PREVENTION OF MOTHER TO CHILD TRANSMISSION OF HUMAN IMMUNE VIRUS INFECTION AND ITS DETERMINANTS AMONG WOMEN IN SELECTED HEALTH CENTRES IN ZOMBA

MSc THESIS IN TRANSFORMATIVE COMMUNITY DEVELOPMENT

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DECLARATION

I hereby declare that this thesis titled, **"Prevention of Mother to Child Transmission of HIV infection and its Determinants among Women in Selected Health Centres in Zomba"** has been written by me and is a record of my research work. All citations, references, and borrowed ideas have been duly acknowledged. It is being submitted in fulfilment of the requirements for the award of the degree of Master of Science in Transformative Community Development of the Mzuzu University. None of the present work has been submitted previously for any degree or examination in any other University.

10/12/2025

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Yanjano Grace Mbendera **Date**

CERTIFICATE OF APPROVAL

I, the undersigned, certify that this thesis is a result of the author's own work, and that to the best of my knowledge, it has not been submitted for any other academic qualification within Mzuzu University or elsewhere. The thesis is acceptable in form and content, and that satisfactory knowledge of the field covered by the thesis was demonstrated by the candidate through an oral examination held on

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DEDICATION

I dedicate this work to my husband, Daniel Farch Chizala, and my children, Oriana Chizala and Valentina Mbendera.

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ABBREVIATIONS AND ACRONYMS

AGYW	Adolescent Girls and Young Women
AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
ART	Antiretroviral Therapy
CD4	Cluster of Differentiation 4
HIV	Human Immunodeficiency Virus
KAP	Knowledge Attitude and Practice
LMIC	Low- and Middle-Income Countries
MTCT	Mother to Child Transmission
PMTCT	Prevention of Mother to Child Transmission
UNAIDS	Joint United Nations Programme on HIV/AIDS
USAID	United States Agency for International Development
WHO	World Health Organisation

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ABSTRACT

Good health is a human right that is recognised in different international human rights instruments including the Universal Declaration of Human Rights. One public health challenge that has affected human health and has implications on development is Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS). Mother to child transmission is still prevalent among women and remains the most common cause of paediatric HIV infection in Malawi. This study assesses the level of knowledge, attitude and practice, as well as determinants of Prevention of Mother to Child Transmission (PMTCT) of HIV infection among women in selected health centres in Zomba district.The study employed mixed methods research design. Stratified sampling technique was used to sample 250 respondents to participate in the quantitative survey in the selected health centres. Qualitative interviews and focus group discussions complemented quantitative data. Descriptive statistics, test, analysis of variance and thematic analysis were used to analyse data. The study results reveal that women have 59.19% (with the mean score of 9.47 out of 16) knowledge towards prevention of mother-to-child HIV transmission. Overall, women hold positive attitudes toward the prevention of mother-to-child HIV transmission (PMTCT) in the visited health centres, as indicated by an overall mean score of 3.76 (S.D.=1.28). The study also revealed that majority of the women (87.19%) are observing PMTCT practices to protect their babies. Depression, fear of husbands, negligence, income status, and education level are some of the factors associated with the adherence of PMTCT practices in the surveyed health centres. The study is informing government and other stakeholders to develop strategies to respond to knowledge, attitude and practice of pregnant women in preventing mother to child HIV transmission.

Key words; *Human Immunodeficiency Virus, Acquired Immune Deficiency Syndrome, Mother-to-Child Transmission, Prevention of Mother-to-Child Transmis*

CHAPTER ONE: INTRODUCTION

1.1 Background

The Prevention of Mother-To-Child Transmission (PMTCT) of HIV has been a focal point in global public health strategies, particularly in Sub-Saharan Africa, where the burden of the HIV epidemic remains disproportionately high among women (UNAIDS 2025). PMTCT programs aim to eliminate HIV transmission from mother to child during pregnancy, childbirth, and breastfeeding. However, despite widespread implementation of these programs, challenges persist in ensuring comprehensive uptake and adherence to PMTCT services, resulting in continued HIV transmission to infants (Okoli & Lansdown 2014).

One of the key factors influencing the success of PMTCT interventions is the knowledge of women regarding HIV and its prevention, particularly in relation to mother-to-child transmission (Risher et al. 2013). A well-informed population is more likely to engage with healthcare services, adhere to prescribed Antiretroviral Therapies (ART), and take preventive actions such as exclusive breastfeeding practices or timely delivery at health facilities (Al-Worafi 2024). Several studies have indicated that knowledge gaps regarding HIV transmission and prevention remain a significant barrier to the successful implementation of PMTCT programs (Gourlay et al. 2013; Gugsa et al. 2017; Terefe, Jembere & Liyew 2024; Antabe, Sano & Kangmennaang 2024). For example, Alemu et al. (2018) highlights that mothers with limited knowledge about HIV and its transmission pathways are less likely to seek PMTCT services, thereby increasing the risk of transmission.

In addition to knowledge, the attitudes of pregnant women towards PMTCT play a crucial role in shaping health-seeking behaviours. Attitudes influence whether women perceive PMTCT services as accessible, effective, and necessary. Negative attitudes, such as stigma or fear of disclosure, can hinder the utilisation of HIV testing and ART services, thereby impeding efforts

to prevent mother-to-child transmission. According to Mpinganjira et al. (2020), a lack of positive attitudes toward PMTCT services, often driven by cultural beliefs or societal stigma surrounding HIV, has been found to correlate with low uptake of prevention services. Equally important are the practices of pregnant women regarding the prevention of HIV transmission. Knowledge and attitude alone do not guarantee behaviour change. Practices such as regular antenatal care visits, consistent use of antiretroviral drugs, proper infant feeding practices, and safe delivery conditions are crucial in ensuring the effectiveness of PMTCT programs (Van Lettow et al. 2011; Tippett Barr et al. 2018; Puchalski Ritchie et al. 2019). Adherence to PMTCT protocols significantly reduces the risk of transmission (Wondimu et al. 2020), yet many women in Sub-Saharan Africa, including Malawi, continue to face challenges in translating knowledge and positive attitudes into sustained health-promoting behaviours.

Understanding the factors that influence the prevention of mother-to-child HIV transmission is essential for the development of targeted interventions. These factors may include socio-economic determinants, healthcare access, community support systems, and the broader cultural context. Beyene et al. (2018) has shown that women from lower socio-economic backgrounds or rural areas often face barriers to accessing PMTCT services, such as distance to health facilities, financial constraints, and lack of information. Furthermore, the integration of PMTCT services with maternal and child health programs is critical for improving outcomes, as it ensures that HIV prevention is included as part of a holistic approach to maternal care (Tenthani et al. 2014).

The main objective and specific objectives of this study are grounded in a body of academic research highlighting the multi-dimensional factors that influence the prevention of HIV transmission from mother-to-child. By assessing the knowledge, attitudes, practices, and associated factors related to PMTCT, this study seeks to identify the barriers and enablers of

PMTCT uptake, ultimately contributing to improved health outcomes for women and children in Malawi.

1.2 Problem Statement

Mother-to-Child Transmission (MTCT) of HIV remains the leading cause of paediatric HIV infection in Sub-Saharan Africa, contributing significantly to the region's HIV burden (UNAIDS 2020). Despite substantial efforts to prevent MTCT through the implementation of PMTCT programs, the prevalence of MTCT remains alarmingly high (Okello et al. 2023; Kassa 2018; Naidoo et al. 2023). In Malawi, PMTCT programs aim to eliminate MTCT during pregnancy, childbirth, and breastfeeding. However, these programs face persistent challenges, including poor uptake of PMTCT services, retention of HIV-positive women in care, adherence to antiretroviral therapy (ART), and detection and management of new infections during pregnancy or breastfeeding (Harrison et al. 2021). These gaps are exacerbated by socio-economic barriers, cultural stigma, and limited healthcare access, which disproportionately affect women in resource-limited settings (Mpinganjira et al. 2020).

HIV disproportionately affects women in Malawi, with young women aged 15–24 years accounting for 61% of infections among young people in 2024 (National AIDS Commission 2025). In 2018 alone, an estimated 3,500 children in Malawi were newly infected with HIV, largely due to MTCT (Mpinganjira et al. 2020). By 2024, approximately a total of 53,000 children between the ages of 0 and 14 are living with HIV (National AIDS Commission 2025). The effective implementation of PMTCT programs hinges on mothers' Knowledge, Attitudes, and Practices (KAP) regarding HIV transmission and prevention. Positive attitudes, adequate knowledge, and appropriate practices are essential to ensuring the success of PMTCT strategies (Alemu, Habtewold & Alemu 2018; Harrison et al. 2021). However, research indicates that knowledge gaps about HIV transmission pathways, negative attitudes driven by stigma, and

inconsistent practices such as non-adherence to ART, remain critical barriers to achieving PMTCT goals (Beyene, Dadi & Mogas 2018).

While previous studies have documented the importance of KAP in PMTCT success (Antabe, Sano & Kangmennaang 2024; Terefe, Jembere & Liyew 2024; Yeshaneh et al. 2023), these aspects remain underexplored and poorly documented in Malawi, particularly in rural areas. The determinants influencing PMTCT uptake, such as socio-economic status, cultural beliefs, and healthcare accessibility, are not well studied, limiting the development of targeted interventions. Understanding these gaps is essential in addressing the barriers hindering the full realisation of PMTCT program outcomes in Malawi.

This study, therefore, seeks to address these academic and practical gaps by assessing the knowledge, attitudes, and practices of women regarding PMTCT, as well as the factors influencing these elements, in selected health canters in Zomba district. By doing so, the study contributes to the body of evidence required to strengthen PMTCT programs and reduce MTCT rates in Malawi and similar settings.

1.3 Study objectives

1.3.1 Main objective

The main objective of this study was to assess the knowledge, attitudes, and practices on the prevention of mother-to-child transmission (MTCT) of HIV among women in selected health centres in Zomba.

1.3.2 Specific objectives

The specific objectives of this study were to:

1. Assess level of knowledge of preventing mother to child HIV transmission among women.

2. To examine the attitudes of women towards prevention of mother to child HIV transmission.
3. To analyse the practices of pregnant women in preventing mother to child HIV transmission.
4. To analyse factors associated with prevention of mother-to-child HIV transmission among women.

1.4 Research questions

In order to achieve the research objectives, the study attempted to answer the following questions:

1. What is the level of knowledge of preventing mother to child HIV transmission among pregnant women?
2. What are the attitudes among pregnant women towards prevention of mother to child HIV transmission?
3. What are the practices among pregnant women in relation to preventing mother to child HIV transmission?
4. What determines the prevention of mother-to-child transmission of HIV among women?

1.5 Justification of the study

Knowledge plays a critical role in influencing health-related behaviour. Understanding how much pregnant women know about the prevention of mother-to-child transmission of HIV helps identify information gaps that may hinder effective prevention. Inadequate knowledge about how HIV is transmitted during pregnancy, delivery, or breastfeeding can result in increased risk of infection in infants. Assessing women's knowledge provides evidence for

designing targeted health education and awareness programs aimed at reducing paediatric HIV infections.

Even when knowledge exists, attitudes often determine whether women will seek PMTCT services or adhere to treatment. Negative perceptions, stigma, or fear of discrimination may discourage women from undergoing HIV testing or following medical advice. Understanding attitudes enables health authorities to address psychological and social barriers to PMTCT service utilisation, foster positive behaviour change, and strengthen community acceptance of HIV interventions among pregnant women.

Knowledge and attitudes must translate into actual practices in order for PMTCT efforts to be effective. Investigating women's practices helps assess how well PMTCT strategies are being implemented. Identifying poor practices or non-compliance informs policy makers and healthcare providers of the areas where practical interventions and support are most needed.

PMTCT outcomes may depend on multiple factors. Identifying these determinants is essential as it helps to explain why some women effectively prevent HIV transmission while others do not. Understanding such factors is essential for designing context-specific interventions, improving service delivery, and ensuring equitable access to PMTCT programs.

The study contributes to the body of knowledge on PMTCT by providing a foundation for further research, which can inform better practices. It aligns with Malawi Vision 2063 Enabler 5 – Human Capital Development, which emphasises the need for a comprehensive healthcare system.

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CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter covers relevant literature on PMTCT. The first part of the chapter discusses HIV/AIDS. Then, the next section of the chapter discusses MTCT, knowledge, attitude and practice.

2.2 Definitions and Terms used in this thesis

HIV	Human Immunodeficiency Virus (HIV) is an infection that attacks the body's immune system, specifically the white blood cells called CD4 cells that help the body fight infection. HIV destroys these CD4 cells, weakening a person's immunity, and making a person more vulnerable to other opportunistic infections (U.S. Department of Health & Human Services 2023).
Mother-to-child transmission of HIV (MTCT)	Mother-to-Child Transmission (MTCT) of HIV is the transmission of the virus from an HIV-infected mother or from a mother living with HIV infection to her child during pregnancy, labour, delivery or breastfeeding (UNAIDS and World Health Organization 2009) . It is also referred to as vertical transmission (Ministry of Health 2007).
Prevention of mother-to-child transmission of HIV (PMTCT)	PMTCT services are specific interventions and guidelines initiated during pregnancy with the aim of preventing transmission of HIV from the mother to the child. They include early and regular use of antenatal clinics plus HIV counselling and testing, receipt of HIV test results, agreeing and adherence to ART, safe sex during

pregnancy, timely use of skilled attendants, and facility-based delivery (Ministry of Health 2007).

Perception Perception is a process by which individuals organise and interpret their sensory impressions in order to give meaning to their environment. People's behaviour is based on what they perceive the reality is, and not what the reality is (Robbins & Judge 2013).

PMTCT services PMTCT services are specific interventions and guidelines initiated during pregnancy with the aim of preventing transmission of HIV from the mother to the child. They include early and regular use of antenatal clinics plus HIV counselling and testing, receipt of HIV test results, agreeing and adherence to ART, safe sex during pregnancy, timely use of skilled attendants, and facility-based delivery (Ministry of Health 2007).

2.3 Theoretical framework

There are a number of theories that underpin studies on behavioural change in the health sector. However, this study is guided by two theories namely: Heath Belief Model (HBM) and the Theory of Planned Behaviour. Each one of them is briefly discussed below.

2.3.1 Health Belief Model

The Health Belief Model (HBM) posits that people's beliefs significantly influence their health-related actions or behaviours. It is based on the premise that a person's willingness to change their health behaviours primarily stems from their health perceptions (Badran 1995). The model includes six key concepts (Figure 2-1):

Perceived Susceptibility which refers to an individual's belief about their likelihood of developing a particular condition. When individuals perceive themselves as being at high risk, they are more likely to adopt preventive behaviours. Conversely, those who consider themselves at low risk are less inclined to take action (Bissek et al. 2011).

Perceived Severity focuses on how serious an individual believes the consequences of a disease or condition are. This includes both medical consequences, such as death or disability, and personal implications, such as disruptions to daily life (Beyene, Dadi & Mogas 2018).

Perceived Benefits refer to an individual's belief in the effectiveness of specific actions in reducing health risks. A strong belief in the benefits of an action increases the likelihood of adopting the behaviour (Birhane et al. 2015).

Perceived Barriers are the obstacles, both tangible and intangible, that hinder individuals from adopting health-promoting behaviours. Tangible barriers include financial constraints or lack of transportation, while intangible barriers include fear or stigma. These barriers are often the strongest predictors of behaviour change (Feyera et al. 2017).

Cues to Action are triggers that prompt individuals to adopt new behaviours. These can include advice from healthcare providers, public health campaigns, or personal experiences such as a family member's illness (Alemu, Habtewold & Alemu 2018).

Self-Efficacy is an individual's confidence in their ability to successfully perform a specific behaviour. Even when the perceived benefits are high and barriers are low, a lack of self-efficacy can prevent action. Self-efficacy can be enhanced through training, encouragement, and support (Bollinger & Adebiyi 2013).

While the HBM provides a robust framework for understanding the factors that influence health behaviour, it has faced criticism. One major critique is that it overlooks social and environmental influences on behaviour. The model focuses primarily on individual-level

factors and assumes that behaviour is the result of rational decision-making based on personal beliefs. Additionally, the HBM does not account for habitual behaviours that may not involve conscious decision-making or the role of emotions, such as fear or anxiety, which can significantly influence health actions. These limitations highlight the need to complement HBM with other models, such as the Theory of Planned Behaviour, to provide a more comprehensive understanding of health behaviours (Becquet et al. 2012; Feyera et al. 2017).

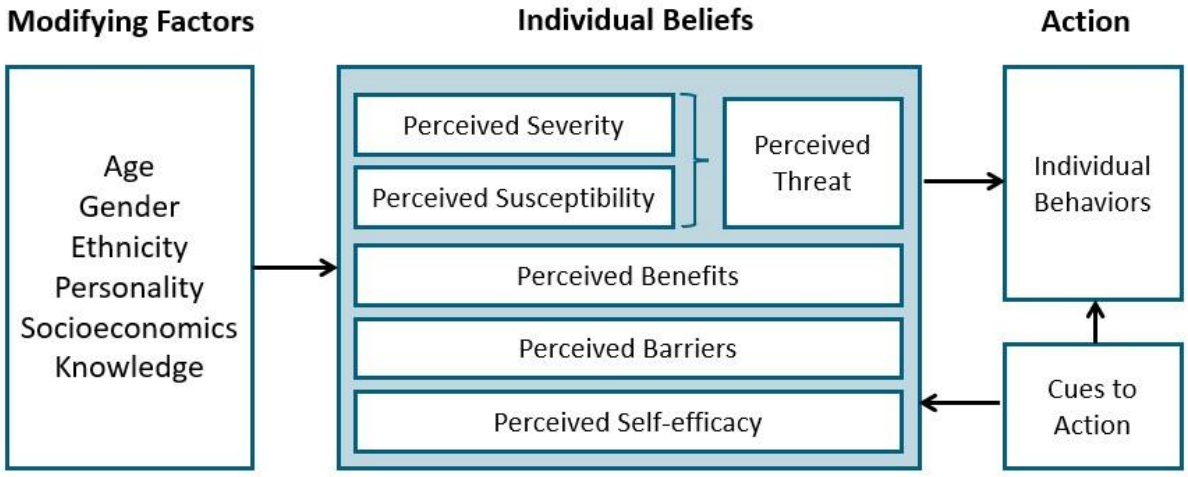

Figure 2 - 1: Health Belief Model (Adapted from (Wethington, Glanz & Schwartz 2010))

2.3.2 Theory of Planned Behaviour

Theory of Planned Behaviour (TPB) provides a robust theoretical framework for understanding how knowledge, attitudes, and practices influence behavioural intentions and actions, particularly in health-related contexts like PMTCT (Ajzen 1991). The TPB posits that human behaviours are intentional and are primarily guided by three core variables: attitude toward the behaviour, subjective norms, and perceived behavioural control.

Attitude toward the behaviour reflects an individual's positive or negative evaluation of performing a specific action. In the context of PMTCT, this could involve how women perceive

the effectiveness and importance of engaging in preventive measures such as adhering to ART or seeking antenatal care.

Subjective norms refer to the perceived social pressure to perform or not perform a behaviour. These norms are shaped by the expectations of influential individuals or groups, such as family members, community leaders, or healthcare providers. For PMTCT, subjective norms might include the influence of partners or family on a woman's decision to participate in prevention programs.

Perceived behavioural control represents an individual's belief in their ability to execute a specific behaviour. This includes internal factors, such as confidence and skills, and external factors, such as access to healthcare facilities or financial resources. Unlike other constructs, perceived behavioural control can influence behaviour directly or indirectly by shaping intentions.

The TPB has been extensively applied in healthcare research to predict behavioural intentions and actions. Validation studies, such as those by Eccles et al. (2006) and Perkins et al. (2007), demonstrate that TPB constructs attitudes, subjective norms, and perceived behavioural control explain 30% to 50% of the variance in behavioural intentions. This makes the TPB particularly effective for understanding the determinants of PMTCT-related behaviours and guiding interventions.

Despite its strengths, the TPB is not without criticism. One limitation is its focus on rational decision-making, which may overlook the influence of emotions, habits, and unconscious biases on behaviour. Additionally, the TPB assumes that intentions always lead to actions, which may not hold true in situations where individuals face unanticipated barriers or conflicting priorities. For example, a woman may intend to adhere to ART but fail to do so due to stigma or lack of support. Furthermore, the TPB does not explicitly account for the dynamic

interplay between behaviour and changing social contexts, which may limit its applicability in rapidly evolving settings.

To address these limitations, the TPB can be complemented by other behavioural theories that incorporate emotional and contextual factors. By doing so, researchers and practitioners can gain a more comprehensive understanding of health behaviours and design more effective interventions.

2.4 Justification for Applying the Health Belief Model and Theory of Planned Behaviour Together

The application of both the HBM and the TP) in this study provides a comprehensive framework for addressing the specific objectives. Each theory offers distinct but complementary perspectives on the factors influencing health behaviours, which are critical for understanding and promoting the prevention of mother-to-child HIV transmission (PMTCT).

The HBM is particularly well-suited for assessing the level of knowledge, as it emphasises the role of individuals' perceptions of susceptibility and severity in shaping their awareness and motivation to engage in preventive behaviours. For example, understanding women's beliefs about their risk of transmitting HIV to their child (perceived susceptibility) and the potential consequences of transmission (perceived severity) provides valuable insights into their knowledge gaps. The TPB complements this by highlighting how knowledge influences attitudes toward PMTCT behaviours, thereby linking awareness to intention.

The TPB directly addresses the role of attitudes in shaping behavioural intentions, making it ideal for examining this objective. Women's perceptions of the benefits and drawbacks of PMTCT practices, as well as their subjective evaluation of these behaviours, align with the attitudinal component of the TPB. The HBM further enhances this analysis by exploring how

perceived benefits and barriers influence attitudes toward PMTCT interventions, such as ART adherence or antenatal care attendance.

Practices are influenced by a combination of knowledge, attitudes, and behavioural control. The HBM explains how cues to action and self-efficacy drive behavioural change, providing insights into why women adopt or fail to adopt certain PMTCT practices. The TPB complements this by emphasising the importance of perceived behavioural control, which includes external factors like healthcare access and internal factors like confidence, in translating intentions into actions. Together, these theories provide a robust framework for understanding the dynamics between intention, action, and outcomes.

Both theories are essential for identifying the factors that influence PMTCT behaviours. The HBM focuses on individual-level determinants, such as perceived barriers and benefits, while the TPB incorporates broader social and contextual factors, including subjective norms and perceived behavioural control. This dual approach allows for a more holistic analysis of the socio-cultural, psychological, and structural factors that shape women's engagement with PMTCT services.

