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Breastfeeding Continuation and Its Determinants: A Cross-Sectional Study of Malawian Mothers with Children Under the Age of Two

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Breastfeeding Continuation and Its Determinants: A Cross-Sectional Study of Malawian Mothers with Children Under the Age of Two

Directed by Professor Sun Ha Jee

A Master's Thesis

Submitted to the Department of Global Health and Disease Control
Division of Health Policy and Financing
and the Graduate School of Public Health of Yonsei University
in partial fulfillment of the requirements for the degree of
Master of Public Health

Madalitso Aline-Mary Mwenemurupa

December 2023

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This certifies that the Master's Thesis of Madalitso Aline-Mary Mwenemurupa is approved.

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DECLARATION

I declare that the study titled " Breastfeeding Continuation and Its Determinants: A Cross-Sectional Study of Malawian Mothers with Children Under the Age of Two" is submitted as partial fulfilment for the Master's degree in the Department of Global Health and Diseases Control, Division of Health Policy and Financing at Yonsei University, Seoul. This paper contains my original research findings and has not been submitted elsewhere. All references have been appropriately acknowledged.

Madalitso Aline-Mary Mwenemurupa

December 2023

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DEDICATION

This thesis is dedicated to the memory of my late mother, Cathy Susan Mwenemurupa (CSM), whose unwavering love, care, and guidance have always pushed me towards excellence. Although she is no longer with me, I am forever grateful for her endless support and the desire she had for me to strive for more and achieve the best. Her legacy will always live on in my heart and my work.

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1 Thessalonians 5:18

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LIST OF ABBREVIATIONS

ANC	Antenatal care
BFHI	Baby Friendly Hospital Initiative
EBF	Exclusive breastfeeding
EIBF	Early initiation of breastfeeding
ESA	East and Southern Africa
CBF	Complementary breastfeeding with appropriate foods from 6 months to two years and beyond
HICs	High-Income Countries
DHS	Demographic Health Survey
IYCF	Infant and young children feeding
LMICs	Low- and Middle-income countries
MDGS	Malawi Growth and Development Strategy
MICS	Multiple Indicator Cluster Survey
NSO	National Statistics Office
PNC	Postnatal care
SAM	Severe Acute Malnutrition
SDGs	Sustainable Development Goals
SSA	Sub-Saharan Africa
UN	United Nations
UNICEF	United Nations Children's Fund
WHO	World Health Organization

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ABSTRACT

Background: The first 1,000 days of a person's life, from conception to age two, are the most vital for children's development, representing an essential investment. Breastfeeding contributes to the growth and development of children, with a prolonged impact on their health and the economic benefits of the country. Like many low and middle-income countries (LMICs), Malawi has exhibited a high prevalence of breastfeeding practices, including early initiation, exclusive breastfeeding, and complementary breastfeeding. Despite the progress made through continuous efforts and interventions by the government and its partners, recent national surveys have indicated a decline in breastfeeding practices. The study aims to identify and explore the determinants of breastfeeding continuation practices among Malawian women with children under two.

Method: A cross-sectional study was conducted on Malawian mothers with children under the age of two, using 2019/20 data from the Multiple Indicator Cluster Survey (MICS). The study's outcome variable was the status of a child under two years still being breastfed by its mother, with potential explanatory variables categorized as socio-demographics, obstetrical and maternal health factors, and child characteristics. The analysis was based on a sample size of 4,104 women with children under two years. The study employed Jamovi software for descriptive statistics, variable associations, and logistic modeling.

Results: Significant associations with continuing breastfeeding practices were the child's age, mother's age, mother's education, mother's marital status or living with a partner, household wealth, postnatal visits, introduction to foods, area, and region of residency. Adjusting for other variables, children aged 6-11 months (OR =3.89, CI. 1.01-14.98) and 12- 23 months (OR = 7.78, CI. 1.93-31.29) were more likely to continue breastfeeding. However, women who are not married or do not live with partners (OR=0.63, CI. 0.47-0.83) had lower chances of continuing breastfeeding. Women from low (OR=1.53, CI. 1.00-2.34) and middle income (OR=1.54, CI. 1.05-2.27) were more likely to continue

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practicing breastfeeding, similarly to rural women (OR=2.25, CI.1.56-3.25) and central region women (OR=1.46, CI. 1.02-2.08).

Conclusion: The study results highlight a forum for programming at both national, community, and individual levels in Malawi. Although distal factors mainly identified determinants of breastfeeding continuation in the study, it recognizes intermediate and proximal determinants' role in the practice, framing room for sustained education programs, targeting messaging, and awareness for the community in recognition of social elements and local structures in promoting desired health outcomes.

Keywords: Breastfeeding, determinants, Malawi, children under two, continued breastfeeding practice.

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I. INTRODUCTION

1.1 Background information

In children, adequate nutrition is an essential determinant of health and development. Recognizing this importance, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) jointly issued the Global Strategy for Infant and Young Children Feeding (IYCF) in 2002. The effort aimed to reverse alarming trends in child health and growth, as evidenced by high levels of morbidity and mortality especially in Low and Middle-Income Countries (LMICs) due to undernutrition levels presented by stunting, wasting and underweight(WHO, 2003b). The global strategy's goal was to improve nutrition status, growth, development, and health through optimal breastfeeding and infant feeding practices, ultimately impacting the infants' and young children's survival (WHO, 2021a).

The IYCF components for optimal feeding practices include early initiation of breastfeeding within 1 hour of birth (EIBF), exclusive breastfeeding (EBF) for the first six months of life, and continued breastfeeding, along with the introduction of nutritionally adequate and safe complementary solid foods (CBF) from six months to 2 years or beyond(WHO, 2003b, 2003c, 2021a). Additionally, the guidelines provide information for breastfeeding with age-appropriate feeding, food consistency, safe feeding, and responsive feeding upon commencement of complementary feeding at six months (Dewey, 2003; PAHO, 2003).

The strategy guidelines highlight the first '1000' days of a child's life as a critical window for the potential attainment of the whole child's growth and development, with adverse long-term effects extending through adulthood (Grantham-Mcgregor et al., 2007; UNICEF, 2011; Victora et al., 2008). The first 1,000 days, spanning from conception to age two, are deemed the most vital for children's development; hence, good nutrition is an essential investment during this period (Khan et al., 2017; Likhar and Patil, 2022).

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Children's ability to develop, grow, learn, and thrive within their environment significantly depends on their caretakers' or mothers' feeding and caring practices during this time, as it lays the foundation for long-term health benefits (Likhar and Patil, 2022). Similarly, the Lancet Commission indicates and recognizes that the first two years after birth are crucial and provide an opportunity for interventions for malnutrition as a significant global and public health concern, especially in LMICs where undernutrition is visibly reflected in poor growth and development in children (Black et al., 2013; Clark et al., 2020; Georgiadis and Penny, 2017). Suboptimal practices, including breastfeeding, contribute significantly to childhood malnutrition and increased morbidity and mortality among infants and children (Scherbaum and Srour, 2016; Unicef, 2013). In recognizing multiple scenarios where breastfeeding conditions become impractical, the WHO issued guidelines for appropriate feeding practices (WHO, 2005, 2009). Nevertheless, the utilization of breastmilk substitutes, such as infant formula, is advised to be approached with care due to the potential risks they pose in environments where water safety and hygiene conditions are inadequate (Gossner et al., 2009).

Breastfeeding is a valuable source of nutrition for newborns and children especially in the early years of life (Victora et al., 2016; WHO/UNICEF, 2014). It provides protection from infection in children, offers an ideal source of nutrients, and is both economical and safe (Victora et al., 2016). Until six months after birth, children's consumption of safe complementary foods that are appropriate and adequate with continued breastfeeding leads to better health outcomes for children (Bhutta et al., 2013). Despite these critical benefits, breastfeeding practices are suboptimal in many parts of the world as many children either do not commence breastfeeding early enough, mothers fail to practice exclusive breastfeeding for the recommended time of six months, or cease breastfeeding prematurely (Asare et al., 2018; Oyelana, Kamanzi and Richter, 2021; Tamiru et al., 2012; UNICEF, 2016b). The WHO includes breastfeeding among its recommended packages of interventions as it is highly linked to long-term benefits such as lower neonatal and preventable child morbidities and mortality from a respiratory infection and

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diarrhoea (Engelhart et al., 2022). Consequently, in LMICs breastfeeding lowers fertility among women as its extended practice reduces the risk of conception and lengthens birth intervals (Akter and Rahman, 2010).

Discontinuation of breastfeeding is a major concern in LMICs as it is associated with avoidable morbidity and mortality field (Akter and Rahman, 2010), where the high presence of undernutrition coexists with other forms of malnutrition, resulting in the burden of malnutrition(Popkin, Corvalan and Grummer-Strawn, 2020). Mothers of children in LMICs remain pressured with several issues pushing to breastfeeding discontinuation, introduction of supplementary foods or switching to infant formula at unrecommended times or foods that are not adequate to the children's needs, contributing to growth faltering and micronutrient malnutrition (Likhar and Patil, 2022; UNICEF, 2023b).

1.2 Problem statement

The prevalence of maternal and child malnutrition remains high, especially in the LMICs (Black et al., 2008; Black et al., 2013; UNICEF, 2019). Efforts and interventions have been implemented in the past decades aiming to reduce child undernutrition due to long-term impacts on health, especially during the crucial 1000 days; however, challenges persist (Bhutta et al., 2013; Morris, Cogill and Uauy, 2008; Victora et al., 2021). These challenges have impacted the achievement pathway for global and national goals and strategies, such as Sustainable Development Goals (SDGs) and nutritional targets and investment led by the WHO (2012), the World Bank (Shekar, 2017), the United Nations (UN, 2016) and Global Breastfeeding Collective 2030 (UNICEF, 2022). These aim to improve and increase breastfeeding practices, promote the sustainability of breastfeeding through continuation for the recommended duration of 2 years, and reduce low birth weight, childhood stunting and wasting, and anemia.

The 2008 and 2013 Maternal and Child Undernutrition Lancet series describe maternal nutrition, postnatal diet, and nurturing care as determinants of undernutrition in LMICs

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(Victora et al., 2021). Furthermore, studies indicated that improper feeding practices, especially in infants and young children, significantly contribute to the global burden of diseases and mortality (Zakarija-Grković et al., 2016) and have a negative impact on the economic and social development of countries (Black et al., 2013). According to IYCF, children who are not adequately fed, are at high risk of adverse health effects, such as morbidity from infectious diseases (Stuebe, 2009). An increase in child illness cases, malnutrition, and developmental delays has been widely documented in LMICs (Black, Trude and Lutter, 2020; Black et al., 2013; Galler et al., 2021; Gudu et al., 2020).

Like other LMICs, Malawi faces a malnutrition burden documented at 35.5% of under-five children stunted, a higher figure than the African average of 30.7% (Global Nutrition Report, 2020). Malawi's Ministry of Health and Population developed an Infant and Young Child Nutrition Policy and guidelines in response to high child malnutrition and mortality rates. Despite these efforts, data indicates suboptimal care and feeding, a significant concern in Malawi evidenced by high rates of stunting, wasting, and underweight in most districts in the country (National Statistical Office, 2017). The country has made progress in breastfeeding, especially in the early initiation and exclusive breastfeeding, reaching, and surpassing the 50% target (Global Nutrition Report, 2020; WHO, 2022). However, the importance of breastfeeding duration remains less emphasized, with no national targets for breastfeeding continuation beyond exclusive breastfeeding. The WHO (2022) and the National Statistical Office (2017) highlight the need for collaboration of efforts between the government and partners to ensure the sustainability of breastfeeding. This consideration is crucial as the country’s breastfeeding indicator has been decreasing, as observed in the national surveys and research. This threatens the past gains in positive health behaviors and combatting chronic malnutrition, which could reverse at least about 573,000 under-five children at risk for malnutrition, with approximately 62,000 children aged between 6 to 59 months at risk of severe acute malnutrition (SAM) (UNICEF, 2015, 2023d).

The need for improved and sustained efforts in halting the decrease of breastfeeding is

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crucial. The reverse situation is critical for improved health of both the children and mothers contributing to better health outcomes at national, regional, and global levels. This includes the achievement of SDGs 2, and 3 and targets 3.2, which aims to ensure healthy lives and well-being at all ages and end all preventable deaths of newborns and children under the age of 5 (UN General Assembly, 2015). Furthermore, aid to the attainment of a Global strategy for women, children, and adolescents' Health 2016-2030, Malawi Growth and Development Strategy (MGDS) III, and all developmental and health policies and strategies are vital.

