DETERMINANTS OF PREVENTION OF MOTHER TO CHILD HIV TRANSMISSION OUTCOMES AMONG WOMEN AT THE HOMA BAY COUNTY REFERRAL HOSPITAL, KENYA

BY

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DECLARATION

This thesis is my original work and has not been presented for any Degree in any other university

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DEDICATION

I dedicate this thesis to all the mothers, healthcare providers and stakeholders working towards elimination of mother to child transmission of HIV.

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I give all the glory to the Almighty whose grace and love has made this possible. My earnest and sincere gratitude to my supervisors; Dr. Louisa Ndunyu and Professor Ng'wena Magak, for their supervision and academic input to this study. Many thanks to the department of health of Homa Bay County for the permission to conduct the study in the County Referral Hospital. Thanks to my wife Sandra for constant support and encouragement in this career path.

ABSTRACT

Homa Bay County had 10% of the children 0-14 years diagnosed with HIV in Kenya in 2017. The county also reported 9.7% of the national annual AIDS-related mortalities among children and 8.8% of new HIV infections among children for the same age group nationally in the same year. Different determinants have been related to varying Prevention of Mother-to-Child Transmission (PMTCT) OF HIV outcomes across different regions. However, the Homa Bay County's determinants have not been investigated. This study assessed maternal, health systems, and male involvement related determinants of PMTCT outcomes among PMTCT mothers at the Homa Bay County Referral Hospital. The research used a descriptive cross-sectional study on a sample of 274 mothers drawn from 4129 women of reproductive age attending care and treatment at the study setting. Eligible participants were required to have been on PMTCT follow up at the study setting and with documented HIV test results (PMTCT outcome) for their child. Simple random sampling was used to sample study participants until the required sample size was achieved. Purposive sampling was used to identify participants for Key Informant Interviews. A mixed-method approach was used to collect quantitative and qualitative data. Quantitate data were collected using a structured questionnaire, while qualitative data were collected using interview guides customized for Key Informants. All the sampled participants; 274, were accessible. However, one (1) questionnaire was rejected because of incompleteness; hence, data is reported for 273 participants. A majority of the participants; 158(57.9%) were aged between 30 to 39 years with the mean age being 32.16 (± 5.54 SD) years. In terms of PMTCT outcome, 10(3.7%) of the participants had a HIV sero-positive child.Chi-square (χ^2)test established existence of statistically significant associations between maternal factors; reason for missing scheduled clinic visit, missing to take ART medications, reasons for missing to take ART medications, and missing to provide ART prophylaxis to infant/child, and PMTCT outcome at $\alpha \leq 0.05$ (χ^2:p=0.002, p=0.005, p=0.006, and p=0.05) respectively. Reason for missing scheduled clinic visit and reason for missing to take ART medications demonstrated higher likelihood (odds) of determining PMTCT outcome (OR=5.122, 95% CI: 0.139-189.53; p=0.002) and (OR=5.751, 95% CI: 0.615-53.781; p=0.006) respectively. Statistically significant associations were further evident between health systems factors; provision of routine pre-conception counseling and provision and discussion of infant diagnosis results with health care provider and PMTCT outcome (χ^2: p=0.018 and p=0.000) respectively. Provision and discussion of infant diagnosis results with health care provider had a higher likelihood (odds) of determining PMTCT outcome (OR=1.530, 95% CI: 0.361-6.486; p=0.000). In terms of male involvement, statistically significant associations were evident of male partner knowing HIV status of participant(s) and male partners reaction to discussions on HIV transmission to infant/child (χ^2: p=0.000 and p=0.000) respectively. Nonetheless, male partner knowing HIV status of participant(s) had higher odds of determining PMTCT outcome (OR=6.0, 95% CI: 0.655-54.997; p=0.000). Qualitative data were analyzed manually based on emerging themes and presented verbatim with the quantitative findings. The findings of this study identify determinants with higher likelihood of determining PMTCT outcomes. This may help in formulation of interventions geared towards reducing the high MTCT rates in Homa Bay County.

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LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	:	Acquired Immunodeficiency Syndrome
ANC	:	Antenatal Clinic
ARV	:	Antiretroviral
ART	:	Anti-Retroviral Therapy
CCC	:	Comprehensive Care Centre
EBF	:	Exclusive Breast Feeding
HAART	:	Highly Active Antiretroviral Therapy
HEI	:	HIV Exposed Infant
HIV	:	Human Immunodeficiency Virus
KAPR	:	Kenya Aids Progress Report
KAIS	:	Kenya Aids Indicator Survey
KHIS	:	Kenya Health Information System
KDHS	:	Kenya Demographic Health Survey
KHER	:	Kenya HIV Estimate Report
KIIs	:	Key Informant Interviews
MCH	:	Maternal and Child Health Clinic
MoH	:	Ministry of Health
MTCT of HIV	:	Mother to child transmission of HIV
NACC	:	National Aids Control Council
NASCOP	:	National Aids and STI Control Program
PMTCT	:	Prevention of Mother to Child HIV Transmission
SSA	:	Sub-Saharan Africa
UNAIDS	:	The Joint United Nations Programme on HIV/AIDS
UNICEF	:	United Nations Children's Fund
VL	:	Viral Load
WHO	:	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Determinants: for this study, this referred to maternal, health systems, and male involvement related factors that have higher likelihood/odds of predicting Prevention of Mother to Child Transmission (PMTCT) outcomes as evidenced by Odds Ration derived from binary logistic regression.