Using HBM and TPB together ensures that this study captures both individual and contextual determinants of PMTCT-related knowledge, attitudes, and practices. The HBM provides insights into how women's perceptions and beliefs influence their engagement with PMTCT, while TPB explains how these perceptions interact with social norms and behavioural control to shape intentions and actions. This integrated approach not only addresses the specific objectives comprehensively but also enhances the study's ability to inform targeted interventions for improving PMTCT uptake and outcomes.

2.5 The Knowledge, Attitude and Practice (KAP) Model

The Knowledge, Attitude, and Practice (KAP) model is widely used in public health and various other social science studies. A KAP survey aims to assess what is known (knowledge), believed (attitude), and done (practice) regarding a specific topic of interest (Andrade et al. 2020). Knowledge refers to the community's understanding of a particular issue, while attitude reflects their feelings or preconceived notions about it. Practice refers to how the community applies their knowledge and attitudes in real-life situations (Tweya et al. 2018). KAP surveys help identify misconceptions or misunderstandings that may hinder the implementation of desired activities and serve as potential barriers to behaviour change. It is important to note that a KAP survey primarily records opinions based on declarative statements.

2.5.1 Insights and Implications of PMTCT Knowledge, Attitudes, and Practices

Knowledge is widely recognized as a critical determinant in the prevention of mother-to-child transmission of HIV. Defined as the ability to acquire, retain, and apply information, knowledge encompasses comprehension, experience, discernment, and skill (Badran 1995). In the context of PMTCT, it reflects the awareness and understanding women possess about HIV transmission, PMTCT interventions, and associated health practices. Effective knowledge enables women to make informed decisions that can significantly impact maternal and child health outcomes.

Studies underscore the role of knowledge in shaping women's engagement with PMTCT programs. For instance, Yeshaneh et al. (2023) highlights that women's awareness of critical aspects of PMTCT, such as the necessity for babies born to HIV-positive mothers to attend ART clinics, plays a pivotal role in reducing transmission risks. Furthermore, knowledge about breastfeeding choices including exclusive breastfeeding, early weaning with formula, and the administration of ARV prophylaxis is essential in minimising the likelihood of transmission through postnatal pathways. However, the extent to which this knowledge is disseminated and

understood by women remains inconsistent, leading to varying levels of adherence to recommended practices.

Understanding the pathways of mother-to-child transmission is another critical dimension of knowledge. MTCT can occur during pregnancy, labour, delivery, or breastfeeding, and awareness of these pathways is fundamental to prevention efforts (Yeshaneh et al. 2023). Beyond identifying these routes, knowledge must extend to specific prevention strategies, including safer infant feeding practices, consistent ART use, safe delivery methods, and promoting condom use to prevent further maternal transmission. These insights emphasise that knowledge must not only be theoretical but also actionable, equipping women with the ability to implement preventative measures effectively.

One area where knowledge gaps persist is in the integration of PMTCT with broader healthcare services. For example, Yeshaneh (2023) highlights the importance of one-to-one HIV counselling, STI testing and treatment, and Family Planning (FP) services as integral components of comprehensive PMTCT programs. These services address interconnected health issues, such as unintended pregnancies among HIV-positive women, which can exacerbate transmission risks. However, the accessibility and uptake of such services are often hindered by systemic barriers, including inadequate information dissemination, cultural stigma, and resource constraints.

Critically analysing these findings reveals that knowledge is not uniformly distributed among women in high HIV prevalence settings. While some women may be well-informed and proactive, others face significant informational and systemic barriers that limit their engagement with PMTCT interventions. This disparity underscores the need for targeted education and communication strategies that are culturally sensitive and contextually relevant.

Interventions must prioritise the delivery of accurate, actionable information while addressing the socio-economic and structural factors that inhibit knowledge acquisition.

Hence, knowledge serves as the foundation for effective PMTCT interventions. It influences women's ability to understand and implement preventative measures, access critical healthcare services, and make informed choices regarding their health and that of their children. Addressing knowledge gaps through tailored education and communication strategies is imperative for improving PMTCT outcomes and reducing HIV transmission rates.

2.5.2 Attitude: A Key Determinant in PMTCT Engagement

Attitude encompasses an individual's inclination to react in specific ways to various situations, interpret events according to particular predispositions, and organize opinions into coherent and interrelated structures (Badran 1995). Attitude is closely linked to values and beliefs, which together shape perceptions and behaviours. Values can be understood in several ways: as the price or importance attached to intellectual or moral qualities, as a means of appreciating merits, or as a set of ethical actions guiding behaviour (Badran 1995). Beliefs, on the other hand, are psychological states where individuals accept propositions or premises as true, often serving as the foundation for attitudes and decisions (Lezin 2007).

In the context of this study, attitude refers to the positive or negative feelings women hold toward utilising PMTCT services. These attitudes are shaped by a combination of knowledge, beliefs, and values (Lezin 2007). For instance, a woman's belief in the efficacy of PMTCT interventions, such as the use of ART services in reducing HIV transmission risks, influences her willingness to engage with such services. Similarly, cultural and societal values surrounding motherhood, breastfeeding, and HIV-related stigma can significantly impact attitudes toward PMTCT practices (Beyene, Dadi & Mogas 2018).

A positive attitude toward PMTCT services is crucial for their successful utilisation. Women who view these services as beneficial and aligned with their values are more likely to adopt recommended practices, such as regular antenatal care visits, ART adherence, and safe delivery methods. Conversely, negative attitudes, often driven by misinformation, stigma, or conflicting beliefs, can deter women from accessing essential healthcare services, thereby increasing the risk of mother-to-child transmission of HIV (Harrison et al. 2021).

Moreover, attitudes are not static; they evolve based on experiences, social interactions, and exposure to education and communication initiatives. Interventions aimed at addressing negative attitudes must therefore be dynamic, culturally sensitive, and contextually relevant. Strategies such as community education campaigns, peer support groups, and healthcare provider training can help reshape attitudes by fostering trust, dispelling myths, and emphasising the benefits of PMTCT services (Alemu, Habtewold & Alemu 2018).

One can say, attitude plays a pivotal role in determining the uptake and effectiveness of PMTCT services. By understanding and addressing the underlying values and beliefs that shape attitudes, interventions can be tailored to overcome barriers and promote positive engagement with PMTCT programs. This approach is critical for achieving better maternal and child health outcomes and reducing the burden of HIV transmission.

2.5.3 The Role of Practice in PMTCT Success

Practice refers to the actual application or use of an idea, belief, or method, as opposed to theoretical discussions about such application (Online Webster Dictionary). Badran (1995) expands on this definition, stating that practice involves the application of rules and knowledge that lead to action. In the context of PMTCT, practice encompasses the tangible steps and behaviours that pregnant women adopt to prevent mother-to-child transmission of HIV.

According to Yeshaneh et al. (2023), all respondents (100%) in the study were tested for HIV, with 99% receiving a negative serostatus. These statistics underline the high level of participation in HIV testing among pregnant women, a critical component of PMTCT. Pregnant women are expected to engage in essential practices, including pre- and post-test counselling, undergoing HIV testing during pregnancy, and demonstrating a willingness to accept their test results. These practices are foundational for effective PMTCT interventions.

Additionally, it is recommended that pregnant women participate in HIV testing with their partners or husbands during antenatal care (ANC) follow-ups. Partner involvement not only enhances the uptake of PMTCT services but also fosters shared responsibility in preventing HIV transmission. Participation in community conversations on HIV/AIDS is another vital practice. Such engagement promotes awareness, reduces stigma, and encourages the adoption of preventative behaviours within the community (Yeshaneh et al. 2023).

Good practices in PMTCT also include adherence to prescribed antiretroviral therapy, safe infant feeding practices, and consistent attendance at ANC visits. These behaviours directly contribute to reducing the risk of HIV transmission from mother to child. However, while the statistics indicate high levels of HIV testing, further investigation is needed to understand whether these practices are consistently maintained throughout pregnancy and the postnatal period. Barriers such as stigma, lack of partner support, or limited access to healthcare services can hinder sustained good practices.

Expanding on this, successful implementation of PMTCT practices requires a supportive environment, including access to quality healthcare, continuous education, and community support systems. Healthcare providers play a pivotal role in reinforcing these practices through regular counselling, follow-up, and addressing challenges that pregnant women face in

maintaining adherence. Culturally sensitive interventions that address societal norms and barriers are also critical for promoting sustainable behavioural change.

The practice represents the actionable component of PMTCT strategies and is integral to the success of HIV prevention programs. By focusing on the application of knowledge and attitudes, and addressing barriers to consistent practice, PMTCT programs can achieve better health outcomes for both mothers and their children.

2.6 Situating HIV and AIDS as a Development and Public Health Challenge

One significant public health challenge that has profoundly affected human health and development is HIV and AIDS. The prevention and control of HIV are embedded within the targets of Sustainable Development Goal (SDG) 3.1, which aims to end HIV as a public health problem by 2030. However, the impact of HIV and AIDS exhibits significant geographical and economic disparities, with low- and middle-income countries disproportionately affected. Sub-Saharan Africa bears the heaviest burden, accounting for two-thirds of the global disease prevalence.

As noted by Yakasai et al. (2021), HIV remains one of the most critical public health challenges in these regions. Compounding this issue is the gendered nature of the epidemic. The HIV epidemic is increasingly feminised, with higher infection rates among women compared to men. In Sub-Saharan Africa, where the burden is most severe, 57% of adults living with HIV are women (Harrison et al. 2021). This disproportionate impact on women exacerbates vulnerabilities, particularly in maternal and infant health. Indeed, HIV is a significant contributor to high maternal and infant mortality and morbidity rates in the region (Chihana et al. 2015; Divala 2013; Kendall et al. 2014).

The implications of HIV extend beyond health, affecting individuals' ability to contribute to social and economic development. The disease undermines productivity, strains healthcare systems, and perpetuates cycles of poverty and inequality. Addressing these challenges requires a multifaceted approach, including targeted interventions to reduce infection rates, improve access to treatment, and tackle the socio-economic determinants of health.

2.6.1 The Extent of Mother-to-Child Transmission (MTCT)

The transmission of HIV infection from mother to child remains a significant global challenge, particularly in developing countries. MTCT represents one of the primary routes of HIV transmission and occurs when an HIV-infected woman passes the virus to her baby during pregnancy, labour, delivery, or breastfeeding (Bissek et al. 2011; Manyi et al. 2020; Yakasai, Panas & Kadrie 2021). This issue is particularly pressing in low- and middle-income countries (LMICs), where limited resources and systemic challenges exacerbate the risk of transmission.

Estimates of MTCT rates vary widely depending on the stage of transmission and whether preventive interventions are in place. Without any PMTCT interventions, the risk of transmission is alarmingly high. Manyi et al. (2020) report that the rate of MTCT ranges between 20% and 45%, with specific risks including 15% to 30% during pregnancy and delivery, and 5% to 20% through breastfeeding. Similarly, other studies highlight the risk distribution: 10–15% during delivery, 5–20% through breastfeeding, and 5–10% during pregnancy (Cherie et al. 2022; Myer et al. 2017). Collectively, the overall risk of MTCT in LMICs can approach 30% to 60%, emphasising the urgent need for robust preventive measures.

What is particularly concerning is the variation in these estimates, reflecting differences in healthcare infrastructure, access to PMTCT services, and socio-economic factors across regions. However, despite these challenges, there is cause for optimism. Effective PMTCT programs, when implemented, can dramatically reduce the risk of transmission to under 2%

(Chimbwandira et al. 2013). These programs involve a combination of strategies, including antiretroviral therapy (ART) for pregnant and breastfeeding mothers, safe delivery practices, and guidance on infant feeding options to mitigate risks associated with breastfeeding.

The success of PMTCT programs underscores the importance of early intervention and comprehensive healthcare delivery. Integrating PMTCT services into maternal and child health programs ensures that women receive consistent care throughout pregnancy and postpartum. In addition, community-based interventions, such as education and support groups, play a critical role in improving awareness and adherence to preventive measures. Addressing barriers to healthcare access, such as stigma, financial constraints, and geographic limitations, is essential for further reducing MTCT rates.

While MTCT remains a significant public health challenge, the availability of effective interventions offers hope for its near-elimination. By prioritising the expansion and optimisation of PMTCT programs, it is possible to achieve substantial reductions in transmission rates, thereby improving maternal and child health outcomes and advancing global HIV prevention efforts.

2.6.2 Case for Prevention of Mother-to-Child Transmission (PMTCT)

Since mother-to-child transmission is the primary mode of HIV transmission to children, recent global efforts have focused on the virtual elimination of paediatric HIV through Prevention of Mother-to-Child Transmission (PMTCT) programs (Van Lettow et al. 2018). Achieving this goal is essential, as ending the HIV epidemic requires eliminating new infections, including those in children born to HIV-positive women who are not enrolled in PMTCT services (Yakasai, Panas & Kadrie 2021).

Studies consistently demonstrate a strong link between the utilisation of PMTCT services and reduced MTCT rates (Boateng, Kwapong & Agyei-Baffour 2013; Feyera et al. 2017). PMTCT programs play a pivotal role in curbing new infections by limiting the number of children contracting HIV and ensuring access to critical services for HIV-positive women (Abajobir & Zeleke 2013; Harrison et al. 2021). By prioritising interventions that address MTCT, PMTCT contributes significantly to the decline in paediatric HIV cases and supports the broader goal of eradicating HIV.

The World Health Organisation promotes a comprehensive approach to PMTCT programs, which includes: preventing new HIV infections among women of reproductive age; preventing unintended pregnancies among Women Living with HIV (WLHIV); preventing HIV transmission from a WLHIV to her child during pregnancy, delivery, or breastfeeding; and providing appropriate treatment, care, and support to WLHIV, their children, and families (Saka, Onyeneho & Ndikom 2021). To meet these objectives, effective PMTCT programs must encompass a cascade of services such as antenatal care and HIV testing during pregnancy, ART initiation for HIV-positive pregnant women, safe delivery practices, appropriate infant feeding practices, infant HIV testing, infant ART prophylaxis, and other essential postnatal healthcare services (Saka, Onyeneho & Ndikom 2021).

HIV testing serves as the critical entry point for PMTCT. Following testing, HIV-negative women are counselled on maintaining their status, while HIV-positive women are enrolled in PMTCT programs to prevent transmission to their babies (Yakasai, Panas & Kadrie 2021). Ineffective implementation of this holistic approach, however, poses significant risks for HIV transmission to children (Bissek et al. 2011). This highlights the importance of addressing systemic gaps and ensuring the seamless execution of PMTCT services.

Advocacy for PMTCT programs remains vital, as argued by Vrazo, Sullivan and Phelps (2018), who emphasise the need for continuous support from providers, policymakers, program implementers, and communities. PMTCT represents a cost-effective platform that simultaneously saves the lives of mothers and infants while preventing HIV and promoting overall family health. Advocacy must also stress the financial benefits of PMTCT, highlighting that it not only improves health outcomes but also reduces long-term expenditures on paediatric HIV care and treatment (Bollinger & Adebiyi 2013; Johri & Ako-Arrey 2011; Kuznik et al. 2012).

Beyond saving lives, PMTCT protects HIV-exposed infants from infection, reducing infant morbidity and mortality and thereby decreasing the need for paediatric ART and limiting HIV resistance (Becquet et al. 2012; Luzuriaga 2016). Moreover, averting over 90% of new paediatric infections would significantly reduce the financial burden on governments and donors, allowing resources to be redirected toward other pressing healthcare needs (Vrazo, Sullivan & Phelps 2018).

PMTCT programs are indispensable in the global fight against HIV. By integrating effective, comprehensive services and sustaining advocacy and funding, PMTCT has the potential to eliminate paediatric HIV, protect maternal and infant health, and alleviate economic burdens associated with the epidemic.

2.7 Challenges in the Prevention of Mother-to-Child Transmission

Despite significant progress in the prevention of mother-to-child transmission, numerous challenges persist in Sub-Saharan African countries, hindering the achievement of the goal to eliminate MTCT. Key challenges include poor uptake of PMTCT services, maintaining women living with HIV in care and on effective ART throughout the breastfeeding period, and reducing, detecting, and managing new infections occurring among women during pregnancy

or breastfeeding (Harrison et al. 2021). These obstacles are multifaceted and require targeted interventions to address them effectively.

One significant challenge is that mothers often present to antenatal care (ANC) clinics late in their pregnancies, delaying critical HIV testing and linkage to ART and prevention services. Additionally, poor maternal retesting coverage around birth and during the breastfeeding period further exacerbate the risk of MTCT. Data indicate that more children are infected with HIV during breastfeeding than during pregnancy, highlighting the need for robust interventions during this critical period. Furthermore, insufficient HIV testing coverage among male partners of Adolescent Girls and Young Women (AGYW), and pregnant and breastfeeding women within the PMTCT program limits the effectiveness of prevention strategies. High rates of unintended pregnancies among HIV-positive women further compound these challenges (O'Shea et al. 2016; Thindwa et al. 2019).

Tenthani et al. (2014) found that Malawian women who initiated ART under Option B+ were five times more likely to disengage from care after their initial visit and twice as likely to miss their first follow-up visit compared with women who started ART through other channels, such as self-referral via voluntary testing and counselling. Similarly, Kim et al. (2015) reported that while Option B+ dramatically improved ART initiation rates, it also led to increased Loss to Follow-up (LTFU) among Malawian women living with HIV after childbirth, rising from 5.8% before the introduction of Option B+ to 11.2% afterward. These findings underscore the need for strategies to improve retention in care.

Loss to follow-up from HIV care remains a significant public health concern. Tweya et al. (2018) emphasise that LTFU increases the risk of drug resistance and treatment failure in cases where death is not the cause of disengagement. Studies have shown that patients with treatment interruptions are more likely to experience treatment failure, viral rebound, and clinically

significant drug resistance (Luebbert et al. 2012; Rastegar, Fingerhood & Jasinski 2003). Addressing LTFU requires a multifaceted approach that includes strengthening follow-up mechanisms, providing psychosocial support, and addressing systemic barriers to retention in care.

Overcoming these challenges is essential for the success of PMTCT programs in Sub-Saharan Africa. Strategies to improve ANC attendance, ensure consistent HIV testing and ART adherence, engage male partners, and address unintended pregnancies are critical to reducing MTCT rates. Additionally, addressing loss to follow-up through targeted interventions can enhance treatment outcomes, prevent drug resistance, and ultimately contribute to the elimination of paediatric HIV.

2.8 The Role of Knowledge and Attitudes in PMTCT Practice

Knowledge and attitudes play a pivotal role in the prevention of mother-to-child transmission practices, particularly in the utilisation of PMTCT services and adherence to care, support, and best practices. Saka, Onyeneho and Ndikom (2021) observe that factors influencing the utilisation of PMTCT services include knowledge, perception, and accessibility of services. Similarly, Balogun and Owoaje (2016) report that knowledge and perception about health services are foundational determinants of the acceptability and uptake of these services.

Several studies underscore the importance of positive attitudes and adequate knowledge in enhancing PMTCT outcomes. Harrison et al. (2021) and Alemu, Habtewold and Alemu (2018) found that mothers who possess good knowledge and maintain positive attitudes toward PMTCT are more likely to adhere to prevention strategies and utilise available services. These findings align with Alemu, Habtewold & Alemu (2018), who highlighted that women with favourable attitudes and sufficient knowledge about PMTCT are more likely to undergo HIV

testing and participate in PMTCT programs. Conversely, women with unfavourable attitudes and inadequate knowledge are less likely to engage with these essential services.

The impact of knowledge on PMTCT uptake has also been emphasised by other researchers. Boateng, Kwapong and Agyei-Baffour (2013), Duff et al. (2010) and Olowokere, Adelakun and Komolafe (2018) report that women with comprehensive knowledge of mother-to-child transmission and PMTCT services are significantly more likely to utilise these services. Women lacking adequate knowledge were found to be at higher risk of defaulting on ART. This suggests that the knowledge levels of pregnant women regarding MTCT directly influence the likelihood of HIV acquisition in children.

Perceptions of HIV and MTCT also play a critical role in the utilisation of PMTCT services. Studies by Sitohang (2017) and Muheriwa et al. (2013) highlight that women's perceptions about HIV and its transmission influence their decisions to seek PMTCT services. Negative perceptions or misconceptions about HIV can act as barriers to service uptake, while positive perceptions foster better engagement and adherence.

The implications of these findings are significant. Promoting knowledge and fostering positive attitudes among women, particularly those in high HIV prevalence settings, are essential for improving PMTCT outcomes. Educational interventions, community outreach programs, and healthcare provider engagement can play critical roles in addressing gaps in knowledge and shaping positive attitudes. Additionally, tackling misconceptions and reducing stigma associated with HIV are imperative for enhancing the perceptions of PMTCT services and ensuring their broader utilisation.

The interplay between knowledge, attitudes, and perceptions is central to the effectiveness of PMTCT programs. Addressing these factors through targeted and culturally sensitive

interventions can significantly enhance service uptake, adherence, and overall PMTCT outcomes.

2.9 Factors Associated with MTCT of HIV Infection

The European Collaborative Study provided significant insights into factors influencing MTCT of HIV (Thorne et al. 2005). It revealed that antenatal ART usage increased dramatically from 5% at the start of the Highly Active Antiretroviral Therapy (HAART) era to 92% in the 2001–2003 period. Correspondingly, the MTCT rate during this time declined significantly, with an overall rate of 2.87%, dropping further to 0.99% between 2001 and 2003. The study highlighted that high maternal viral load and the mode of delivery, particularly elective caesarean sections, were strongly associated with MTCT risk. Additionally, maternal HIV RNA detection was significantly linked to the antenatal use of ART, CD4 cell count and mode of delivery, underscoring the importance of comprehensive maternal care during pregnancy.

Wudineh and Damtew (2016) further emphasised the impact of PMTCT interventions, reporting that HIV infection rates among exposed infants have significantly declined with the scale-up of PMTCT programmes, even though these efforts fell short of achieving their targets. Their study of 382 HIV-exposed infants enrolled in care found that 60 (15.7%) became HIV-positive. Factors such as rural residence, home delivery, lack of infant ARV prophylaxis at birth, mixed feeding practices, and mother-child pairs not receiving ARV were identified as significant independent determinants of MTCT. These findings illustrate the multifaceted nature of MTCT risk, encompassing both biological and socio-behavioural factors.

The lack of similar studies conducted in Malawi highlights an important research gap. While global and regional studies provide valuable insights, localised data is critical for understanding the unique challenges and determinants of MTCT in specific contexts. Factors such as access to healthcare, cultural practices, and socio-economic disparities can vary widely between

regions and significantly influence the effectiveness of PMTCT programmes. Future research in Malawi could provide the evidence base needed to tailor interventions to the country's specific needs, thereby improving outcomes for mothers and infants.