1.3 Research Rationale

Despite the benefits of breastfeeding to both the child and the mother, the Lancet Commission (2016) indicates that it is no longer a norm in many communities. The introduction of the WHO indicators, with persistence in monitoring performance to IYCF, suggests that breastfeeding and infant feeding practices for children have remained suboptimal in LMICs with differences existing between and within countries and regions (Ahishakiye et al., 2019; Issaka et al., 2015; Kabir et al., 2012; Mohammed et al., 2020; Nguyen et al., 2013; Sarrassat et al., 2019; Walters et al., 2019). The exacerbated lies mainly by high levels of poverty and poor living conditions, putting women from LMICs at high risk of deviating from the recommended IYCF (Mutisya et al., 2021). Therefore, the pool of the multifactorial determinants of breastfeeding requires supportive measures at multiple levels, including legal and policy directives, social norms, attitudes and values, better work and employment conditions for women, and healthcare services to enable women to breastfeed throughout the recommended duration (Rollins et al., 2016).

Adequate delivery of relevant interventions towards breastfeeding practices changes the pivot to responsiveness and positively improves the outcome rapidly (Rollins et al., 2016). Studies conducted in LMICs have primarily focused on understanding infant feeding practices, including exploring social behaviors and norms that influence breastfeeding efficacy and complementary feeding interventions (Santana et al., 2018;

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Webb Girard et al., 2020). Similarly, systematic reviews have been conducted on related topics, such as examining and investigating interventions to promote breastfeeding and maternal-infant feeding practices during the transition from milk feeding to family food (Buckland et al., 2020; Harrison, Brodribb and Hepworth, 2017; Khatib et al., 2023; Lamberti et al., 2013).

Researchers in LMICs have identified a wide variety of factors associated with the initiation, maintenance, and early termination of breastfeeding. Age, education, socioeconomic level, and time of initiation of breastfeeding are predictive of the duration (Abada, Trovato and Lalu, 2001; Asare et al., 2018; Kinshella et al., 2021; Radzyminski and Callister, 2016; Salim and Stones, 2020). However, these factors provide little understanding of sustained breastfeeding (Shaheen Premani, Kurji and Mithani, 2011).

In Malawi, despite the presence of guidelines on infant and young child feeding practices, the leading national surveys; the Demographic Health Survey (DHS) (NSO, 2015-16) and the Multiple Cluster Indicator Surveys (MICs) 2019-2020 (NSO, 2021) highlights a decrease in early initiation and exclusive breastfeeding among children in Malawi. Notably, these surveys focus on exclusive breastfeeding duration and early initiation but lack emphasis on adherence to the continuation to the full recommended duration of the breastfeeding. Other contextual studies conducted in Malawi aim to understand the feeding practices and types of food introduced to children. However, most of these studies focus on singular aspects of the IYCF components rather than the comprehensive IYCF components (Chipojola et al., 2020; Kerr, Berti and Chirwa, 2007; Nyondo-Mipando et al., 2021; Salim and Stones, 2020; Walters et al., 2019). The segregation in research components of breastfeeding heightens the need for country-specific profiling of the determinants of breastfeeding continuation practices among women in Malawi with children under two. This involves exploring child, maternal and obstetrics, and health-related determinants. Such profiling facilitates the development and design of context-based interventions that promote optimal IYCF practices, providing recommendations for practical strategies to encourage continued

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breastfeeding among Malawian mothers.

1.4 Study Broad Objectives and Question

- This study aims to explore the determinants of breastfeeding and its continuation practices among Malawian women with children under two.

1.4.1 Specific objective

- To identify and describe factors associated with breastfeeding and its continuation among mothers in Malawi who have children under two.
- To examine and discuss the identified factors promoting breastfeeding practices in relation to the World Health Organization (WHO) Infant and Young Children Feeding (IYCF) practice indicators.

1.4.2 Research Question

The question guiding the study is.

- What factors are associated with breastfeeding and its continuation among mothers in Malawi with children under two?

1.5 Definitions

- **Breastfeeding:** Feeding an infant or young child with breast milk directly from female human breasts (lactation), not from a bottle or container (Ballard and Morrow, 2013).
- Breastfeeding Continuation: The act or process of a mother continuing to breastfeed a child from birth and up to two years. It involves exclusively breastfeeding for the first 6 months, and the introduction of complementary foods while continuing to breastfeed for up to two years or beyond.
- Malnutrition: Deficiencies, imbalances, or excess in essential nutrients, energy intake, and utilization that manifest in undernutrition and overweight or obesity

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(WHO, 2023c).

- **Wasting:** Impaired growth and development in children, resulting in reduced height-for-age due to chronic malnutrition, repeated infections, or both, negatively impacting cognitive development and overall health outcomes (Cogill, 2001; WHO, 2019b).
- Stunting- Low height for age, an indicator of cumulative nutritional deprivation with recurrent infections occurring since and before birth, which restricts a child's potential physical development and mental growth (WHO, 2019c).

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II. LITERATURE REVIEW

Introduction

This chapter explores existing literature, which forms the foundation of the study. The chapter comprises seven sub-sections that will provide general and contextual background information about breastfeeding practices, their continued benefits, and the adverse consequences of suboptimal breastfeeding.

2.1 The global prevalence of childbirth and breastfeeding

The United Nations (UN) estimates a relatedly stable number of births for the past five decades, with almost 385,000 daily births around the world, totaling approximately 140 million a year UNICEF (2023a). All these births are, at one point, breastfed, as data collected from about 123 countries indicate that at least 95 % of babies ever receive breastmilk (UNICEF, 2023a). However, this varies widely between and within LMICs and High-Income Countries (HICs), with approximately 4% or 1 in every 25 babies never being breastfed and 21% or 1 in every five babies never receiving breast milk in LMICs and HICs respectively (UNICEF, 2018). In HICs such as Oman, Sweden, and Uruguay, the rates have remained high, with almost all babies being breastfed, whilst in others such as the United States, the rates remain low, with about 74% of babies ever receiving breastmilk, and Ireland with about 55% being breastfed (UNICEF, 2018). In LMICs, however, such differentiations may not be observed, as almost all children are breastfed at about a 90% rate (UNICEF, 2018).

The visibility difference in breastfeeding prevalence rates between and within countries and households with varying economic statuses and income levels has been observed (Neves et al., 2021; UNICEF, 2018), with it reported to be more prevalent in LMICs (Victora et al., 2016) and inversely associated with national Gross Domestic

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Product (GDP) (Neves et al., 2022).

Studies in HICs have provided different results in the practices. For instance, studies from the USA and Canada report that mothers from the higher income quartiles are more likely to exclusively breastfeed than those from the lower quartiles (Temple Newhook et al., 2017; US Department of Health Human Services, 2011). This contrasts with some HICs, such as Saudi Arabia, which reported a reduced probability of early initiation and duration of breastfeeding among high-income households (Elyas et al., 2017). However, some studies indicated a downward trend in breastfeeding, with high rates at initiation and lower after the child's first month (Alsulaimani, 2019; Alyousefi, 2021), due to multiple intrapersonal, interpersonal, and environmental factors (Raheel and Tharkar, 2018).

In some instances, there is no distinction between the quartiles in Eastern Europe and Central Asia, where the status of the breastfeeding practice has remained low for two years (Neves et al., 2021). This contrasts with LMICS, where studies have found that Sub-Sahara Africa, South and Southeast Asia, and Latin America to have more breastfeeding practices, with more children from lower quartiles being breastfed than those from higher quartiles (Anstey et al., 2017; Oakley et al., 2018; Victora et al., 2016). This pattern is also reported in studies and surveys conducted in Ethiopia (Elyas et al., 2017; Ethiopia Demographic and Health Survey, 2012; Teka, Assefa and Haileslassie, 2015), Tanzania (Mgongo et al., 2013), and Malawi (NSO, 2015-16; Salim and Stones, 2020).

Although this is the case, LMICs breastfeeding practice have remained inconsistent, with duration varying between households (UNICEF, 2018; Victora et al., 2016; Zong, 2021), with about 41% of the high-income households continuing breastfeeding and 64% of poor households (UNICEF, 2018). In the West and Central Africa region, the observation of breastfeeding is reported: 63% of children from the lower quartiles are still being breastfed at two years compared to 26% in higher quartiles (UNICEF, 2018). Several studies, including the Lancet series on breastfeeding in 2016, reported suboptimal

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breastfeeding by the IYCF guidelines in LMICs (Victora et al., 2016; Zong et al., 2021).

The global rate of the early initiation of breastfeeding (EIBF) within the first hour is 47%, which is concerning as it exposes newborn babies not only to contact with their mothers but also to infections (UNICEF, 2023a). The prevalence of EIBF differs within regions, with 39% in South Asia, 41% in East Asia and the Pacific (UNICEF, 2023a). In Africa, the pooled prevalence is placed at 57%, with the highest being in Malawi and the lowest in Congo Brazzaville (Birhan et al., 2022). UNICEF (2023a) has indicated vulnerabilities, exposing about 1 in every three newborns to receive food or liquids that are not breastmilk in the earliest days of their lives.

The global prevalence of EBF has increased in the last decade to 48% globally (WHO, 2021b), with South Asia having the highest prevalence of EBF, where over 60% of infants are breastfed. In Sub-Saharan Africa, the prevalence proportion is lower compared to other LMICs (Bhattacharjee et al., 2019; Kinshella et al., 2021). Despite this progress in EBF, UNICEF (2016a) reported a drop in the prevalence of continued breastfeeding after the commencement of complementary feeding, from 74% to 46%. However, this varies between regions and countries.

There are inconsistent findings on breastfeeding factors associated with early initiation of breast milk and exclusive breastfeeding practices (Adhikari et al., 2014; Asfaw, Argaw and Kefene, 2015; Berde and Yalcin, 2016; Cai, Wardlaw and Brown, 2012; Edmond et al., 2006; John et al., 2019; Liben and Yesuf, 2016; Setegn et al., 2012; Tariku et al., 2017). Health-related categories such as place of delivery and the availability of facilities are associated with optimal practices in Sub-Sahara Africa (Bergamaschi, Oakley and Benova, 2019) and Nepal (Adhikari et al., 2014) and failed to show association in a study conducted in Ethiopia (Liben and Yesuf, 2016).

2.2 Infant and Young Children Breastfeeding and its Benefits.

In the past decade, noteworthy epidemiological and biological discoveries have emerged, further elucidating the established advantages of breastfeeding for both women

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and children, regardless of their socioeconomic status (Victora et al., 2016). The importance of EIBF, EBF and CBF as optimal breastfeeding practices is among the core elements in ensuring children are protected from early death, with an approximation of about 820,000 children saved under the age of 5, of which 87% would be below six months old (The Lancet, 2002; UNICEF, 2018).

There are several benefits to the practice of breastfeeding spanning both HICs and LMICs for both the child and the mother in terms of survival, development, and health. It also serves as an essential intervention, especially in the promotion of good health and primarily impacts the economic and human capital (Oliveira, Prell and Cheng, 2019; Rollins et al., 2016; Victora et al., 2016).

Research has expanded and established the known short and long-term benefits of breastfeeding for young children and their mothers (Lutter and Lutter, 2012; Zong et al., 2021) and indicates the need for breastfeeding to become a health-behavior-modified habit (Louis-Jacques and Stuebe, 2020). Antibodies contained in breast milk protect children from the risk of developing several diseases, (Atyeo and Alter, 2021; Lokossou et al., 2022; Oddy, 2001; UNICEF & WHO, 2021), with several studies indicating breastfeeding's vitalness not only improves human intelligence but also reduces the risk of diarrhoea, pneumonia and future health risks such as obesity and diabetes among children later in life (Bernardo, Cesar and Organization, 2013; Lamberti et al., 2011; Lamberti et al., 2013; Lee and Binns, 2020; Sankar et al., 2015; Santiago et al., 2019) and improved immune system (Miller, 2017). Additionally, children and adolescents who were breastfed as babies are less likely to develop overnutrition issues such as overweight or obesity, which is associated mostly with higher income in adult life (Victora et al., 2016).

In women, breastfeeding has proven to have a significant impact, resulting in improvement in public health indicators such as a reduction in risks of choric diseases, including myocardial infarction, cardiovascular diseases, post-partum hemorrhage, and depression, as well as breast and ovarian cancer risks, especially type 2 diabetes (Bartick

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et al., 2017; Horta, Loret de Mola and Victora, 2015; Natland Fagerhaug et al., 2013; Sankar et al., 2015; The Lancet, 2002; Tschiderer et al., 2022). Breastfeeding can prevent about 20,000 maternal deaths from breast cancer (Victora et al., 2016).