Exclusive Breastfeeding: Involves giving only breast milk with no other liquids, including water, to infants under six months. Giving vitamins, mineral supplements, or medicines is permitted.

Health Systems Determinants: for this study, this referred to features attributable to health systems structures at Homa Bay County Referral Hospital. These features included; availability of Anti-Retroviral Therapy (ART), lab, and Family Planning (FP) commodities, waiting time at facility, and uptake of national guidelines.

Male Partner Involvement in PMTCT: Male partner involvement in PMTCT referred to the direct assistance provided by men to improve their female partners' and children's health through the perinatal, antenatal, labor, and delivery period. These were assessed by probing for male participation in PMTCT seeking services and male involvement in infant feeding and care practices.

Maternal Determinants: for this study, this referred to features attributable to women of reproductive age attending care and treatment for Human Immune-Deficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) at Homa Bay County Referral Hospital. These features included; knowledge of HIV status prior and after pregnancy, art adherence, and compliance with infant feeding and art prophylaxis guidelines.

Mixed Feeding: Involves giving other liquids and other foods together with breast milk to infants under six months.

Partner: for this study, this referred to a male person currently or previously in a relationship with the HIV sero-positive woman enrolled for the study.

CHAPTER ONE
INTRODUCTION

This chapter presents the study background, statement of the problem, general objectives, specific objectives, research questions, and justification of the study.

1.1 Background of the Study

More than 90% of HIV-infected children worldwide are from Sub-Saharan Africa (SSA). Even though there has been a 54% decline in new Human Immune-Deficiency Virus (HIV) infections since 2010 among children, there were 150,000 new HIV infections in 2020, with 37% of them being from the Eastern and Southern Africa countries Kenya included(UNAIDS, 2016, 2017a, 2021).Kenya is one of the largest HIV epidemic countries globally (Kimanga et al., 2014). Of the 1.5 million people living with HIV in Kenya, 7% were children below 15 years by the end of 2017. It was estimated that 15.2% of the 28,200 deaths attributed to illness related to Acquired Immune-Deficiency Syndrome (AIDS) in the same year were children (National AIDS Control Council, 2018).

The HIV pandemic has a diverse geographical distribution in Kenya, with the most affected counties being Homa Bay, Kisumu, Migori, and Siaya (National AIDS Control Council, 2018). Homa Bay County has consistently registered high HIV prevalence since the year 2014, having a prevalence of 25.7% (National AIDS Control Council (NACC), 2014), 26% (National AIDS and STI Control Programme, 2016), and 20.7% (National AIDS Control Council, 2018). The prevalence of HIV in Homa Bay County was 20.7% in 2017, almost 4.2 times higher than the national prevalence and second-highest nationally after Siaya County, which had a prevalence of 21%(National AIDS Control Council, 2018)

Homa Bay County accounted for 10% of children 0-14 years living with HIV in Kenya, and the county also had over 700 new HIV infections among children aged 0-14 years in 2017(National AIDS Control Council, 2018b). This accounted for 8.8% of all the new HIV infections among children in the same year. There were approximately 420 child mortalities attributable to conditions related to AIDS in the year 2017, accounting for 9.7% of all the AIDS related deaths among children in Kenya. Nationally, Homa Bay County had the highest numbers of new HIV infections, annual AIDS-related deaths, and the number of children living with HIV aged 0-14 years in 2017 (National AIDS Control Council, 2018).

Children born by HIV sero-positive mothers with high viral load and low CD4 cell count are more vulnerable to Mother-To-Child Transmission of HIV (MTCT of HIV) (Ngwende et al., 2013). Maternal factors such as maternal immunological status and being on antiretroviral treatment, maternal viral load, obstetric factors such as traumatic delivery, fetal prematurity, and breastfeeding and nutritional practices pose an influence HIV transmission to the child (UNAIDS, 2017b). Other maternal factors include knowledge of HIV status during or before the pregnancy, adherence to ART, place of delivery, and compliance to infant feeding and prophylaxis provision guidelines (Onono et al., 2015). This study sought to establish the extent to which maternal-related factors determine PMTCT outcomes in Homa Bay County.

The involvement of male partners in the uptake of Prevention of Mother-To-Child Transmission (PMTCT) services influences the outcomes in terms of whether the child turns out to be HIV sero-positive or negative. In most cases, men influence whether their partners will attend the first ANC clinic and get tested for HIV, whether or not their female partners will deliver in a health facility, and whether or not they will adopt safe infant feeding practices (Beyene et al., 2018). Part of the study objectives was to establish male partner involvement in the uptake of PMTCT services in Homa Bay County and how it influenced the PMTCT outcomes.