Several factors influence the risk of MTCT. High maternal viral load remains a primary determinant, underscoring the importance of ART during pregnancy to suppress viral replication. The mode of delivery also plays a crucial role; elective caesarean sections have been associated with reduced transmission rates compared to vaginal deliveries, particularly in cases where the maternal viral load is not optimally controlled.

Breastfeeding presents another significant risk factor for MTCT. It is estimated that breastfeeding accounts for approximately one-third of MTCT cases. High levels of HIV in breast milk correlate with increased transmission risk. Avoiding breastfeeding has been suggested as a strategy to reduce the risk of HIV transmission.

Socio-demographic factors also contribute to MTCT risk. Studies have identified rural residence, home delivery, and lack of access to healthcare services as significant determinants. For example, a study conducted in Ethiopia found that rural residence and home delivery were associated with higher MTCT rates (Kassa 2018).

Maternal nutritional status, particularly vitamin A deficiency, has also been linked to increased MTCT risk. Ongoing trials in Malawi, South Africa, Tanzania, and Zimbabwe are exploring whether adding vitamin supplements to the diets of pregnant women could reduce the risk of transmitting HIV to their children (UNAIDS 2023a).

Behavioural factors, such as mixed feeding practices, further elevate the risk. Exclusive breastfeeding or exclusive formula feeding is recommended to minimise MTCT, as mixed feeding can damage the infant's gut lining, facilitating viral entry.

In Malawi, the country's high HIV prevalence and predominantly rural population suggest that factors such as limited healthcare access, home deliveries, and mixed feeding practices may contribute significantly to MTCT rates. Addressing these challenges requires targeted interventions, including improving healthcare accessibility, promoting facility-based deliveries, and providing education on optimal infant feeding practices.

Reducing MTCT of HIV necessitates a multifaceted approach that addresses both biomedical and socio-behavioural factors. Early initiation and adherence to ART, appropriate delivery methods, safe infant feeding practices, and tackling socio-demographic disparities are critical components of effective prevention strategies.

2.10 Research Gaps in HIV and PMTCT Interventions

As demonstrated, globally, a substantial body of literature exists on HIV and PMTCT, highlighting that Knowledge, Attitude, and Practice (KAP) is an effective model for behavioural interventions. Studies such as those by Lee, Kang and You (2021) and Yeshaneh et al. (2023) provide robust evidence in support of this. Additionally, other relevant studies have been cited in this review. However, there is a notable lack of research specifically focused on Zomba District in Malawi.

Furthermore, while significant research has been conducted on HIV and PMTCT in Malawi, there is limited investigation into the experiences and behaviours of pregnant mothers in the Malawian context. This gap in the literature underscores the need for a deeper exploration of how PMTCT interventions impact behavioural outcomes among pregnant women in Malawi.

This study seeks to address these gaps, contributing to the empirical understanding of HIV and PMTCT by focusing on the specific context of Zomba District and pregnant mothers in Malawi. By doing so, it aims to enhance the knowledge base and inform more effective behavioural interventions in this area.

2.11 Conceptual framework

The conceptual framework in Figure 2-2 illustrates the dynamic relationship between KAP in the context of HIV, mother-to-child transmission, and prevention of mother-to-child transmission. It positions these three components as interconnected and mutually reinforcing elements, essential for the successful implementation of PMTCT interventions. Knowledge serves as the foundation, encompassing awareness of HIV prevention methods, exclusive breastfeeding practices, early weaning, and the use of ARV prophylaxis. This knowledge shapes Attitude, which reflects individuals' beliefs, perceptions and acceptance of PMTCT strategies. A positive attitude, influenced by accurate knowledge, fosters practice, which involves adopting behaviours such as attending antenatal care (ANC), adhering to ART, and following safe infant feeding practices. The cyclical nature of the framework highlights that improved practice reinforces knowledge and attitudes, creating a continuous loop of learning and behaviour reinforcement. At its core, the framework focuses on reducing MTCT of HIV, demonstrating that addressing gaps in knowledge, fostering favourable attitudes, and promoting positive practices are critical for achieving effective behavioural interventions and better maternal and child health outcomes.

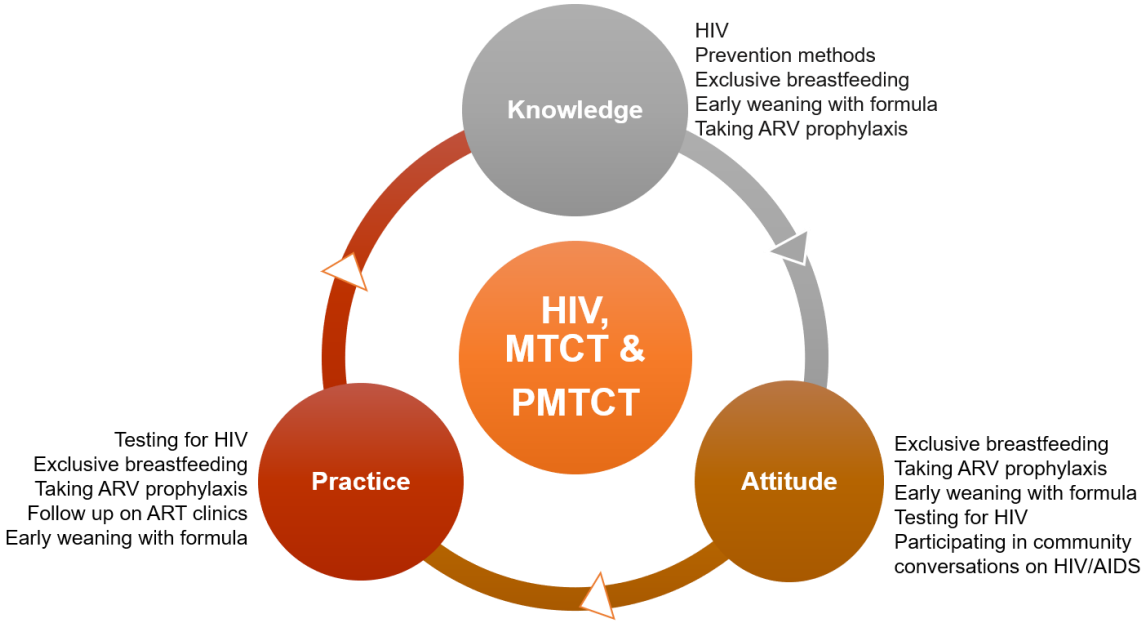

Figure 2 - 2: Conceptual framework (Source: Author)

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter presents the research methodology. It begins by presenting the research site and research design. Then, the chapter presents the sampling procedure and sample size calculation. Finally, the chapter presents data collection tools and method of data analysis before winding up with limitations of the study.

3.2 Study site

The study was conducted in Zomba District, Malawi, focusing on four health centres: two urban facilities, Municipality and Sadzi Clinic, and two rural facilities, Naisi Health Centre and Domasi Health Centre (Figure 3-1). Zomba was purposively chosen as the study location due to its significant HIV prevalence. While the national adult HIV prevalence in Malawi is approximately 6.7% (UNAIDS 2023b), Zomba District is situated within a high HIV prevalence zone in the south-eastern part of the country (Nutor et al. 2020). This highlights the critical need for effective PMTCT interventions in the district.

Zomba offers a unique and representative setting for studying PMTCT due to its blend of urban and rural populations, facilitating the exploration of diverse socio-economic, cultural, and healthcare access challenges. Urban areas, such as those served by Municipality and Sadzi Clinics, provide insights into PMTCT service uptake in settings with relatively better healthcare infrastructure and access to information. Conversely, rural health centres like Naisi and Matawale highlight the barriers faced by populations with limited healthcare resources, lower literacy levels, and higher socio-economic vulnerabilities. This urban-rural dichotomy allows for a comprehensive understanding of the factors influencing PMTCT practices and outcomes in varying contexts.

Moreover, Zomba is predominantly agrarian, with rural communities encountering challenges such as long distances to health facilities, stigma associated with HIV, and limited awareness about PMTCT services. A socio-economic report of Zomba District (2017–2022) highlighted an acute shortage of healthcare staff, isolated healthcare centres lacking essential amenities, and poor road conditions (Zomba District Council 2020). By focusing on Zomba, the study captures these contextual challenges, providing a basis for tailored interventions that address the specific needs of both urban and rural populations. The selection of Zomba as a study location also aligns with the need to address disparities in healthcare access and outcomes, contributing to the broader goal of improving maternal and child health in Malawi.

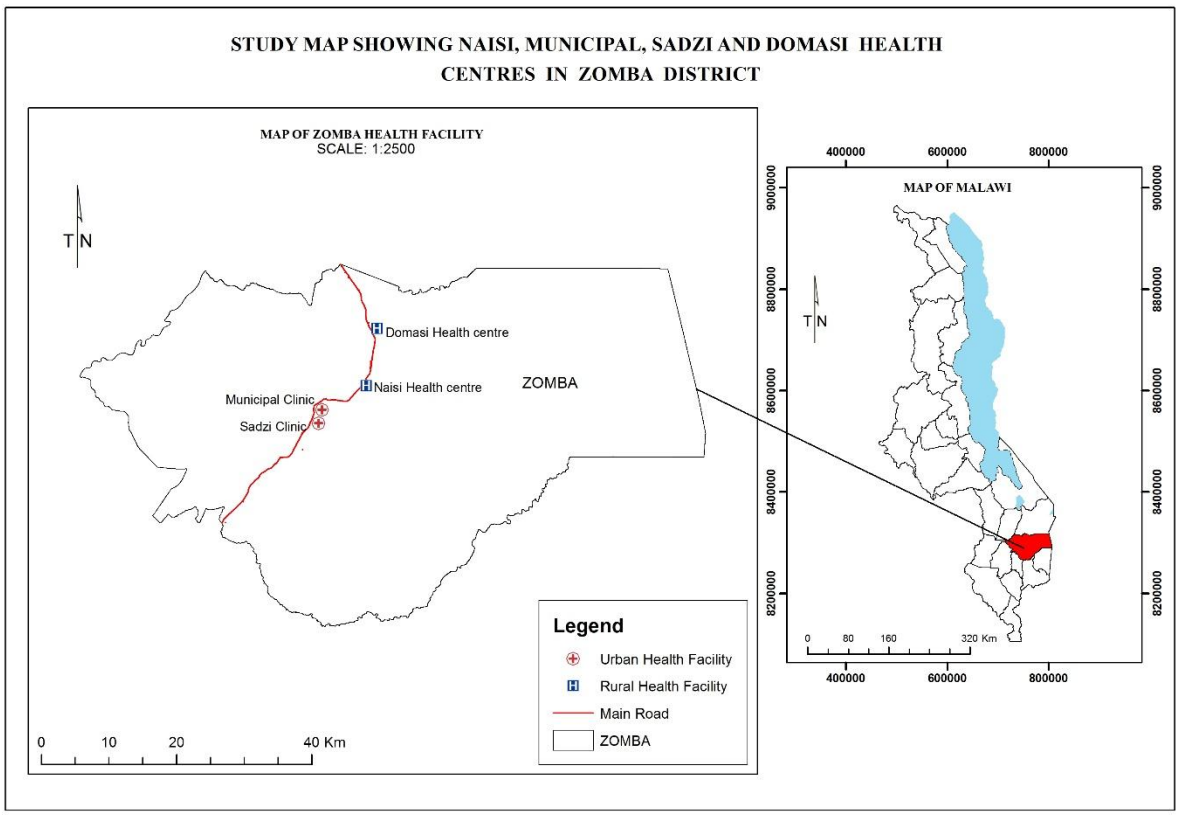

Figure 3 - 1: Map of Malawi showing study area

3.3 Research design

The study employed a cross-sectional survey design utilising mixed methods approach that integrated both quantitative and qualitative data collection approaches. This design facilitated the comprehensive collection of detailed data from respondents at a single point in time, making it suitable for descriptive purposes and for examining relationships between variables. The cross-sectional designs are effective for capturing a snapshot of a population's characteristics and for identifying associations among variables (Crano, Brewer & Crano 2014). The incorporation of mixed methods allowed for a more nuanced understanding of the research problem, as it combined the strengths of both quantitative and qualitative approaches, providing a richer and more complete perspective on the study's objectives. This methodological triangulation enhances the validity of the findings by corroborating results across different data sources and methods.

3.3.1 Sample Frame

The sample frame for this study consisted of a diverse group of respondents drawn from Zomba, reflecting various socio-economic, cultural, and healthcare-related characteristics relevant to PMTCT service uptake. The study targeted a population with varying marital statuses, education levels, religious affiliations, tribal compositions, occupational backgrounds, and residential settings to ensure a comprehensive understanding of the factors influencing PMTCT outcomes.

Participants were selected to include a range of marital statuses, from married women representing stable unions, to single, divorced, separated, and widowed women, as well as a smaller group in non-marital partnerships. This approach ensured representation of different relationship dynamics that might impact PMTCT programme participation and adherence.

The sample also captured a spectrum of educational attainment levels, ranging from respondents with no formal education to those with tertiary qualifications. Women with incomplete or completed primary and secondary education formed a significant portion of the sample, providing insights into how educational disparities influence knowledge and access to PMTCT services.

Religious diversity was incorporated into the sample, including Christians, Muslims, and those practising traditional religions, reflecting the cultural and spiritual composition of Zomba. This diversity allowed for the exploration of how religious beliefs and practices affect engagement with PMTCT services and HIV-related stigma.

Ethnic representation within the sample included prominent groups such as the Yao and Lomwe, along with Chewa, Mang'anja, Ngoni, Tumbuka, Sena, and Tonga communities. This broad tribal representation ensured that the study considered cultural nuances, linguistic differences, and practices unique to each group, which are crucial for designing culturally sensitive PMTCT interventions.

Occupational diversity was also a key consideration in the sample frame, with respondents engaged in farming, business, formal employment, and homemaking. A smaller group of unemployed individuals was included to capture the economic vulnerabilities that may impact healthcare access and adherence to PMTCT protocols. The inclusion of participants with varied economic activities allowed for an analysis of how daily routines and financial realities influence PMTCT service utilisation.

Finally, the sample was nearly evenly divided between rural and urban residents. This balance facilitated an understanding of urban-rural disparities in PMTCT service access, highlighting the differences in healthcare infrastructure, availability of resources, and socio-economic conditions between these settings.

The diverse composition of the sample frame ensured that the study captured a wide range of experiences and perspectives. This comprehensive approach allowed for the identification of key factors influencing PMTCT uptake and outcomes, paving the way for interventions that are inclusive and responsive to the needs of Zomba's population.

3.4 Sample Size and Sampling Procedure

3.4.1 Sample Size Calculator

The sample size for the study was determined using a simplified formula provided by Cochran (1977), which is commonly applied when the population size of the study area is unknown. The formula is as follows:

$$n = \frac{z^2 pq}{e^2}$$

Where: z = the value of standard variate at 95% confidence level, z = 1.96, p = population estimate of 80%, q = 1-p and e = precision level of ±5%.

By substituting these values into the formula, the calculated sample size was 245 women. This figure was adjusted up 10% to cover for non-response rate to 270. In practice, the study surveyed 255 women. These respondents were evenly distributed between rural (127 women) and urban (128 women) areas, ensuring balanced representation of the population.

3.4.2 Sampling Procedure

The study employed both probability and non-probability sampling techniques to select participants. Women participating in the survey were chosen using the simple random sampling method. This approach ensured that each potential respondent had an equal chance of being included in the study, minimising bias and enhancing the representativeness of the sample. Women were assigned random numbers, and Microsoft Excel random number generator was used to select the participants of the survey.

For the qualitative component of the study, purposive sampling was used to select four health personnel for interviews. These participants were chosen based on their specialised knowledge and experience in PMTCT services. Their inclusion aimed to provide in-depth insights into the operational and contextual factors affecting PMTCT programme implementation in the study area.

This dual approach to sampling ensured a robust and comprehensive dataset, combining randomised quantitative data with targeted qualitative insights to achieve the study's objectives effectively.

3.5 Data Collection Methods

The study employed a variety of data collection methods to gather comprehensive and relevant information. These methods included the use of semi-structured questionnaires, Key Informant Interviews (KIIs), and Focus Group Discussions (FGDs). Each method was chosen to align with the study objectives and address the specific research questions effectively.

3.5.1 Questionnaires

A questionnaire is a research tool consisting of a series of questions designed to collect data from respondents (Artino et al. 2014). In this study, a semi-structured questionnaire (Appendix c) was used, which included both open-ended and closed-ended questions. This method was chosen because it provides a cost-effective, quick, and efficient way of gathering large amounts of data from a sizeable sample (Saunders, Lewis & Thornhill 2009). The flexibility of a semi-structured format allowed for the collection of both quantitative and qualitative data, ensuring a more nuanced understanding of the respondents' perspectives (Bryaman 2015). In this study, 255 questionnaires were administered. The first section of the questionnaire collected the socio-demographic information of the respondents such as age, marital status, tribe, location, distance

to health centre, income, occupation and religion. In questions on the level of PMTCT among women, the questionnaire collected information in four dimensions namely: mode of HIV transmission, ways of preventing HIV, time for MTCT and actions for PMTCT. In total there were 16 binary response questions. The attitudes of women towards prevention of mother to child HIV transmission were captured using 5-point Likert scale (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree). The attitude questions were focused in areas of antenatal services, adherence to antiretroviral treatment (ART), HIV testing during pregnancy, infant feeding, and facility-based delivery. Women were asked about the practices of preventing mother to child HIV transmission.

3.5.2 Key Informant Interviews

Four Key Informant Interviews (KIIs) were conducted using a checklist, an appendix c with individuals considered knowledgeable about the community and the topic under study. These key informants, often referred to as gatekeepers, are crucial for facilitating researchers' entry into the field and providing valuable insights (Saunders, Lewis & Thornhill 2009). In this research, four health personnel, one from each of the selected health centres, served as the key informants. Their expertise and familiarity with the healthcare context provided critical qualitative data to complement the findings from other methods (Artino et al. 2014).

3.5.3 Focus Group Discussions

Focus Group Discussions (FGDs) were also employed as a data collection method. Using interview guide, appendix c Four FGDs were conducted at pre-agreed locations and times to gather in-depth information on the study topic. The FGDs are valuable for exploring group dynamics, collective experiences, and diverse viewpoints within a community (Krueger & Casey 2015). This method allowed participants to discuss issues openly, enabling the

researchers to capture rich qualitative data that could not be obtained through individual surveys or interviews.

These data collection methods were selected to ensure a holistic understanding of the research topic. By combining the strengths of questionnaires, KIIs, and FGDs, the study was able to collect both broad and deep data, ensuring that the findings were comprehensive and reliable.

3.6 Data Analysis Methods

The study employed different methods to analyse the qualitative and quantitative data generated from the questionnaires. Each method was chosen to ensure that the data was comprehensively examined and appropriately addressed the research objectives.

3.6.1 Quantitative Data

Quantitative data was analysed using descriptive statistics, which were applied to generate frequencies, percentages, measures of central tendency, and measures of dispersion. The findings were presented in tables and charts to facilitate interpretation and communication. On the level of knowledge related to PMTCT, the 16 binary response questions in the fore-mentioned four dimensions were used to categorise the level of knowledge in three categories namely: 0-5.4 rated as moderate knowledge, 5.5-10.5 rated as moderate knowledge, and 10.5-16 rated as adequate knowledge. Finally, the overall level of knowledge was determined by calculating the proportion against the maximum score of 16.

A Likert scale was used to analyse perception-related questions, providing a structured approach to measure respondents' attitudes and opinions (Artino et al. 2014).

Additionally, univariable analysis, t-tests, and Analysis of Variance (ANOVA) were conducted. These statistical tests helped to identify differences in the level of knowledge on

PMTCT among women with varying social characteristics. The analysis was carried out using specialised software, including the Statistical Package for Social Sciences (SPSS) and Microsoft Excel (2021), to ensure accuracy and reliability (Bryaman 2015; Pallant 2020).

3.6.2 Qualitative Data

Qualitative data was analysed using thematic analysis, a structured method involving the identification of patterns and themes within the data. The process was guided by Kiger and Varpio (2020) and followed three key stages:

1. **Open Coding**: Data was divided into smaller units, and each unit was assigned a descriptor or code that captured its meaning.
2. **Axial Coding**: The codes were grouped into categories based on their relationships and similarities.
3. **Selective Coding**: Broader themes were developed from the categories to encapsulate the key issues expressed by participants, reflecting their views and experiences.

Thematic analysis adhered to the framework proposed by Strauss and Corbin (1998), which emphasises grouping data into broader categories to explore the depth and diversity of participant perspectives. This approach ensured that the qualitative data provided rich and meaningful insights into the research topic.

By employing these distinct data analysis methods, the study was able to derive both numerical and thematic insights, ensuring a comprehensive understanding of the research problem.

3.7 Validity and reliability

The validity and credibility of any research instrument are crucial aspects of conducting reliable and impactful research. Validity ensures that the research results are relevant and capable of

providing solutions to similar problems. In this study, the researcher ensured that the questionnaire effectively measured the constructs under investigation (Krauss 2005). This was achieved through a critical review of the available literature to inform the design and content of the research instrument.

Reliability, on the other hand, refers to the consistency and dependability of the research instrument over time and across various conditions. To ensure reliability, the questionnaire underwent pre-testing in a sample similar to the study population, allowing for refinement based on feedback. This process ensured that the questions were clear, unambiguous, and capable of eliciting consistent responses.

By addressing both validity and reliability, the study aimed to produce robust and credible findings that contribute meaningfully to the understanding of PMTCT-related issues in the research context.

3.8 Ethical considerations

This research adhered to ethical considerations including respect for human dignity, disclosure, voluntary participation, informed consent, harmlessness, minimising risk, privacy, anonymity, and confidentiality. Ethical clearance was obtained from Mzuzu Research Ethics Committee (MZUNIREC **/DOR/23/117**) . Permission to conduct the study at Zomba Central Hospital as obtained from the District Health Office (AppendixD).

CHAPTER 4: RESULTS

This chapter presents the findings of the study. Firstly, the socio-demographic characteristics of the respondents are presented followed by the findings per each objective.