Additionally, research published in the 2016 Lancet series reported strong evidence of the importance of interaction between mother and child during breastfeeding that promotes bonding, reduces stress, and induces appetite and sleep development due to the release of hormones such as prolactin, and oxytocin (Pérez-Escamilla et al., 2023; UvnäsMoberg et al., 2020). Hence, undermining the importance of breastfeeding and its continuation till two years of age results in an evolutionary loss for both the mother and the child (Doma et al., 2021; Pérez-Escamilla et al., 2023).

2.3 Adverse consequences of improper breastfeeding practices among children

The Convention on the Rights of the Child under the United Nations (UN) indicates every infant and child's right to good nutrition, however, only a quarter of infants and children have access to the required frequency of diversified dietary foods (WHO, 2023b). It has been estimated that the number of preventable deaths of children under the age of five was between 5 and 5.3 million during the period spanning from 2018 to 2020. These deaths could have been avoided if affordable services, such as adequate nutrition, appropriate feeding and care practices (including early initiation of breastfeeding, exclusive breastfeeding, and safe complementary feeding for six months with continued breastfeeding for up to two years or beyond), as well as sanitation and hygiene practices, were accessible to mothers and caretakers (WHO, 2018, 2020, 2023a).

Life-threatening consequences and long-term impacts on children due to delayed breastfeeding have been documented (Okechukwu and Achonwa, 2009; Owa and Osinaike, 1998; Udo et al., 2008; UNICEF, 2023a), with a 33% risk of dying, especially for children with delayed breastfeeding initiation with 2 to 23 hours after birth. These risks double after 24 hours of birth (Smith et al., 2017).

A study by Victora et al. (2016) reported that improper breastfeeding practices

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contribute to about 16% of deaths annually. Children who do not receive optimal breastfeeding are at risk of malnutrition (Ahmed and Salih, 2019; Walters et al., 2019), and make up one-third of all child malnutrition cases (WHO, 2021a, 2023b). Malnutrition is an underlying cause of infectious diseases such as pneumonia, diarrhoea, and malaria, along with pre-term birth and congenital anomalies, which are leading causes of death (WHO, 2020). Additionally, it can impair physical and mental development, impacting economic development (Dipasquale, Cucinotta and Romano, 2020; Govender et al., 2021; Saleem et al., 2021; WHO, 2023b).

Overlapping forms of malnutrition are present in more than one-third of countries in LMICs, with a particular concentration in Sub-Saharan Africa (SSA), South and East Asia, and the Pacific regions (WHO, 2019a). The Lancet series on maternal and child undernutrition and overweight in LMICs from 2013, as well as the 2008 Lancet series on the intervention of maternal and child undernutrition and survival, have shed light on the links between suboptimal breastfeeding practices, recurring infections, and micronutrient deficiencies as proximal determinants of stunting in children (Black et al., 2013). Additionally, the series has highlighted the significance of caregivers' suboptimal complementary caring and feeding practices in LMIC households (Black et al., 2013). These findings underscore the need for targeted interventions to improve maternal and child health outcomes in LMICs (Bhutta et al., 2008).

Numerous studies have been conducted on improper feeding practices among young children, with some indicating a potential link between younger mothers and a higher risk of suboptimal feeding practices. Further, reports highlight the associated poorer nutrition status of infants and children, mainly in LMICs (Benova et al., 2020; Hill et al., 2015; Jama et al., 2018). A study conducted by Hackett et al. (2015) reported understanding and interpretation gaps in younger mothers regarding IYCF practices.

Other studies have indicated that high suboptimal breastfeeding practices are due to factors such as the mother's status as either a migrant or refuges (Hashmi et al., 2019), cultural and traditional beliefs (Oyelana, Kamanzi and Richter, 2021), geographic and

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residence area (Hazir et al., 2013; Issaka et al., 2015; Veeranki et al., 2017), inadequate health-seeking habits such as ANC and breastfeeding counseling (Hoche, Meshesha and Wakgari, 2018). There are mixed findings on education, with lower education levels and income reported by Zakarija-Grković et al. (2016) while Ogbo, Agho and Page (2015) reported on higher education.

2.4 Early cessation or discontinuity of Breastfeeding

Globally, the rate of breastfeeding varies regardless of national economic status, however, at the first birthday, most children in LMICs are still breastfed when compared to those in HICs (Lancet Commission, 2016). Although studies have shown high adherence to breastfeeding in LMICs, the discontinuation or cessation of breastfeeding is variably reported before the age of two in countries, indicating reasons for discontinuation ranging from medical, psychological, social, and physical discomfort (Carletti et al., 2011; Odom et al., 2013; Olang et al., 2012; Radwan, 2013). In a mixed study by Ericson and Palmér (2020), found that some mothers discontinue breastfeeding due to self-imaging concerns and discomfort.

The factors affecting breastfeeding practices extend from individual characteristics, including socio-demographics such as the age of the mother, education, and economic status, to other environmental issues such as the socio-cultural aspect that considers habits, knowledge and other children's illnesses, and obstetric factors (Bai, Fong and Tarrant, 2015; Bakoula et al., 2007; Dashti et al., 2014; Doherty et al., 2012; Haile et al., 2014; Mbada et al., 2013; Radwan et al., 2021). Adherence to breastfeeding practices as recommended by the WHO becomes uneven, with some mothers not initiating in time, some failing to exclusively breastfeed, and most discontinuing breastfeeding upon commencement of complementary feeding at 6 months (Abraham Tamirat, Pradeep and Morankar, 2023; Balogun et al., 2015; Notzon, 1984; Trafford et al., 2020).

Hulsbosch et al. (2023) emphasized the ongoing significance of breastfeeding continuation for children's and mothers' health, indicating that the concerning decline in

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breastfeeding rates offers a promising opportunity to conduct investigations into the maternal factors linked to prolonged breastfeeding. Through this knowledge, enhancing support for women in their breastfeeding practices following childbirth can be achieved.

2.5 Policy and Strategy for Breastfeeding in Malawi

The UNICEF and WHO (1990) Innocenti Declaration, WHO Baby-Friendly Hospital Initiative (BFHI), and WHO (2003a) Global Strategy for Infant and Young Children Feeding (IYCF) to support, promote and protect breastfeeding through policies led a foundation for breastfeeding interventions, especially in the SSA. Malawi launched breastfeeding interventions in 1993 based on BFHI standards, adhering to the Ten Steps to Successful Breastfeeding measures, which incorporated prenatal and postnatal breastfeeding education during ANC and PNC visits by trained health personnel (WHO/UNICEF, 2014). This contributed significantly to increased breastfeeding between 1993 and 2004, from 3% to 25%, although the initiative was lost due to limited resources, mainly externally sourced (Chipojola et al., 2020; Kavle et al., 2019).

A systematic review and meta-analysis of 58 countries (Pérez-Escamilla, Martinez and Segura-Pérez, 2016) and 195 studies in LMICs and HICs (Sinha et al., 2015) found and reported an increase in EIBF, EBF, and duration of breastfeeding due to BFHI. Similarly, a meta-analysis study aimed at assessing the four key breastfeeding prevalence indicators in 29 SSA countries by Issaka et al. (2015) suggested increased rates of early initiation of breastfeeding and exclusive breastfeeding in most African countries, with Malawi ranked highest in 2010.

The developed and recommendations of Malawi's National Nutrition Policy and Strategic Plan have strengthened interventions in infant and young feeding practices, with activities ranging from training service providers and mothers and sensitization campaigns for community members (Malawi Government, 2016). The country's most significant progress was in EBF, with an increase in months that remained steady in duration between 1992 and 2010 (0.4 to 3.8 months) before a drop in 2015 to 3.2 months,

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as reported in the NSO (2015-16).

As a country, breastfeeding is commonly practiced in Malawi, with around 98% of mothers reported to have breastfed at some point. Approximately 60% of children have stopped breastfeeding by 23 months (NSO, 2015-16). Research has been conducted to investigate breastfeeding practices among the general population in Malawi (Kalanda, Verhoeff and Brabin, 2006; Vaahtera et al., 2007), with additional studies conducted in specified districts of the country (Kalanda, Verhoeff and Brabin, 2006; Kamudoni et al., 2010; Kumwenda et al., 2016), and a few conducted nationwide focusing on mothers living with HIV, as well as on initiation and exclusive breastfeeding (Kafulafula et al., 2013; Kamudoni et al., 2015; Kazembe, 2008).

Similarly, several studies have indicated various determinants of breastfeeding engagement (Rollins et al., 2016) with mixed findings in determinants. However, the Malawi National Statistics Office (NSO) (2015-16) indicates that different cultures and demographics have contributed differently to EIBF, EBF, and CBF suggesting a need for further investigation.

2.6 Breastfeeding Trends in Malawi

Malawi has made significant strides in promoting breastfeeding practices, with a particular emphasis on exclusive breastfeeding (EBF). The progress is attributed to various factors, including the implementation of BFHI, government support for IYCF through the development of policies and guidelines, community integration, program mainstreaming, and mass education campaigns (Chipojola et al., 2020; NSO, 2015-16; Walsh et al., 2023).

Despite efforts that have collectively contributed to the improvement of breastfeeding practices in Malawi, a decline in the EBF rate within the first month of birth was recognized in the Malawi Demographic Health Survey (MDHS) from 72% in 2010 to 61% in 2016, along with an increase in children receiving complementary foods early before 6 months and not being breastfed (Figure 1)(NSO, 2015-16). Similarly, the

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Multi-Indicator Cluster Survey (MICS) reported that the country's breastfeeding indicators are signaling regression in practice, with a drop in EIBF from 8 out of 10 in 2016 to 6 out of 10 in 2019, and EBF decreasing from 72% in 2010 to 64% in 2019 (WHO, 2022).

The United States Agency for International Development (USAID, 2017), in its Maternal and Child Survival Program report (MCSP) addressing the barriers to exclusive breastfeeding in Malawi, indicated an increased prevalence in the introduction of foods and liquids to children below six months, placed at 34.6%, with an average of 3 mothers practicing EBF for the entire first six months (Kafulafula et al., 2013). Considering the declining records in breastfeeding practices not only in Malawi but also in other countries, both LMICs and HICs, research regarding determinants of breastfeeding practices up to 2 years of age of a child is warranted. This research aims to depict the trends of suboptimal performance in breastfeeding practices that divert from the recommended IYCF practices (Nkoka et al., 2019; WHO/UNICEF, 2009).

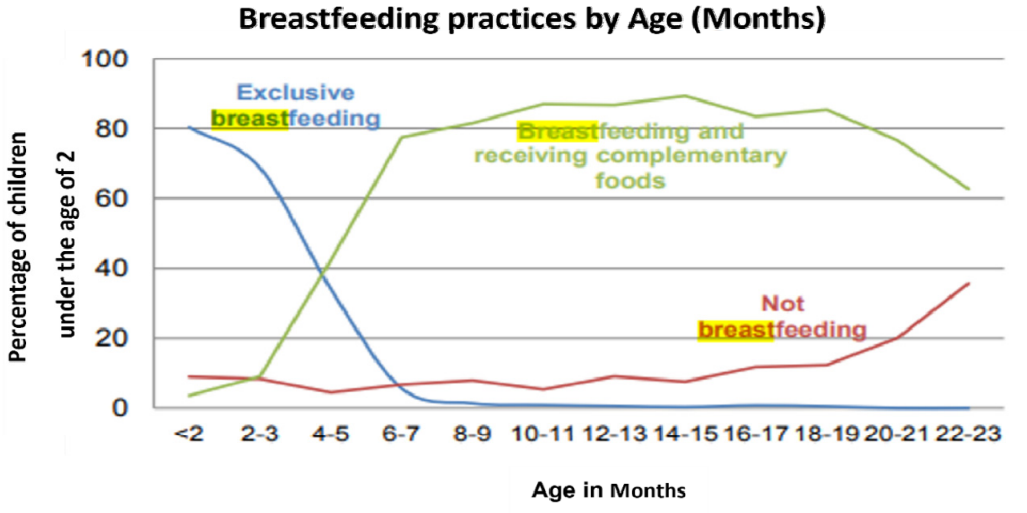

Figure 1. Breastfeeding Practices by child age in Malawi NSO (2015-16)

A cross-sectional nutritional baseline survey conducted in the two districts in Malawi

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(Kasungu and Mzimba) reported higher breastfeeding practices among children under one month (81%) than those at five months (15%). Additionally, it revealed higher rates of diarrhoea and fever among non-breastfed children (Kuchenbecker et al., 2015). Similar observations were reported by Kerr, Berti and Chirwa (2007), who conducted a study in northern Malawi and found the early introduction of food to children (65%) in their first month, such as herbs, water, and porridge. Kamudoni et al. (2010) in Mangochi district in the eastern region found a difference in exclusive breastfeeding lasting for six months in perception and actual practice, with 40.1% and 7.5%, respectively. A cohort study conducted by Kalanda, Verhoeff and Brabin (2006) enrolled children and reported poor breastfeeding practices, with a mean age of introduction of water at 2.5 months, early introduction of complementary feeding at 3.4 months, and solid foods at 4.5 months, resulting in low weight and respiratory infection. However, this study attributed these outcomes to mothers' illiteracy levels.