Health system factors can influence access to PMTCT services and PMTCT outcomes. According to the World Health Organization (WHO), achieving access to PMTCT services by all relies heavily on the capability of health systems to deliver the services. The existing gaps in human resource and human resource capacity program management, supply chain, and health financing have been a significant barrier to the scale-up of these services (Goals, 2015). The health system factors associated with MTCT of HIV include health system barriers such as poor provider-client relationships, low uptake of national treatment guidelines, limited HIV education, and overcrowded health systems (Okoko et al., 2017). There is a gap in literature how the health system determinants affect uptake of PMTCT services and the PMTCT outcomes in Homa Bay County based on client's perspectives. This study further sought to assesshow health system factors are associated with uptake of PMTCT services as well as the PMTCT outcomes.

1.2 Statement of the problem

The advent of Anti-Retroviral Therapy (ART) has provided a comprehensive platform through which persons infected with HIV and AIDS can lead health and productive lifestyles. In fact, it

has further provided an avenue through which HIV sero-positive mothers can attain positive pregnancy outcomes aligned to giving birth to health HIV sero-negative infants. However, despite the implementation of PMTCT strategies, the rate of transmission of HIV from mother to child in Kenya is at 8.3% above the WHO target of less than 5%(UNAIDS, 2016). Homa Bay County had the highest contribution to the new HIV cases among children in Kenya according to the Kenya HIV Estimates Reports of 2016 and 2018. The county registered contribution of 15% and 8.8% new cases of HIV among children in the year 2015 and 2017 respectively with an MTCT rate of 8.1% (National AIDS Control Council, 2018b).

Vertical transmission of HIV and AIDS, which is transmission of the infection to an infant during delivery or breastfeeding, is determined by various factors. These factors include maternal, health systems, and male-partner involvement-related factors. As such, these factors predict or determine PMTCT outcome amongst infants and children born of HIV seropositive women. Despite these factors posing some influence on PMTCT outcomes, limited studies have been carried out on the same; hence, limited literature is available. Understanding the determinants of the PMTCT outcomes in Homa Bay County was necessary for developing as well as improving interventions aimed at addressing and reducing their impact on MTCT of HIV outcomes. The study aimed to assess maternal, health-systems, and male partner involvement-related determinants of PMTCT outcomes among women attending care and treatment at Homa Bay County Referral Hospital, Homa Bay County, Kenya.

1.3 Research Objectives

1.3.1 General Objective

The main objective of the study was to assess determinants of prevention of mother to child HIV transmission outcomes among women at the Homa Bay County Referral Hospital, Kenya.

1.3.2 Specific Objectives

The specific objectives of the study were to**;**

i. Establish the maternal determinants associated with Prevention of Mother-to-Child Transmission of HIV outcomes among women at the Homa Bay County Referral Hospital.

ii. Establish the health system determinants associated with Prevention of Mother-to-Child Transmission of HIV outcomes among women at the Homa Bay County Referral Hospital.

iii. Establish male partner involvement determinants associated with Prevention of Mother-to-Child Transmission of HIV outcomes among women at the Homa Bay County Referral Hospital.

1.4 Research Questions

i. What are the maternal determinants associated with Prevention of Mother-to-Child Transmission of HIV outcomes among women at the Homa Bay County Referral Hospital?

ii. What are the health system determinants associated with Prevention of Mother-to-Child Transmission of HIV outcomes among women at the Homa Bay County Referral Hospital?

iii. What are the male partner involvement determinants associated with Prevention of Mother-to-Child Transmission of HIV outcomes among women at the Homa Bay County Referral Hospital?

1.5 Significance of the Study

Prevention of transmission of HIV from mother to child should be achieved in regions that still register large numbers of MTCT of HIV. This will facilitate attainment of World Health Organization's (WHO) goal of eliminating MTCT of HIV globally. The findings reported herein provide crucial insights on context-specific maternal, health systems, and male involvement related determinants of PMTCT outcome. These findings help in the understanding of the determinants of PMTCT of HIV outcomes in Homa Bay County. As such, these results may be adopted by the County Government of Homa Bay, the Government of Kenya (GoK), and other relevant stakeholders for use in supplementing PMTCT intervention strategies. The results further supplement existing body of knowledge and inform further interventions to Prevention of Mother-to-Child Transmission of HIV.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter provides a rigorous analysis of the Prevention of Mother-to-Child Transmission (PMTCT) of HIV. A discussion of a range of scientific articles on the maternal determinants, health system determinants, and male partner involvement in the uptake of PMTCT services and their impact on PMTCT outcomes is presented. Finally, a conceptual framework is provided that captures these relationships.

2.2 Maternal Determinants Associated with PMTCT Outcomes

In a matched case-control study of a sample of 200 participants at 31 ministries of health facilities in Western Kenya by Onono et al. (2015), it was established that some of the maternal determinants of PMTCT outcomes include knowledge of Human Immune-deficiency Virus (HIV) status, adherence to Anti-Retroviral Therapy (ART), and compliance to infant feeding, and infant ART prophylaxis provision guidelines. These determinants, it was established from the study, can influence the PMTCT outcomes individually or collectively. From the study, the risk of Mother-To-Child Transmission (MTCT) of HIV was higher if a woman knew of her HIV status during pregnancy, did not adhere to ART, delivered at home, or if the infant was not put on ART prophylaxis. The study did not however assess the impact of infant feeding which is a critical element of PMTCT.

