003
18. Understanding	247,312
19. Experience	447,444
20. Motivations	64,097
21. Barriers	119,725

22. Facilitators	19,402
23. 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22	1,610,024
24. (MH "Internet")	53,210
25. Online	105,867
26. Internet-based	5,938
27. Interne*	83,490
28. Communities	369,098
29. Worldwide	54,891
30. 24 OR 25 OR 26 OR 27 OR 28 OR 29	168,931
31. 4 AND 11	35
32. 4 AND 11 AND 23	26
33. 4 AND 11 AND 23 AND 30	15

Scopus (via Elsevier)

Searches	**Number of hits**
S1. Human milk OR breastmilk OR mothers milk TITLE-ABS-KEY ("human milk" OR "breastmilk" OR "mothers milk")	6,955
S2. Peer sharing OR Peer-to-peer OR informal sharing OR breastmilk donation OR breastmilk donor OR unscreened sharing OR unregulated sharing TITLE-ABS-KEY ("Peer sharing" OR "Peer-to-peer" OR "informal sharing" OR breastmilk donation" OR "breastmilk donor OR "unscreened sharing" OR "unregulated sharing")	190

S3. Practices OR perceptions OR perspectives OR views OR opinion OR understanding OR experience OR motivations OR barriers OR facilitators TITLE-ABS-KEY (Practices OR perceptions OR perspectives OR views OR opinion OR understanding OR experience OR motivations OR barriers OR facilitators)	32,468,402
S4. Internet OR online OR internet-based OR interne* OR communit* OR worldwide TITLE-ABS-KEY (Internet OR online OR "internet-based" OR interne*)	12,645,916
S4. S1 AND S2 TITLE-ABS-KEY ("human milk" OR "breastmilk" OR "mothers milk") AND ("Peer sharing" OR "Peer-to-peer" OR "informal sharing" OR breastmilk donation" OR "breastmilk donor" OR "unscreened sharing" OR "unregulated sharing")	157
S5. S1 AND S2 AND S3 TITLE-ABS-KEY ("human milk" OR "breastmilk" OR "mothers milk") AND ("Peer sharing" OR "Peer-to-peer" OR "informal sharing" OR breastmilk donation" OR "breastmilk donor" OR "unscreened sharing" OR "unregulated sharing") AND (Practices OR perceptions OR perspectives OR views OR opinion OR understanding OR experience OR motivations OR barriers OR facilitators)	153
S6. S1 AND S2 AND S3 AND 4 TITLE-ABS-KEY ("human milk" OR "breastmilk" OR "mothers milk") AND ("Peer sharing" OR "Peer-to-peer" OR "informal sharing" OR breastmilk donation" OR "breastmilk donor" OR	135

“unscreened sharing” OR “unregulated sharing”) AND (Practices OR perceptions OR perspectives OR views OR opinion OR understanding OR experience OR motivations OR barriers OR facilitators) AND (Internet OR online OR “internet-based” OR interne* OR communit* OR worldwide)	

Medline (via Pubmed)

#1	"Milk, Human"[Mesh] OR “breastmilk”[tw] OR “mothers milk”[tw]	24,723
#2	“peer sharing”[tw] OR “peer-to-peer”[tw] OR “informal sharing”[tw] OR “unscreened sharing”[tw] OR “unregulated sharing”[tw]	1,834
#3	“practice*”[tw] OR “perception*”[tw] OR “perspective*”[tw] OR “view*”[tw] OR “attitude*”[tw] OR “opinion*”[tw] OR “understanding*”[tw] OR “experience*”[tw] OR “motivation*”[tw] OR “barrier*”[tw] OR “facilitator*”[tw]	5,165,386
#4	"Internet"[Mesh] OR “online”[tw] OR “internet-based”[tw] OR “interne*”[tw] OR “community*”[tw] OR “worldwide”[tw]	1,347,531
#5	#1 AND #2 AND #3 AND #4	9

Web of Science

#1	TOPIC: (Human milk OR breastmilk OR mothers milk)	67,444
#2	TOPIC: (peer sharing OR peer-to-peer OR informal sharing OR unscreened sharing OR unregulated sharing)	46,650

#3	TOPIC: (practices OR perceptions OR perspectives OR views OR attitudes OR opinions OR understanding OR experiences OR motivations OR barriers OR facilitators)	10,542,887
#4	TOPIC: (Internet OR online OR internet-based OR communities OR worldwide)	2,956,975
#5	#1 AND #2 AND #3 AND #4	19

Embase (via Elsevier)

#1	'breast milk'/exp OR 'human milk' OR 'mothers milk'	44,696
#2	'peer sharing' OR 'peer-to-peer' OR 'informal sharing' OR 'unscreened sharing' OR 'unregulated sharing'	2,617
#3	'practice*' OR 'perception*'OR 'perspective*' OR 'view*' OR 'attitude*' OR 'opinion*' OR 'understanding*' OR 'barrier*' OR 'facilitator*'	7,600,328
#4	'internet'/exp OR 'internet' OR 'online' OR 'internet-based' OR 'interne*' OR 'communit*' OR 'worldwide'	2,419,240
#5	#1 AND #2 AND #3 AND #4	12

Appendix N: Appraisal Outcomes/ Risk of Bias Assessment

Qualitative Research: JBI Critical Appraisal Checklist for Qualitative Research

Each Question is assigned **10% for Yes, 0% for No and Unclear**

Y= Yes, N=No, U=Unclear, N/A= Not applicable

Author, Year, citation number []	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**Results (%)**
Obeng et al, 2022, [59]	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**80%**
Wagg et al, 2022, [15]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**Y**	**Y**	**Y**	**90%**
McCloskey and Karandikar, 2018, [42]	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**80%**
McCloskey and Karandikar, 2019, [43]	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**80%**
McNally and Spatz, 2020, [44]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**N**	**Y**	60%