4.1 Socio-demographic characteristics of the respondents

Results on Table 4-1 show the socio-demographic characteristics (categorical variables) of the women who participated in the survey. The majority of women (67.1%) were married, 10% were divorced, 8.2% single, 7.1% separated, 5.1% widowed and 2.4% had regular boyfriends. About 44.7% had not completed primary education, 7.8% completed primary education, 22.4% had not completed secondary education while 12.2% completed secondary education and only 5.9% attained tertiary education. The majority of women (62.4) were Christians, followed by 34.5% Muslims and 3.1% affiliated to tradition religion.

The demographic diversity of the respondents highlights the complexities of designing and implementing PMTCT programmes. The findings underscore the importance of tailoring interventions to address the specific needs of various subgroups, including women of different marital statuses, education levels, occupations, and residential settings. For instance, targeted health education campaigns are needed to improve PMTCT awareness among less-educated women, while community-based approaches may be more effective in rural areas. Additionally, leveraging religious and cultural structures can enhance community acceptance and participation in PMTCT initiatives.

The results from this Table 4-1 provide a robust foundation for analysing the social determinants of PMTCT uptake and identifying barriers that need to be addressed to improve maternal and child health outcomes in Zomba.

Table 4 - 1: Demographic characteristics of the respondents (categorical variables)

Demographics	Frequency	Percent (%)
Marital status		
Married	171	67.1
Have regular boyfriend	6	2.4
Separated	18	7.1
Divorced	26	10.2
Widowed	13	5.1
Single	21	8.2
Education level		
No formal education	18	7.1
Primary not completed	114	44.7
Primary completed	20	7.8
Secondary not completed	57	22.4
Secondary completed	31	12.2
Tertiary	15	5.9
Religion		
Christianity	159	62.4
Islam	88	34.5
Tradition	8	3.1
Tribe		
Chewa	49	19.2
Yao	104	40.8
Mang'anja	10	3.9

Lomwe	70	27.5
Ngoni	10	3.9
Tumbuka	5	2.0
Tonga	2	.8
Sena	5	2.0
Occupation		
Farmer	115	45.1
Employed	28	11.0
Business woman	64	25.1
Housewife	30	11.8
Unemployed	18	7.1
Residence		
Rural	128	50.2
Urban	127	49.8
Total	**255**	**100**

In terms of tribe, about 40.8% of the surveyed women were Yao followed by other women of different tribes. The study area was dominated by farmers where it was found that 45.1% of women were practicing farming followed by 25.1% business women, 11.8% housewives, 11% were employed and 7.1% were unemployed. The average age of surveyed women was 29.4 (Table 4-2) with average household size of 4. The significance age differences were observed among women of difference marital status ($F=11.211$, $P<0.001$). Single women were younger than married women with mean difference of 5.638 years ($P=0.039$). However, the widowed women were older than married women with mean age difference of 15.230 years ($P <0.001$). Similarly, the single women were younger than widowed women with mean age difference of

20.868 (P < 0.001). The average monthly income of women was MK 54,696.91. The average distance to the nearest hospital was 14 km (Table 4-2). No significance differences were observed in incomes among women of difference marital status (F=0.843, P =0.521).

Age-related variability underscores the need for age-specific interventions that address the unique needs of younger and older women. Household size may influence resource allocation and decision-making dynamics, affecting women's ability to prioritise their healthcare needs. Finally, the substantial variation in proximity to health centres reveals a critical gap in healthcare accessibility, particularly for rural populations.

These findings suggest that tailored interventions addressing economic barriers, healthcare accessibility, and the specific needs of different age groups and household contexts are essential for improving PMTCT service utilisation and health outcomes in Zomba.

Table 4 - 2: Socio-demographic characteristics of the respondents (Continuous variables)

Socio-demographic	N	Min	Max	Mean	Std. Deviation
Age (years)	255	18	60	29.40	9.032
Monthly income (MK)	255	0	1,300,000	54;696.91	107,685.292
Household size	255	1	12	4.29	1.851
Distance to nearest health centre (Km)	255	.1	200.0	14.068	35.1164

4.2 Knowledge of preventing mother-to-child HIV transmission among women

4.2.1 Level of knowledge of PMTCT among women

Table 4-3 shows the level of knowledge of PMTCT among women in the study population. The knowledge was assessed across four key dimensions, namely: mode of HIV transmission,

ways of preventing HIV, timing of mother-to-child transmission, and actions for PMTCT, culminating in an overall knowledge score. Scores were categorised as limited, moderate, or adequate knowledge based on defined ranges.

The scores for knowledge of HIV transmission modes ranged from 0.00 to 4.00, with a mean of 2.73 and a standard deviation of 0.975. This indicates that, on average, women had a moderate understanding of how HIV is transmitted. However, the presence of minimum scores at 0.00 suggests that a subset of women had no knowledge of transmission modes, underscoring the need for targeted educational interventions to address these gaps.

Knowledge of HIV prevention methods ranged from 0.00 to 5.00, with a mean score of 3.12 and a standard deviation of 1.36. While this reflects a relatively higher level of knowledge compared to other dimensions, the variability suggests that some women were well-informed, while others lacked essential information. Enhanced awareness campaigns and health education programmes could help bridge these disparities.

Knowledge of when MTCT occurs (during pregnancy, delivery, or breastfeeding) had a mean score of 1.94, with a standard deviation of 0.86, based on a maximum possible score of 3.00. This indicates limited understanding of the critical periods for MTCT. Since timing is crucial for effective PMTCT interventions, this finding highlights the importance of emphasising these details in healthcare communication.

Knowledge of specific actions for PMTCT, such as antiretroviral therapy (ART), had a mean score of 1.71, with a standard deviation of 0.99. The maximum possible score was 4.00. This was an indication that most women had limited understanding of the actions required to prevent HIV transmission to their children. This represents a critical area for improvement, as practical knowledge of PMTCT actions is essential for successful programme uptake. Overall, the level of knowledge among women were recorded at 9.47 out of 16 representing 59.19%

(9.47/16*100). This indicates that women in the area had moderate knowledge in relation to PMTCD.

Table 4 - 3: Level of knowledge for PMTCT among women

Level of Knowledge	N	Total scores	Min	Max	Mean	Std. Deviation
Mode of HIV transmission	255	4	.00	4.00	2.7333	.97582
Ways of preventing HIV	255	5	.00	5.00	3.1176	1.36386
Timing of MTCT	250	3	.00	3.00	1.9400	.86452
Actions for PMTCT	255	4	.00	4.00	1.7176	.99540
Overall knowledge	**255**	**16**	**.00**	**16.00**	**9.4706**	**3.33292**

Note: 0-5.4=limited knowledge, 5.5-10.4 = moderate knowledge, 10.5-16=Adequate knowledge

4.2.2 Sources of information for PMTCT

Figure 4-1 illustrates the primary sources of information about Prevention of Mother-to-Child Transmission (of HIV among women in the study population. The results reveal the distribution of information sources and highlight the reliance on certain communication channels for PMTCT awareness.

The majority of respondents, 229 (89.8%), identified healthcare providers as their primary source of PMTCT information. This high percentage underscores the critical role that healthcare professionals play in disseminating accurate and reliable information about PMTCT. It reflects the trust women place in medical staff and the importance of antenatal care visits for educating women about PMTCT services and practices.

A significant proportion of respondents (53.7%) reported obtaining PMTCT information from friends, relatives, and peers. This finding highlights the influence of social networks in spreading awareness about PMTCT. While these informal sources can enhance information dissemination, the accuracy and completeness of the information shared may vary, emphasising the need for community-based health education initiatives.

Television and radio were cited as information sources by 36.2% of respondents. These traditional mass media platforms play a supportive role in spreading PMTCT awareness. However, the relatively lower percentage compared to healthcare providers and social networks suggests that mass media campaigns might not be fully utilised or may not be as impactful in reaching certain populations, particularly in rural areas where access to these media may be limited.

Only a small fraction (2.4%) of respondents reported using social media platforms as a source of PMTCT information. This indicates that digital platforms are currently underutilised in the dissemination of PMTCT-related knowledge. It may also reflect limited internet access or low digital literacy among the study population, particularly in rural areas.

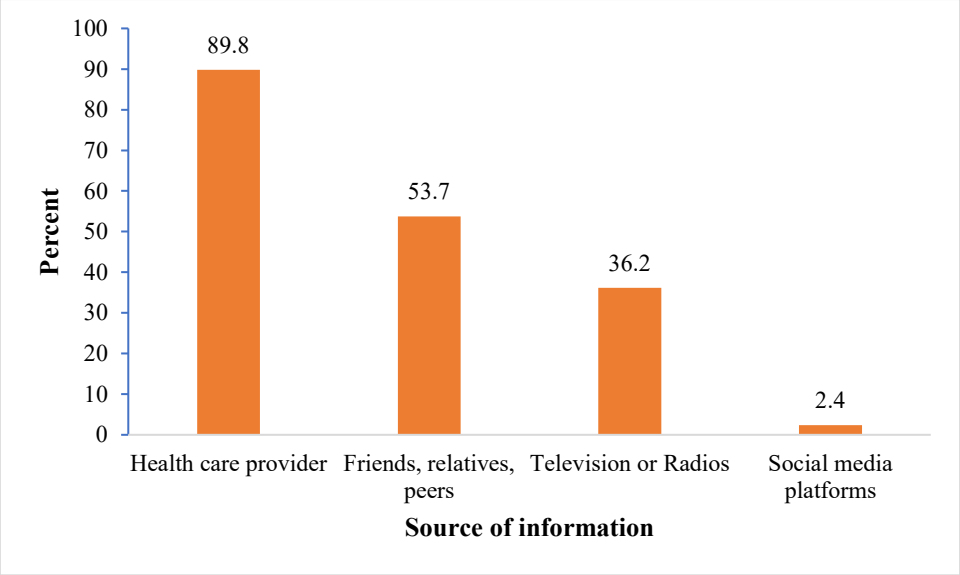

Figure 4 - 1: Sources of PMTCT information among women

The findings from Figure 4-1 demonstrate the dominance of healthcare providers as the most trusted and accessible source of PMTCT information. This reliance underscores the importance of equipping healthcare workers with the necessary knowledge and communication skills to effectively educate women about PMTCT. The significant role of social networks also suggests that leveraging community-based health educators or peer support groups could further enhance PMTCT awareness and uptake.

The relatively lower reliance on television, radio, and social media points to potential gaps in the use of mass and digital media for health communication. Strengthening media campaigns and integrating culturally relevant messages could broaden their reach and effectiveness. Expanding the use of social media, particularly for younger or urban populations, may also provide opportunities to disseminate PMTCT information more widely.

4.2.3 Difference in level of PMTCT knowledge among women of different socio-demographics

The analysis of Table 4-4 examines the differences in PPMTCT knowledge among women based on various socio-demographic factors, including marital status, education level, religion, occupation, and residence. The overall mean PMTCT knowledge score for the sample was 9.47, categorised as "moderate knowledge" (5.5–10.4). However, the data reveals that religion was the only socio-demographic factor significantly associated with PMTCT knowledge, while other factors showed no statistically significant differences.

Regarding marital status, widowed women had the highest PMTCT knowledge mean score (10.38), followed by women on separation (10.06) and divorced women (9.58). Married women (9.46) and those with a regular boyfriend (8.50) had slightly lower scores, while single women recorded the lowest mean score (8.62). Despite these variations, the p-value (0.636) indicates no statistically significant difference in PMTCT knowledge by marital status. This suggests that marital status does not strongly influence women's knowledge levels about PMTCT in this population.

Education level showed a trend where PMTCT knowledge scores increased with higher education attainment. Women with tertiary education had the highest mean score (10.07), followed closely by those who completed secondary education (10.19). Women with no formal education (8.89) and those who did not complete primary education (9.32) recorded lower scores. However, the p-value (0.737) suggests no statistically significant difference in knowledge levels based on education. Although education may slightly enhance knowledge, the effect is not substantial enough to be statistically meaningful.

Religion was the only socio-demographic factor that showed a statistically significant difference in PMTCT knowledge ($p = 0.001$). Women practising traditional religions had the highest mean score (13.50), followed by Christian women (9.48), while Muslim women had the lowest mean score (9.09). These findings suggest that religious affiliation plays a critical role in shaping knowledge about PMTCT, possibly reflecting differences in access to health information or cultural attitudes towards health interventions. This highlights the potential of engaging religious institutions and leaders in promoting PMTCT awareness and education.

Occupational differences in PMTCT knowledge were observed, with housewives having the highest mean score (10.67) and unemployed women the lowest (8.94). Farmers (9.22) employed women (9.43), and businesswomen (9.53) had mean scores in the same category. However, the p-value (0.288) indicates no statistically significant association between occupation and PMTCT knowledge. This implies that occupation does not strongly influence knowledge levels in the study population.

Similarly, the results show no significant difference in PMTCT knowledge between rural and urban respondents. Rural women had a mean score of 9.48, while urban women scored 9.46. The p-value (0.947) confirms that residence does not significantly affect PMTCT knowledge. This parity suggests that both rural and urban populations in Zomba have comparable access to PMTCT-related information and health services.

Table 4 - 4: Difference in PMTCT knowledge among women of different socio-demographics

Variable	N	Mean	S.D	Test used	p-value
Marital status				**.684[a]**	**.636**
Married	171	9.4620	3.39940		
Have regular boyfriend	6	8.5000	2.88097		
Separated	18	10.0556	3.48901		
Divorced	26	9.5769	2.71548		
Widowed	13	10.3846	3.96943		
Single	21	8.6190	3.13809		
Education level				**.552[a]**	**.737**
No formal education	18	8.8889	3.17877		
Primary not completed	114	9.3158	3.55068		
Primary completed	20	9.3000	3.19704		
Secondary not completed	57	9.4737	3.10590		
Secondary completed	31	10.1935	2.98239		
Tertiary	15	10.0667	3.71227		
Religion				**6.706[a]**	**.001**
Christianity	159	9.4780	3.30484		
Islam	88	9.0909	3.23642		
Tradition	8	13.5000	2.44949		
Occupation				1.255[a]	.288
Farmer	115	9.2174	3.27077		
Employed	28	9.4286	2.72748		

Business woman	64	9.5313	3.47768		
Housewife	30	10.6667	3.29402		
Unemployed	18	8.9444	3.97747		
Residence				**0.066[b]**	**0.947**
Rural	128	9.4844	3.25790		
Urban	127	9.4567	3.41973		
Overall Total	**255**	**9.4706**	**3.33292**	**-**	**-**

[a] F-values from one-way ANOVA [b] independent t-test

Table 4-5 show the difference in level of knowledge among women affiliated to different religious groups. It was observed that women affiliated to traditional religion had significantly higher knowledge on PMTCT than women affiliated to Christianity (*P = 0.002*) and women affiliated to Islam (*P = 0.001*). However, the difference in level of knowledge on PMTCT was not statistically significant between women affiliated to Christianity and women affiliated to Islam.

Table 4 - 5: The difference in level of PMTCT knowledge among women affiliated to different religious groups

(I) Religion	**(J) Religion**	**Mean Difference (I-J)**	**Std. Error**	**Sig.**	**95% Confidence Interval**	
					Lower Bound	**Upper Bound**
Christianity	Islam	.38708	.43320	.645	-.6343	1.4084
	Tradition	-4.02201	1.18140	.002	-6.8073	-1.2367
Islam	Christianity	-.38708	.43320	.645	-1.4084	.6343
	Tradition	-4.40909	1.20401	.001	-7.2477	-1.5705

The mean difference is significant at the 0.05 level. Dependent Variable: Knowledge

4.3 The attitudes towards PMTCT among women

The results presented in Table 4-6 highlight women's attitudes toward various aspects of PMTCT. The responses provide insights into the perceptions and beliefs of the study population regarding critical PMTCT practices, as reflected in the mean scores and standard deviations for each statement.

The statement, *"It is important that every pregnant woman gets tested for HIV,"* received the highest mean score (4.66) with a standard deviation of 0.578. This indicates a strongly positive attitude among respondents toward universal HIV testing for pregnant women. The low standard deviation suggests that this opinion is widely accepted, with minimal variability among the respondents. This strong consensus underscores the recognition of HIV testing as a critical first step in PMTCT interventions.

For the statement, *"Following up on ART clinic among pregnant HIV-positive mothers reduces the risk of HIV transmission from mother to child,"* the mean score was 4.19 with a standard deviation of 1.233. This indicates a generally positive attitude toward the importance of adherence to ART clinic visits. However, the higher standard deviation suggests more variability in responses, possibly reflecting differing levels of understanding or accessibility of ART services among the respondents.

The opinion, *"Early weaning with formula for HIV-positive mothers reduces the risk of HIV transmission from mother to child,"* had a mean score of 4.41 and a standard deviation of 1.054. This relatively high mean score indicates strong agreement with the practice of early weaning as a preventative measure. The moderate variability in responses suggests that while the

majority of respondents support this practice, some may have reservations due to cultural beliefs, economic constraints, or limited awareness about safe infant feeding practices.

Lastly, the statement, *"Exclusive breastfeeding for HIV-positive mothers reduces the risk of HIV transmission from mother to child,"* received the lowest mean score of 3.92, with the highest standard deviation of 1.706. This result reflects a more mixed attitude toward exclusive breastfeeding, with some respondents likely perceiving it as a viable option for PMTCT, while others may hold conflicting beliefs or misconceptions. The high variability indicates significant differences in knowledge or cultural perceptions about the risks and benefits of breastfeeding among HIV-positive mothers.

The findings suggest that while women generally hold positive attitudes toward key PMTCT practices, certain areas, such as exclusive breastfeeding and ART clinic follow-ups, show variability in responses, highlighting potential gaps in knowledge or acceptance. The strong support for universal HIV testing reflects awareness of its importance, but targeted interventions may be needed to address misconceptions and reinforce the benefits of exclusive breastfeeding and consistent ART adherence.

The variability in attitudes toward specific practices, such as early weaning and exclusive breastfeeding, may be influenced by socio-economic, cultural, or informational barriers. Strengthening community education efforts, addressing cultural concerns, and ensuring access to formula for safe weaning can help improve attitudes toward these practices. Overall, the results demonstrate a foundation of positive attitudes toward PMTCT while identifying areas for targeted improvement to optimise PMTCT outcomes.

Table 4 - 6: Women's attitudes towards PMTCT

#	Opinion	Mean	S.D.
1	It is important that every pregnant woman gets tested for HIV.	4.66	0.578
2	Following up on ART clinic among pregnant HIV positive mothers reduces the risk of HIV transmission from mother to child	4.19	1.233
3	Early weaning with formula for HIV positive mothers reduces the risk of HIV transmission from mother to child	4.41	1.054
4	Exclusive breasting for HIV positive mothers reduces the risk of HIV transmission from mother to child	3.92	1.706
5	it is important that women should participate in community conversation on prevention of mother-to-child HIV transmission	3.89	1.14
6	If one is infected with HIV then she should not get pregnant again.	2.62	1.565
7	Using condoms during pregnancy and breastfeeding reduces the risk of transmission from mother to child.	2.97	1.533
8	Some women choose to breastfeed despite their HIV status, due to stigma.	3.39	1.475
9	Some women choose to breastfeed despite their HIV status, due to poverty.	3.55	1.416
10	Some women choose to breastfeed despite their HIV status, due to fear of disclosure.	3.54	1.408

#	Opinion	Mean	S.D.
11	Some women choose to breastfeed despite their HIV status, due to lack of education.	3.70	1.348
12	Some women choose to breastfeed despite their HIV status, due to lack of awareness	3.74	1.339
13	My family will support my choice of feeding the baby.	3.83	1.217
14	I will support the strategies for PMTCT.	4.24	0.916
Overall attitude		**3.76**	**1.281**

Mean score of 0-2.4, 2.5-3.4 & 3.5-5 means negative, medium and positive attitude respectively.

The findings suggest that while women generally hold positive attitudes toward key PMTCT practices, certain areas, such as exclusive breastfeeding and ART clinic follow-ups, show variability in responses, highlighting potential gaps in knowledge or acceptance. The strong support for universal HIV testing reflects awareness of its importance, but targeted interventions may be needed to address misconceptions and reinforce the benefits of exclusive breastfeeding and consistent ART adherence.

The study found no statistical differences in attitudes among women of difference socio-demographic characteristics ($P>0.05$). Hence, the variability in attitudes toward specific practices, such as early weaning and exclusive breastfeeding, may be influenced by socio-economic, cultural, or informational barriers but not the socio-demographic characteristics indicated in this study. Strengthening community education efforts, addressing cultural concerns, and ensuring access to formula for safe weaning can help improve attitudes toward these practices. Overall, the results demonstrate a foundation of positive attitudes toward PMTCT while identifying areas for targeted improvement to optimise PMTCT outcomes.

The results in **Table 4-7** reveals generally positive attitudes towards key PMTCT practices, such as universal HIV testing, ART clinic follow-ups, and formula feeding. However, areas of concern include mixed attitudes towards exclusive breastfeeding, low support for condom use, and the influence of stigma, poverty, and lack of education on infant feeding choices. These findings underscore the importance of addressing knowledge gaps, cultural barriers, and socio-economic challenges through targeted education and community engagement.

Family and community support were shown to be critical, highlighting the need for inclusive interventions that engage families and address broader societal factors. Strengthening health communication strategies and integrating PMTCT awareness into community conversations can help overcome these barriers and foster supportive environments for HIV-positive women and their children.

The results from Table 4-7 highlight a range of attitudes among women towards PMTCT practices. A significant majority (71%) strongly agreed that all pregnant women should get tested for HIV, with an additional 25.1% agreeing. This overwhelming support indicates widespread awareness of the importance of HIV testing as a foundational step in PMTCT. Similarly, 57.8% strongly agreed and 24.7% agreed that attending ART clinics reduces the risk of HIV transmission, although some respondents (7.4% strongly disagreed and 6.8% disagreed) expressed reservations, potentially pointing to gaps in understanding or barriers to accessing ART services.

The practice of early weaning with formula was viewed positively, with 64.6% strongly agreeing and 25.7% agreeing that it reduces the risk of transmission. This reflects a favourable attitude towards formula feeding, though small proportions of disagreement (5.5% strongly disagreed and 3% disagreed) suggest that economic or cultural factors may hinder its universal acceptance. Exclusive breastfeeding, on the other hand, elicited more mixed attitudes. While

61.5% strongly agreed and 15.4% agreed that it reduces transmission risk, 23.1% strongly disagreed, indicating conflicting perceptions or limited understanding of the role of exclusive breastfeeding in PMTCT.

Community participation in PMTCT-related conversations was supported by a majority, with 35.4% strongly agreeing and 37.1% agreeing on its importance. However, 13.5% of respondents remained neutral, and a combined 14% disagreed, highlighting potential barriers such as stigma or lack of awareness that might limit women's engagement in such activities. Attitudes towards avoiding future pregnancies for HIV-positive women revealed a polarised view, with only 14.9% strongly agreeing and 24.7% agreeing, while a substantial 40.8% strongly disagreed. This divide suggests differing cultural beliefs and access to information about safe pregnancy options for HIV-positive women.