In another cumulative nested case-control study of HIV Exposed Infants (HEI) enrolled in PMTCT across 20 health facilities in Rongo Sub-County between January and June 2012 by Okoko et al., (2017), poor adherence to infant prophylaxis, lack of awareness of HIV status by the mother, failure to access and adhere to ART, and lack of clinic-based HIV education and counselling was established to significantly contribute to MTCT of HIV despite access to PMTCT services. In a systematic review as well as meta-analysis conducted by Kassa (2018c)on “Mother to child transmission of HIV infection and its associated factors in Ethiopia," it was established that home delivery, lack of ARV prophylaxis for infant, mixed infant feeding, and the absence of mother's PMTCT interventions were significantly associated with MTCT of HIV. In the same study, it is postulated that mixed feeding is associated with diarrheal diseases, which lead to ulcerations in the gastrointestinal tract. The ulcerated gastrointestinal tissues can easily be

the entry point for HIV into the infant's bloodstream. Therefore, adoption of recommended infant feeding options such as exclusive breastfeeding as recommended by the World Health Organization is important.

Another study opined that there is a risk of MTCT of HIV during breastfeeding if the mother has advanced HIV with a lower CD4 count and high viral loads. The risk of breastfeeding based MTCT of HIV is increased by failure to receive post-natal antiretroviral and mixed feeding (Tolle, M. and Dewey, 2010). This was further confirmed in the study by Okoko et al. (2017), who note that infants introduced to mixed feeding prior the age of six months have a higher risk of MTCT of HIV than those who were exclusively breastfed. To decrease the risk of transmission of HIV from mother to child, the Ministry of Health (MoH) in Kenya recommends that the mother adheres to their ARV treatment to help suppress their viral load to a level that is not transmittable and provide ARV prophylaxis to their infants as directed by the service provider (Ministry of Health, 2016).

2.3 Health System Determinants Associated with PMTCT Outcomes

According to Okoko et al. (2017), modifiable health system factors can improve PMTCT outcomes in areas where MTCT rates are high. These include uptake of national guidelines on HIV treatment and prevention of MTCT of HIV, availability of staff, and the quality of services offered in the health facilities. The service providers' quality of counselling plays a crucial role in determining whether a mother will adhere to ART treatment and continue with the PMTCT follow-up (Anígilájé et al., 2016). Anígilájé et al. (2016) further argued that it is crucial to ensure that the waiting time for services is minimal to increase efficiency and allow clients to receive treatment and still attend to their other daily activities. Further, long waiting time at the PMTCT clinics is associated with clients not honoring their clinic appointments and eventually becoming lost to follow up; staff attitude and continued health education to mother on PMTCT are also determinants to MTCT of HIV outcomes (Anígilájé et al., 2016).The health system determinants of PMTCT outcomes and their association with the high cases of MTCT of HIV in Homa Bay County have not been documented. This study sought to establish the determinants and test their association with the PMTCT of HIV outcomes among women at the Homa Bay County Referral Hospital.

2.3.1 Uptake of National Guidelines on HIV Treatment and PMTCT by Health Facilities

The national guidelines provide the treatment protocols for the service providers to ensure the prevention of MTCT of HIV. Based on the guidelines, to prevent the transmission of HIV infection from mother to child (PMTCT); pregnancy status should be established for all women of reproductive age at every HIV clinical visit, and assess their pregnancy intention so that family planning or preconception counselling can be provided appropriately (Ministry of Health, 2016b). The guidelines further recommend that pregnant women attend the four minimum recommended antenatal visits or more, have their delivery done by skilled birth attendants (Ministry of Health, 2016b). Therefore, HIV sero-positive pregnant women should be put on ART to restore and maintain mothers' immune function to prevent transmission of HIV in-utero, labor and delivery, and breastfeeding. Pregnant and breastfeeding HIV sero-positive mothers should take ART to achieve viral suppression (less than 1,000 copies/ml).

The guidelines further provide that there should be Exclusive Breastfeeding (EBF) for all HEI within their first six months of life because mixed feeding is associated with a significantly higher risk of mother-to-child transmission of HIV, diarrhea, and respiratory tract illness. During the breastfeeding period, infants are put on a daily dose of ARV prophylaxis and continued six weeks after breastfeeding cessation (Ministry of Health, 2016b).A nationally representative study by the National AIDS Control Council (2014a) found the attendance of the recommended minimum of four ANC visits by pregnant women to stand at 61.7%, with the majority of the women presenting for their first ANC in the second trimester. The study also established that 45% of exposed infants and 40% of HIV infected women failed to receive ARV prophylaxis. The study's findings also indicated that women who completed all steps in the PMTCT cascade had a lower rate of MTCT of HIV (National AIDS Control Council, 2014b). In the same study, 36% of HIV sero-positive pregnant women did not give birth in a health facility, and only 35% attended the recommended four antenatal visits in Homa Bay County (Sirengo et al., 2014).The study did not however establish the reasons why the pregnant women did not deliver in health a health facility.