Keim et al, 2014, [53] (qualitative component)	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**80%**
Perrin et al, 2014, [54] (qualitative component)	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**N**	**Y**	**Y**	**Y**	**70%**
Perrin et al, 2016,[45]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**100%**
Bressler et al, 2020, [46]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**Y**	**Y**	**Y**	**90%**
Gribble, 2013, [51]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**70%**
Gribble, 2014, [50]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**70%**
Gribble, 2014, [48]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**70%**
Gribble, 2014, [49]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**70%**
Gribble, 2018, [25]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**70%**
Thorley, 2009, [58]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**N**	**Y**	**60%**

Thorley, 2012, [16]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**70%**
Wilson, 2018, [47]	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**80%**
O' Sullivan et al., 2016, [17]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**70%**
O' Sullivan et al., 2018 (qualitative component), [52]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**70%**

Quantitative: JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies

Each Question is assigned **12.5% for Yes, 0% for No and Unclear**

Y= Yes, N=No, U=Unclear, N/A= Not applicable

Author, Year, Citation	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Results (%)**
Cassar-Uhl and Liberatos, 2018, [55]	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**75%**
Onat and Karakoç, 2019, [61]	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**75%**
Schafer et al, 2018, [56]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**100%**
Palmquist and Doehler, 2016, [57]	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**75%**
Perrin et al, 2014, [54] (quantitative component)	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**75%**
Keim et al, 2014, [53]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**100%**

(quantitative component)									
O' Sullivan et al., 2018, [52] (quantitative component)	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**75%**

Grey Literature Sources

Methodological quality of grey literature according to the AACODS tool (Authority= Yes, Accuracy= Yes, Coverage= Yes, Objectivity= Yes, Date=Yes, Significance= Yes).

Adequate quality according to the AACODS checklist, meeting all AACODS criteria for methodological quality.

AACODS checklist (Tyndall, 2010) http://dspace.flinders.edu.au/dspace/

Author, Year, Citation

Papanicolaou, 2013, [60]

AACODS		Yes	No	?
Authority	Identifying who is responsible for in the intellectual content. **Individual author:** ● Associated with a reputable organization ● Professional qualifications or considerable experience ● Produced/published other work (grey/black) in the field? ● Recognised expert, identified in other sources?	 **Y** **Y** **Y** **Y** **Y** **Y**		

	● Cited by others? (use Google Scholar as a quick check) ● Higher degree student under 'expert' supervision? **Organisation or group:** Is the organization reputable (e.g. W.H.O)? Is the organisation an authority in the field? **In all cases:** Does the item have a detailed reference list or bibliography?	**Y** **Y** **Y**		
Accuracy	Does the item have a clearly stated aim or brief? If so, is it met? Does it have a stated methodology? If so, is it adhered to? Has it been peer-reviewed? Has it been edited by a reputable authority? Supported by authoritative, documented references or credible sources? It is representative of work in the field? If No, is it a valid counterbalance? Is any data collection explicit and appropriate for the research?	**Y** **Y** **Y** **Y** **Y** **Y** **Y**	 **N** **N**	

	If item is secondary material, refer to the original. Is it an accurate, unbiased interpretation or analysis?	**NA**		
Coverage	All items have parameters which define their content coverage. These limits might mean that a work refers to a particular population group, or that it excluded certain types of publication. A report could be designed to answer a particular question, or be based on statistics from a particular survey. ● Are any limits clearly stated?	**Y**		
Objectivity	It is important to identify bias, particularly if it is unstated or unacknowledged. ● Opinion, expert or otherwise, is still opinion; is the authors standpoint clear? ● Does the work seem to be balanced in presentation?	**Y** **Y**		
Date	For the item to inform your research, it needs to have a date that confirms relevance. ● Does the item have a clearly stated date related to content? No easily discernible date is a strong concern.	**Y**		

	● If no date is given, but can be closely ascertained, is there a valid reason for its absence? ● Check the bibliography: have key contemporary material been included?	**NA** **Y**		
Significance	There is a value judgment of the item, in the context of the relevant research area: ● Is the item meaningful (this incorporates feasibility, utility and relevance) ● Does it add context? ● Does it enrich or add something unique to the research? ● Does it strengthen or refute a current position? ● Is it integral, representative, typical? ● Does it have impact? (in the same sense of influencing the work or behaviour of others)	**Y** **Y** **Y** **Y** **Y** **Y**		

Appendix O: Characteristics of Included Studies in Mixed Methods Systematic Review

Author, Year, Country/Region(s), Citation []	Study Aim	Participants	Data collection method (DC), Data analysis technique (DA)	Quality Appraisal Outcome
Qualitative studies				
Obeng et al, 2022, Ghana, [59]	to evaluate breastfeeding prevalence and human milk sharing practices among Ghanaian women.	(100%, n=1050) (8%, n=86) Donors	(DC) Online survey (DA) descriptive qualitative analysis.	Included
Wagg et al, 2022, UK, [15]	exploratory study observing the attitudes, thoughts, and feelings of one mother seeking human donor milk through online groups.	(100%, n=1) Recipient	(DC) Recorded notes by participant and interview (DA) narrative description and pattern matching analysis	Included
McCloskey and Karandikar, 2018, USA and Canada, [42]	experiences of mothers who have received donated human milk from a peer.	(100%, n=20) Recipients	(DC) Interviews (DA) Attribute and magnitude coding (Saldana, 2015) and iterative coding (Strauss and Corbin, 1990)	Included