The use of condoms during pregnancy and breastfeeding also evoked mixed responses. While 27.5% agreed and 19.6% strongly agreed that condom use reduces transmission, 40% either strongly disagreed or disagreed. This indicates persistent misconceptions or resistance to condom use within the study population. Additional challenges were identified in the reasons cited for some women choosing to breastfeed despite their HIV status. Factors such as stigma (29.4%), poverty (32.9%), fear of disclosure (33.3%), lack of education (36.9%), and lack of awareness (38.4%) emerged as significant barriers, underscoring the systemic and socio-economic issues affecting infant feeding practices.

Family support for infant feeding choices was generally perceived positively, with 36.9% strongly agreeing and 31.4% agreeing. However, a notable proportion (16.9%) were neutral, and 15% either disagreed or strongly disagreed, reflecting varying degrees of familial or cultural pressure. Finally, a majority of respondents (48.2% strongly agreed and 34.1% agreed)

expressed support for PMTCT strategies, indicating overall positive attitudes towards interventions, though small pockets of disagreement remain.

Table 4 - 7: Women's attitudes towards Prevention of Mother to Child Transmission

#	Question	S.D	D	N	A	S.A
1	It is important that every pregnant woman gets tested for HIV.	-	0.8	3.1	25.1	71
2	Following up on ART clinic among pregnant HIV positive mothers reduces the risk of HIV transmission from mother to child	7.4	6.8	3.2	24.7	57.8
3	Early weaning with formula for HIV positive mothers reduces the risk of HIV transmission from mother to child	5.5	3	1.1	25.7	64.6
4	Exclusive breasting for HIV positive mothers reduces the risk of HIV transmission from mother to child	23.1	-	-	15.4	61.5
5	it is important that women should participate in community conversation on prevention of mother-to-child HIV transmission	4.9	9.1	13.5	37.1	35.4
6	If one is infected with HIV then she should not get pregnant again.	40.8	10.6	9	24.7	14.9
7	Using condoms during pregnancy and breastfeeding reduces the risk of transmission from mother to child.	29.4	10.6	12.9	27.5	19.6

#	Question	S.D	D	N	A	S.A
8	Some women choose to breastfeed despite their HIV status, due to stigma.	18.8	11	11.8	29.4	29
9	Some women choose to breastfeed despite their HIV status, due to poverty.	15.3	8.6	14.5	28.6	32.9
10	Some women choose to breastfeed despite their HIV status, due to fear of disclosure.	12.7	11.8	14.5	26.7	33.3
11	Some women choose to breastfeed despite their HIV status, due to lack of education.	11.4	9	14.9	27.8	36.9
12	Some women choose to breastfeed despite their HIV status, due to lack of awareness	11	8.2	15.3	27.1	38.4
13	My family will support my choice of feeding the baby.	7.5	7.5	16.9	31.4	36.9
14	I will support the strategies for PMTCT.	2.4	1.6	13.7	34.1	48.2

S.D.=Strongly Disagree, D=Disagree, N=No Opinion, A=Agree & S. A=Strongly Agree.

4.4 The practices of pregnant women in preventing mother-to-child HIV transmission

4.4.1 HIV status

Figure 4-2 illustrates the distribution of study respondents based on their HIV status, revealing that the majority (76.5%) were HIV-negative, while a smaller but significant proportion (23.5%) were HIV-positive. This distribution highlights the dual focus required in PMTCT programmes to address the distinct needs of these two groups effectively.

The higher proportion of HIV-negative respondents (76.5%) suggests that ongoing HIV prevention efforts, such as testing, education, and awareness campaigns, may be having a

positive impact in Zomba. However, this finding also underscores the importance of maintaining robust preventative strategies to ensure that HIV-negative women remain free from infection, particularly during high-risk periods such as pregnancy and breastfeeding.

The presence of 23.5% HIV-positive respondents is notable and indicates that nearly a quarter of the study population faces direct risks associated with HIV, including the potential for mother-to-child transmission. This proportion highlights the critical need for comprehensive PMTCT programmes to support HIV-positive mothers. Such programmes should focus on providing access to antiretroviral therapy (ART), counselling, and guidance on safe infant feeding practices to minimise the risk of vertical transmission.

The inclusion of both HIV-positive and HIV-negative respondents in the study offers valuable insights into PMTCT interventions. For HIV-positive women, the focus should be on addressing challenges such as stigma, ensuring ART adherence, and providing education to support effective PMTCT practices. For HIV-negative women, the emphasis should be on maintaining their HIV-negative status through continuous education on safer sexual practices, regular testing, and access to preventive healthcare services.

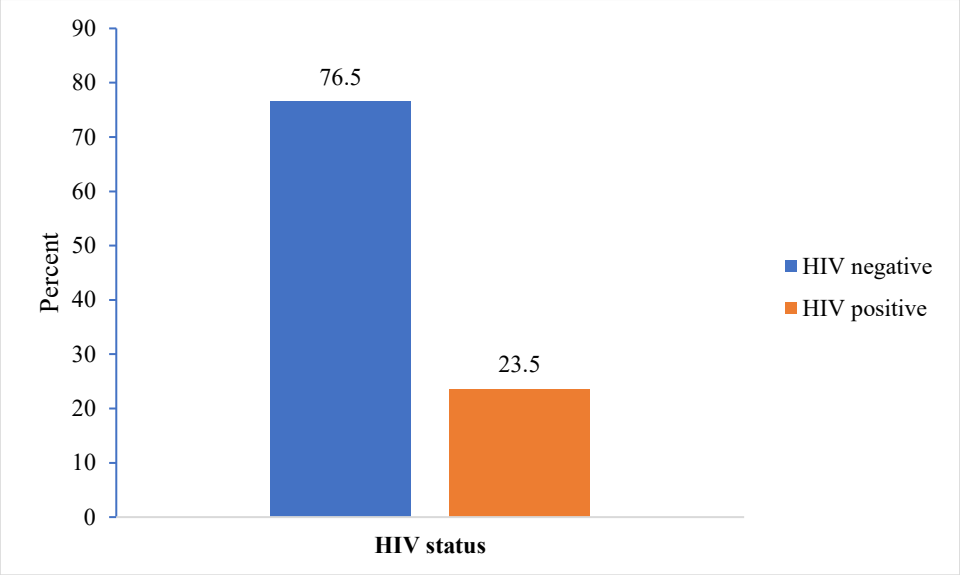

Figure 4 - 2: Distribution of Study Respondents by HIV Status

4.4.2 The Prevention of Mother to Child Transmission Practices

Table 4-8 highlights PMTCT practices among women in the study population. The data provides a comprehensive overview of the extent to which women engage in recommended PMTCT-related practices, offering insights into their adherence and highlighting areas requiring improvement.

All respondents (100%) reported as having been tested for HIV, reflecting the success of HIV testing campaigns. Similarly, nearly all respondents (97.9%) accessed antenatal services, demonstrating strong healthcare utilisation during pregnancy.

Among women requiring PMTCT interventions, 89.7% reported taking antiretroviral drugs before delivery or during labour. However, a small proportion of women (10.3%) did not take ART. Postnatally, 70.7% of women reported administering antiretroviral drugs to their babies. While this is a majority, nearly 30% of infants did not receive these drugs. The uptake of

caesarean sections at delivery was low, with only 8.6% of women undergoing this procedure. Similarly, adherence to ART was also universal (100%).

Regarding infant feeding practices, all respondents adhered to appropriate feeding methods, either exclusive breastfeeding or exclusive formula feeding. However, only 34.5% of women opted for early weaning with formula. On average, the study findings show that 87.19% of the women participated in the quantitative survey were practising PMTCT services.

Table 4 - 8: The Prevention of Mother to Child Transmission practices among women

Practices	**N**	**Frequency**	**Precent (%)**
Before getting tested for HIV Positive			
Getting tested for HIV	255	255	100
Receive antenatal services	243	238	97.9
Average			**98.95**
After getting tested for HIV positive			
Taking drugs before delivery/during labour	58	52	89.7
Give baby drugs (antiretroviral)	58	41	70.7
Having caesarean section at the time of delivery	58	5	8.6
Having CD count	60	60	100
Appropriate infant feeding	58	58	100
Early weaning with formula	58	20	34.5
Adherence to ART	58	58	100
Facility-based delivery	58	58	100

Average	**75.44**
Overall Average	**87.19**

4.5 Factors Associated with Prevention of Mother-to-Child HIV Transmission

4.5.1 Depression

The study revealed that it is difficult for mothers who have recently tested HIV-positive to immediately accept their diagnosis and start treatment. It often takes time for a mother to come to terms with her condition, leaving her child susceptible to HIV infection during this period of delay. One of the key informants narrated that

> *"some women ask to go back to their home and discuss with their husband citing that they don't know how their husband will receive the news that the woman has tested HIV positive, leaving the women in dilemma."* (Female, Chief, 38 years)

Additionally, some patients on antiretroviral therapy (ART) experience mental health challenges such as depression and anxiety, which significantly affect their adherence to treatment regimens. A healthcare worker highlighted the importance of mental health services, stating,

> *"Access to mental health services is crucial for patients on ART. Unfortunately, mental health resources are often limited, and many patients do not receive the support they need." (**KII 4, Healthcare Worker**)*

These findings underscore the need for integrated mental health services within PMTCT programmes to support women in accepting their diagnosis and adhering to treatment.

4.5.2 Fear of Their Husbands

The study also revealed that fear of their husbands' reactions is a significant barrier for mothers who test HIV-positive. Many women are hesitant to disclose their status to their husbands due to concerns about stigma, blame, or conflict. This fear is often compounded by the fact that women are more likely than men to seek HIV testing. Some women request health personnel to allow them to discuss their results with their husbands before beginning treatment. This delay highlights the need for couple-focused HIV counselling and testing to encourage joint decision-making and reduce the fear associated with disclosing HIV status within households.

4.5.3 Negligence

Healthcare providers observed that negligence on the part of mothers poses a significant challenge to PMTCT. One healthcare worker shared an example:

> "*We have a tangible example of a baby who tested negative at six weeks but tested positive after one year because the mother stopped taking medication."* Another case involved mothers bringing their children late for testing: "*Instead of testing at 12 months, some mothers come at 13 months due to ignorance*."

These examples underscore the importance of sustained education and follow-up support to ensure adherence to PMTCT protocols.

4.5.4 Income

Income levels were found to influence women's ability to access consistent healthcare services. Low-income women often struggle to afford transportation to clinics, particularly in rural areas where distances are greater. One healthcare worker noted,

> *"Many of the pregnant women we see struggle with low income, which makes it difficult for them to access consistent healthcare. Some of them have to choose between buying food and paying for transportation to the clinic."*

Addressing financial barriers through transportation subsidies or mobile clinics could improve access to PMTCT services for low-income women.

4.5.5 Education

Education level was identified as a critical factor influencing adherence to PMTCT protocols. Women with higher education levels were more likely to understand the importance of ART, follow medical advice, and adhere to PMTCT protocols compared to those with little or no education. One healthcare provider shared,

> *"Education plays a crucial role in how well patients understand and adhere to PMTCT protocols. Those with higher education levels are generally more informed about their health and the importance of ART."* (**KII 2, Healthcare Provider**)

A mother participating in a focus group discussion reinforced this point, saying,

> *"I didn't understand much about HIV for a long time, but after attending some health talks at the clinic, I have learnt how to take care of myself and my baby."* (**FGD Participant 3**)

These findings highlight the need for targeted health education campaigns to empower less-educated women with knowledge and skills to adhere to PMTCT practices.

The study identified several socio-economic, psychological, and educational factors influencing the prevention of mother-to-child transmission of HIV. Addressing challenges such as mental health support, spousal communication, financial barriers and educational gaps is essential for improving PMTCT outcomes. Tailored interventions that integrate mental health services, couple-focused counselling, financial support and accessible education campaigns can significantly enhance adherence to PMTCT protocols and reduce the risk of vertical transmission.

CHAPTER FIVE: DISCUSSIONS

5.1 Introduction to the chapter

The findings from this study provide significant insights into the demographic characteristics, knowledge, attitudes, and practices related to the prevention of mother-to-child transmission of HIV among women in Zomba District, Malawi. This discussion explores these findings in relation to the specific objectives of the study and existing literature, highlighting their implications for PMTCT interventions.

5.2 Knowledge of Preventing Mother-to-Child HIV Transmission

The study revealed moderate levels of knowledge among respondents, with an overall mean knowledge score of 9.47 out of 16 representing 59.19%. While this indicates encouraging awareness of PMTCT, gaps remain in understanding specific aspects such as the timing of mother-to-child transmission (MTCT) and actions for PMTCT. Similar findings have been reported by Birhane et al. (2015), who identified knowledge deficits as a barrier to effective PMTCT uptake in Ethiopia. These gaps may stem from inadequate health education during antenatal care (ANC) visits or cultural misconceptions about HIV transmission.

Disparities in knowledge were noted across socio-demographic groups. Women with higher education levels demonstrated better knowledge of PMTCT, aligning with findings by Zegeye et al. (2022), who reported that education enhances women's ability to understand and act on health information. However, the lack of significant differences in knowledge based on marital status or residence suggests that access to healthcare and community-based interventions play a critical role in shaping PMTCT knowledge. Strengthening health education campaigns that target less-educated and rural women is essential for bridging these gaps and improving outcomes.

5.3 Attitudes Towards Prevention of Mother-to-Child HIV Transmission

The study participants exhibited generally positive attitudes towards PMTCT, with strong agreement on the importance of HIV testing for pregnant women and ART adherence. These findings are consistent with studies by Boateng, Kwapong and Agyei-Baffour 2013 and Saka, Onyeneho and Ndikom 2021), which highlight positive attitudes as facilitators of PMTCT service uptake. However, attitudes towards exclusive breastfeeding for HIV-positive mothers were mixed, with some respondents expressing concerns about stigma and fear of disclosure. (Ramoshaba & Sithole 2017) similarly noted that cultural and societal norms often discourage optimal infant feeding practices among HIV-positive mothers.

Negative attitudes were also observed regarding subsequent pregnancies for HIV-positive women, with many respondents agreeing that HIV-positive women should avoid further pregnancies. This perception aligns with findings by O'Shea et al. (2016) and underscores the need for comprehensive counselling to address misconceptions and promote informed reproductive choices. Engaging male partners and addressing cultural norms can help foster supportive attitudes towards PMTCT and improve service uptake.

5.4 Practices of Pregnant Women in Preventing Mother-to-Child HIV Transmission

The study highlighted commendable PMTCT practices, with universal HIV testing and adherence to ART among all respondents. These findings align with reports by the World Health Organisation (2023), which emphasise the critical role of early HIV testing and ART adherence in reducing MTCT. However, challenges were noted in areas such as infant feeding practices and administering antiretroviral prophylaxis to infants. Only 70.7% of respondents administered antiretroviral drugs to their babies, indicating gaps in postnatal counselling and

support. Similar challenges were reported by Beyene, Dadi and Mogas (2018), who identified inadequate follow-up care as a barrier to effective PMTCT implementation.

The low uptake of caesarean deliveries (8.6%) among respondents raises concerns, as elective caesarean sections can significantly reduce MTCT in cases where maternal viral load is high. The universal adherence to ART (100%) and facility-based deliveries (100%) reflect strong compliance with key PMTCT practices and underscore the importance of continued support and education for women.

5.5 Factors Associated with Prevention of Mother-to-Child HIV Transmission

The study identified several factors influencing PMTCT outcomes, including depression, fear of husbands' reactions, economic constraints, and education levels. Depression and anxiety were common among women who had recently tested HIV-positive, consistent with findings by Adams et al. (2012), who emphasised the impact of mental health challenges on ART adherence. Limited access to mental health services exacerbates this issue, highlighting the need for integrated mental health support within PMTCT programmes.

Economic constraints emerged as another significant barrier, with low-income women struggling to afford transportation to clinics or prioritise healthcare over basic needs. Haas et al. (2016) similarly reported that economic barriers often impede women’s access to healthcare services. Addressing these challenges requires strengthening community-based support systems and providing financial incentives or subsidies for low-income women.

Education was also identified as a critical factor, with women of higher education levels demonstrating better adherence to PMTCT protocols. This finding aligns with a stufy by Abajobir & Zeleke (2013), which found that education improves women’s ability to understand and follow health advice. Enhancing educational opportunities and incorporating tailored

health education campaigns can empower women to make informed decisions and improve PMTCT outcomes.

5.5.1 Depression

The study found that depression plays a significant role in the challenges faced by mothers who have recently tested HIV-positive. It is often difficult for these women to immediately accept their diagnosis and begin their treatment regimen, which delays the start of ART. During this period of emotional adjustment, the child remains vulnerable to HIV transmission. Furthermore, the study highlighted that some women on ART experience mental health issues such as depression and anxiety, which adversely affect their ability to consistently adhere to their treatment regimen. One participant remarked,

"Access to mental health services is crucial for patients on ART. Unfortunately, mental health resources are often limited, and many patients do not receive the support they need."

This finding aligns with several studies, including one by Goldhammer et al. (2022), which found that mental health conditions, especially depression, are common among people living with HIV and significantly impact their adherence to ART. Similarly, Adams et al. (2012) highlighted that psychological distress, including depression, negatively affects ART adherence, leading to poorer health outcomes. These studies emphasize the critical need for addressing both the psychological and physical health of HIV-positive mothers in preventing mother-to-child transmission, advocating for a more comprehensive approach to maternal care.

5.5.2 Fear of their husbands

The study also revealed that fear of their husbands' reactions is a significant barrier for mothers who have recently tested HIV-positive. Many women are hesitant to disclose their HIV status to their husbands due to concerns about their reactions, as it is often the case that women are more willing to undergo HIV testing than men. This fear stems from cultural and societal

norms, where HIV-related stigma is prevalent and may lead to rejection or violence. As a result, women tend to inform healthcare personnel of their diagnosis but request time to discuss it with their husbands before starting treatment. This finding is consistent with research by Kabwama et al. (2019) which highlighted that women in Sub-Saharan Africa often fear disclosure of their HIV status to their partners due to the potential for domestic violence, divorce, or abandonment and study also found that gender-related power dynamics significantly impact women's decisions to disclose their HIV status to their partners, with fear of negative reactions being a key barrier.

5.5.3 Negligence

The study also found that healthcare assistants often attribute challenges in preventing mother-to-child transmission of HIV to negligence on the part of mothers. Many healthcare workers shared anecdotes of cases where mothers discontinued their treatment regimens or delayed key actions, such as timely HIV testing for their infants, contributing to the risk of transmission. One such example highlighted a situation where a baby tested HIV-negative at 6 weeks but later tested positive after the mother stopped taking medication. This was attributed to the mother's failure to adhere to the prescribed ART regimen. Similarly, healthcare assistants reported that some mothers delayed bringing their children for testing beyond the recommended 12-month mark, which they felt was due to ignorance or negligence on the mother's part. These findings align with research by Clouse et al. (2017), which indicated that poor adherence to ART and delays in timely infant testing are common challenges in PMTCT programs, often driven by ignorance or lack of awareness. Lerebo et al. (2014) further noted that lack of consistent care and neglecting infant health checks, such as timely HIV testing, remain persistent issues in PMTCT efforts.

5.5.4 Income

The study found that income levels significantly impact the ability of pregnant women to access consistent healthcare services, particularly when it comes to attending regular clinics for PMTCT. Many women with low-income face challenges in affording transportation to healthcare facilities and often have to prioritise other essential needs, such as food, over healthcare. As one participant noted, *"Many of the pregnant women we see struggle with low income, which makes it difficult for them to access consistent healthcare. Some of them have to choose between buying food and paying for transportation to the clinic."* These findings align with research by Mphego, Madiba and Ntuli (2014), which highlighted the financial barriers faced by low-income women in accessing healthcare services in Sub-Saharan Africa, including HIV testing and PMTCT interventions. It also found that economic factors, particularly transportation costs and the inability to afford care, were key determinants of maternal healthcare access in rural areas

5.5.5 Education

The study found that education level plays a critical role in adherence to PMTCT protocols. Women with higher education levels generally have a better understanding of their health, the importance of antiretroviral therapy (ART), and the necessity of following medical advice. As one participant noted,

"Education plays a crucial role in how well patients understand and adhere to PMTCT protocols. Those with higher education levels are generally more informed about their health and the importance of ART."

This finding aligns with research conducted by Subedi, Mandal and Choudhary (2023), which showed that educated women were more likely to adhere to HIV treatment and PMTCT guidelines due to a better understanding of the disease and its prevention methods. It also found that maternal education significantly influences health behaviours, including adherence to

PMTCT protocols, as educated women are more likely to seek regular medical care and follow medical advice. The study also highlights instances where a lack of education led to delays in testing children for HIV, as described by one participant: *"Some women come late with their children to get tested for instance instead of 12 months you find out that the child has been tested in 13 months; this is all due to ignorance.*"

5.6 Implications for PMTCT Interventions

The findings underscore the need for multifaceted interventions to enhance PMTCT outcomes. Strengthening health education campaigns to improve knowledge, addressing stigma and cultural misconceptions, and integrating mental health support into PMTCT programmes are critical steps. Additionally, targeted interventions for low-income and rural women, such as mobile health clinics and community outreach programmes, can help address disparities in healthcare access.

Furthermore, engaging male partners in PMTCT programmes is essential for fostering shared responsibility and reducing stigma. Studies by Alemu, Habtewold and Alemu (2018) and Duff et al. (2010) highlight the positive impact of male involvement on PMTCT adherence and service uptake. Policymakers and healthcare providers should prioritise strategies that promote male partner testing and participation in antenatal and postnatal care.

5.7 The Study Findings and Theory Building

5.7.1 Health Belief Model

5.7.1.1 Perceived Susceptibility and Severity

Women's strong endorsement of HIV testing during pregnancy (mean score = 4.66) and high antenatal service attendance (97.9%) show an acute perception of personal and child vulnerability to HIV, consistent with the HBM notion of perceived susceptibility and severity.

This suggests that many women recognize the risk of vertical transmission and its serious consequences for both mother and child.

5.7.1.2 Perceived Benefits

The findings show that women understand the benefits of PMTCT practices, including ART adherence (89.7% during labour) and safe infant feeding (100%). High agreement that ART clinic follow-ups reduce transmission (mean score = 4.19) also supports this. These perceived benefits likely motivated behaviour change, as postulated by the HBM.