This study sought to establish the uptake of national guidelines on HIV Treatment and PMTCT in the provision of services to PMTCT mothers and women of reproductive age. This study

further tested the relationship the between the uptake of the national guidelines and the PMTCT outcomes at the Homa Bay County Hospital**.**

2.3.1.1 The Role of Family Planning in PMTCT Outcomes

Halperin et al. (2009) conducted analysis modelling on 'Benefits and costs of expanding access to family planning programs to women living with HIV". Data was presented from the 139 countries included in the 2008 annual United Nations joint report on HIV/AIDS. The main results focused on the 14 countries with the largest number of HIV infected pregnant women. According to the analysis results, Family Planning (FP) is cost-effective for preventing HIV transmission and unplanned pregnancies and would decrease infant and maternal mortality and lead to a reduction in HIV-related or phanhood. However, the analysis did not capture the access of HIV sero-positive clients to FP methods.

The use of contraceptives as a PMTCT method has yielded remarkable positive results. At the same expenditure levels, contraceptive strategy averts 28.6% more HIV-positive birth than the use of nevirapine to prevent mother to child transmission of HIV (Heidi W., Barbara, J., Rick, H., and Laura, 2006). From these results, it is clear that increasing access of HIV sero-positive women to FP methods can improve the PMTCT outcomes. However, the intervention has also been faced with an unmet need for contraceptives. Unmet need for contraceptives refers to the percentage of in-union or married women within the reproductive age bracket who want to postpone or stop conception but report they are not using any contraceptive method to prevent pregnancy (Mills, S., Bos, E., 2010).

One in thirteen never-married women and more than one in seven married women in the age bracket of 15-19 have an unmet need for contraception across 53 developing countries. According to Sedgh, Ashford, & Hussain (2016) Sub-Saharan Africa has a greater proportion of women with unmet family planning needs than other parts of the world. A study on fertility desires, unmet need for FP, and unwanted pregnancies among HIV-infected women in care in Kinshasa showed that 17.6% who did not want another child had an unmet need for FP. In the follow-up period, it was also identified that 14.1% became newly pregnant among all women interviewed, including 8.7% among women who had initially reported not wanting another child.

In a cross-sectional survey among clients at HIV clinics in Uganda conducted by Wanyenze et al. (2011) on uptake of FP methods and unplanned pregnancies among HIV infected individuals, FP among HIV infected individuals was found to be high though unplanned pregnancies were also high. However, the study didn't examine the use of long-term FP methods, which is more effective in preventing unplanned pregnancies. This study examined the access and use of long-term family planning methods among HIV sero-positive women at the Homa Bay County Hospital.

2.3.1.2 Pre- and Post-Natal Interventions Aimed at Preventing Vertical Transmission of HIV

MTCT of HIV can occur during pregnancy and delivery or postpartum via breastfeeding. Predisposing factors to MTCT of HIV comprise prenatal maternal factors such as low CD4 cell count, high viral load, and advanced clinical stage; obstetric influences such as protracted rupture of membranes and invasive obstetric procedures; and post-natal aspects such as breastfeeding (Tolle, M. and Dewey, 2010). Kassa (2018) articulate that there should be PMTCT interventions during pregnancy, labor, delivery, and breastfeeding to reduce the number of cases of transmission of HIV from Mother to Child. HIV sero-positive women with no PMTCT intervention are more likely to have HIV sero-positive children. Similarly, without PMTCT intervention, it is estimated that 20 to 45% of infants would be HIV-infected. This could be because the use of ARVs reduces maternal viral load and consequently reduces the risk of transmission of HIV from mother-to-child.

2.3.1.3 Antenatal Care

According to a study by Chibwesha et al. (2011), when pregnant mothers start ART at least thirteen weeks before childbirth, it provides great benefits in preventing mother-to-child HIV transmission. HIV sero-positive pregnant women who get ART for eight weeks or less before delivery have a greater risk of HIV being transmitted to their infants than women on ART for thirteen weeks or more (Chibwesha et al., 2011).Chibwesha et al. (2011) further found that it is vital to have HIV counselling and testing for pregnant women at the earliest opportunity and minimize the time taken from being diagnosed with HIV and being started antiretroviral treatment. The viral load for expectant mothers determines the risk of HIV transmission to the infant. Therefore, starting a pregnant woman who is HIV sero-positive on ART earlier in the

pregnancy would provide enough time for viral load monitoring (Chibwesha et al., 2011). Global data by WHO shows that while 86% of pregnant women access Ante-Natal Care (ANC) at least once with skilled health personnel, only 62% receive at least the recommended four ANC visits. Data by UNICEF in 2018 shows that the proportion of women who received at least four ANC visits in Sub-Saharan Africa is 52%. This is despite the WHO recommending a minimum of four ANC visits to allow regular contact with a medical provider, which exposes the pregnant women to services that are important both to them and the infants. According to the WHO, receiving ANC is important in helping women understand warning signs during pregnancy, childbirth as well as preparing for delivery. During ANC visits, pregnant women can get tested for HIV and obtain treatment to prevent MTCT of HIV for those diagnosed HIV sero-positive (Grenier et al., 2019).