McCloskey and Karandikar, 2019, USA and Canada, [61]	Recipients' motivations for participating in peer-to-peer breast milk exchange, as well as the connection between receiving donated milk and postpartum stress and mental health in mothers.	(100%, n=20) Recipients	(DC) Interviews (DA) Iterative coding (Strauss and Corbin, 1990)	Included
McNally and Spratz 2020, USA, [44]	Challenges, successes, motivations, barriers of informal milk sharing among recipients.	(100%, n=3) Recipients	(DC) Interviews (DA) Thematic analysis (Braun and Clarke 2006)	Included
Perrin et al, 2016, USA, [54]	An exploration of the experiences of peer-to-peer milk sharers	(100%, n=27) Donors	(DC) Interviews (DA) Iterative coding	Included
Bressler et al, 2020, USA, [46]	An exploration of the lived experience of informal donation of Ultra-Orthodox mothers	(100%, n=14) Donors	(DC) Interviews (DA) Qualitative phenomenological analysis (Edmund Husserl's framework and Colaizzi's method of analysis)	Included
Wilson, 2018, USA, [47]	An exploration of how breastmilk sharers counter risk narratives	(100%, n=58) Donors and Recipients	(DC) Interviews (DA) Grounded theory data analysis and coding (Glaser and	Included

			Strauss 1967 and Strauss and Corbin 1997)	
Gribble, 2014a, USA, Europe, Oceania, Asia *'I'm happy to help'* [48]	To examine the beliefs and practices of individuals involved in peer-to-peer milk sharing	(100%, n=97) Donors	(DC) Survey (DA) Descriptive statistics and qualitative content analysis	Included
Gribble, 2014b, *'A better alternative'* Australia, Canada, Malaysia, New Zealand, USA, [49]	Exploration of the processes, beliefs and practices of women who used online peer-to-peer milk sharing	(100%, n= 41) Recipients	(DC) Interviews (DA) Descriptive statistics and qualitative content analysis	Included
Papanicilaou, 2013, Canada, [60]	To explore the description of sharing human milk utilizing an online commerce-free approach.	(100%, n=13) Recipient (n=1) Donors (n=9) Recipients and Donors (n=3)	(DC) Interviews (DA) Qualitative content analysis	Included
Gribble, 2013, USA, Europe, Oceania, Asia, [51]	To examine women's perceptions of peer-to-peer milk sharing and milk banking	(100%, n=139) Donors (n=98) Recipients (n=41)	(DC) Online survey (DA) Descriptive statistics and qualitative content analysis	Included

Gribble, 2014, USA, Europe, Oceania and Asia '*perception and management of risk'* [50]	To explore the perception and management of risks of peer-to-peer milk sharing	(100%, 138) Donors (n=97) Recipients (n=41)	(DC) Online survey (DA) Descriptive statistics and qualitative content analysis	Included
Gribble, 2018, USA, Europe, Oceania, Asia, [25]	To explore relationships between individuals involved in internet-facilitated peer-to-peer milk sharing	(100%, n=138) Donors (n=97) Recipients (n=41)	(DC) Online survey (DA) Descriptive statistics and qualitative content analysis	Included
Thorley, 2009, Australia, [58]	To explore the experiences of mothers involved in the sharing of breastmilk or shared breastfeeding	(100%, n=43) Donors and Recipients	(DC) Interview (e-mail or telephone) (DA) Unreported	Included
Thorley, 2012, India, Australia, Indonesia, USA, Columbia, Canada, Lebanon, Netherlands, [16]	To observe the practices of women who shared breastfeeding in a number of cultures	(100%, n=23) Donors and Recipients	(DC) Interviews (e-mail or telephone) (DA) Thematic analysis	Included
O' Sullivan et al., 2016, USA, [17]	To explore the experiences of and attitudes towards human milk sharing among women with experience	(100, n=41) Mothers	(DC) Interviews (DA) Inductive analysis	Included

	of human milk feeding, breast bump use			
Citation (Year), Country/Region	**Study Aim**	**Participants**	**Data collection method (DC), Data analysis technique (DA)**	**Quality Appraisal Outcome**
Mixed method studies				
O' Sullivan et al 2018, USA, [52]	To describe the attitudes towards human milk sharing and selling the prevalence of human milk sharing and selling in a sample of US Mothers	*Quantitative* (100%, n=456) Postnatal Mothers *Qualitative* (100%, n=41)	Quantitative component: (DC) Online questionnaire (DA) Descriptive statistics Qualitative component: (DC) Interviews (DA) Content analysis and coding	Included
Keim et al., 2014, USA, [53]	To examine the prevalence, maternal and infant characteristics of milk sharing. To examine the awareness, consideration,	*Quantitative* (100%, n=499) Postnatal women	Quantitative component: (DC) Survey of women (n=499)	Included

	participation and reasons for milk sharing	*Qualitative* (100%, n=11) Recipients and Donors	(DA) Univariate, bivariate, and exact logistic regression. Qualitative component: (DC) Interviews (DA) Unreported	
Perrin et al., 2014, USA, [54]	To describe the size and activity of online milk sharing communities	*Quantitative* (100%, n=2) Commerce-free milk sharing online networks in USA *Qualitative* (100%, n=954) milk sharing	Quantitative component: (DC) Counting of Facebook "likes" from two commerce-free milk sharing networks (Human milk for Human Babies HM4HB Facebook communities in 50 states) and Eats on Feets (EOF) Facebook communities in 47 states). (DA) Descriptive statistics (DC) Observation of Facebook posts	Included