The studies indicate a problem in EBF and CBF practices that may result from perception or literacy. This drop-in practice as a child's age increases continued to be reported in a systematic review conducted by Kavle et al. (2017) in LMICs highlighting the implications of this in programmatic planning. Other studies on SSA have also indicated that socioeconomic status, level of health advice from skilled personnel, lack of privacy and comfort during breastfeeding, and the level of family support can act as barriers and facilitators to breastfeeding practices (Chipojola et al., 2020; Kinshella et al., 2021; Seabela, Modjadji and Mokwena, 2023; Snyder et al., 2021).

2.7 Study Linkage to the Sustainable Development Goals

The significance of children's feeding and care practices in the health and development of a country has been acknowledged (WHO, 2003a, 2009). This recognition is further exemplified by the inclusion of IYCF in the global agenda, specifically in the 2030 SDGs, particularly in SDG 2, which aims to achieve zero hunger and address all forms of malnutrition, including the nutritional needs of adolescents. It is also emphasized in SDG

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3, which aims to promote well-being and healthy lives for individuals of all ages (UN, 2015).

Optimal breastfeeding practices among children under the age of two can also be linked to other SDGs, such as goals 4, 5, 6, and 10, which focus on quality education, gender equality, sanitation, access to quality water, and reducing the gap between the rich and poor (Benova et al., 2020; Starbird, Norton and Marcus, 2016). The high return on investment in children's breastfeeding is reflected in the health outcomes of children and mothers, with significant implications for human capital and future economic benefits. Therefore, it is a global priority for such investment to yield a more significant impact (Topothai and Tangcharoensathien, 2021; Walters, Phan and Mathisen, 2019).

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III. CONCEPTUAL FRAMEWORK

3.1 Hierarchical Conceptual Framework

The study will adopt a hierarchical conceptual framework proposed by Victora et al. (1997) to aid in the analysis of the study objectives, which aims to explore several determinants of breastfeeding continuation practices. The framework suggests that these practices are arranged in a hierarchy, ranging from distal to intermediate to proximal determinants.

The distal determinants, essential for developing maternal and child health policies and programs, are classified as contextual, domestic, household, and maternal characteristics. Intermediate determinants refer to more immediate influences on behaviors (prenatal and postnatal care, maternal and child characteristics at health facilities). Lastly, the proximal determinants involve the interaction between the mother and the child, such as characteristics of the child that can directly influence the initiation and continuation of breastfeeding and feeding patterns. Understanding these different levels of the determinants will guide effective interventions and policies that can promote and support breastfeeding practices.

Figure 2 presents a hierarchical conceptual framework showcasing the interplay between independent variables at different levels and their collective influence on the study outcome. The framework encompasses variables categorized into three hierarchical levels: distal, intermediate, and proximal. The distal factors, represented by sociodemographic factors, have the potential to exert both direct and indirect influences on all other levels of determinants, serving as foundational impact elements. The intermediate factors act as connectors between the distal and proximal determinants, as mechanisms through which the distal factors interrelate for the desired outcome, playing a crucial role in mediating the relationship between the levels. The proximal determinants directly impact the development of interest and are associated with the distal determinants; the relationship

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between these proximal and the distal determinants can be both parallel and hierarchical, indicating that they can act independently or in conjunction with one another to influence the outcome. The framework allows for systematic adjustments for the distal influences on proximal determinants (Victora et al., 1997), making it suitable for the study.

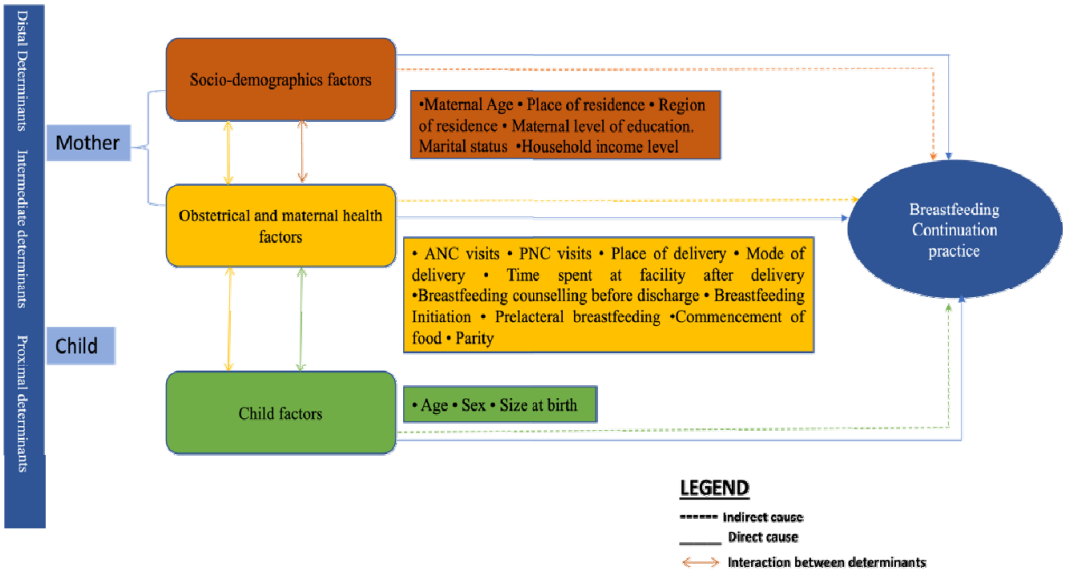

Figure 2. Hierarchical Conceptual framework applied to identify Breastfeeding continuation determinants among Malawian women.

Although the UNICEF conceptual framework for malnutrition, UNICEF (1998), and the socio-ecological model by Bronfenbrenner (1979) could have been applicable for the research, as they propose a multidimensional approach with a cyclical nature of understanding human behavior, the study design and the depth of available variables necessitated the adoption of the hierarchical concept. The ecological model was deemed less suitable due to its lack of alignment with the study's specific requirements.

The hierarchical concept, similar to the socio-ecological model, clarifies the relationship among independent variables at both individual and societal tiers, making it suitable for guiding the analysis and interpretation of the study. The study proposal

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acknowledges the importance of understanding that behavior is affected by a range of variables involving the individual, broader physical, social and policy environment.

The use of the hierarchical approach as a conceptual framework in breastfeeding practices has been applied by other researchers conducting systematic reviews aiming to understand trends in the prevalence and determinants of age-appropriate breastfeeding among 0-23 months, determine factors associated with the sustainability of breastfeeding for 12 months or more, exclusive breastfeeding, initiation of breastfeeding and exclusive breastfeeding duration and its discontinuation (Boccolini, Carvalho and Oliveira, 2015; Esteves et al., 2014; Mohammed et al., 2022; Santana et al., 2018; Vieira et al., 2014).

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IV. METHODS

Introduction

This chapter outlines the research methodology, encompassing study design, study context and population, inclusion and exclusion criteria, sample size, data collection, management, and analysis.

4.1 Study design

This cross-sectional design study explores the determinants of breastfeeding and its continuation practices among mothers of children under two in Malawi. Conducting a cross-sectional study helps establish preliminary evidence that can be used for planning and intervention for a particular group of people and aids in informing future research (Wang and Cheng, 2020). Additionally, the selection of cross-sectional studies allows insights to be gained by comparing different components, facilitating the examination of multiple parameters for analysis to aid decision-making and impact performance (Wang and Cheng, 2020). The use of secondary data is increasingly common in the health sector; its main advantage lies in addressing research questions but is limited due to resource constraints in performing such research (Wickham, 2019).

4.2 Study Setting and Population

4.2.1 Setting

Malawi is a country in Southern Africa, bordered by Tanzania to the North and North-East, Mozambique to the South and South-West and Zambia to the West and North-West. According to the World Bank (2023), Malawi is classified as a low-income country, falling under the Gross National Income (GNI) range of $1,035 to $4,045 with an estimated population estimated of 20,405,317.

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The country covers an area of about 118,484 square kilometers and is administratively divided into three regions; North, Central and South, which collectively form 28 districts, with six districts in the North, nine in the Centre and 13 in the South.

The life expectancy in Malawi is reported to be 63 years, and the birth rate is 33 per 1,000 people, with 96% of births attended by skilled birth attendants (Bank, 2023). The mortality rates per 1,000 children stand at 31 for infant mortality, 19 for neonatal mortality, and 42 for under-five mortality (WorldBank, 2023).

districts.

4.2.2 Study Population Inclusion and Exclusion

The study population consisted of mothers with children under the age of 2 years residing in Malawi, and who were eligible and included in the Multiple Indicator Cluster Survey 6 (MICS6) conducted in 2019. These mothers included those who had ever given birth, and the information considered only children born in the two years preceding the survey who were alive at the time of the survey. Women with multiple children falling into the desired age category were included in the study, as the dataset provided key variables based on the line number of the mother, thus minimizing the likelihood of duplication or exclusion of certain children. Children older than 23 months were excluded from the study, as were mothers with no children.

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4.3 Data source and collection

The study used secondary data from the Malawi Multiple Indicator Cluster Survey 6 (MICS6) conducted under the East and Southern Africa (ESA) region, conducted from 2019 to 2020 by UNICEF and the Malawi National Statistical Office (NSO). The data set was extracted from this specific time and focused on the women file (wm.sav) where mothers or caretakers were and the children file (ch. sav) which were used in the analysis.

UNICEF designed the survey to collect health indicators primarily concerning women and children at the national level, encompassing both the urban and rural areas in Malawi. This comprehensive survey covers all 28 districts, which are categorized into three regions: South, Central, and North. The survey employed a two-stage sampling technique to select households (HH) from each district's urban and rural areas. Enumeration areas (EAs) were systematically selected with probability size proportional within strata. A systematic sample of 24 HH was drawn from each EA household listing, resulting in a total of 1,112 sampled EAs and 26,904 HH chosen at the national level.

Although this study applied only 2 files from MICS datasets such as women (wm. sav) and children (ch. sav), the survey consists of six additional questionnaires administered to gather the health of women and children’s data. These questionnaires comprised the household questionnaire (hh.sav), which collected demographic information on the residents and dwellings of households and included questions on water quality testing for three families in each cluster. The fertility/birth history module was administered to women aged between 15 and 49, while men aged between 15 and 49 were surveyed using the men's questionnaire. Children between the ages of 5-17 years were also surveyed, and the final questionnaire focused on mosquito nets in households.

4.4 Sample size

For this study, a sample size of 4,104 children under the age of two with mothers aged between 15-49 years, who had given at least one live birth in the last two years and met

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the selection criteria, were included in the research from the 24,543 households interviewed in the 2019/20 MICs survey. The sample size was derived from a merged file between women (wm. sav) and children (ch. sav), which had a total of children under the age of 5 at 15,569. This was filtered to include children under two4 months (0-23months), resulting in 6,315 children. Considering the removal of missing variables from the total number of mothers with children included in the study, the final sample size was 4,104. It is important to take note that the MICs of 2019-20 had higher percentages of respondents from rural areas than those in urban areas, with 84.5% and 15.5%, respectively, and about 33% of households were female-headed (NSO, 2021).

1. 4.5 Variables

4.5.1 Dependent variable:

The primary outcome variable for this study was the dichotomized status of a child still being breastfed by the mother (continued breastfeeding practice).

4.5.2 Independent variables:

The vital independent variables considered were maternal socio-demographics, which included the socio-economic factors such as mothers' age, mother region, area of stay, household income level (defined by the highest level of education attained), education of mother, mother parity, and child size perceived by mother. Health characteristics included the number of ANC and PNC visits conducted by the mother, place and mode of delivery, duration of stay at the facility after birth, breastfeeding counseling, early initiation of breastfeeding, and introduction of foods. The child’s characteristics included the sex and age of the child.