2.3.1.4 Skilled Deliveries

Mortality and morbidity for mother and child are reduced significantly when skilled birth attendants attend to pregnant mothers during delivery. According to a study by UNICEF in 2018, millions of births take place yearly without a skilled birth attendant (UNICEF 2018). Research by Kassa, (2018)has shown that HIV sero-positive mothers who deliver at health facilities are less likely to have an HIV sero-positive child compared to HIV sero-positive mothers who deliver at home; a situation attributable to the lack of PMTCT interventions for mothers who deliver at home during and immediately after labor and delivery (Kassa, 2018).HIV infections among infants born to seropositive mothers are higher during labor and delivery, especially when there is no integration of HIV services.

Based on a previous study in Africa, infants who were delivered at home were more prone to harmful traditional practices which heightened the risk of HIV infections such as cord-cutting by shared razor, placenta blood contamination, unplanned circumcision, uvulectomy, pre-lacteal feeding, and breastfeeding from unexamined nipples (Endalamaw et al., 2018).In a retrospective cohort analysis of pregnant HIV infected women attending public antenatal care clinics in Lusaka, Zambia by Chibwesha et al. (2011), the duration of antenatal Highly Active Anti-Retroviral Therapy (HAART) is the most important predictor of perinatal HIV transmission. Based on the study, women who were initiated on HAART at least 13 weeks before delivery had a lower likelihood of transmitting HIV to their infants than those on HAART for four weeks. The

study was however conducted before the institutionalization of WHO guidance of HAART for all and hence it did not examine adherence to ART and viral load monitoring.

2.4 PMTCT Male Partner Involvement in the Uptake of PMTCT Services

Male partner involvement in the uptake of PMTCT services has been found to be critical to adoption and adherence to PMTCT interventions. Absence of male involvement in PMTCT uptake affects the uptake of interventions for PMTCT. Ante-Natal Care (ANC) provides a chance to identify and enroll pregnant mothers and their male partners to prevent MTCT of HIV during pregnancy, at labor and delivery, and during breastfeeding. In some instances, PMTCT mothers report that they donot get permission to be tested for HIV, could be afraid to disclose their HIV status, and in some cases, are prevented from adopting safe infant-feeding practices (Nzitunga, 2019). In a cross-sectional study conducted by Haile & Brhan (2014) on male partner involvement in PMTCT in Mekelle, Northern Ethiopia, knowledge of HIVsero-status, the willingness of mothers to inform their male partners about the availability of voluntary counselling and testing services in ANC/PMTCT and previous history of couple counselling was established to be predictors of increased uptake of ANC/PMTCT services. However, the study did not examine the effect of male partner involvement in PMTCT outcomes.

In another retrospective cohort study by Kalembo et al. (2013) on the association between male partner involvement and the uptake of mother to child transmission of HIV (PMTCT) interventions in Mwanza District, Malawi, "male partner involvement increases the uptake of PMTCT interventions by HIV sero-positive women". The study established that participants with male partner involvement were more likely to use condoms, deliver at the hospital and complete follow up in the program than those without male partner involvement. Women with male partners involved in PMTCT were more likely to have infants who tested HIV negative.

2.5 Conceptual Framework

The study was informed by a conceptual framework adopted and modified from Gourlay et al., (2015). The independent variables under study were maternal features, health-systems factors, and male-involvement related factors. On the other hand, the dependent variable was PMTCT outcomes, which were assessed on a binary scale (positive outcome vs negative outcome). As indicated by the framework, maternal-related factors have a more direct influence on the PMTCT outcomes where mothers with appropriate HIV and AIDS care and treatment features such as

good adherence status and appropriate infant feeding practices are likely to ensure positive PMTCT outcomes. Male-involvement factors such as actively participating in adequate health care seeking behaviors such as ANC attendance and providing a viable means through which spouses can develop concerted efforts towards mitigating the occurrence of HIV and AIDS transmission. On the other hand, health systems factors have a direct influence on PMTCT outcomes in that PMTCT related services such as counseling and provision of ART prophylaxis are domiciled in health care contexts in this case Homa Bay County Referral Hospital. Worth noting is the fact that health systems factors also determine male-involvement in that they provide structures that accommodate mutual involvement of male partners in PMTCT mitigation measures.