5.7.1.3 Perceived Barriers

Despite positive attitudes, the study identifies key barriers: economic constraints, limited uptake of early formula weaning (only 34.5%) due to cost; fear of disclosure delayed ART initiation among newly diagnosed mothers; and stigma and lack of education hindered adherence and influenced breastfeeding choices. These barriers reflect HBM's emphasis on obstacles that prevent behaviour, even when benefits are acknowledged.

5.7.1.4 Cues to Action

Healthcare workers were the primary source of PMTCT information for 89.8% of respondents, underlining their role as external cues prompting action. Peer networks also contributed significantly (53.7%), showing the value of interpersonal reinforcement in encouraging health behaviour.

5.7.1.5 Self-Efficacy

Variability in adherence particularly the 70.7% of HIV-positive women who administered ARVs to their babies may reflect differing confidence in their ability to follow PMTCT protocols, especially in the face of poverty, limited health literacy, or spousal opposition.

5.7.2 The Theory of Planned Behaviour

The TPB posits that intention to perform a behaviour is predicted by attitudes toward the behaviour, subjective norms, and perceived behavioural control (Ajzen 1991).

5.7.2.1 Attitudes Toward the behaviour

The majority of respondents held positive attitudes toward PMTCT practices (mean attitude score = 3.76/5). Statements such as “It is important that every pregnant woman gets tested for HIV” and support for ART indicate favourable attitudes, which according to TPB, strongly influence behavioural intentions.

5.7.2.2 Subjective Norms

The study showed that 53.7% of respondents received PMTCT information from friends, relatives, and peers, and that women feared disclosing their HIV status to their husbands due to potential stigma. This reflects how perceived social pressure (subjective norms) plays a crucial role in health behaviours. Similar findings have been reported by (Jennings et al. 2010), who emphasised the impact of social norms on PMTCT adherence.

5.7.2.3 Perceived Behavioural Control

Income, education level, and fear of disclosure emerged as factors influencing women's ability to perform PMTCT behaviours (e.g., adhering to ART, attending clinics). These are directly related to perceived control over behaviour execution. For example, lack of money for transportation undermines perceived control.

5.8 Chapter Conclusion

This study highlights the successes and challenges of PMTCT implementation in Zomba District. While the high rates of HIV testing and ART adherence are commendable, gaps in knowledge, infant feeding practices, and access to comprehensive care persist. Addressing

these challenges through targeted, culturally sensitive, and community-driven interventions will be essential for achieving the ultimate goal of eliminating MTCT in Malawi and beyond.

CHAPTER SIX: CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The study aimed to assessed knowledge, attitude and practice and its determinants on prevention of mother-to-child transmission (MTCT) of HIV infection among women in selected health centres in Zomba. The study concludes that women have 59.19% knowledge towards prevention of mother-to-child HIV transmission (with the mean score of 9.47 out of 16). Overall, women hold positive attitudes toward the prevention of mother-to-child HIV transmission (PMTCT) in the visited health centres, as indicated by an overall mean score of 3.76 (S.D.=1.28). This indicates that women perceive that it is crucial to protect unborn baby from HIV infection. The study also revealed that majority of the women (87.19%) are observing PMTCT practices to protect their baby. Depression, fear of husbands, negligence, income status, and education level are some of the factors associated with the adherence of PMTCT practices in the surveyed health centres.

6.2 Recommendations

- Objective 1: The Ministry of Health and implementing partners should intensify comprehensive PMTCT education campaigns focusing on the timing of HIV transmission and specific preventive actions like ART adherence. These efforts should involve health workers, community leaders, and religious institutions, using local languages and culturally appropriate materials to reach women of all education levels and faiths.
- Objective 2: PMTCT programmes should strengthen community and family-based counselling to address cultural misconceptions and stigma related to HIV and infant feeding. Creating peer support groups and involving spouses and families in PMTCT education can promote shared responsibility, reduce fear, and reinforce positive attitudes toward preventive practices.

- Objective 3: Health authorities should strengthen postnatal follow-up systems to ensure that infants receive ARV prophylaxis and that mothers maintain treatment adherence. Additionally, government and partners should support affordable formula feeding options and continuous health education on safe infant feeding practices to improve PMTCT outcomes.
- Objective 4: MTCT interventions should integrate mental health and psychosocial support, alongside couple-based HIV counselling to encourage partner disclosure and joint decision-making. Furthermore, economic support mechanisms such as transport vouchers and targeted education for less-educated women should be introduced to overcome financial and knowledge-related barriers to PMTCT participation.

6.3 Areas of Further Studies

Exploration of Male Perceptions and Roles in PMTCT

Future studies should explore the perceptions, attitudes and roles of male partners in PMTCT. Understanding men's beliefs and behaviours regarding HIV testing, ART adherence and partner support can inform gender-inclusive interventions.

Impact of Socio-Cultural Beliefs on PMTCT Adherence

Research is needed to examine how cultural norms, religious beliefs and traditional practices influence women's decisions to access and adhere to PMTCT services.

Assessment of PMTCT Service Delivery in Health Facilities

A study assessing the quality, accessibility and confidentiality of PMTCT services at health facilities would provide valuable insights into systemic barriers and potential areas for improvement in service delivery.

REFERENCES

Abajobir, AA & Zeleke, AB 2013, 'Knowledge, attitude, practice and factors associated with prevention of mother-to-child transmission of HIV/AIDS among pregnant mothers attending antenatal clinic in Hawassa referral hospital, South Ethiopia', *Journal of AIDS and Clinical Research*, vol. 4, no. 6.

Adams, JL, Gaynes, BN, McGuinness, T, Modi, R, Willig, J & Pence, BW 2012, 'Treating depression within the HIV medical home: A guided algorithm for antidepressant management by HIV clinicians', *AIDS Patient Care and STDs*, vol. 26, no. 11, pp. 647–654, viewed May 12, 2025, </doi/pdf/10.1089/apc.2012.0113?download=true>.

Ajzen, I 1991, 'The theory of planned behavior', *Organizational Behavior and Human Decision Processes*, vol. 50, no. 2, pp. 179–211, viewed May 12, 2025, <https://www.sciencedirect.com/science/article/abs/pii/074959789190020T?via%3Dihub>.

Al-Worafi, YM 2024, 'Health Literacy and Patient Education', *Handbook of Medical and Health Sciences in Developing Countries*, pp. 1–23, viewed August 20, 2025, <https://link.springer.com/rwe/10.1007/978-3-030-74786-2_284-1>.

Alemu, YM, Habtewold, TD & Alemu, SM 2018, 'Mother's knowledge on prevention of mother-to-child transmission of HIV, Ethiopia: A cross sectional study', *PLOS ONE*, vol. 13, no. 9, p. e0203043, viewed April 12, 2025, <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0203043>.

Andrade, C, Menon, V, Ameen, S & Kumar Praharaj, S 2020, 'Designing and Conducting Knowledge, Attitude, and Practice Surveys in Psychiatry: Practical Guidance', *Indian Journal of Psychological Medicine*, vol. 42, no. 5, pp. 478–481, viewed April 12, 2025, <https://journals.sagepub.com/doi/full/10.1177/0253717620946111>.

Antabe, R, Sano, Y & Kangmennaang, J 2024, 'Knowledge of mother-to-child transmission of HIV among women living with HIV in Malawi', *International Journal of STD & AIDS*, vol. 35, no. 9, pp. 703–709, viewed August 20, 2025, <https://scholar.google.com/scholar_url?url=https://journals.sagepub.com/doi/pdf/10.1177/09564624241246297&hl=en&sa=T&oi=ucasa&ct=ufr&ei=hx2maMbdM-HUieoPx7KPyQg&scisig=AAZF9b9MEWsqBa73s3ihqoyWn3-L>.

Artino, AR, La Rochelle, JS, Dezee, KJ & Gehlbach, H 2014, 'Developing questionnaires for educational research: AMEE Guide No. 87', *Medical Teacher*, vol. 36, no. 6, pp. 463–474, viewed April 19, 2025, <https://www.tandfonline.com/doi/abs/10.3109/0142159X.2014.889814>.

Badran, 1995 1995, 'Knowledge, attitude and practice the three pillars of excellence and wisdom: a place in the medical profession', *East Mediterr Health J*, vol. 1, no. 1, viewed April 12, 2025, <https://apps.who.int/iris/bitstream/handle/10665/326808/EMHJ_01_01_1995.pdf?sequence=1#page=10>.

Balogun, F & Owoaje, E 2016, 'Perception about the "Opt Out Strategy" for HIV testing and counselling among pregnant women attending antenatal clinic in Ibadan, Nigeria', *Journal of Community Medicine and Primary Health Care*, vol. 28, no. 1, pp. 45–51, viewed April 12, 2025, <https://www.ajol.info/index.php/jcmphc/article/view/139406>.

Becquet, R, Marston, M, Dabis, F, Moulton, LH, Gray, G, Coovadia, HM, Essex, M, Ekouevi, DK, Jackson, D, Coutsoudis, A, Kilewo, C, Leroy, V, Wiktor, SZ, Nduati, R, Msellati, P, Zaba, B, Ghys, PD & Newell, ML 2012, 'Children Who Acquire HIV Infection Perinatally Are at Higher Risk of Early Death than Those Acquiring Infection through Breastmilk: A Meta-Analysis', *PLOS ONE*, vol. 7, no. 2, p. e28510, viewed April 12, 2025,

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0028510>.

Beyene, GA, Dadi, LS & Mogas, SB 2018, 'Determinants of HIV infection among children born to mothers on prevention of mother to child transmission program of HIV in Addis Ababa, Ethiopia: A case control study', *BMC Infectious Diseases*, vol. 18, no. 1, pp. 1–10, viewed April 12, 2025, <https://link.springer.com/articles/10.1186/s12879-018-3217-3>.

Birhane, T, Assefa Tessema, G, Addis Alene, K & Dadi, AF 2015, 'Knowledge of Pregnant Women on Mother-to-Child Transmission of HIV in Meket District, Northeast Ethiopia', *Journal of Pregnancy*, vol. 2015, no. 1, p. 960830, viewed April 12, 2025, <https://onlinelibrary.wiley.com/doi/full/10.1155/2015/960830>.

Bissek, A-CiZ-K, Yakana, IE, Monebenimp, F, Chaby, G, Akondeng, L, Angwafor, SA, Lok, C, Njamnshi, AK & Muna, WF 2011, 'Knowledge of Pregnant Women on Mother-to-Child Transmission of HIV in Yaoundé', *The Open AIDS Journal*, vol. 5, no. 1, p. 25, viewed April 12, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC3103904/>.

Boateng, D, Kwapong, GD & Agyei-Baffour, P 2013, 'Knowledge, Perception about antiretroviral therapy (ART) and prevention of mother-to-child-transmission (PMTCT) and adherence to ART among HIV positive women in the Ashanti Region, Ghana: A cross-sectional study', *BMC Women's Health*, vol. 13, no. 1, pp. 1–8, viewed April 12, 2025, <https://link.springer.com/articles/10.1186/1472-6874-13-2>.

Bollinger, L & Adebiyi, A 2013, *Cost-effectiveness of integrating PMTCT and MNCH services: An application of the LiST Model for Malawi, Mozambique, and Uganda*, USA, viewed April 12, 2025, <https://dhsprogram.com/publications/publication-op7-occasional-papers.cfm>.

Bryaman, A 2015, *Social Research Methods* 5th Edition., Oxford University Press, United Kingdom, viewed April 12, 2025,

<https://books.google.com.tr/books?hl=en&lr=&id=N2zQCgAAQBAJ&oi=fnd&pg=PP1&dq=Bryman,+A.+2015.+Social+Research+Methods.+5th+ed.+Oxford:+Oxford+University+Press.&ots=dqMvGUO3ok&sig=Dt2nBnLtxOKcXCN21JSGN5gczqk&redir_esc=y#v=onepage&q=Bryman%2C A. 2015. Social Research Methods. 5th ed. Oxford%3A Oxford University Press.&f=false>.

Cherie, S, Workie, H, Kassie, T, Bitew, A & Samuel, T 2022, 'Pregnant Women's Knowledge, Attitude, and Practice Towards the Prevention of Mother to Child Transmission of HIV/AIDS in Dil Chora Referral Hospital, Dire Dawa, Eastern Ethiopia: A Cross-Sectional Study', *HIV/AIDS - Research and Palliative Care*, vol. 14, pp. 45–60, viewed April 12, 2025, <https://www.tandfonline.com/action/journalInformation?journalCode=dhiv20>.

Chihana, ML, Price, A, Floyd, S, Mboma, S, Mvula, H, Branson, K, Saul, J, Zaba, B, French, N, Crampin, AC & Glynn, JR 2015, 'Maternal HIV status associated with under-five mortality in rural northern malawi: A prospective cohort study', *Journal of Acquired Immune Deficiency Syndromes*, vol. 68, no. 1, pp. 81–90, viewed April 12, 2025, <https://journals.lww.com/jaids/fulltext/2015/01010/maternal_hiv_status_associated_with_under_five.12.aspx>.

Chimbwandira, F, Mhango, E, Makombe, S, Midiani, D, Mwansambo, C, Njala, J, Chirwa, Z, Jahn, A, Schouten, E, Phelps, BR, Gieselman, A, Holmes, CB, Maida, A, Gupta, S, Barr, BAT, Modi, S, Dale, H, Aberle-Grasse, J, Davis, M, Bell, D & Houston, J 2013, 'Impact of an Innovative Approach to Prevent Mother-to-Child Transmission of HIV — Malawi, July 2011–September 2012', *Morbidity and Mortality Weekly Report*, vol. 62, no. 8, p. 148, viewed April 12, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC4604864/>.

Clouse, K, Vermund, SH, Maskew, M, Lurie, MN, MacLeod, W, Malete, G, Carmona, S, Sherman, G & Fox, MP 2017, 'Mobility and clinic switching among postpartum women

considered lost to HIV Care in South Africa', *Journal of Acquired Immune Deficiency Syndromes*, vol. 74, no. 4, pp. 383–389.

Cochran, WG 1977, *Sampling Techniques* 3rd Edition., John Wiley & Sons, New York, viewed April 19, 2025, <https://www.wiley.com/en-us/Sampling+Techniques%2C+3rd+Edition-p-9780471162407>.

Crano, WD, Brewer, MB & Crano, WD 2014, *Principles and methods of social research* 3rd Edition., Routledge Taylor and Francis, New York, viewed April 12, 2025, <https://www.taylorfrancis.com/books/mono/10.4324/9781315768311/principles-methods-social-research-william-crano-marilynn-brewer-andrew-lac>.

Divala, OH 2013, 'Factors Influencing Utilization of Prevention of Mother to Child Transmission of HIV Services in Young Adults in Balaka District', viewed April 12, 2025, <https://dspace.unza.zm/server/api/core/bitstreams/21b42e25-2616-4fcc-9941-59693d222451/content>.

Duff, P, Kipp, W, Wild, TC, Rubaale, T & Okech-Ojony, J 2010, 'Barriers to accessing highly active antiretroviral therapy by HIV-positive women attending an antenatal clinic in a regional hospital in western Uganda', *Journal of the International AIDS Society*, vol. 13, no. 1, pp. 1–9, viewed April 12, 2025, <https://link.springer.com/articles/10.1186/1758-2652-13-37>.

Eccles, MP, Hrisos, S, Francis, J, Kaner, EF, Dickinson, HO, Beyer, F & Johnston, M 2006, 'Do self- reported intentions predict clinicians' behaviour: A systematic review', *Implementation Science*, vol. 1, no. 1, pp. 1–10, viewed May 12, 2025, <https://link.springer.com/articles/10.1186/1748-5908-1-28>.

Feyera, A, Megerssa, B, Legesse, D & Hailemichael, F 2017, 'Prevention of mother to child transmission of HIV/AIDS: Service utilization and associated factors among selected public health facilities in Ethiopia', *Medical Practice and Reviews*, vol. 8, no. 1, pp. 1–13, viewed

April 12, 2025, <https://academicjournals.org/journal/MPR/article-abstract/3FDCBA365848>.

Goldhammer, H, Marc, LG, Chavis, NS, Psihopaidas, D, Massaquoi, M, Cahill, S, Bryant, H, Bourdeau, B, Mayer, KH, Cohen, SM & Keuroghlian, AS 2022, 'Interventions for Integrating Behavioral Health Services Into HIV Clinical Care: A Narrative Review', *Open Forum Infectious Diseases*, vol. 9, no. 8, viewed May 12, 2025, <https://dx.doi.org/10.1093/ofid/ofac365>.

Gourlay, A, Birdthistle, I, Mburu, G, Iorpenda, K & Wringe, A 2013, 'Barriers and facilitating factors to the uptake of antiretroviral drugs for prevention of mother-to-child transmission of HIV in sub-Saharan Africa: a systematic review', *Journal of the International AIDS Society*, vol. 16, no. 1, p. 18588, viewed August 20, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC3717402/>.

Gugsa, S, Potter, K, Tweya, H, Phiri, S, Sande, O, Sikwese, P, Chikonda, J & O'Malley, G 2017, 'Exploring factors associated with ART adherence and retention in care under Option B+ strategy in Malawi: A qualitative study', *PLOS ONE*, vol. 12, no. 6, p. e0179838, viewed August 20, 2025, <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0179838>.

Harrison, Nkechinyere Elizabeth, Oruka, KE, Agbaim, UC, Adegbite, OA, Anelechi, N, Okeji, E & Harrison, N E 2021, 'Evaluating the Knowledge of HIV Transmission and Prevention of Mother to Child Transmission (PMTCT) of HIV among HIV-Positive Mothers Accessing Care in Military Hospital in Lagos, Nigeria', *World Journal of AIDS*, vol. 11, no. 01, pp. 25–40, viewed April 12, 2025, <//file.scirp.org/html/3-5200492_108183.htm>.

Jennings, L, Yebadokpo, AS, Affo, J & Agbogbe, M 2010, 'Antenatal counseling in maternal and newborn care: Use of job aids to improve health worker performance and maternal

understanding in Benin', *BMC Pregnancy and Childbirth*, vol. 10, no. 1, pp. 1–13, viewed May 12, 2025, <https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/1471-2393-10-75>.

Johri, M & Ako-Arrey, D 2011, 'The cost-effectiveness of preventing mother-to-child transmission of HIV in low- and middle-income countries: Systematic review', *Cost Effectiveness and Resource Allocation*, vol. 9, no. 1, pp. 1–16, viewed April 12, 2025, <https://link.springer.com/articles/10.1186/1478-7547-9-3>.

Kabwama, SN, Bukenya, J, Matovu, JKB, Gwokyalya, V, Makumbi, F, Beyeza-Kashesya, J, Mugerwa, S, Bwanika, JB & Wanyenze, RK 2019, 'Intimate partner violence among HIV positive women in care - Results a national survey, Uganda 2016', *BMC Women's Health*, vol. 19, no. 1, pp. 1–10, viewed April 12, 2025, <https://bmcwomenshealth.biomedcentral.com/articles/10.1186/s12905-019-0831-1>.

Kassa, GM 2018, 'Mother-to-child transmission of HIV infection and its associated factors in Ethiopia: A systematic review and meta-analysis', *BMC Infectious Diseases*, vol. 18, no. 1, pp. 1–9, viewed April 12, 2025, <https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-018-3126-5>.

Kendall, T, Danel, I, Cooper, D, Dilmitis, S, Kaida, A, Kourtis, AP, Langer, A, Lapidos-Salaiz, I, Lathrop, E, Moran, AC, Sebitloane, H, Turan, JM, Watts, DH & Wegner, MN 2014, 'Eliminating preventable HIV-related maternal mortality in Sub-Saharan Africa: What do we need to know?', *Journal of Acquired Immune Deficiency Syndromes*, vol. 67, pp. S250–S258, viewed April 12, 2025, <https://journals.lww.com/jaids/fulltext/2014/12011/eliminating_preventable_hiv_related_maternal.12.aspx>.

Kiger, ME & Varpio, L 2020, 'Thematic analysis of qualitative data: AMEE Guide No. 131',

Medical Teacher, vol. 42, no. 8, pp. 846–854, viewed April 19, 2025, <https://www.tandfonline.com/doi/abs/10.1080/0142159X.2020.1755030>.

Kim, MH, Ahmed, S, Hosseinipour, MC, Giordano, TP, Chiao, EY, Yu, X, Nguyen, C, Chimbwandira, F, Kazembe, PN & Abrams, EJ 2015, 'Implementation and operational research: The impact of option B+ on the antenatal PMTCT cascade in Lilongwe, Malawi', *Journal of Acquired Immune Deficiency Syndromes*, vol. 68, no. 5, pp. e77–e83, viewed April 12, 2025, <https://journals.lww.com/jaids/fulltext/2015/04150/implementation_and_operational_research__the.19.aspx>.

Krauss, SE 2005, 'Research Paradigms and Meaning Making: A Primer', *The Qualitative Report*, vol. 10, no. 4, pp. 758–770, viewed April 12, 2025, <http://www.nova.edu/ssss/QR/QR10-4/krauss.pdf>.

Krueger, RA & Casey, MA 2015, *Focus Groups: A Practical Guide for Applied Research* 5th Edition., SAGE, Los Angeles | London| New Delhi | Singapore | Washington DC, viewed April 12, 2025, <https://books.google.com.tr/books?hl=en&lr=&id=8wASBAAAQBAJ&oi=fnd&pg=PP1&dq=Krueger,+R.A.+and+Casey,+M.A.+2015.+Focus+Groups:+A+Practical+Guide+for+Applied+Research.+5th+edn.+Thousand+Oaks,+CA:+Sage+Publications.&ots=XgeJFzaLqW&sig=kKYhvAbn15nOf3qD0MTpFKpUQ8o&redir_esc=y#v=onepage&q&f=false>.

Kuznik, A, Lamorde, M, Hermans, S, Castelnuovo, B, Auerbach, B, Semeere, A, Sempa, J, Ssennono, M, Ssewankambo, F & Manabe, YC 2012, 'Evaluating the cost-effectiveness of combination antiretroviral therapy for the prevention of mother-to-child transmission of HIV in Uganda', *Bulletin of the World Health Organization*, vol. 90, no. 8, pp. 595–603.

Lee, M, Kang, BA & You, M 2021, 'Knowledge, attitudes, and practices (KAP) toward

COVID-19: a cross-sectional study in South Korea', *BMC Public Health*, vol. 21, no. 1, pp. 1–10, viewed April 21, 2025, <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-021-10285-y>.