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Table 1. Description of dependent and independent Variables

Variables	Measurement	Remarks
Breastfeeding continuation status	Yes, no	The child under the age of 2 status of whether is still being breastfed or not.
Child's characteristics		
Age of child	0 to 23 months (Continuous numeric variable)	Age of child in months
Categorized child's age	0-5 months, 6-11 months, 12-23 months	Children's age (under two years) in months according to the IYCF recommended feeding practices.
Sex	Male, Female	Sex of a child
Mothers Socio-demographic		
Categorized mother's age	< 18 years, <25 years, 25 years and above	Categorized age of the mother's completed years: teen mothers, young mothers, and older mothers with children under the age of 2
Age of mother	15 to 49 years (Continuous numeric variable)	Age of mothers completed years
Married or living with a partner	Yes, no	The status to whether the mother to the child is married or lives with a partner or not.
Residence	Urban, Rural	Place of residence of the parent or caretaker described through the level of urbanization
Region	North, Central, Southern	The region where the household is located
Household wealth Level	Low, Middle, High	HH income level of the parent taking responsibility for the child
Mothers' Education level	None (preprimary), Primary level, Secondary level, Tertiary level	Education level for the mother under the age of 2
Parity	Less than 5, More than 5	The number of times the woman has given birth
Size of child at birth	Large, Average, Small	Child size at birth reported by the mother
Obstetrical and maternal Health Care		
ANC visits	Less than four visits, four or more visits	The number of times mothers attended Antenatal clinics before actual birth for checkups. With four recommended by the WHO
Place of delivery	Hospital, Other	The place where the mother gave birth to the child under two years
Health facilities stay after birth.	Less than 10 days, less than 23 days, more than 23 days	Mothers' duration of stay after giving birth at the facility for further observation or as guided by a physician.

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Variables	Measurement	Remarks
Breastfeeding initiation	Immediately or less than one hour, within three hours, more than three hours	Mothers time to commence breastfeeding after birth
Breastfeeding counseling after birth.	Yes, no	Mothers recall receiving breastfeeding counseling after birth before leaving the health facility.
Prelacteral breastfeeding initiation	Yes, no	Mothers' response to giving another thing other than breastmilk to the baby within the first 3 hours
Introduction to foods	Yes, no	Introduction of other foods such as soft, semi-solid and solid food to the child

4.6 Data Analysis

The present study utilized a comprehensive descriptive data analysis approach to investigate the association and prevalence of continued breastfeeding practices among Malawian mothers with children below the age of 2 years. The raw data were initially processed, cleaned, and merged using SPSS software, resulting in a master dataset that was subsequently analyzed using the Jamovi software version 2.3.21.0. The missing data from both the dependent and independent variables were removed from the data set.

4.6.1 Descriptive statistics:

Frequencies and percentages for categorical variables were calculated in the descriptive analysis. This was done to summarize and provide the descriptives for both the dependent and independent variables of the dataset, aiming to provide an understanding of the distribution of values and identify existing patterns and trends within the dataset. The descriptives provide insights into the data to make informed decisions on the findings.

4.6.2 Chi-square analysis:

A chi-square analysis will determine the association and prevalence of breastfeeding practices among Malawian mothers with children below the age of 2 years. This

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statistical test was selected due to its usefulness in analyzing different categorical variables.

4.6.3 Regression analysis:

Binominal logistic regression was employed to investigate the impact of each variable on the binary outcome of whether the mother still breastfeeds or not. Odds ratios with a 95% Confidence Interval (CI) and P-value <0.05 were considered statistically significant. Both univariate and multivariate analysis were fitted into the model that were selected based on statistical significance, as well as potential confounding variables and factors, to determine the strength of the relationship. In the multivariate analysis, the fitting of the variables into the regression model was guided by the conceptual framework, which ranged from the proximal, intermediate, and distal determinants. Overall, allowing a thorough investigation of the association of continued breastfeeding practices among Malawian mothers with children below the age of 2 years.

4.7 Ethical Consideration

The study did not require ethical approval because it uses publicly available data from UNICEF; it is exempted from going under the ethical board review of Yonsei University. However, approval to conduct the study was obtained through an application submission highlighting the study title and objectives on 30th December 2022 and the data set was downloaded from https://mics.unicef.org/surveys. UNICEF ensures that all personal information regarding respondents is kept confidential and encrypted and approves the application on the basis that the datasets will be used for research purposes by the researcher (UNICEF, 2023c).

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V. RESULTS

Introduction

This chapter provides details of the results of this study, organized through table presentation. It commences with a brief description of critical general characteristics of the participants according to breastfeeding continuation practices presented in Table 2, followed by the association table between variables in Table 3. Table 4 presents both univariate and multivariate analysis in the logistic regression model of association with breastfeeding continuation status.

5.1 Descriptive of the study findings

The study included 4,104 mothers from all 28 districts in Malawi who gave birth and had children below two years old preceding the MICS survey conducted in 2019-2020. Table 1 shows the general characteristics of the women aged 15-45 years as the study population was categorized into three characteristics: mothers' sociodemographic, mothers' obstetrics and health care, and child characteristics, stratified by the status of whether they are still being breastfed ('Yes') or have ceased the practice ('No'). The current study demonstrated that the rate of mothers who were still breastfeeding their children was 91.1% compared to the 8.9% who were not breastfeeding. The mean age of all the mothers in the study was 25.8 ± 6.95 years, of which 437 (11%) were teenage mothers aged less than 18 years, 1,642 (40%) were young mothers below 25 years old, and 2,025 (49%) were older mothers above 25 years old. The overall mean age of the children in months was 12 ± 6.80 months, with 2,015 (49.1%) males and 2,089 (50.1%) females falling into categories 0-5months (901), 6-11 months (992), and 12 -23 months (2,211).

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Table 2. General characteristics of the participants according to breastfeeding continuation practices

Characteristics	Breastfeeding continuation status				Total (n=4,104)
	Yes (n=3,739)		No (n=365)		
	n	(%)	n	(%)	n
CHILD CHARACTERISTICS					
Child sex					
Male	1,831	(91)	184	(9)	2,015
Female	1,908	(91)	181	(9)	2,089
Child Mean Age [SD]	11.2	[6.53]	20	[3.58]	12 [6.80]
Child Age Categorized					
0-5 Months	898	(100)	3	(0)	901
6-11 Months	983	(99)	9	(1)	992
12-23 Months	1,858	(84)	353	(16)	2,211
MOTHERS' OBSTETRICS AND HEALTHCARE					
Number of ANC visits					
Few visits <4	1,649	(92)	150	(8)	1,799
More visits =>4	2,090	(91)	215	(9)	2,305
PNC visit					
Yes	1,368	(90)	155	(10)	1,523
No	2,371	(92)	210	(8)	2,581
Place of delivery					
Hospital	3,737	(91)	365	(9)	4,102
Others*	2	(100)	0	(0)	2
Mode of delivery					
Caesarian birth	352	(91)	35	(9)	387
Normal birth	3,387	(91)	330	(9)	3,717
Duration of stay at the facility after birth					
Less than 10 days	3,623	(91)	356	(9)	3,979
Less than 23 days	113	(93)	8	(7)	121
More than 23 days	3	(75)	1	(25)	4

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Characteristics	Breastfeeding continuation status				Total (n=4,104)
	Yes (n=3,739)		No (n=365)		
	n	(%)	n	(%)	n
Breastfeeding counselling after birth					
Yes	3,293	(91)	329	(9)	3,622
No	446	(93)	36	(8)	482
Breastfeeding initiation					
Within an hour (<=1 hour)	2,911	(91)	293	(9)	3,204
Less than 3 hours	499	(92)	46	(8)	545
More than 3 hours	329	(93)	26	(7)	355
Prelacteral Breastfeeding initiation					
Yes	54	(89)	7	(12)	61
No	3,739	(91)	358	(9)	4,043
Introduction to foods (soft, semi and solid)					
Yes	1,586	(88)	216	(12)	1,802
No	2,153	(94)	149	(7)	2,302
Parity					
Less than 5	3,156	(91)	318	(9)	3,474
More than 5	583	(93)	47	(8)	630
Size of child at birth (mother report)					
Large	3239	(91)	325	(9)	3,564
Small	500	(93)	40	(7)	540
MOTHERS SOCIO-DEMOGRAPHICS					
Mothers Mean Age [SD]	25.8	[6.99]	26.1	[6.47]	25.8 [6.95]
Mothers Age categorized					
Teen mothers (<18)	417	(95)	20	(5)	437
Young mothers (<25)	1,482	(90)	160	(10)	1,642
Older mothers (>=25)	1,840	(91)	185	(9)	2,025
Mothers' education					
No education*	239	(93)	19	(7)	258
Primary	2,482	(91)	236	(9)	2,718

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Characteristics	Breastfeeding continuation status				Total (n=4,104)
	Yes (n=3,739)		No (n=365)		
	n	(%)	n	(%)	n
Secondary	964	(91)	98	(9)	1,062
Tertiary	54	(82)	12	(18)	66
Married or with a partner					
Yes	2,909	(92)	254	(8)	3,163
No	830	(88)	111	(12)	941
HH wealth level					
Low	1,611	(92)	134	(8)	1,745
Middle	1,487	(92)	131	(8)	1,618
High	641	(87)	100	(14)	741
Area					
Urban	485	(84)	91	(16)	576
Rural	3,254	(92)	274	(8)	3,528
Country Region					
North	777	(89)	92	(11)	869
Central	1,242	(93)	100	(8)	1,342
South	1,720	(91)	173	(9)	1,893

Abbreviations:
Data expressed as N (count) and percentage (%) unless otherwise stated.
SD. Standard deviation
Others*: Deliveries that were done outside medical facilities, at home or by non-skilled persons.
ANC: Antenatal clinic
PNC: Post Natal Clinic
No education*: this includes pre-primary school.
HH wealth: reported in quartiles (Lower=Poor), (Middle=Average), (High=Rich)

Table 2 shows that most of the women in the study were from the Southern region, represented by 1,893 (46%), 1,342 (33%) from the central region, and 868 (21%) from the northern region, respectively. The majority of the mothers, 77.1%, indicated that they were married or had a partner, while 22.9% had no partners or were not married. Among

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the participants, 3,528 (86%) resided in rural areas, with 576 (14%) residing in urban areas. Additionally, 1,745 (43%) came from low-wealth households (HH), 1,618 (39%) from middle or average-wealth households, and 741 (18%) from high-wealth households. While most mothers responded to continue breastfeeding their children, 2,718 (66%) had primary school level education, followed by 1,062 (26%) with secondary school level education, 258 (6%) with no education, and 66 (2%) with tertiary or higher education.

In terms of obstetrics and healthcare, 56% (2,305) reported having visited ANC more than four times as recommended by the WHO, while 44% (1,799) had fewer than four ANC visits before birth. Regarding PNC, 63% (2,581) indicated not having gone for PNC after birth, while 37% (1,523) indicated having gone for PNC. The place for women's delivery varied, with 0.0% (2) for home delivery and 100% (4,102) for hospital delivery, with 3,717 (91%) having normal births and 387 (9%) having caesarian section births. The duration of stay after giving birth at the health facility varied, with 3,979 (97%) reporting staying less than 10 days, 121 (3%) less than 23 days, and 4 (0.0%) more than 23 days. The study found that 3,204 mothers, representing 78% of the mothers, commenced breastfeeding immediately and within an hour, with 545 (13%) starting within 3 hours and 355 (9%) starting breastfeeding after 3 hours. A total of 3,622 mothers (88.3%) mothers indicated receiving breastfeeding counselling before discharge, while 482 (11.7%) did not receive counselling.

In addition to the mother’s obstetric history, 85% (3,474) mothers had not given birth more than five times, while 15% (630) had given birth more than five times. Among them, 3,564 (87%) reported the size of their child at birth to be regular and large, while 540 (13%) reported their child as being small. About 1.5% (61) of mothers reported giving their children liquids or foods other than breast milk within the first 3 hours of birth, and 98.5% (4,043) responded to having only breastfed as a measure of early breastfeeding initiation. Furthermore, 1,802 (43.9%) mothers indicated introducing semisolid foods with breastfeeding, while 2,302 (56.1%) reported not having complementary feeding.