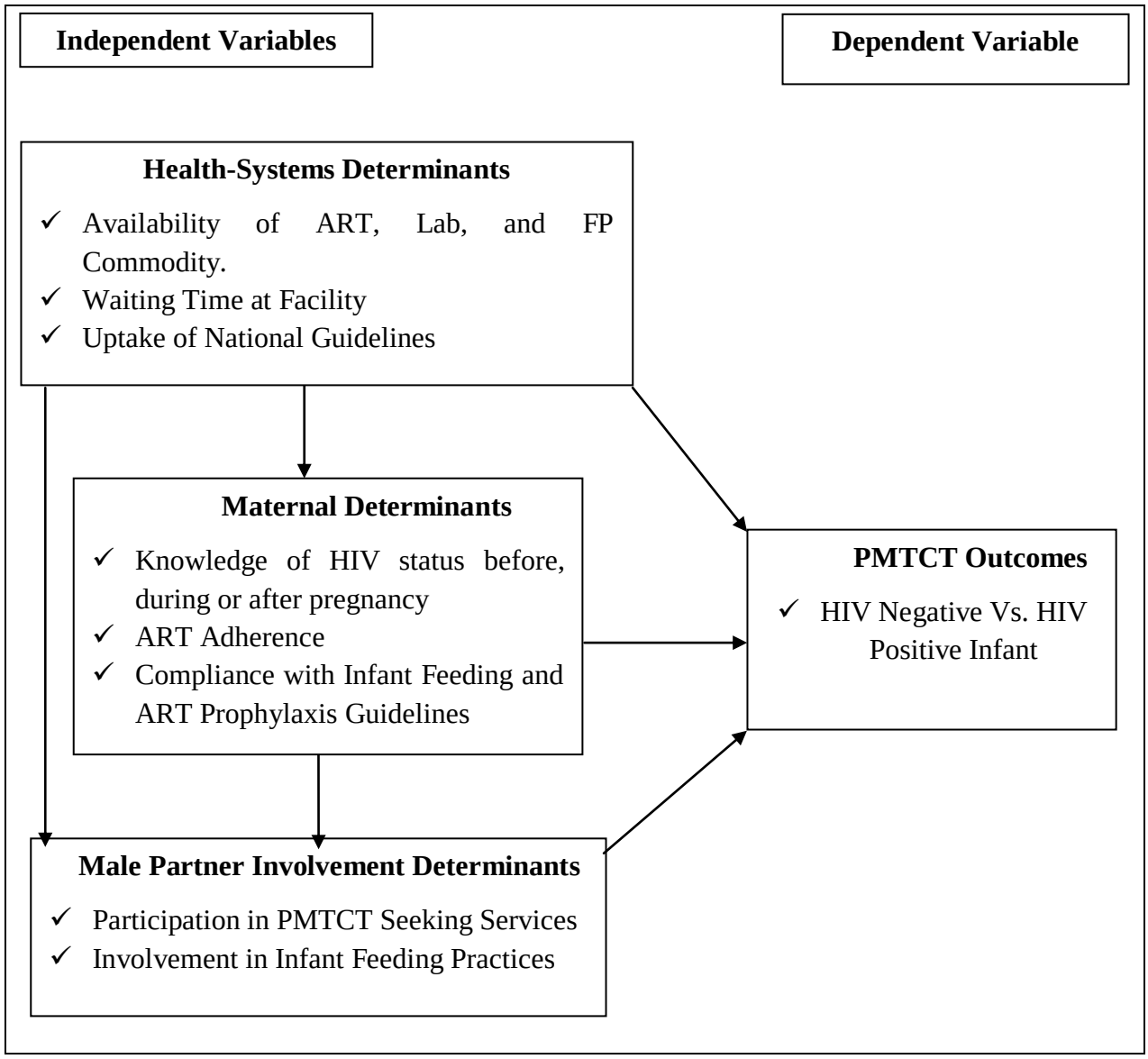

Figure 1.1: Conceptual Framework on the Relationship between Study Variables

CHAPTER THREE
METHODOLOGY

3.1 Introduction

The chapter highlights the research methods and procedures that were used in carrying out the study. It describes the study area, study design, target population, sampling size and sampling techniques, criteria for including and excluding study subjects, data collection methods, data analysis and presentation and the ethical consideration made in the study.

3.2 Study Setting

The study was conducted in the Homa Bay County Referral Hospital (Appendix I). Homa Bay County Referral Hospital is Homa Bay County's major referral health facility. According to the Kenya Health Information System (KHIS), by June 2021, Homa Bay County had 117,816 people enrolled on Anti-Retroviral Therapy (ART), with 6% of them being children less than 15 years, 30% men 15 years or older, and 64% being female 15 years or older. The facility provides care and treatment for 7,346 of all the Human Immune-deficiency Virus (HIV) sero-positive clients drawn from within and outside the county, which accounts for 6.2% of patients on care in the county. These services are provided to the general public at various service delivery points within the facility, namely: Comprehensive Care Centre (CCC), Ante-Natal Clinic (ANC), post-natal clinic, child welfare clinic, and in the maternity. The county has a high HIV prevalence rate of 20.7%. This is nearly four times higher than the national average of 4.9% (National AIDS Control Council, 2018). However, the rate of Mother-To-Child Transmission (MTCT)of HIV in the county is slightly lower at 8.1% compared to the national average of 11.5% (National AIDS Control Council, 2018). The most recent MTCT rates from current published report is from the Kenya HIV Estimates report of 2018.