		donors and recipients	(DA) Content analysis and coding	
Citation (Year), Country/Region	**Study Aim**	**Participants**	**Data collection method (DC), Data analysis technique (DA)**	**Quality Appraisal Outcome**
Quantitative Studies				
Cassar-Uhl and Liberatos 2018, USA, Europe, South Pacific, Asia/Middle East, [55]	To assess the prevalence and experiences of shared milk use among breastfeeding mothers with insufficient milk supply and compare shared milk users with non-uses.	(100%, n=475) Milk sharers (n=138) and non-milk sharers (n=337)	(DC) Internet based survey (DA) Descriptive statistics	Included
Onat and Karakoç 2019, Turkey, [61]	To record the religious concerned views and attitudes towards breastmilk sharing and risk reduction strategies of mothers	(100%, n=435) Donors (n=48) Recipients (n=16)	(DC) Online questionnaire (DA) Descriptive statistics	Included

		Non-milk sharers (n=371)		
Schafer et al, 2018, USA, [56]	To explore factors associated with emotional responses of recipients of shared breastmilk	(100%, n=205) Recipients	(DC) Online cross-sectional survey (DA) Descriptive and inferential statistics	Included
Palmquist and Doehler ,2016, USA, [57]	To describe human milk sharing practices in the U.S	(100%, n=867) Donors (n=661) Recipients (n=206)	(DC) Online survey (DA) Descriptive and inferential statistics	Included

Appendix P: STROBE checklist of items that should be included in reports of observational studies

Informal Human Milk Sharing Practices: A cross-sectional survey of donors and recipients in Ireland

Item Number		Recommendation	Page Number
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2-4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4-5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-5

Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	4
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4-5
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	4-5
Bias	9	Describe any efforts to address potential sources of bias	4-5, 11
Study size	10	Explain how the study size was arrived at	4

Appendix Q: Motivations, Influences and Perceptions of IHMS Respondents Stratified by Cohort

	Recipient (n=24)		Donor (n=73)		Recipient/ Donor (n=6)		Total ‡	
	n	(%)§	n	(%) §	n	(%)§	n	(%)§
Initial idea of donating HM informally								
Someone in an online community	-	-	30	(41.1)	2	(33.3)	32	(40.5)
Myself	-	-	27	(37)	3	(50)	30	(37.9)
Friend/Family Member	-	-	12	(16.4)	3	(50)	15	(18.9)
Breastfeeding support group	-	-	11	(15.1)	2	(33.3)	13	(16.4)
Online web search	-	-	6	(8.2)	0	(0)	6	(7.5)
Other	-	-	3	(4.1)	1	(16.7)	4	(5)
Health visitor	-	-	2	(2.7)	1	(16.7)	3	(3.7)
Midwife	-	-	2	(2.7)	0	(0)	2	(2.5)
Partner/significant other	-	-	2	(2.7)	1	(16.7)	3	(3.7)
Doula	-	-	1	(1.4)	0	(0)	1	(1.2)
Public Health Nurse	-	-	1	(1.4)	0	(0)	1	(1.2)
Positive aspects of donating								
Felt good about helping	-	-	56	(76.7)	5	(83.3)	61	(77.2)
Happy milk didn't go to waste	-	-	42	(57.5)	3	(50)	45	(56.9)
Personally rewarding	-	-	34	(46.6)	1	(16.7)	35	(44.3)
Felt good about my body producing	-	-	18	(24.7)	1	(16.7)	19	(24.1)
Proud to tell others	-	-	17	(23.3)	2	(33.3)	19	(24.1)
Pumping worthwhile	-	-	16	(21.9)	1	(16.7)	17	(21.5)
Formed a friendship	-	-	5	(6.8)	1	(16.7)	6	(7.6)
Previously shared/pay it forward	-	-	0	(0)	2	(33.3)	2	(2.5)
Other	-	-	1	(1.4)	0	(0)	1	(1.3)
Important motivations to donate informally								
Help someone who needed milk	-	-	49	(67.1)	5	(83.3)	54	(68.4)

Had excess expressed milk	-	-	35	(47.9)	2	(33.3)	37	(46.8)
Didn't want milk to go to waste	-	-	32	(43.8)	3	(50)	35	(44.3)
Think HM is important	-	-	36	(49.4)	4	(66.6)	40	(50.6)
Knowing not everyone can make enough milk	-	-	21	(28.8)	1	(16.7)	22	(27.8)
View CMF as deficient	-	-	15	(20.5)	2	(33.3)	17	(21.5)
Knew a family who needed milk and wanted to help	-	-	7	(9.6)	1	(16.7)	8	(10.1)
Had excess milk that child couldn't have	-	-	4	(5.5)	1	(16.7)	5	(6.3)
Would want someone to give me milk if I couldn't produce	-	-	12	(16.4)	2	(33.3)	14	(17.7)
Other	-	-	5	(6.8)	1	(16.7)	6	(7.5)
Initial idea of receiving HM informally								
Myself	11	(46)	-	-	4	(66.6)	15	(50)
Someone in an online community	14	(58)	-	-	1	(16.7)	15	(50)
Online web	5	(21)	-	-	2	(33.3)	7	(23.3)
Someone in a breastfeeding support group	8	(33)	-	-	2	(33.3)	10	(33.3)
Friend or family member	4	(17)	-	-	2	(33.3)	6	(20)
Lactation consultant	3	(12.5)	-	-	1	(16.7)	4	(13.3)
Doula	1	(4.1)	-	-	0	(0)	1	(3.3)
Partner	0	(0)	-	-	0	(0)	0	(0)
Other not listed	1	(4.1)	-	-	0	(0)	1	(13.3)
Positive aspects of IHMS as a recipient								
I felt supported by a community of other mothers	16	(53.3)	-	-	5	(83.3)	21	(70)
My stress or anxiety was significantly reduced	17	(56.6)	-	-	4	(66.7)	21	(70)
I was able to provide more breastmilk to my child	16	(53.3)	-	-	4	(66.7)	20	(66.7)