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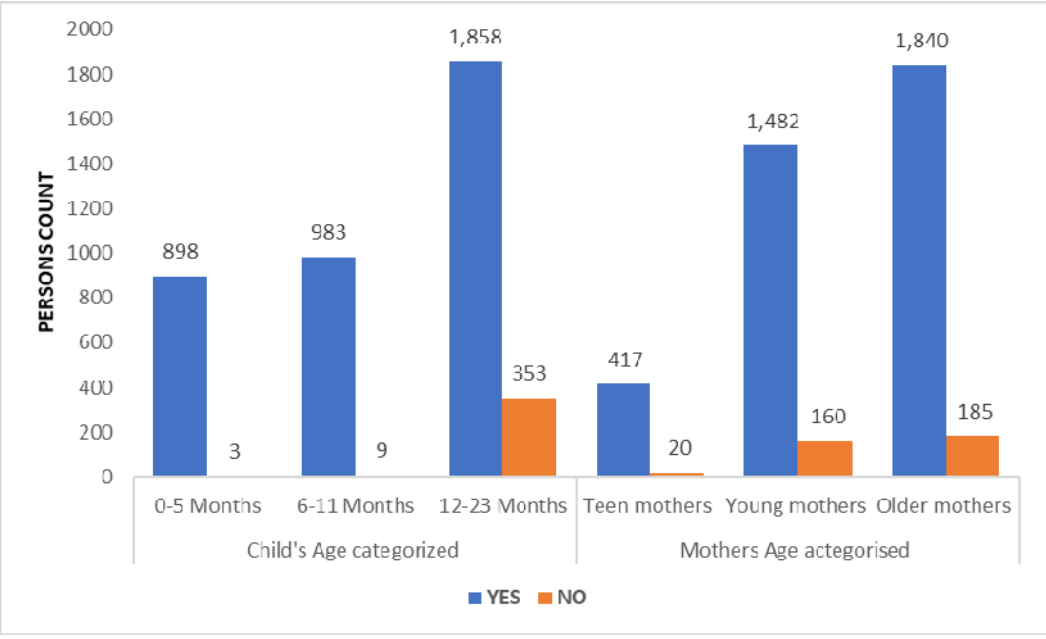

Figure 4. Descriptive graphs of the child's age and mother's age to continued breastfeeding status.

The descriptive graph presented in Figure 1 illustrates the relationship between the age of children and the age of mothers in relation to their sustained breastfeeding practices. The graph reveals that older mothers reported continuing breastfeeding more than younger mothers, including teen and young mothers. Furthermore, the graph suggests that breastfeeding rates decrease as the age of the child increases. These findings indicate differences in breastfeeding rates among mothers of varying age groups, with older mothers exhibiting higher breastfeeding rates. Consequently, Figure 4 presents the breastfeeding status of children, indicating whether they were still breastfed or not, whether they were given anything other than breastmilk during the first three days after birth (prelacteral breastfeeding), and whether they were introduced to foods or not (soft, semi-solid or solid).

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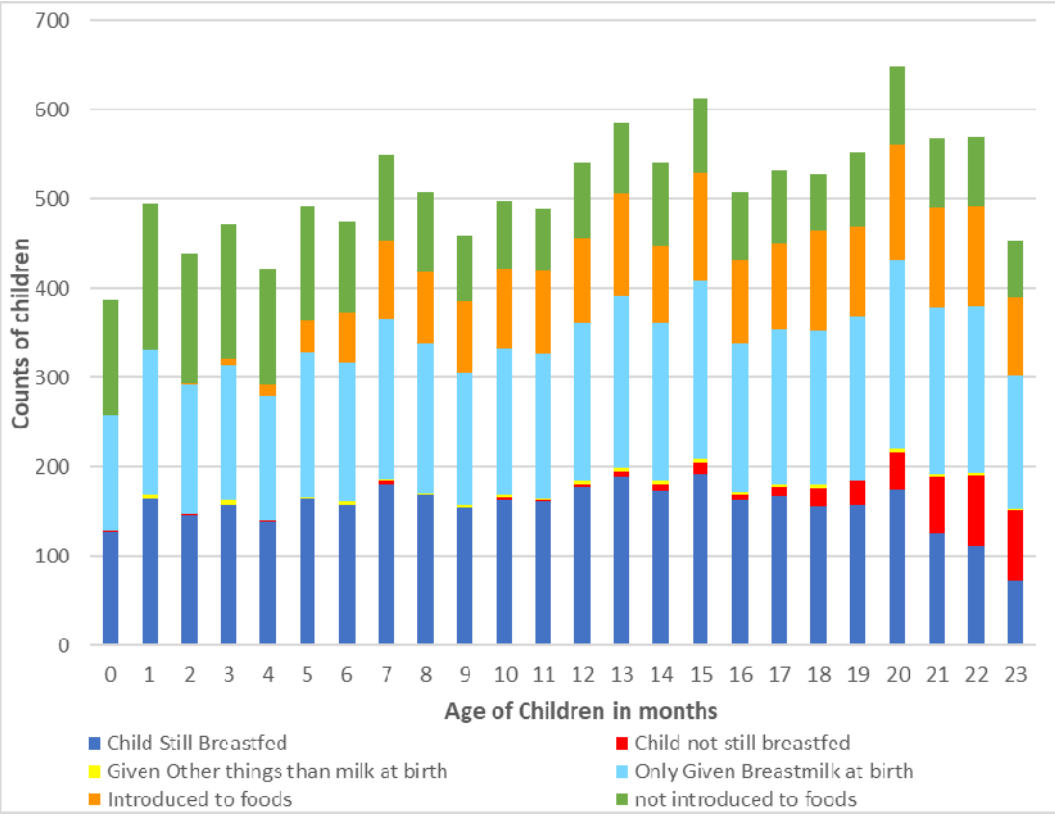

Figure 5. Breastfeeding status and introduction to food presentation

5.2 Study findings in association with variables

Table 3 provides the association and prevalence rate for the continuation of breastfeeding with the independent variables. The study results showed that the general child's age ($p<0.001$), child's age categorized ($p<0.001$), mothers age categories ($p=0.003$), mothers' education ($p=0.045$), married or with partner (<.001), household income level (wealth) ($p<0.001$), residence area ($p<0.001$), region of the country ($p=0.036$), PNC visits ($p=0.026$), and the status of the introduction of semi, soft, and solid foods ($p<0.001$) were associated with continued breastfeeding practices.

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Table 3. Association table between breastfeeding continuation status.

Characteristics	Breastfeeding continuation Status				Total (n=4,104) n	PR	*P*-Value
	Yes (n=3,739) n	(%)	No (n=365) n	(%)			
CHILD CHARACTERISTICS							
Child sex							0.599
Male	1,831	(90.9)	184	(9.1)	2,015	1.00	
Female	1,908	(91.3)	181	(8.7)	2,089	1.04	
Child Age Categorized				**<.001***			
0-5 Months	898	(99.7)	3	(0.3)	901	1.0	
6-11 Months	983	(99.1)	9	(0.9)	992	1.1	
12-23 Months	1,858	(84.0)	353	(16.0)	2,211	2.5	
MOTHERS' OBSTETRICS AND HEALTHCARE							
Number of ANC visits							0.269
Few visits <4	1,649	(91.7)	150	(8.3)	1,799	1.0	
More visits =>4	2,090	(90.7)	215	(9.3)	2,305	1.3	
PNC visit							**0.026***
Yes	1,368	(89.8)	155	(10.2)	1,523	1.0	
No	2,371	(91.9)	210	(8.1)	2,581	1.7	
Place of delivery							0.659
Hospital	3,737	(91.1)	365	(8.9)	4,102	1.0	
Others*	2	(100.0)	0	(0.0)	2	0.0	
Mode of delivery							0.913
Caesarian birth	352	(91.0)	35	(9.0)	387	1.0	
Normal birth	3,387	(91.1)	330	(8.9)	3,717	9.6	
Duration of stay at the facility after birth							0.355
Less than 10 days	3,623	(91)	356	(9)	3,979	1.0	
Less than 23 days	113	(93)	8	(7)	121	0.0	
More than 23 days	3	(75)	1	(25)	4	0.0	
Breastfeeding counselling after birth							0.242
Yes	3,293	(91)	329	(9)	3,622	1.0	

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Characteristics	Breastfeeding continuation Status				Total (n=4,104) n	PR	*P*-Value
	Yes (n=3,739) n	(%)	No (n=365) n	(%)			
No	446	(93)	36	(8)	482	0.1	
Breastfeeding initiation							0.480
Immediately or <=1hr	2,911	(91)	293	(9)	3,204	1.0	
Less than 3 hours	499	(92)	46	(8)	545	0.2	
More than 3 hours	329	(93)	26	(7)	355	0.1	
Prelacteral breastfeed				0.475			
Yes	54	(89)	7	(12)	61	1.0	
No	3,739	(91)	358	(9)	4,043	66.3	
Introduction to foods (soft, semi, and solid)							**<.001***
Yes	1,586	(88)	216	(12)	1,802	0.8	
No	2,153	(94)	149	(7)	2,302	1.0	
Parity							0.17
Less than 5	3,156	(91)	318	(9)	3,474	1.0	
More than 5	583	(93)	47	(8)	630	0.2	
Size of child at birth (mother report)							0.193
Large	3239	(91)	325	(9)	3,564	1.0	
Small	500	(93)	40	(7)	540	0.2	
MOTHERS SOCIO-DEMOGRAPHICS							
Mothers Age categorized							**0.003***
Teen mothers (<18)	417	(95)	20	(5)	437	0.2	
Young mothers (<25)	1,482	(90)	160	(10)	1,642	0.8	
Older mothers (>=25)	1,840	(91)	185	(9)	2,025	1.0	
Mothers' education							**0.045***
No education*	239	(93)	19	(7)	258	1.0	
Primary s	2,482	(91)	236	(9)	2,718	10.5	
Secondary	964	(91)	98	(9)	1,062	4.1	
Tertiary	54	(82)	12	(18)	66	0.3	
Married or with a partner							**<.001***

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Characteristics	Breastfeeding continuation Status				Total (n=4,104) n	PR	*P*-Value
	Yes (n=3,739) n	(%)	No (n=365) n	(%)			
Yes	2,909	(92)	254	(8)	3,163	1.0	
No	830	(88)	111	(12)	941	0.30	
HH wealth level							**<.001***
Low	1,611	(92)	134	(8)	1,745	2.4	
Middle	1,487	(92)	131	(8)	1,618	2.2	
High	641	(87)	100	(14)	741	1.0	
Area							**<.001***
Urban	485	(84)	91	(16)	576	1.0	
Rural	3,254	(92)	274	(8)	3,528	6.1	
Country Region							**0.036***
North	777	(89)	92	(11)	869	1.0	
Central	1,242	(93)	100	(8)	1,342	1.5	
South	1,720	(91)	173	(9)	1,893	2.2	

Abbreviations:
Data expressed as N (count) and percentage (%) unless otherwise stated.
SD. Standard deviation
PR: Prevalence Rate
Others*: Deliveries that were done outside medical facilities, at home, or by non-skilled persons.
ANC: Antenatal clinic
PNC: Post Natal Clinic
No education*: this includes pre-primary school.
HH wealth: reported in quartiles (Lower=Poor), (Middle=Average), (High=Rich)

The study, however, failed to find an association between other independent variables; the sex of the child (p-value = 0.599), parity of the mother (p-value = 0.17), size of the child (p-value = 0.193), number of the ANC visits (p-value = 0.269), place of delivery (p-value = 0.659), mode of delivery (caesarian section or normal birth) (p-value = 0.913), duration of stay at the health facility after birth (p = 0.355), breastfeeding counseling from the facility (p = value 0.242), breastfeeding initiation (p-value = 0.480), and the

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feeding of other foods apart from breastmilk three days after birth (p-value = 0.475).

Table 4 presents the crude and adjusted odds ratio (OR) for determinants of breastfeeding and its continuation among Malawi mothers with children under the age of two. In running the logistic regression, in the univariate model, some predictors yielded statically significant associations with the continued breastfeeding status of children by their mothers. The odds of continued breastfeeding in relation to the child's age were lowered by 0.75 (CI 0.68, 0.7) with a p-value of <.001. However, in the categorized child's age, it was observed that odds were more lowered when comparing children between 12-23 months to those 0-5 months, with an OR of 0.02 times (CI 0.01, 0.05) and a p-value of <.001. Although the 6-11 months group had a lowered OR of 0.4, the results were not statistically significant with a p-value = 0.131.