Lerebo, W, Callens, S, Jackson, D, Zarowsky, C & Temmerman, M 2014, 'Identifying factors associated with the uptake of prevention of mother to child HIV transmission programme in Tigray region, Ethiopia: A multilevel modeling approach', *BMC Health Services Research*, vol. 14, no. 1, pp. 1–11, viewed April 21, 2025, <https://link.springer.com/articles/10.1186/1472-6963-14-181>.

Van Lettow, M, Bedell, R, Landes, M, Gawa, L, Gatto, S, Mayuni, I, Chan, AK, Tenthani, L & Schouten, E 2011, 'Uptake and outcomes of a prevention-of mother-to-child transmission (PMTCT) program in Zomba district, Malawi', *BMC Public Health*, vol. 11, p. 426, viewed August 20, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC3126744/>.

Van Lettow, M, Landes, M, Van Oosterhout, JJ, Schouten, E, Phiri, H, Nkhoma, E, Kalua, T, Gupta, S, Wadonda, N, Jahn, A & Tippett-Barr, B 2018, 'Prevention of mother-to-child transmission of HIV: a cross-sectional study in Malawi', *Bulletin of the World Health Organization*, vol. 96, no. 4, p. 256, viewed April 21, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC5872011/>.

Lezin, N 2007, *Theories & Approaches: Theory of Reasoned Action (TRA)*, ETR Associates, Resource Centre for Adolescent Pregnancy Prevention, viewed May 12, 2025, <https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=+Lezin%2C+Nicole+%282007%29.+Theory+of+Reasoned+Action+%28TRA%29.+&btnG=#d=gs_cit&t=1747035940916&u=%2Fscholar%3Fq%3Dinfo%3ADbn0-x8ujisJ%3Ascholar.google.com%2F%26output%3Dcite%26scirp%3D0%26hl%3Den>.

Luebbert, J, Tweya, H, Phiri, S, Chaweza, T, Mwafilaso, J, Hosseinipour, MC, Ramroth, H,

Schnitzler, P & Neuhann, F 2012, 'Virological failure and drug resistance in patients on antiretroviral therapy after treatment interruption in Lilongwe, Malawi', *Clinical infectious diseases : an official publication of the Infectious Diseases Society of America*, vol. 55, no. 3, pp. 441–448, viewed April 21, 2025, <https://pubmed.ncbi.nlm.nih.gov/22573849/>.

Luzuriaga, K 2016, 'Early combination antiretroviral therapy limits HIV-1 persistence in children', *Annual Review of Medicine*, vol. 67, no. Volume 67, 2016, pp. 201–213, viewed April 21, 2025, <https://www.annualreviews.org/content/journals/10.1146/annurev-med-091114-111159>.

Manyi, OF, Clement, ANJ, Enow, MR, Marcelin, NN, Manyi, OF, Clement, ANJ, Enow, MR & Marcelin, NN 2020, 'Socio-Demographic Profiles of Naive HIV Pregnant Women and Retention to the Prevention of Mother-to-Child Transmission (PMTCT) Interventions in the East Region of Cameroon', *World Journal of AIDS*, vol. 10, no. 1, pp. 36–45, viewed April 21, 2025, <https://www.scirp.org/journal/paperinformation?paperid=99048>.

Matthew B. Perkins, MD. MBA, Peter S. Jensen, MD, James Jaccard, PD, Peter Gollwitzer, PD, Gabriele Oettingen, PD, Elizabeth Pappadopulos, PD & Kimberly E. Hoagwood, PD 2007, 'Applying Theory-Driven Approaches to Understanding and Modifying Clinicians' Behavior: What Do We Know?', *Psychiatric Services*, vol. 58, no. 3, pp. 295–425, viewed May 12, 2025, </doi/pdf/10.1176/ps.2007.58.3.342?download=true>.

Ministry of Health 2007, *Prevention of mother to child transmission of HIV Guidelines* 2nd Edition., Ministry of Health, Lilongwe.

Mphego, Z, Madiba, S & Ntuli, B 2014, 'The influence of the family on adherence to exclusive breastfeeding : experiences of women living in extended family households in poorly resourced communities of Mpumalanga Province, South Africa : child nutrition and feeding practices ', *African Journal for Physical Health Education, Recreation and Dance*, vol. 1, no. 1, pp. 279–

290, viewed April 21, 2025, <https://journals.co.za/doi/abs/10.10520/EJC162271>.

Mpinganjira, S, Tchereni, T, Gunda, A & Mwapasa, V 2020, 'Factors associated with loss-to-follow-up of HIV-positive mothers and their infants enrolled in HIV care clinic: A qualitative study', *BMC Public Health*, vol. 20, no. 1, pp. 1–10, viewed April 21, 2025, <https://link.springer.com/articles/10.1186/s12889-020-8373-x>.

Muheriwa, SR, Chimwaza, A, Maluwa, AO, Nyasulu, BM, Pindani, M, Muheriwa, SR, Chimwaza, A, Maluwa, AO, Nyasulu, BM & Pindani, M 2013, 'Beliefs and practices of young women on utilization of prevention of mother to child transmission of HIV services in Malawi', *Health*, vol. 5, no. 7, pp. 1172–1179, viewed April 21, 2025, <https://www.scirp.org/journal/paperinformation?paperid=35112>.

Myer, L, Essajee, S, Broyles, LN, Watts, DH, Lesosky, M, El-Sadr, WM & Abrams, EJ 2017, 'Pregnant and breastfeeding women: A priority population for HIV viral load monitoring', *PLOS Medicine*, vol. 14, no. 8, p. e1002375, viewed April 21, 2025, <https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002375>.

Naidoo, K, Hoque, Monjurul, Buckus, S, Hoque, Maariyah & Jagernath, K 2023, 'Prevention-of-mother-to-child-transmission (PMTCT) program outcomes in South Africa in the pre-COVID and COVID eras', *BMC Public Health*, vol. 23, no. 1, p. 1395, viewed August 20, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC10357590/>.

National AIDS Commission 2025, *Malawi HIV Factsheet 2025*, Lilongwe.

Nutor, JJ, Duah, HO, Agbadi, P, Duodu, PA & Gondwe, KW 2020, 'Spatial analysis of factors associated with HIV infection in Malawi: Indicators for effective prevention', *BMC Public Health*, vol. 20, no. 1, pp. 1–14, viewed April 12, 2025, <https://link.springer.com/articles/10.1186/s12889-020-09278-0>.

O'Shea, MS, Rosenberg, NE, Tang, JH, Mukuzunga, C, Kaliti, S, Mwale, M & Hosseinipour, MC 2016, 'Reproductive intentions and family planning practices of pregnant HIV-infected Malawian women on antiretroviral therapy', *AIDS Care*, vol. 28, no. 8, pp. 1027–1034, viewed April 21, 2025, <https://www.tandfonline.com/doi/abs/10.1080/09540121.2016.1140891>.

Okello, B, Nyana, H, Luwukya, R, Odongkara, M, Kibone, W & Bongomin, F 2023, 'Breakthrough mother-to-child transmission of HIV in a low-health facility in Uganda', *IJID Regions*, vol. 8, p. 153, viewed August 20, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC10491621/>.

Okoli, JC & Lansdown, GE 2014, 'Barriers to successful implementation of prevention-of-mother-to-child-transmission (PMTCT) of HIV programmes in Malawi and Nigeria: a critical literature review study', *The Pan African Medical Journal*, vol. 19, p. 154, viewed August 20, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC4345230/>.

Olowokere, AE, Adelakun, OA & Komolafe, AO 2018, 'Knowledge, perception, access and utilisation of HIV counselling and testing among pregnant women in rural communities of Osogbo town, Nigeria', *Australian Journal of Rural Health*, vol. 26, no. 1, pp. 33–41, viewed April 21, 2025, <https://onlinelibrary.wiley.com/doi/full/10.1111/ajr.12368>.

Pallant, J 2020, *SPSS Survival Manual : A step by step guide to data analysis using IBM SPSS* 7th Edition., Routledge, London, viewed April 21, 2025, <https://www.taylorfrancis.com/books/mono/10.4324/9781003117452/spss-survival-manual-julie-pallant>.

Puchalski Ritchie, LM, Van Lettow, M, Pham, B, Straus, SE, Hosseinipour, MC, Rosenberg, NE, Phiri, S, Landes, M & Cataldo, F 2019, 'What interventions are effective in improving uptake and retention of HIV-positive pregnant and breastfeeding women and their infants in prevention of mother to child transmission care programmes in low-income and middle-income

countries? A systematic review and meta-analysis', *BMJ Open*, vol. 9, no. 7, p. e024907, viewed August 20, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC6677958/>.

Ramoshaba, R & Sithole, SL 2017, 'Knowledge and Awareness of MTCT and PMTCT Post-Natal Follow-up Services Among HIV Infected Mothers in the Mankweng Region, South Africa', *The Open AIDS Journal*, vol. 11, no. 1, p. 36, viewed April 21, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC5543619/>.

Rastegar, DA, Fingerhood, MI & Jasinski, DR 2003, 'Highly active antiretroviral therapy outcomes in a primary care clinic', *AIDS Care*, vol. 15, no. 2, pp. 231–237, viewed April 21, 2025, <https://www.tandfonline.com/doi/abs/10.1080/0954012031000068371>.

Risher, K, Adams, D, Sithole, B, Ketende, S, Kennedy, C, Mnisi, Z, Mabusa, X & Baral, SD 2013, 'Sexual stigma and discrimination as barriers to seeking appropriate healthcare among men who have sex with men in Swaziland', *Journal of the International AIDS Society*, vol. 16, no. 3Suppl 2, p. 18715, viewed August 20, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC3833105/>.

Robbins, PS & Judge, TA 2013, *Organizational Behavior 15th Edition Pearson Prentice Hall*, Pearson, Boston.

Saka, AO, Onyeneho, CA & Ndikom, CM 2021, 'Perception and utilization of prevention of mother-to-child transmission of human immunodeficiency virus (HIV) services among women living with HIV', *European Journal of Midwifery*, vol. 5, p. 41, viewed April 21, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC8442691/>.

Saunders, M, Lewis, P & Thornhill, A 2009, *Research methods for business students*, Pearson education, viewed April 21, 2025, <https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Saunders%2C+M.+Lewis%2C+P.+and+Thornhill%2C+A.+2012.+Research+Methods+for+Business+Student.+6th+Editio

n.+Pearson+Education+Limited%2C+Essex%2C+England.&btnG=#d=gs_cit&t=1745244822168&u=%2Fscholar%3Fq%3Dinfo%3AqOt7A9y2gKUJ%3Ascholar.google.com%2F%26output%3Dcite%26scirp%3D0%26hl%3Den>.

Sitohang, MY 2017, 'Utilization Factors of Prevention Mother to Child HIV Transmission (PMTCT) Program Among Pregnant Women ', *Journal of Indonesian Social Sciences and Humanities*, vol. 7, no. 2, viewed April 21, 2025, <https://ejournal.brin.go.id/jissh/article/view/8604>.

Strauss, AL & Corbin, JM 1998, *Basics of Qualitative Research : Techniques and Procedures for Developing Grounded Theory*, Sage Publications, Inc., CA.

Subedi, S, Mandal, PK & Choudhary, A 2023, 'Knowledge on Prevention of Mother to Child Transmission of HIV among Pregnant Women of Damak', *Bouddhik Abhiyan (बौद्धिक अभियान)*, vol. 8, no. 01, pp. 201–214, viewed April 21, 2025, <https://nepjol.info/index.php/bdkan/article/view/57808>.

Tenthani, L, Haas, AD, Tweya, H, Jahn, A, Van Oosterhout, JJ, Chimbwandira, F, Chirwa, Z, Ng'Ambi, W, Bakali, A, Phiri, S, Myer, L, Valeri, F, Zwahlen, M, Wandeler, G & Keiser, O 2014, 'Retention in care under universal antiretroviral therapy for HIV-infected pregnant and breastfeeding women ('Option B+') in Malawi', *AIDS*, vol. 28, no. 4, pp. 589–598, viewed April 21, 2025, <https://journals.lww.com/aidsonline/fulltext/2014/02200/retention_in_care_under_universal_antiretroviral.15.aspx>.

Terefe, B, Jembere, MM & Liyew, B 2024, 'Comprehensive knowledge of mother-to-child HIV/AIDS transmission, prevention, and associated factors among reproductive-age women in East Africa: insights recent demographic and national health surveys', *BMC Women's Health*, vol. 24, no. 1, pp. 1–9, viewed August 20, 2025,

<https://bmcwomenshealth.biomedcentral.com/articles/10.1186/s12905-024-03173-1>.

Thindwa, D, Landes, M, van Lettow, M, Kanyemba, A, Nkhoma, E, Phiri, H, Kalua, T, van Oosterhout, JJ, Kim, EJ & Tippett Barr, BA 2019, 'Correction: Pregnancy intention and contraceptive use among HIV-positive Malawian women at 4-26 weeks post-partum: A nested cross-sectional study', *PLOS ONE*, vol. 14, no. 5, p. e0217330, viewed April 21, 2025, <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0217330>.

Thorne, C, Giaquinto, C, Ruga, E, De Rossi, A, Grosch-Worner, I, Mok, J, de Jose, I, Bates, I, Hawkins, F, Ladron de Guevara, C, Ma Pena, J, Gonzalez Garcia, J, Arribas Lopez, JR, Garcia-Rodriguez, MC, Asensi-Botet, F, Otero, MC, Perez-Tamarit, D, Suarez, G, Scherpbier, H, Kreyenbroek, M, Boer, K, Bohlin, AB, Lindgren, S, Ehrnst, A, Belfrage, E, Naver, L, Lidman, K, Anzen, B, Levy, J, Barlow, P, Hainaut, M, Peltier, A, Goetghebuer, T, Ferrazin, A, Bassetti, D, De Maria, A, Gotta, C, Mur, A, Paya, A, Vinolas, M, Lopez-Vilchez, MA, Rovira, Carreras, R, Valerius, NH, Jimenez, J, Coll, O, Suy, A, Perez, JM, Fortuny, C, Casellas Caro, M, Canet, Y, Savasi, V, Vigano, A, Ferrazi, E, Alberico, S, Rabusin, M, Bernardon, M, Taylor, GP, Lyall, EGH, Penn, Z, Buffolano, W, Tiseo, R, Martinelli, P, Agangi, A, Sansone, CM, Tibaldi, C, Marini, S, Masuelli, G, Benedetto, C, Niemiec, T, Marczynska, M & Horban, A 2005, 'Mother-to-child transmission of HIV infection in the era of highly active antiretroviral therapy', *Clinical Infectious Diseases*, vol. 40, no. 3, pp. 458–465, viewed May 12, 2025, <https://dx.doi.org/10.1086/427287>.

Tippett Barr, BA, van Lettow, M, van Oosterhout, JJ, Landes, M, Shiraishi, RW, Amene, E, Schouten, E, Wadonda-Kabondo, N, Gupta, S, Auld, AF, Kalua, T & Jahn, A 2018, 'National estimates and risk factors associated with early mother-to-child transmission of HIV after implementation of option B+: a cross-sectional analysis', *The Lancet HIV*, vol. 5, no. 12, pp. e688–e695, viewed April 21, 2025,

<https://www.thelancet.com/action/showFullText?pii=S2352301818303163>.

Tweya, H, Oboho, IK, Gugsa, ST, Phiri, S, Rambiki, E, Banda, R, Mwafilaso, J, Munthali, C, Gupta, S, Bateganya, M & Maida, A 2018, 'Loss to follow-up before and after initiation of antiretroviral therapy in HIV facilities in Lilongwe, Malawi', *PLOS ONE*, vol. 13, no. 1, p. e0188488, viewed April 21, 2025, <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0188488>.

U.S. Department of Health & Human Services 2023, 'What Are HIV and AIDS? | HIV.gov', viewed April 21, 2025, <https://www.hiv.gov/hiv-basics/overview/about-hiv-and-aids/what-are-hiv-and-aids>.

UNAIDS 2020, *Report on the global AIDS epidemic 2019*, Geneva.

UNAIDS 2023a, 'Trials and research on maternal nutrition and HIV', *Trials and research on maternal nutrition and HIV*.

UNAIDS 2023b, *Malawi HIV Estimates.*,.

UNAIDS 2025, 'Global HIV & AIDS statistics — Fact sheet ', *Global HIV & AIDS statistics — Fact sheet*, viewed August 20, 2025, <https://www.unaids.org/en/resources/fact-sheet>.

UNAIDS and World Health Organization 2009, *AIDS Epidemic Update*, Geneva.

Vrazo, AC, Sullivan, D & Phelps, BR 2018, 'Eliminating Mother-to-Child Transmission of HIV by 2030: 5 Strategies to Ensure Continued Progress', *Global Health: Science and Practice*, vol. 6, no. 2, pp. 249–256, viewed April 21, 2025, <https://www.ghspjournal.org/content/6/2/249>.

Wethington, E, Glanz, K & Schwartz, MD 2010, 'Stress, Coping, and Health Behaviour', in SH Kelder, CL Perry, & D Hoelscher (eds), *Health Behavior: Theory, Research, and Practice*, WILEY, USA, pp. 159–181.

Wondimu, F, Yetwale, F, Admassu, E, Binu, W, Bulto, GA, Lake, G, Girmaye, E, Temesgen, K & Marama, T 2020, 'Adherence to option b+ care for the prevention of mother-to-child transmission among pregnant women in ethiopia', *HIV/AIDS - Research and Palliative Care*, vol. 12, pp. 769–778, viewed April 21, 2025, <https://www.tandfonline.com/action/journalInformation?journalCode=dhiv20>.

Wudineh, F & Damtew, B 2016, 'Mother-to-Child Transmission of HIV Infection and Its Determinants among Exposed Infants on Care and Follow-Up in Dire Dawa City, Eastern Ethiopia', *AIDS Research and Treatment*, vol. 2016, no. 1, p. 3262746, viewed April 21, 2025, <https://onlinelibrary.wiley.com/doi/full/10.1155/2016/3262746>.

Yakasai, HB, Panas, RM & Kadrie, MB 2021, 'Knowledge of mother-to-child transmission of HIV as a predictor of HIV testing in some women of childbearing age in Nigeria', *Science World Journal*, vol. 16, no. 3, pp. 266–271, viewed April 21, 2025, <https://www.ajol.info/index.php/swj/article/view/221741>.

Yeshaneh, A, Abebe, H, Tafese, FE & Workineh, A 2023, 'Knowledge, attitude, and practice towards prevention of mother-to-child transmission of HIV among antenatal care attendees in Ethiopia, 2020', *PLOS ONE*, vol. 18, no. 2, p. e0277178, viewed April 21, 2025, <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0277178>.

Zegeye, B, Ahinkorah, BO, Ameyaw, EK, Seidu, AA, Olorunsaiye, CZ & Yaya, S 2022, 'Women's decision-making power and knowledge of prevention of mother to child transmission of HIV in sub-Saharan Africa', *BMC Women's Health*, vol. 22, no. 1, pp. 1–10, viewed April 21, 2025, <https://link.springer.com/articles/10.1186/s12905-022-01691-4>.

Zomba District Council 2020, *ZOMBA DISTRICT SOCIO-ECONOMIC PROFILE*, Zomba.

Appendices A: Mzuzu University Research Ethics Committee Informed Consent Form

(English)

Mzuzu University Research Ethics Committee (MZUNIREC)

Informed Consent Form for Research in Agri-Sciences

Introduction

I am **Yanjano Grace Mbendera** from the Department of Agri-Sciences in the Faculty of Environmental Sciences at Mzuzu University. We are doing research on ***Prevention of Mother to Child Transmission of HIV infection and its Determinants among women in Zomba Health Centres.*** This consent form may contain words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them of me or of another researcher.

Purpose of the research

This research aims to assess knowledge, attitude and practice of mother-to-child transmission (MTCT) of HIV infection among women and HIV MTCT rate in Zomba district health centres.

Type of Research Intervention

This research will involve your participation in answering an individual interview**.**

Participant Selection

You are being invited to take part in this research because of your capacity as Director of Animal Health and Livestock Development

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. If you choose not to participate nothing will change. You may skip any question and move on to the next question.

Duration

The research takes place from the month of June 2023 to May 2024.

Risks

You do not have to answer any question or take part in the discussion/interview/survey if you feel the question(s) are too personal or if talking about them makes you uncomfortable.

Reimbursements

You will not be provided any incentive to take part in the research.

Sharing the Results

The knowledge that we get from this research will be shared with you and your community before it is made widely available to the public. Following, we will publish the results so that other interested people may learn from the research.

Who to Contact

If you have any questions, you can ask them now or later. If you wish to ask questions later, you may contact: Associate Prof Mavuto Tembo (supervisor), Mzuzu University, Private Bag 201, Luwinga, Mzuzu 2. Phone: 0997376822, Email: tembo.m@mzuni.ac.mw; or you can contact Dr. Ulemu Msiska (Postgraduate Coordinator), Department of Agri-Sciences, Mzuzu University, Private Bag 201, Luwinga, Mzuzu 2.

This proposal has been reviewed and approved by Mzuzu University Research Ethics Committee (MZUNIREC) which is a committee whose task it is to make sure that research participants are protected from harm. If you wish to find about more about the Committee, contact Mr. Gift Mbwele, Mzuzu University Research Ethics (MZUNIREC) Administrator, Mzuzu University, P/Bag 201, Luwinga, Mzuzu 2, Phone: 0999404008/0888641486

Do you have any questions?

Part II: Certificate of Consent

I have been invited to participate in research about ***Nexus of Political Economy and Public Finance Management in Livestock Development in Malawi***

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study

Print Name of Participant_____

Signature of Participant _____

Date _____

Day/month/year

If illiterate [1]

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual consent freely. | |

Print name of witness_____ Thumb print of participant

Signature of witness _____

Date _____

Day/month/year

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands the research project. I confirm the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher /person taking the consent_____

Date _____

Day/month/year

[1] A literate witness must sign (if possible, this person should be selected by the participant and should have no connection to the research team). Participants who are illiterate should include their thumb print as well.

Appendices B: Mzuzu University Research Ethics Committee Informed Consent Form

(Chichewa)

Mzuzu University Research Ethics Committee (MZUNIREC)

Informed Consent Form for Research in Agri-Sciences

Mau oyamba

Ine ndine **Grace Mbendera** kuchokera ku gawo la maphunziro la Agri-Sciences mu nthambi ya Environmental Sciences ku Mzuzu University. Tikuchita maphunziro pa mutu oti ***Kupewa kwa Amayi Kupatsirana kwa Ana kachilombo ka HIV ndipo ndi Kuzindikira pakati pa azimayi m'malo a Zomba Health.*** Kalata ya chilolezoyi itha kukhala ndi mau oti simukutha kuwavetsa bwino. Chonde muzindiuza kuti ndiime ndifotokozere pamene tikuchita kafukufukuyu. Ngati muli ndi mafuso ena, ndifunseni ineyo kapena azanga omwe ndikuchita nawo kafukufukuyu.