I was able to avoid feeding my child CMF	13	(54.2)	-	-	5	(83.3)	18	(60)
My child was able to receive immune benefits from breastmilk	11	(45.8)	-	-	3	(50)	14	(46.7)
I was happy another parent's breastmilk didn't go to waste	10	(41.7)	-	-	4	(66.7)	14	(46.7)
I developed a friendship with my donors	6	(25)	-	-	2	(33.3)	8	(26.7)
To reduce the amount of CMF my child received	6	(25)	-	-	0	(0)	6	(20)
Previously donated and felt good about receiving donated milk	0	(0)	-	-	1	(16.7)	1	(3.33)
Milk kinship	2	(8.3)	-	-	2	(33.3)	4	(13.3)
Other	0	(0)	-	-	1	(16.7)	1	(3.33)
	1	(4.1)	-	-	1	(16.7)	2	(6.66)
Motivations for seeking donor HM								
Insufficient milk supply	12	(50)	-	-	2	(33.3)	14	(46.7)
Baby seemed hungry after being fed at the breast	12	(50)	-	-	2	(33.3)	14	(46.7)
HM is the biological normal way of feeding	11	(45.8)	-	-	1	(16.7)	12	(40)
Concerns about CMF	7	(29.1)	-	-	1	(16.7)	8	(26.7)
Insufficient weight gain/ significant weight loss	5	(21)	-	-	2	(33.3)	14	(23.3)
Infant was intolerant to CMF	4	(16.7)	-	-	2	(33.3)	6	(22)
Baby was born preterm or low birth weight	4	(16.7)	-	-	1	(16.7)	5	(16.6)
Infant was sensitive or intolerant to something in the breastfeeding parent's diet	0	(0)	-	-	1	(16.7)	1	(3.33)
Maternal illness	1	(4.1)	-	-	0	(0)	1	(3.33)
Breastfeeding was too painful	12	(50)	-	-	0	(0)	12	(40)
Psychological or emotional distress	2	(8.3)	-	-	1	(16.7)	3	(10)
Convenience or opportunity	2	(8.3)	-	-	0	(0)	2	(6.66)
It was free	1	(4.1)	-	-	0	(0)	1	(3.33)
Beliefs about the right of infants to have HM	1	(4.1)	-	-	1	(16.7)	2	(6.66)
Infant was intolerant to CMF	4	(16.7)	-	-	2	(33.3)	6	(20)
HCP advised that breastfeeding was best for baby	5	(21)	-	-	1	(16.7)	6	(20)
Baby was sick	5	(21)	-	-	1	(16.7)	6	(20)
Baby was having difficulty breastfeeding	1	(4.1)	-	-	1	(16.7)	2	(6.66)
Other	0	(0)	-	-	2	(33.3)	2	(6.66)

People/resources that influenced decision to receive HM								
Other breastfeeding mothers	11	(46)	-	-	5	(83)	16	(53.3)
Eats on Feets or HM4HB website	9	(38)	-	-	3	(50)	12	(40)
Facebook pages	11	(46)	-	-	1	(16.7)	11	(36.6)
Someone in a breastfeeding support group	8	(33.3)	-	-	1	(16.7)	9	(30)
Partner or significant other	4	(16.6)	-	-	2	(33.3)	6	(20)
Friend or family member	4	(16.6)	-	-	1	(16.7)	5	(16.6)
Lactation consultant	4	(16.6)	-	-	2	(33.3)	6	(20)
Online web search	5	(20.8)	-	-	0	(0)	5	(16.6)
My own professional training	3	(12.5)	-	-	1	(16.7)	4	(13.3)
Public Health Nurse	1	(4.1)	-	-	0	(0)	1	(3.33)
Professional organisation statements about milk sharing	1	(4.1)	-	-	0	(0)	1	(3.33)
Doula	1	(4.1)	-	-	1	(16.7)	2	(6.66)
Other, not listed	0	(0)	-	-	0	(0)	0	(0)
Discussed MS with a HCP ¶								
Yes	4	(20)	19	(31.2)	4	(66.6)	27	(31)
No	16	(80)	42	(68.8)	2	(33.3)	60	(69)
Select reasons why was MS not discussed with a HCP†								
HCP never asked	10	(62.5)	20	(47.6)	2	(100)	32	(53.3)
I didn't feel comfortable discussing with HCP	5	(31.2)	4	(9.5)	1	(50)	10	(16.6)
I didn't feel the need to discuss this with HCP	9	(56.2)	5	(11.9)	1	(50)	15	(25)
I didn't think HCP would understand or approve	4	(25)	6	(14.2)	1	(50)	11	(18.3)
I didn't view HCP as educated enough to weigh in on decision	2	(12.5)	4	(9.5)	1	(50)	7	(11.6)

Satisfaction with IHMS ¶								
Very satisfied	23	(95.8)	36	(62.1)	5	(83.3)	64	(73.6)
Satisfied	1	(4.1)	18	(31)	0	(0)	19	(21.9)
Neutral	0	(0)	4	(6.9)	0	(0)	4	(4.5)
Dissatisfied	0	(0)	0	(0)	0	(0)	0	(0)

Abbreviations: HM, human milk, HMHB Human Milk for Human Babies, IHMS informal human milk sharing, HCP healthcare professional, CMF commercial milk formula

‡ The base Total column varies by question and represents only the cohorts applicable to that question. For example 'the initial idea for donating' applies to donors (n=73) and recipient/donors (n=6), Total (n=79).