The study also reported a statistically significant association between categorized mothers' age and breastfeeding continuation practice, showing an increase among teenage mothers below 18 years of age (OR 2.19, CI 1.31, 3.37) compared to older mothers above 25 years of age. The study found statistical significance between young mothers aged below 25 but above years when compared to older mothers, although it presented low odds of continued breastfeeding (OR 0.93, CI 0.75, 1.16) with p-value= 0.530.

Table 4. Logistic regression Model of association with breastfeeding continuation status

Variables	OR Unadjusted (95% CI)			*P*-Value	OR Adjusted (95% CI)			*P*-Value
	OR	Lower	Upper		OR	Lower	Upper	
Child Age Categorized								
0-5 Months			1				1	
6-11 Months	0.4	0.10	1.4	0.131	3.89	1.01	14.98	0.049
12-23 Months	0.02	0.01	0.05	<.001	7.78	1.93	31.29	0.004
PNC visit								
Yes							1	
No	1.28	1.03	1.59	0.027	1.30	1.00	1.68	0.049
Introduction to foods (soft, semi, and solid)								
Yes	0.51	0.41	0.63	<.001	0.91	0.70	1.17	0.456

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Variables	OR Unadjusted (95% CI)			*P*-Value	OR Adjusted (95% CI)			*P*-Value
	OR	Lower	Upper		OR	Lower	Upper	
No			1				1	
Mothers Age categorized								
Teen mothers (<18)	2.19	1.31	3.37	0.002	0.89	0.50	1.55	0.669
Young mothers (<25)	0.93	0.75	1.16	0.530	0.81	0.63	1.06	0.126
Older mothers (>=25)			1				1	
Mothers' education								
No education*			1				1	
Primary	0.84	0.51	1.36	0.470	0.88	0.51	1.53	0.652
Secondary	0.78	0.47	1.30	0.346	0.94	0.52	1.72	0.842
Tertiary	0.35	0.16	0.78	0.010	0.65	0.24	1.76	0.394
Married status								
Yes			1				1	
No	0.65	0.52	0.83	<.001	0.63	0.47	0.83	0.001
HH wealth level								
Low	1.88	1.43	2.47	<.001	1.53	1.00	2.34	0.049
Middle	1.77	1.34	2.33	<.001	1.54	1.05	2.27	0.028
High			1				1	
Area								
Urban			1				1	
Rural	2.23	1.73	2.88	<.001	2.25	1.56	3.25	< .001
Country Region								
North			1				1	
Central	1.47	1.09	1.98	0.011	1.46	1.02	2.08	0.038
South	1.18	0.90	1.54	0.231	1.25	0.91	1.71	0.178

Abbreviations:
OR: Odds ratio
CI: confidence Interval (95%)
Home*: Deliveries that were done outside medical facilities and skilled persons
HH wealth: reported in quartiles (Lower=Poor), (Middle=Average), (Upper=Rich)
Reference group: indicated as 1: 00
Note. Estimates represent the log odds of " continued breastfeeding = 1" vs. "BD3 = 2" 1=yes 2=No

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On the other hand, the comparison between the level of education resulted in lowered odds for mothers with tertiary education to continue breastfeeding (OR 0.35, CI 0.16,0.78, p-value = 0.010) when compared to mothers with no education. The other levels of mother's education were also lowered in odds; however, they were not statistically significant: primary level (OR 0.84, CI 0.51,1.36, with p-value=0.470), secondary level (OR 0.78, CI 0.47,1.30, p-value = 0.346) when compared to no education.

Study findings indicate that mothers were likely to continue their breastfeeding practices when they were from low and middle-income households with increased odds of 1.88 times (CI 1.43,2.47, <.001 p-value) and 1.77 times (CI 1.34, 2.33, p-value <.001) respectively when compared to those from high-income households. With regards to the area of residency, mothers who resided in rural areas had higher odds of continued breastfeeding their children when compared to those in urban areas (OR 2.23, CI 1.73,2.88, p-value <.001). Similarly, mothers residing in the central region were likely to continue breastfeeding their children under the age of two when compared to those in the northern region (OR 1.47, CI 1.09, 1.98) p-value =0.011. Although the southern region provided increased odds, it was not statistically significant (OR 1.18, CI 0.90,1.54, p-value=0.231).

The introduction of soft, semi-solid, or solid food indicates the unlikeliness of continuing breastfeeding the child (OR 0.51, CI 0.41,0.63, p-value <.001). The study findings indicate that a mother who did not attend postnatal care (PNC) after birth was more likely to continue breastfeeding her child with increased odds of 1.28 times (CI 1.03,1.59, p-value=0.027) when compared to those who attended PNC. Additionally, mothers who were not married or living with a partner had a lower possibility to continue breastfeeding their child (OR 0.65, CI 0.52,0.83, with p-value <.001).

The multivariate logistic regression analysis in Table 3 helps in identifying which independent variables have a statistically significant impact on the outcome variable, providing insights into the importance of various influencing factors. All the independent variables that were significant in the study presented in Table 2 were included for multivariate modeling. The child's age was strongly related to the status of breastfeeding

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continuation (OR 0.68, CI 0.65, 0.71, p-value <.001). In examining the categorization of child's age, those aged 12-23 months had increased odds of being continued breastfed (OR 7.78, CI 1.93, 31.29, p-value=0.004), and odds increased among children aged 6-11 months (OR 3.89, CI 1.01,14.98, p-value= 0.049) when compared to those aged 0-5 months. Mothers were more likely to continue breastfeeding if they were from low-income households (OR 1.53, CI 1.00, 2.34, p-value=0.049) and middle-income households (OR 1.54, CI 1.05, 2.27, p-value=0.028) when compared to those in high-income households. Additionally, mothers who did not attend PNC after child's birth were more likely to continue breastfeeding their children with 1.30 times odds (CI 1.00, 1.68) p-value=0.049. Mothers who were not married and not living with a partner had lower odds of continued breastfeeding, 0.63 times (CI 0.47, 0.83, p-value = 0.001).

In the multivariate model, the area and region where the mother resides, the study finds that mothers in rural areas were more likely to continue breastfeeding with an odds ratio (OR) of 2.25 (CI 1.56, 3.25) with p-value <.001 than those in urban areas. However, in terms of region, mothers from the central region had increased odds of breastfeeding continuation of 1.46 times (CI 1.02, 2.08) p-value 0.038 when compared to northern region mothers.

The multivariate model, the study failed to find an association between the outcome variable and other independent variables, including the region of residence, especially in the southern region (OR 1.25, CI 0.91, 1.71, p-value 0.178) when compared to the northern region. Mothers' level of education also showed no significant association: Primary level (OR 0.88, CI 0.51, 1.53, p-value=0.6252), Secondary level (OR 0.94, CI 0.52, 1.72, p-value 0.842) and Tertiary (OR 0.65, CI 0.24, 1.76, p-value=0.394), when compared to no education. Categorized age of mothers; Teenage mothers (OR 0.89, CI 0.50, 1.55, p-value = 0.669) and younger mothers (OR 0.81, CI 0.63, 1.06, p-value = 0.126) showed no significant association when compared to older mothers. The introduction of solid food to a child (OR 009, CI 0.70, 1.06, with p-value= 0.456) also did not exhibit a statistically significant association with the outcome variable.

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VI. DISCUSSION

Introduction

The study explored the determinants of breastfeeding continuation among Malawi women with children under the age of 2. It identified, examined, and discussed these determinants in relation to recommended IYCF practices. The aim was to create practical recommendations for programming to improve feeding practices among Malawi mothers.

6.1 Determinants of breastfeeding continuation

The breastfeeding determinants among the Malawian mothers in this study predominantly fell within the category of distal determinants rather than intermediate or proximal determinants. This suggests that broader societal determinants exert more influence on breastfeeding continuation practices. The variables found to be associated with continued breastfeeding practices included the age of a child, postnatal (PNC) visits, introduction of food (soft, semi-solid, solid), mother's age, mother's education, marital status, household wealth, area, and region of residency. In the multivariate analysis, strong relationships were observed in the age of the child, PNC, marital status, household wealth, area, and region of residency.

6.1.1 Distal determinants

The present study found that household wealth is highly associated with breastfeeding continuation practice, with women from high-income households being more likely to discontinue breastfeeding their children compared to mothers from middle and low-income households who continue practicing breastfeeding. These findings align with other studies that have indicated women in high-income households or socioeconomically privileged positions tend to discontinue breastfeeding earlier (Elyas et al., 2017; Khan et al., 2017; Temple Newhook et al., 2017; UNICEF, 2018). In contrast, studies by Heck et

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al. (2006) and Murage et al. (2011) have reported that the socioeconomic gradient positively affects breastfeeding practices, as higher income and education levels facilitate exposure to various knowledge forums encouraging the practice. The study implies that lower-educated woman breastfeeds their children for a longer duration, suggesting the need for specific institutional interventions and policies that advocate for IYCF promotion among high-income individuals. This could involve facilitating proper institutional structures that accommodate lactating or breastfeeding mothers in high-education settings, providing flexibility in working hours, and ensuring the availability of nursing rooms.

This study also found variations in breastfeeding practices among mothers in rural and urban residency in Malawi, with rural mothers continuing to breastfeed their children more than those in urban areas. This indicates that the place of residency can influence the decision of optimal breastfeeding practices and serves as an indicator for targeted beneficiaries and audiences for improved health behaviours. Similar findings were observed in studies conducted in Kenya (Kimani-Murage et al., 2015), which recorded longer breastfeeding among rural mothers than those in urban areas. This is attributed to the pressures faced by mothers in urban areas to meet living costs and work long hours, leaving them with fewer options for optimal breastfeeding, as found in Kenya and Bangladesh (Hossain et al., 2018; Kimani-Murage et al., 2015). This trend is particularly applicable to urban poor settings, especially rural-urban migrants, who face complex situations, putting them at risk for poor breastfeeding practices due to multiple challenges and risk behaviours, coupled with a lack of health accessibility and information (Yin et al., 2020). However, it’s important to note that the area of residence has other interrelated factors that influence breastfeeding as studies in other LMICs such as Tanzania (Shirima et al., 2001), Latin America (Pérez-Escamilla et al., 1995), Nigeria (Davies-Adetugbo, 1997), Uganda (Engebretsen et al., 2007), and Niger (Hitachi et al., 2019) found that it is associated with culture, religion, and the practice of early initiation of breastfeeding after birth.

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This indicates the need to strengthen both individual and collective behavioral changes in program design and implementation. Deliberate strategies should aim to measure and sustain desired behaviors in individuals or communities for rural mothers and improve behaviors for urban mothers.

Additionally, the study found a relationship between breastfeeding and the region of residence, indicating variance in the area and region of residency. Mothers residing in the central region of Malawi have higher chances of continuing breastfeeding their children than in northern and southern regions. Similar regional variations in breastfeeding practice, especially regarding early initiation, were observed in Malawi in a study by Nkoka et al. (2019), which reported contradicting finding that the central region had reduced odds of early initiation of breastfeeding compared to the northern region, however, the study focused on one component of IYCF.

However, this can be aligned with the survey results from the Malawi NSO (2015-16), which reported higher educational levels in the northern region. This attribution can be associated with better job opportunities, indicating that mothers with jobs may have less time to breastfeed beyond the recommended maternity leave. Similarly, studies in Sudan and Nepal have reported regional variations attributed to different living situations in the region, influencing access to knowledge and information, tribes, ethnicity, and religion (Abdel-Rahman et al., 2020; Hassan et al., 2018; Mohammed, 2014; Wasti et al., 2023). The present study suggests further exploration into the regional determinants that contribute to such variations.

The study, in its univariate model, did find that mothers' age and level of education are associated with continued breastfeeding practices. Specifically, teenage mothers showed a higher likelihood of continuing the practice of breastfeeding their children compared to older mothers. A similar study conducted in Nigeria, using Demographic Health Survey data from 2003 to 2018, reported that teenage mothers exhibited a higher prevalence and likelihood of continued breastfeeding with children aged 1 to 2 years old. These study findings present an uncommon trend, as most studies report teenage mothers as less likely

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to initiate and continue breastfeeding. However, studies in the field have documented challenges faced by teenage mothers in following optimal breastfeeding practices with factors such as age, societal pressures, financial instability, and social and financial dependence on their families may influence their ability to adhere to recommended breastfeeding practices. Teenage mothers are often regarded as incapable of nurturing a child, and societal norms can impact their breastfeeding practices both positively and negatively. Influence from family has been widely recorded in Sub-Saharan Africa, South Asia and Latin America (Aubel, 2012; Negin et al., 2016). These findings present the need for recognizing family, social and cultural networks as stakeholders in integrated community programs, facilitators in peer interventions playing a crucial role in promoting the intended behaviours of breastfeeding in women at all ages, ensuring improved health outcomes for children (Bar-Yam and Darby, 1997; Tadesse et al., 2018).