Cholinga cha kafukufuku

Kafukufukuyu akufuna kuunika Kupewa kwa Amayi Kupatsirana kwa Ana kachilombo ka HIV ndipo ndi Kuzindikira pakati pa azimayi m'malo a Zomba Health.

Mtundu wa kafukufuku

Kafukufukuyu akudalila kutengapo gawo kwanu poyankha mafuso amene ndikufuseni mkucheza kwathu.

Mchifukwa chani mwasankhidwa?

Mwasankhidwa kuti muchite nawo kafukuyu potengela udindo wanu ngati wamkulu oona za zachilendedwe.

Kutengapo gawo pa kafukufuku mosakakamiza

Kutengapo gawo kwanu pa kafukufukuyu mkosakakamiza. Muli ndi ufulu kutengapo gawo kapena ayi. Mukasankha kusachita nawo kafukufukuyu palibe icho chisinthe. Muli ndi ufulu

kusiya mafuso ena osayankha mkuyankhako ena.

Kafukufukuyu atenga nthawi yotalika bwanji?

Kafukufukuyu atenga mwezi umodzi wa okotobala chaka chomwe chino.

Zodzetsa Nkhawa

Simukuyenera kuyankha mafuso kapena kutengapo mbali mkucheza ngati mukuona kuti mafuso ena salibwino kapena simunasangalare nawo.

Cholowa/Kulipidwa

Kutenga nawo gawo pa kafukufukuyu ndi kwa ulere ndipo simudzalandira kalikonse.

Kugawana zotsatila za Kafukufuku

Zotsatila za kafukukuyu zidzagawidwa kwa inu amene mutengepo mbali ndi anthu a mdela lanu zisanagawidwe ku mtundu wose wa aMalawi. Zotsatila za kafukufukuyu zidzasindikizidwa mu m'buku kuti anthu ose ofuna kuva zambiri za kafukufukuyu athe kutero.

Oti mungathe kulumikizana nawo

Ngati muli ndi mafuso, mutha kufusa panopa kapena nthawi ina. Ngati mukufuna kudzafusa nthawi ina chonde alembeleni kalata a Associate Prof Mavuto Tembo omwe ndi aphuzitsi ku Mzuzu University pa adilesi iyi: Private Bag 201, Luwinga, Mzuzu, kapena aimbileni foni pa 0997376822. Mutha kutumizaso kalata ku imelo adilesi iyi: tembo.m@mzuni.ac.mw. Mutha Kulembelaso Dr Ulemu Msiska (Postgraduate Coordinator), Department of Agri-Sciences, Mzuzu University, Private Bag 201, Luwinga, Mzuzu 2. Foni: 0994954025, Imelo adilesi: kaluwa.a@mzuni.ac.mw.

Kafukufukuyu waunikidwa ndi kuvomerezedwa ndi a Mzuzu University Research Ethics Committee (MZUNIREC) yomwe ndi komiti yoonetsetsa kuti ochita nawo kafukufuku ndi otetezedwa mu njira ina iliyose. Ngati mukufuna kuva zambili za komitiyi lumikizanani ndi a Gift Mbwele pa adilesi iyi: Mzuzu University Research Ethics (MZUNIREC) Administrator, Mzuzu University, P/Bag 201, Luwinga, Mzuzu 2, Ma nambala awo a foni: 0999404008/0888641486

Muli ndi mafuso Lirilonse?

Gawo lachiwiri: Kalata yovomereza

Ndaitanidwa kuti ndichite nawo kafukufuku wa "Kupewa kwa Amayi Kupatsirana kwa Ana kachilombo ka HIV ndipo ndi Kuzindikira pakati pa azimayi m'malo a Zomba Health".

Ndawelenga komaso andiwelengera zose zoyenera pa kafukufukuyu. Ndinapatsidwa mwayi oti ndifunse mafuso pa kafukufukuyu ndipo mafuso ose ndinafusa andiyankha mogwira mtima. Ndikuvomereza kuchita nawo kafukufuyu mwakufuna kwanga

Dzina la ochita nawo kafukufuku_____

Signature _____

Tsiku_____

Tsiku/Mwezi/Chaka

Ngati ali osatha kelemba ndi Kuwelenga[2]

Ndaonelela kuwerenga kolondola kwa kalata ya chivomerezo kwa otenga nawo mbali pa kafufukufuku. Ndipo otenga nawo mbaliyu anapatsidwa mwayi ofusa mafuso. Ndikutsimikizira kuti otenga nawo mbaliyu wavomereza yekha kutenga nawo mbali pa kafukufukuyu.

Dzina la mboni_____Otenga nawo mbali a*dinde ndi chala apa* ☐

Signature ya mboni _____

Tsiku _____

Tsiku/Mwezi/Chaka

Statement by the researcher/person taking consent

[2]Mboni yodziwa kulemba imusainile uyu ochita nawo kafukufuku (ngati mkotheka mboniyi isankhindwe ndi uyu ochita nawo kafukufuku osati awo ochititsa kafukufuku). Ochita nawo kafukufuku omwe sadziwa kulemba adindeso ndi chala.

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands the research project. I confirm the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher /person taking the consent_____

Date _____

Day/month/year

Appendices C: Data Collection Protocol

Prevention of Mother to Child Transmission of HIV infection and it's Determinants among women in Selected Health Centres in Zomba

Data collection protocol

Objective one: Assess the level of knowledge of preventing mother-to-child HIV transmission among women.

Definition	This objective intends to assess knowledge of preventing mother-to-child HIV transmission among women in selected health centres. Mother-to-child transmission (MTCT) of human immune deficiency virus (HIV) is the transmission of the virus from an HIV-infected mother or from a mother living with HIV infection to her child during pregnancy, labour, delivery or breastfeeding (Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization, 2009). It is also referred to as vertical transmission (MoH, 2007). PMTCT services are specific interventions and guidelines initiated during pregnancy with an aim of preventing transmission of HIV from the mother to the child. They include early and regular use of antenatal clinic plus HIV counselling and testing, receipt of HIV test results, agreeing and adherence to ART, safe sex during pregnancy, timely use of skilled attendant, and facility-based delivery (MoH, 2007). This obejctive amims to assess to what extent do women know this PMTCT services.

Respondents/Data source	- Pregnant and non-pregnant women
Data type	- HIV transmission and prevention methods - Follow up on ART clinics - Exclusive breastfeeding - Early weaning with formula - Taking ARV prophylaxis - Testing for HIV - Participate in community conversations on HIV/AIDS - Follow up on ART clinics
Method of data collection	- Survey and FGD
Sampling procedure	- Random sampling
Sample size	- 270
Data collection sites	- Municipality, Sadzi Clinic, Naisi Health Centre and Matawale Health centre
Tool	- Questionnaire and Interview guide
Question to be included in the tool	**Section B: Knowledge of HIV/AIDS and PMTCT** **14.** How is the HIV transmitted? *(More than one answer may be correct)* (1) Unsafe blood transfusion (2) Sharing sharps with an infected person (3) Mother to child transmission (4) Unprotected sexual intercourse (5) Don't know **15.** Can you mention ways of preventing someone from acquiring HIV? *(More than one answer may be correct)* (1) Abstinence (2) Having one faithful sexual partner. (3) Condom use (4) Don't know

	16. Can HIV be transmitted from a mother to her baby? (1) Yes (2) No (3) Don't know (skip to 16) (4) Not sure **17.** If yes, how can this happen? (1) During pregnancy/in the womb (2) During delivery (3) During breastfeeding (4) Don't know **18.** What actions can be taken to prevent transmission of HIV to an unborn baby? (more than one answer may be correct) (1) Receive antenatal services (2) HIV testing during pregnancy (3) Have access to antiretroviral treatment (ART) (4) Practice safe childbirth (5) Nothing (6) Appropriate infant feeding (7) Don't know **19.** What should an HIV+ mother feed her baby in first three months of life to reduce the risk of HIV transmission? (1) Other liquids only or with formula (2) Formula only, Breast milk only (3) Breast milk with formula or other liquids (4) Don't know **20.** Have you ever heard of prevention of mother-to-child transmission (PMTCT)? (1) Yes (2) No (skip to 21) **21.** If yes, where did you get information on PMTCT from? *(More than one answer may be correct)* (1) Health care providers (Doctors/Nurses) (2) Friend/relative/peer (3) TV/Radio (4) Newspaper/Magazines/Books

	(5) Lectures/seminars (6) Others e.g. sangoma/traditional healer **Qualitative:** 1. What methods of HIV transmission do you know? 2. What is your perception towards each method of HIV transmission? 3. What methods of PMTCT do you know? 4. On the list of PMTCT methods outlined, what methods commonly practiced? 5. How can women protect their in-born baby from getting HIV? 6. As a community, do you organise community conversation on HIV for women? If yes, do women participate?
Data analysis	- Descriptive statics (Frequency, percentage, mean and std deviation) - Thematic analysis: Transcription of every word in an interview. Coding of the transcribed interview into themes.

Objective 2: To examine the attitudes of pregnant women towards prevention of mother to child HIV transmission.

Definition	This objective intends to examine attitudes of preventing mother-to-child HIV transmission among women in selected health centres in Zomba District. Mother-to-child transmission (MTCT) of human immune deficiency virus (HIV) is the transmission of the virus from an HIV-infected mother or from a mother living with HIV infection to her child during pregnancy, labour, delivery or breastfeeding (Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization, 2009). It is also referred to as vertical transmission (MoH, 2007). PMTCT services are specific interventions and guidelines initiated during pregnancy with an aim of preventing transmission of HIV from the mother to the child. They include early and regular use of

	antenatal clinic plus HIV counselling and testing, receipt of HIV test results, agreeing and adherence to ART, safe sex during pregnancy, timely use of skilled attendant, and facility-based delivery (MoH, 2007). Attitude refers to inclinations to react in a certain way to certain situations; to see and interpret events according to certain predispositions; or to organize opinions into coherent and interrelated structures (Badranm, 1995). In this objective, attitude refers to in how women react to or regard PMTCT in their communities.
Respondents/Data source	- Pregnant and non-pregnant women
Data type	- HIV transmission and prevention methods - Follow up on ART clinics - Exclusive breastfeeding - Early weaning with formula - Taking ARV prophylaxis - Testing for HIV - Participate in community conversations on HIV/AIDS - Follow up on ART clinics
Method of data collection	- Survey
Sampling procedure	- Random sampling
Sample size	- 270
Data collection sites	- Municipality, Sadzi Clinic, Naisi Health Centre and Matawale Health centre
Tool	- Questionnaire

Question to be included in the tool

Section C: Attitude towards PMTCT

Please indicate the extent of your agreement with the following statements? (Circle the number)

Statement	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1. It is important that every pregnant woman gets tested for HIV.	5	4	3	2	1
2. If one is infected with HIV then she should not get pregnant again.	5	4	3	2	1
3. Using condoms during pregnancy and breastfeeding reduces the risk of transmission from mother to child.	5	4	3	2	1
4. Some women choose to breastfeed despite their HIV status, due to stigma.	5	4	3	2	1
5. Some women choose to breastfeed despite their HIV status, due to poverty.	5	4	3	2	1
6. Some women choose to breastfeed despite their HIV status, due	5	4	3	2	1

	to fear of disclosure.					
	7. Some women choose to breastfeed despite their HIV status, due to lack of education.	5	4	3	2	1
	8. My family will support my choice of feeding the baby.	5	4	3	2	1
	9. I will support the strategies for PMTCT.	5	4	3	2	1
Data analysis	- Descriptive statics (Frequency, percentage, mean and std deviation)					

Objective 3: To analyse the practices of pregnant women in relation to preventing mother to child HIV transmission.

Definition	This objective intends to analyse the practices of pregnant women in relation to preventing mother to child HIV transmission in selected health centres in Zomba District. Mother-to-child transmission (MTCT) of human immune deficiency virus (HIV) is the transmission of the virus from an HIV-infected mother or from a mother living with HIV infection to her child during pregnancy, labour, delivery or breastfeeding (Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization, 2009). It is also referred to as vertical transmission (MoH, 2007). PMTCT services are specific

	interventions and guidelines initiated during pregnancy with an aim of preventing transmission of HIV from the mother to the child. They include early and regular use of antenatal clinic plus HIV counselling and testing, receipt of HIV test results, agreeing and adherence to ART, safe sex during pregnancy, timely use of skilled attendant, and facility-based delivery (MoH, 2007). In this objective, practice refers to the doing or following the guidance by pregnant women given by health personnel aiming to preventing MTCT.
Respondents/Data source	- Pregnant and non-pregnant women
Data type	- HIV transmission and prevention methods - Follow up on ART clinics - Exclusive breastfeeding - Early weaning with formula - Taking ARV prophylaxis - Testing for HIV - Participate in community conversations on HIV/AIDS - Follow up on ART clinics
Method of data collection	- Survey and key informant interviews
Sampling procedure	- Random sampling
Sample size	- 270 and 5 key informants
Data collection sites	- Municipality, Sadzi Clinic, Naisi Health Centre and Matawale Health centre
Tool	- Questionnaire and interview guide

Question to be included in the tool	**Section D: Practice toward PMTCT** 1. Have you ever been tested for HIV? (1) Yes (2) No (skip to 31) (3) Don't like to answer (skip to 31) 2. If you've received the results, can you share your results with me? (1) Yes (2) No (skip to 31) 3. If you can share the results to me, what were the results? (1) Living **with** HIV/AIDS (HIV+) (2) Living **without** HIV/AIDS (HIV-) (3) Don't know 4. At what time did you know about your HIV status? (1) Before being pregnant (2) While I was pregnant? (3) At the time of delivery (4) After giving birth 5. What was the reason for not having a HIV test? (More than one answer may be correct) (1) Stigma and discrimination (2) Fear of people not maintaining my confidentiality (3) Knowing HIV-status has no advantage. (4) Other reasons. (5) I did the test. 6. Have you ever discussed having an HIV test with your partner? (1)Yes (2) No 7. If yes, what was your partner's response to having an HIV test?

	(1) Wants couple testing. (2) Wants woman to be tested alone. (3) Doesn't want woman to be tested. (4) I don't want to answer. 8. Did you have Antenatal care visits during your last pregnancy? (1) Yes (2) No (3) I cannot remember. 9. Upon your arrival here at the Hospital, did the staff offer you PMTCT counselling? (1) Yes (2) No 10. If yes, have you been convinced to use PMTCT services? (1) Yes (2) No Qualitative What are gaps in the PMTCT?
Data analysis	- Descriptive statics (Frequency, percentage, mean and std deviation)

Objective 4: To analyse factors associated with prevention of mother-to-child HIV transmission among pregnant women

Definition	This objective intends to analyse factors associated with PMTCT among pregnant women. A factor is a circumstance, fact, or influence that contributes to a result. PMTCT services are specific interventions and guidelines initiated during pregnancy with an aim of preventing transmission of HIV from the mother to the child. They include early and regular use of antenatal clinic plus HIV counselling and testing, receipt of HIV test results, agreeing and adherence to ART, safe sex during pregnancy, timely use of skilled attendant, and facility-based delivery (MoH, 2007).
Respondents/Data source	- Pregnant women
Data type	- Demographic characteristics - HIV-1 history

	- ART in pregnancy - CD4+ T cell counts during pregnancy - Timing of MTCT - Drug use during pregnancy - Absence of counsellors - Poor counselling - Knowledge about HIV Counselling and Testing - Lack of interest and psychological unpreparedness - Family support - Health worker support
Method of data collection	- Survey
Sampling procedure	- Random sampling
Sample size	- 270/2
Data collection sites	- Municipality, Sadzi Clinic, Naisi Health Centre and Matawale Health centre
Tool	- Questionnaire
Question to be included in the tool	Section A-1: Socio-Demographic Data **1.** What is your age?.....(in years). **2.** Marital status: (1) Single (2) Married (3) Divorced (4) Separated (5) Have a regular boyfriend **3.** What level of education did you attain? (1) No formal education (2) Primary not completed (3) Primary completed (4) Secondary not completed (5) Secondary completed (6) Tertiary education **4.** What is your tribe? (1) Chewa (2) Lomwe (3) Yao (4) Sena (5) Tonga (6) Ngoni (7) Other (Specify) .....

5. What is your religion?

(1) Christian (2) Muslim (3) Other (Specify) .....

(4) Don't like to answer

6. What is your occupation?

(1) Employed (2) Businesswoman (3) Housewife

(4) Farmer (5) Unemployed (6) Other (Specify) .....

7. What is your total household income monthly? *(In MK)*

8. Place of residence:

(1) Urban (2) Rural

9. Household size: .....

10. Distance to the nearest health centre (in Km): .....

Section A-2: Reproductive History

11. How many times have you been pregnant?

(1) First pregnancy (2) Second pregnancy

(3) Third pregnancy (4) More than third pregnancy

12. How many babies have you before this pregnancy?

(1) No baby (2) One baby (3) Two babies

(4) Three babies (5) Four babies (6) More than four babies

13. If you had pregnancy before, where was your last baby delivered?

(1) Home (2) Hospital (3) Health Centre

(4) Private Clinic (5) Had no previous pregnancy.

14. How many months pregnant are you?

(1) Less than one month (2) Between one to 3 months

(3) Between 3 to 6 months (4) More than 6 months (5) Don't have

(6) Don't know

15. Were you planned to get that pregnant?

(1) Yes (2) No

16. In the current pregnancy, how many times have you visited the Antenatal clinic?

(1) One (2) Two (3) Three

(4) Four and above

13. Have you had CD4 Count?

(1) Yes (2) No

Section D: Practice toward PMTCT

17. Have you ever been tested for HIV?

(1) Yes (2) No (skip to 31)

(3) Don't like to answer (skip to 31)

18. If you've received the results, can you share your results with me?

(1) Yes (2) No (skip to 31)

19. If you can share the results to me, what were the results?

(1) Living with HIV/AIDS (HIV+) (2) Living without HIV/AIDS (HIV-)

(3) Don't know

20. At what time did you know about your HIV status?

(1) Before being pregnant

(2) While I was pregnant?

(3) At the time of delivery

(4) After giving birth

21. What was the reason for not having a HIV test? (More than one answer may be correct)

	(6) Stigma and discrimination **(7)** Fear of people not maintaining my confidentiality **(8)** Knowing HIV-status has no advantage. **(9)** Other reasons. **(10)** I did the test. **22.** Have you ever discussed having an HIV test with your partner? (1)Yes (2) No **23.** If yes, what was your partner's response to having an HIV test? (1) Wants couple testing. (2) Wants woman to be tested alone. (3) Doesn't want woman to be tested. (4) I don't want to answer. **24.** Did you have Antenatal care visits during your last pregnancy? (1) Yes (2) No (3) I cannot remember. **25.** Upon your arrival here at the Hospital, did the staff offer you PMTCT counselling? (1) Yes (2) No **26.** If yes, have you been convinced to use PMTCT services? (1) Yes (2) No Qualitative What do you think are the factors associated by PMTCT among women in your community?
Data analysis	Thematic analysis: Transcription of every word in an interview. Coding of the transcribed interview into themes.

Appendices D: Letter of Support from Zomba District Council

Telephone: +265 0999 019 286 ZOMBA
E-mail: achijuwa@gmail.com ZOMBA
PRIVATE BAG 18,
All Communications should be ZOMBA,
addressed to: The Director of Health
and Social Services

DISTRICT COUNCIL
DITRICT HEALTH OFFICE,

MALAWI

Ref. No. ZA/DC/ADMIN **Date: January 5, 2024**

Mzuzu University

Private Bag 201

Luwinga

Mzuzu

Dear Ms. Grace Y. Mbendera,

Letter of Support for your study in Zomba District

I, on behalf of Zomba DHO Health Research Coordination Committee, would like to notify you that the committee found no objection for you to conduct your study titled "***Prevention of Mother to Child Transmission of HIV infection and its Determinants among Women in Selected Health Centres in Zomba***" in health facilities in Zomba. This letter documents our support for your study. However, you are being requested to notify the committee when the study has been approved by Research Ethical Committee before starting data collection.

Yours faithfully,

Dickson Kazembe

Research Coordinator

For: THE DIRECTOR OF HEALTH AND SOCIAL SERVICES

Appendices E: Ethical approval

MZUZU UNIVERSITY

DIRECTORATE OF RESEARCH

Mzuzu University
Private Bag 201
Luwinga
Mzuzu 2
MALAWI
TEL: 01 320 722
FAX: 01 320 648

MZUZU UNIVERSITY RESEARCH ETHICS COMMITTEE (MZUNIREC)

Ref No: MZUNIREC/DOR/23/117 14/11/2023.

Yanjano Grace Mbendera,

Mzuzu University,

P/Bag 201, Luwinga,

Mzuzu 2.

yanjanogracembendera@yahoo.com

Dear Yanjano,

RESEARCH ETHICS AND REGULATORY APPROVAL AND PERMIT FOR PROTOCOL REF NO: MZUNIREC/DOR/23/117: PREVENTION OF MOTHER TO CHILD TRANSMISSION OF HIV INFECTION AND IT'S DETERMINANTS AMONG WOMEN IN SELECTED HEALTH CENTRES IN ZOMBA.

Having satisfied all the relevant ethical and regulatory requirements, I am pleased to inform you that the above referred research protocol has officially been approved. You are now permitted to proceed with its implementation. Should there be any amendments to the approved protocol in the course of implementing it, you shall be required to seek approval of such amendments before implementation of the same.

This approval is valid for one year from the date of issuance of this approval. If the study goes beyond one year, an annual approval for continuation shall be required to be sought from the

Mzuzu University Research Ethics Committee (MZUNIREC) in a format that is available at the Secretariat. Once the study is finalised, you are required to furnish the Committee with a final report of the study. The Committee reserves the right to carry out compliance inspection of this approved protocol at any time as may be deemed by it. As such, you are expected to properly maintain all study documents including consent forms.

Committee Address:

Secretariat, Mzuzu University Research Ethics Committee, P/Bag 201, Luwinga, Mzuzu 2; Email address: mzunirec@mzuni.ac.mw

Wishing you a successful implementation of your study.

Yours Sincerely,

Gift Mbwele

SENIOR RESEARCH ETHICS ADMINISTRATOR

For: CHAIRMAN OF MZUNIREC

Committee Address:

Secretariat, Mzuzu University Research Ethics Committee, P/Bag 201, Luwinga, Mzuzu 2; Email address: mzunirec@mzuni.ac.mw