§ Percentages may sum to greater than 100% as respondents could select multiple options.

¶ Denominator differs due to missing data.

† This question was only answered by respondents who answered no to the preceding question

Appendix R: Characteristics, Practices and Experiences of Donors Related to IHMS

	Donors (n=73)		Recipients and Donor (n=6)		Total (n=79)	
	n	(%)§	n	(%)§	n	(%)§
HMB consideration and screening						
Considered donating to a HMB	64	(87.6)	3	(50)	67	(84.5)
Commenced screening as a HMB donor	31	(42.4)	2	(33.3)	33	(41.7)
Approved as a HMB donor	22	(30.1)	0	(0)	22	(27.8)
Did not finish the screening process	7	(9.5)	0	(0)	7	(8.8)
Not approved as a donor	4	(5.4)	0	(0)	4	(5)
Top reasons for not screening as a HMB donor						
Too time consuming and/or expensive	16	(22)	0	(0)	16	(20)
Milk was expressed prior to screening	16	(22)	0	(0)	16	(20)
Other reasons not listed	9	(12)	1	(16.7)	10	(13)
Minimum volume requirements	7	(10)	0	(0)	7	(9)
Milk bank is too far	4	(6)	0	(0)	4	(5)
Prefer local donation	1	(1.3)	0	(0)	1	(1.2)
Wanted to know the recipient family	2	(2.7)	0	(0)	2	(2.5)
Was donating to someone I knew	1	(1.3)	0	(0)	1	(1.2)
No reason	2	(2.7)	0	(0)	2	(2.5)
Other	9	(12.3)	0	(0)	9	(11.3)

Initial idea of donating HM informally						
Someone in an online community	30	(41.1)	2	(33.3)	32	(40.5)
Myself	27	(37)	3	(50)	30	(37.9)
Friend/family member	12	(16.4)	3	(50)	15	(18.9)
Breastfeeding support group	11	(15.1)	2	(33.3)	13	(16.4)
Online web search	6	(8.3)	0	(0)	6	(7.5)
Other	3	(4.1)	1	(16.7)	4	(5)
Health Visitor	2	(2.7)	1	(16.)	3	(3.7)
Midwife	2	(2.7)	0	(0)	2	(2.5)
Partner/Significant Other	2	(2.7)	1	(16.7)	3	(3.7)
Doula	1	(1.4)	0	(0)	1	(1.2)
Public Health Nurse	1	(1.4)	0	(0)	1	(1.2)
Donor characteristics and type of HM donated						
Surplus HM intended for own child	39	(53.4)	2	(33.3)	41	(51.8)
HM expressed specifically for donating	12	(16.4)	2	(33.3)	14	(17.7)
Both surplus and HM intended for donating	22	(30.1)	2	(33.3)	24	(30.3)
Donor had an oversupply of HM	53	(72.6)	3	(50.0)	56	(70.8)
Storage location of expressed HM for donation						
Fridge freezer	47	(63.3)	2	(33.3)	49	(62)
Deep freezer	24	(32.8)	2	(33.3)	26	(32.9)
Fridge	1	(1.3)	2	(33.3)	3	(3.7)
Ice compartment	1	(1.3)	0	(0)	1	(1.2)
Discussion Topics Donor Perspective						
Age of donor baby (Age-Matching)	33	(45)	3	(50)	36	(45.5)
Alcohol consumption	31	(43)	2	(33.3)	33	(41.7)
Tobacco use	28	(38)	3	(50)	32	(40.5)
Prescription drugs	33	(45)	4	(66.4)	37	(46.8)
Age of milk (how long frozen)	31	(43)	2	(33.3)	33	(41.7)

Recreational drug use	20	(27)	0	(0)	20	(25.3)
Cleanliness/hygiene	13	(18)	0	(0)	13	(16.4)
Infectious disease	13	(18)	0	(0)	13	(16.4)
Health status of donor	23	(32)	0	(0)	23	(29.1)
Health of donors' baby or children	8	(11)	0	(0)	8	(10.1)
Health of recipient baby	5	(7)	0	(0)	5	(6.3)
Storage/pumping practices	19	(26)	2	(33.3)	21	(26.5)
Heat treatment/ home pasteurisation	0	(0)	0	(0)	0	(0)
Religious/philosophical beliefs	0	(0)	0	(0)	0	(0)
Methods of initially connecting with recipients						
Online group (HM4HB, Facebook)	52	(71.2)	4	(66.6)	56	(70.8)
Already knew them	12	(16.4)	3	(50)	15	(18.9)
Connected through a mutual friend	4	(5.4)	2	(33.3)	6	(7.5)
Connected through a midwife or doula	3	(4.1)	0	(0)	3	(10)
Connected through a lactation consultant	2	(2.7)	1	(16.7)	3	(10)
Connected through a practice nurse	0	(0)	0	(0)	0	(0)
Connected through a Public Health Nurse PHN	0	(0)	0	(0)	0	(0)
Other	0	(0)	0	(0)	0	(0)
Donated milk to the following individuals						
Friend	9	(12.3)	4	(66.6)	13	(16.4)
Family member	4	(5.4)	1	(16.6)	5	(6.3)
Online acquaintance who they have met	33	(45.2)	4	(66.6)	37	(46.8)
Online acquaintance who they have not met	23	(31.5)	1	(16.6)	24	(30.3)
Methods of milk exchange						
Directly in person	5	(83.3)	66	(90)	71	(89.8)
Indirectly	1	(16.6)	10	(13.6)	11	(13.9)
Cross-nursed	1	(16.6	0	(0)	1	(1.2)
Mail/shipped	0	(0)	0	(0)	0	(0)