Education level, especially at the tertiary level, was reported to be associated with lower odds of breastfeeding continuation, indicating early cessation of the practices by highly educated mothers compared to those with no education or lower education levels. The idea of higher education acting as a barrier to optimal breastfeeding practice has been documented in several studies, which suggest the early onset of complementary feeding and weaning among highly educated mothers (LeGrand and Mbacké, 1993). However, contradicting findings report that highly educated mothers are capable of following WHO-recommended practices, especially in EBF (Agho et al., 2021). The study suggests that there is a need to comprehensively measure the effects of highly educated women on the concerned policies and programs, providing a basis for adjustments to promote, protect, and support breastfeeding.

Additionally, women who indicated that they were not married or living with partners were less likely to continue breastfeeding their children than those who were married and are living with partners. The status of marriage or living with partner has been associated with positively impacting mothers' breastfeeding experience and success. The support and involvement of a partner not only provide financial security (Papp, 2012; Thulier and

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Mercer, 2009) but also correlate with better relationship function, creating a conducive environment for mothers to breastfed (Krieg, 2007). However, it is important to note that the status of breastfeeding on its own does not directly affect breastfeeding practices, it is influenced by other factors. These study findings imply to suggest that the need for programs to recognize the support provided by partners that encourage breastfeeding practices through male engagement programs or education targeting specific audiences to promote positive and desired health behaviors. Additionally, employing emotional support strategies for single mothers who lack encouragement for continued breastfeeding is essential.

6.1.2 Intermediate determinants

In the intermediate determinants, the present study reported that women who did not attend the postnatal visit after the delivery of their child were more likely to continue breastfeeding than those who attended the PNC. Attending postnatal is essential in promoting mothers to continue optimal care for children and provides necessary information that mothers seek for clarification (Jebena and Tenagashaw, 2022; Mamo et al., 2020). Its non-attendance to health institutions following birth indicates a risk of several negative consequences for both the child and the mother (Kyabaishiki and Omona, 2021). The study findings indicate that mothers who failed to go for PNC continued breastfeeding need further investigation, although other studies, such as a study conducted by Costanian, Macpherson and Tamim (2016), failed to find an association between PNC visits and breastfeeding practices.

Additionally, children who have commenced supplementary and complementary feeding were more likely to not be given breastmilk by their mothers than those who have not started eating foods. The initiation of appropriate diet foods for children is essential from six months, as their high nutritional demands cannot be sustained by breastmilk alone However, providing food to children before the recommended age puts them at risk of malnutrition, such as stunting, wasting, underweight, and poor cognitive and

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physical development (Masuke et al., 2021). This implies the need for the development of national guidelines to provide accurate and consistent recommendations on age-appropriate feeding practices, including when the commencement of complementary foods should start in children.

6.1.3 Proximal determinants

The practice of continued breastfeeding is more common in LMICs than in HICs, with more children reporting continued breastfeeding at one year (Shrimpton R, 2019). In this study, the age of a child associated with breastfeeding takes a bi-directional trend in the regression model, with lowered chances of breastfeeding continuation as the child grows in univariate analysis to increased odds of continuation of the practice in multivariate modeling. Age association with breastfeeding in general has been found more especially in EBF as studies conducted in Tobago and Germany (Nichols et al., 2002; Rebhan et al., 2009). The study findings are also similar to other studies, such as an EBF study in Malawi that reported age as associator to breastfeeding, with younger children aged 0-2 months more likely to be breastfed by their mothers than those who are 3-5 months. In Nigeria, a study reported that mothers with children after 3 months believe in the insufficient provision of required nutrients, prompting early supplementary foods (Ibe et al., 2017). A study conducted by Scott et al. (2019) found that additional to the age, partners' encouragement to breastfeeding promotes the likelihood of continue breastfeed the child beyond 12 months. This indicates the need to enforce support, awareness, and education on breastfeeding benefits and its impact on child development. The creation of a unified approach to programming and dissemination of IYCF and child development information to yield better child health outcomes.

6.2 Study Limitations

The study was a cross-sectional study that applied secondary information collected from women with children before the survey year from their early practices; hence, it was

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based on their recall. Thus, recall and social desirability bias may have occurred, limiting the extent of result interpretation. However, this bias may have been minimized by limiting the sample to children not above two years and additionally acknowledging that the study's design could not allow causal inferences to be made.

Secondly, the researcher's subjectivity may have been a limiting factor in consideration. Researchers being born and raised in the country of study, which is also an LMIC, and working in the field of nutrition, the professional experience may be a limiting factor. However, this experience may also contribute to understanding the research's depth.

Thirdly, the study objectives explored the broader determinants regarding the continuation of breastfeeding, namely, sociodemographic, obstetrical and maternal health factors, and child characteristics. Although this forms a basis for understanding the general determinants, such designs are faulted in presenting broader explanatory aspects of the topic under study rather than in-depth knowledge of each determinant aspect.

Lastly, the study employed a hierarchical conceptual framework to guide the analysis and interpretation of individual variables, aiming to understand the determinants of breastfeeding continuation among Malawian mothers with children under the age of two. Recognizing the limitations of the framework at the individual and societal levels, due to the complexity and multifaceted nature of human behavior, which necessitates the application of broader lenses, the researcher acknowledges its potential to provide valuable insights when used collaboratively with other frameworks for comprehensive and holistic understanding of complex issues such as breastfeeding practices.

6.3 Significance of the study

The determinants found in this study represent areas that can be employed to fulfill optimal breastfeeding practices and ensure that the children are breastfed to the recommended age of 2 in Malawi. The strength of the study lies in its use of nationally representative sample, allowing the results to be generalized to the Malawian women. Hence, its highlights on how the determinants operate in the hierarchy highlight the

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outcome of the practice, as the leading underlying causes that make mothers cease breastfeeding practices remain interconnected through the layers.

Additionally, the research provides an understanding of breastfeeding gaps that require positive systematic and structural interaction to improve the socio-demographic, obstetrical, and maternal health, and child characteristics determinants, aiding efforts in curbing undernutrition in Malawi.

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VII. SUGGESTIONS AND CONCLUSION

7.1 Recommendations for Interventions, Policy, and Further Research

The study indicated that breastfeeding continuation as an optimal practice is multifaceted with influence across hierarchical layers. The focus should primarily be on the broader distal factors that affect intermediate and proximal determinants. The socio-demographics of women influence their ability to practice recommended breastfeeding practices or adopt health-seeking habits. Realizing the importance of addressing socio-demographic factors in reducing adverse health outcomes in children is crucial. Hence efforts to promote breastfeeding as a part of IYCF should encompass addressing underlying social and cultural networks, and structural aspects.

Additionally, breastfeeding interventions should aim to improve the availability of messages and information on IYCF and nutrition age-appropriate guidelines beyond health facilities and move away from bracket program designs for all women, to regard needs specification. Another crucial aspect is the multisectoral approach, especially with pregnant and lactating mothers. This requires health structure reformation that prioritizes and seeks to sustain community cohesion and collaborations by advancing the roles of community front-line workers from all related sectors as key players in local setting training to meet the health needs of mothers across social, health, and education services.

Although the present studies present the determinants of breastfeeding and its continuation among Malawian mothers, further research recommendations can be made in the following areas.

- Investigation should focus on the age-appropriate feeding practices among children in Malawi and its related factors.
- Explore the effects of IYCF information dissemination in various regions and areas of residency in Malawi. This is to aid information on the regional variation in the breastfeeding practices.

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- Explore feeding practices among young mothers in different socioeconomic contexts across the country.

7.2 Conclusion

The primary objective of this study was to investigate the determinants of continued breastfeeding practices among Malawian mothers with children under the age of two. Focusing on children under two is vital as this stage of children critically requires optimal and sustained breastfeeding and feeding practices to improve children's health outcomes in both short and long term, contributing to the country's development. The study identified distal, intermediate, and proximal factors influencing breastfeeding practices, with socio-demographic characteristics being the most associated determinants of continued breastfeeding practice. Therefore, it is crucial to understand that the mothers' continuation of breastfeeding is layered in a hierarchy from distal determinants requiring the development of a strengthened multi-pronged approach to achieve sustained benefits in feeding practices and improved nutritional status. Intermediate factors call for enhanced structural and systematic delivery of services with the inclusion of the larger community as stakeholders. Proximal factors requiring targeted design in message delivery for age-appropriate feeding practices.

In addition to the study findings, it suggests that reforming structures aimed at promoting maternal and child health is necessary to ensure comprehensive dissemination of information for all, hence the role of each duty bearer such as policymakers, service providers and community, including the mothers, for assured child growth. While this study utilized secondary data to explore the determinants, future studies should examine age-appropriate feeding practices and the effects of IYCF information in specific areas and regions of residency to assess effectiveness and exploration of feeding practices of young mothers in different socioeconomic contexts in Malawi.

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APPENDIX

APPENDIX 1: KOREAN ABSTRACT

추상

배경: 임신에서 두 살까지 한 사람의 생애 첫 1,000일은 아이들의 발달에 가장 필수적이며, 이는 필수적인 투자이다. 모유 수유는 아이들의 성장과 발달에 기여하며, 그들의 건강과 국가의 경제적 이익에 장기적인 영향을 미친다. 많은 중저소득 국가들(LMIC)과 마찬가지로, 말라위는 조기 모유 수유, 독점적 모유 수유 및 보완적 모유 수유를 포함한 모유 수유 관행이 널리 퍼지 있다. 정부와 파트너들의 지속적인 노력과 개입으로 이루어진 진전에도 불구하고, 최근 전국적인 조사에 따르면 모유 수유 관행이 감소하였다. 이 연구는 2세 미만의 아이를 가진 말라위 여성들의 모유 수유 지속 관행의 결정 요인을 확인하고 탐구하는 것을 목표 이다.

방법: MICS(Multiple Indicator Cluster Survey)의 2019/20 데이터를 사용하여 2세 미만의 자녀를 둔 말라위 어머니를 대상으로 단면 연구를 수행하였다. 연구의 결과 변수는 2세 미만의 자녀가 여전히 어머니로부터 모유 수유를 받고 있는 상태이며, 잠재적 설명 변수는 사회 인구학적 요인, 산부인과 및 산모 건강 요인, 아동 특성으로 분류되었다. 분석은 2세 미만의 자녀를 둔 여성 4,104명의 표본 크기를 기준으로 하였다. 기술 통계량, 변수 연관성 및 로지스틱 모델링을 위해 Jamovi 소프트웨어를 사용하였다.

결과: 모유 수유를 지속하는 것과 관련된 중요한 연관성은 자녀의 나이, 어머니의 나이, 어머니의 교육, 어머니의 결혼 상태 또는 파트너와 함께 사는 것, 가구의 부, 산후 방문, 음식에 대한 소개, 지역 및 거주 지역이었다. 다른 변수를 조정하면 6-11개월(OR = 3.89, CI. 1.01-14.98)과 12-23개월(OR = 7.78, CI. 1.93-31.29)의 자녀가 모유 수유를 지속할 가능성이 더 높았다. 그러나 결혼하지 않았거나 파트너와 함께 살지 않는 여성(OR = 0.63, CI. 0.47-0.83)은 모유 수유를 지속할 가능성이 더 낮았다. 농촌 여성(OR = 2.25, CI.1.56-3.25)과 중부 지역 여성(OR = 1.02-2.08)과 마찬가지로 낮은 소득 (OR = 1.53, CI.1.00-2.34)과 중간 소득 여성(OR = 1.54, CI.05-2.27)이 모유 수유를 지속할 가능성이 더 높았다.

결론: 연구 결과는 말라위의 국가, 지역 사회 및 개인 수준 모두에서 프로그래밍을 위한 포럼을 강조하였다. 본 연구에서 주로 모유 수유 지속의 결정 요인을 식별했지만, 중간 및 근위결정 요인의 관행 역할을 인식한다. 이들이 원하는 건강 결과를 촉진하는 데 있어 사회적 요소와 지역 구조에 필요한 지속적인 교육 프로그램, 목표 메시지 및 사회적인 인식을 가능하게 만든다.