HMHB Human Milk for Human Babies, HMB human milk bank,§ Percentages may sum to greater than 100% as respondents could select multiple options.

Appendix S: Characteristics, Practices and Experiences of Recipients Related to IHMS

	Recipients (n=24)		Recipients and Donor (n=6)		Total (n=30)	
	n	(%)§	n	(%)§	n	(%)§
How much of the milk was donated						
A little or some	13	(54.1)	5	(83.3)	18	(60)
About half	3	(12.5)	1	(16.7)	4	(13.3)
A lot	2	(8.3)	0	(0)	2	(6.6)
All of it	3	(12.5)	1	(16.7)	4	(13.3)
It varied	2	(8.3)	0	(0)	2	(6.6)
When the milk was received was it fresh or frozen						
Fresh	1	(1)	2	(33.3)	3	(11.5)
Frozen	19	(95)	4	(66.6)	23	(88.4)
When receiving milk was the infant receiving any of your milk						
Yes-throughout the milk sharing arrangement	19	(79.1)	5	(83.3)	24	(80)
Yes-throughout some of the milk sharing arrangement	0	(0)	1	(16.7)	1	(3.33)
No	4	(16.7)	0	(0)	4	(13.3)
How old was the infant when you began receiving milk						
0-4 weeks	13	(54.1)	6	(100)	19	(63.3)
4-12 weeks	6	(25)	0	(0)	6	(20)
12-26 weeks	2	(8.3)	0	(0)	2	(6.6)
26-60 week	3	(12.5)	0	(0)	3	(10)

Was the infant diagnosed with a lip or tongue tie						
Yes-tongue tie only	9	(37.5)	2	(32.3)	11	(36.6)
Yes-lip tie only	0	(0)	1	(16.7)	1	(3.33)
Yes-both lip and tongue tie	2	(8.3)	0	(0)	2	(6.66)
No	12	(50)	3	(50)	15	(50)
Don't know/uncertain	1	(4.1)	0	(0)	1	(3.33)
What other options were considered before IHMS						
HMB	9	(38)	2	(33.3)	11	(36.6)
CMF	10	(42)	1	(16.7)	11	(36.6)
Animal milk	1	(4)	1	(16.7)	2	(6.66)
Other milk (coconut, almond, soy etc.)	3	(13)	3	(50)	6	(20)
None	3	(13)	3	(50)	6	(20)
Other	1	(4)	0	(0)	1	(3.33)
Methods of initially connecting with donors						
Online groups (Eats on Feets, HM4HB)	16	(66.7)	3	(50)	19	(79.1)
Already knew them	3	(12.5)	2	(33.3)	5	(16.6)
Facilitated by a mutual friend	1	(4.2)	1	(16.7)	2	(6.66)
Facilitated by a midwife or doula	1	(4.2)	1	(16.7)	2	(6.66)
Facilitated by lactation consultant	1	(4.2)	1	(16.7)	2	(6.66)
Facilitated by practice nurse	0	(0)	1	(16.7)	1	(3.33)
Facilitated by Public Health Nurse	0	(0)	0	(0)	0	(0)
Other	0	(0)	0	(0)	0	(0)
Source of DHM						
Online acquaintance (have met in person)	7	(29.2)	3	(50)	10	(33.3)
Online acquaintance (have not met in person)	5	(20.5)	2	(33.3)	7	(23.3)
Friend	2	(8.3)	3	(50)	5	(16.7)
Someone met in local community	2	(8.3)	1	(16.7)	3	(10)
Other	1	(4.2)	1	(16.7)	2	(6.6)
Someone connected through an intermediary	1	(4.2)	0	(0)	1	(3.3)

Method of receiving milk						
Directly (met donor)	15	(62.5)	5	(83.3)	20	(66.6)
Indirectly (did not meet donor, but donor gave to someone else)	8	(33.3)	3	(50)	11	(36.6)
Received via mail/shipping	0	(0)	0	(0)	0	(0)
Via cross-nursing	0	(0)	0	(0)	0	(0)
Did you heat treat the milk prior to feeding it to infant						
Yes	0	(0)	1	(16.7)	1	(3.3)
No	24	(100)	5	(83.3)	29	(96.6)
Reasons for not health treating milk						
I trusted that the milk was clean/safe	13	(54.2)	3	(50)	16	(53.3)
Didn't know heat treatment was an option/didn't occur to me	7	(29.2)	1	(16.7)	8	(26.7)
I wanted to preserve the 'good things' in the milk	6	(25)	2	(33.3)	8	(26.7)
My child was healthy and not preterm or sick	2	(8.3)	1	(16.7)	3	(10)
I was too stressed out to learn and incorporate another new step in feeding my baby	2	(8.3)	1	(16.7)	3	(10)
Did you screen donors by asking them questions						
Yes, everyone	7	(29.1)	1	(16.7)	8	(26.6)
Some people, but not all, regardless of familiarity	2	(8.3)	1	(16.7)	3	(10)
Only strangers, not friends or family	2	(8.3)	1	(16.7)	3	(10)
No one	13	(54.1)	3	(50)	16	(53.3)
Did you do any other actions to minimise concerns						
Ensured appropriate temperature during transportation	14	(58.3)	3	(50)	17	(56.7)
Ensured donor is breastfeeding her own child	8	(33.3)	3	(50)	11	(36.7)
Looked up donor online (Facebook, Google etc)	9	(37.5)	2	(33.3)	11	(36.7)
Mixed milk with BF parents when feeding	9	(37.5)	1	(16.7)	10	(33.3)
Managed pick-up by meeting in public or bringing companion	6	(25)	2	(33.3)	8	(26.7)

Examined milk containers for cleanliness	6	(25)	2	(33.3)	8	(26.7)
Asked donor about their health/medical history	5	(20.8)	2	(33.3)	7	(23.3)
Mixed milk with breastfeeding parents when feeding	9	(37.5)	1	(16.7)	10	(33.3)
Discussed it with a healthcare provider	3	(12.5)	1	(16.7)	4	(13.3)
Examined appearance of the donor, their house, or children	1	(4.1)	1	(16.7)	2	(6.6)
Introduced milk slowly	4	(16.7)	1	(16.7)	5	(16.6)
Blended several donors' milks together when feeding	0	(0)	1	(16.7)	1	(3.3)
Asked other people about their donor to get reputations	1	(4.1)	1	(16.7)	2	(6.6)
Prayed/meditated	1	(4.1)	0	(0)	1	(3.3)
Had professional monitoring by a lactation consultant	2	(8.3)	1	(16.7)	3	(10)
None of the above	5	(20.8)	1	(16.7)	6	(20)
Discussion topics recipient perspective						
Alcohol consumption	13	(54.3)	4	(66.7)	17	(56.7)
Tobacco use	13	(54.3)	4	(66.7)	17	(56.7)
Prescription drug use	16	(66.7)	4	(66.7	17	(66.7)
Recreational drug use	12	(50)	4	(66.7	16	(53.3)
Age of milk (how long frozen)	10	(41.7)	3	(50)	13	(43.3)
Age of donor baby (Age matching)	8	(33.3)	1	(16.7)	9	(30)
Cleanliness/hygiene	6	(25)	1	(16.7)	7	(23.3)
Infectious diseases	7	(29.2)	1	(16.7)	8	(26.6)
Health status of the donor	1	(4.1)	1	(16.7)	2	(6.66)
Health status of the donors' baby or children	3	(12.5)	0	(0)	3	(10)
Health status of the recipient baby	3	(12.5)	1	(16.7)	4	(13.3)
Storage/pumping practices	9	(37.5)	3	(50)	12	(40)
Heat treatment/home pasteurisation	0	(0)	3	(50)	3	(10)
Religious or philosophical beliefs	0	(0)	0	(0)	0	(0)
None of the above	1	(4.1)	0	(0)	1	(3.33)

When you began IHMS how urgent was it						
Extremely urgent	13	(54.1)	2	(33.3)	15	(50)
Urgent	7	(29.1)	3	(50)	10	(33.3)
A little urgent	3	(12.5)	1	(16.7)	4	(13.3)
Not urgent	1	(4.1)	0	(0)	1	(3.33)
How important was IHMS in helping to meet your feeding goals						
Very important	20	(83.3)	1	(16.7)	21	(70)
Important	3	(12.5)	4	(16.7)	7	(23.3)
Somewhat important	1	(4.1)	1	(16.7)	2	(6.6)
Would you recommend IHMS to a friend with breastfeeding challenges?						
Yes	20	(83.3)	6	(100)	26	(86.6)
No	0	(0)	0	(0)	0	(0)
Maybe	4	(16.7)	0	(0)	4	(13.3)

HM4HB Human Milk for Human Babies, CMF commercial milk formula, IMHS informal human milk sharing, DHM donor milk, HMB human milk bank.

§ Percentages may sum to greater than 100% as respondents could select multiple options.

Appendix T: Standards for Reporting Qualitative Research (SRQR)

http://www.equator-network.org/reporting-guidelines/srqr/

	Page/line no(s).
Title and abstract	
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	p.1
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	p.1
Introduction	
Problem formulation	
Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	p.4-6
Purpose or research question	
Purpose of the study and specific objectives or questions	p.6
Methods	

Qualitative approach and research paradigm	
Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	p.6
Researcher characteristics and reflexivity	
Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	p.7 -8
Context	
Setting/site and salient contextual factors; rationale**	p.6
Sampling strategy	
How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	p.6
Ethical issues pertaining to human subjects	
Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	p.8
Data collection methods	
Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	p.6-7

Data collection instruments and technologies	
Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	p.6-7
Units of study	
Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	p.8
Data processing	
Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	p.7-8
Data analysis	
Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	p.7
Techniques to enhance trustworthiness	
Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	p.7-8
Results/findings	
Synthesis and interpretation	
Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	p.8-15

Links to empirical data	
Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	p.8-15
Discussion	
Integration with prior work, implications, transferability, and contribution(s) to the field	
Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	p.16-18
Limitations	
Trustworthiness and limitations of findings	p.19
Other	
Conflicts of interest	
Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	p.1
Funding	
Sources of funding and other support; role of funders in data collection, interpretation, and reporting	p.1

Reference:
O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
DOI: 10.1097/ACM.0000000000000388