3.3 Study Design

The study adopted a cross-sectional descriptive hospital-based study design assessing the determinants of the Prevention of Mother-To-Child Transmission (PMTCT) outcomes for women receiving HIV treatment at Homa Bay County Referral Hospital at a point in time. This study design has been successfully adopted in similar studies that assessed the barriers to uptake of PMTCT services in an ANC setting in other countries such as Nigeria (Anígilájé et al., 2016) and Malawi (Van Lettow et al., 2018). The study design further utilized a mixed-methods

approach to collect and analyze quantitative and qualitative data. The quantitative data were collected through a survey using semi-structured questionnaires, while the qualitative data were collected through Key Informant Interviews (KIIs) to inform study findings. Both the quantitative and qualitative study tools were researcher conceptualized and designed.

3.4 Target Population

The target populations were HIV sero-positive women of reproductive age who had ever been on PMTCT follow up during the ANC period, at maternity or post-natal at the Homa Bay County Hospital.

3.5 Study Population

The study populations were HIV sero-positive women of reproductive age on HIV care and treatment at the Homa Bay County Referral Hospital and had ever been on PMTCT follow up within the same facility with documented HIV test outcomes for their children.

3.5.1 Inclusion Criteria

All the HIV sero-positive women of reproductive age receiving care and treatment services at Homa Bay County Referral Hospital with the following characteristics were included in the study;

i. The women must have had a child on PMTCT follow up within Homa Bay County. This is because there are different transmission rates of HIV from mother to child across different counties.
ii. The women must have had a child between 18 and 59 months from the time of the interview.
iii. The women must have consented participation in the study.

3.5.2 Exclusion Criteria

The study excluded HIV sero-positive women of reproductive age on care and treatment services at Homa Bay County Referral Hospital;

i. Who had final HIV test outcomes for the child but transferred from other facilities outside Homabay County during the PMTC follow up period since the difference in mother to child HIV transmission rates in other counties are incomparably lower than that of Homa Bay County?

ii. Who were on HIV care and treatment from within Homa Bay County between 18 and 60 months ago, but their babies did not have documented final HIV test results?

3.6 Sample Size Determination

The desired sample size was determined using the formula of Fishers *et al*. (1998):

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

Where;

n =The desired sample size (if the target population is more than 10,000)

Z = the standard normal deviation, set at 1.96, which corresponds to 95% confidence level

P = Prevalence of HIV for women in the reproductive age 15-49 in Homa Bay= 22.1%(National AIDS Control Council, 2018b).

q =1-p (that is 100-22.1) =77.9% or 0.779

$$n = \frac{1.962 \times 0.221 \times 0.779}{0.05^2} = 264$$

Since the HIV sero-positive women of the reproductive age on care and treatment at the facility target population were less than 10,000, sample adjustment was done using the following formula.

$$nf = n/(1+n/N)$$

where;

nf=The desired sample size, when the population is less than 10,000

n=The desired sample when the population is more than 10,000

N=The estimated population size of HIV sero-positive women of reproductive on care and treatment at the facility.

$$nf = 264/(1+264/4129) = 249$$

An additional 10% (25 participants) was added to cater for non-response(Godden, 2004). Therefore, the sample size was 274 women who had babies on PMTCT follow up at the facility.

3.6.1 Sampling Technique

The two hundred and seventy-four study (274) participants were randomly selected from four thousand one hundred and twenty-nine (4129) women of reproductive age at Homa Bay County Referral Hospital and who had ever been on PMTCT follow up within the same facility with documented HIV test outcomes for their infants/children. The enrolment register was used to identify the files for these HIV sero-positive women and CCC patient unique numbers from the registers were used to identify the patient files of these women clients, which formed the sampling frame. The patient files of these clients were then serialized and a random number generator (STAT Trek) was used to generate two hundred and seventy-four (274) numbers within the range of serialized patient files and the random numbers used to pick the respective patient files.

Clients whose files had been sampled and met the eligibility criteria were then contacted via phone, the study purpose and procedure explained to them and their consent and permission to be included in the study sought. In cases whereby a patient whose file had been randomly picked declined to participate in the study, the reasons for declining were sought and documented, and then the next client was sampled. This continued until the desired sample size was achieved. Upon agreeing to be included in the study, a convenient date and venue for the interview was agreed upon at the patient's convenience for the actual interview. The option of a telephone interview was also made available for the participants.

3.7 Research Instruments

Quantitative survey data were collected using a structured questionnaire (Appendix III), which were available on android mobile devices. The survey collected information on basic demographic information of the participants, their knowledge of their HIV status before pregnancy, adherence to ART treatment, adherence to infant feeding and ART prophylaxis guidelines, compliance with ANC visit requirements, the mode of delivery for the reference child and access to skilled delivery services. The research assistants further used chart abstraction tool (Appendix V)to collect data from HIV Exposed Infant(HEI) registers on PMTCT interventions, clinical outcomes, and demographic data. This was done for all the HEI whose mothers participated in the interview process.

Qualitative data were collected using interview guides (Appendix IV) customised for the Key Informant Interviews (KIIs). The KIIs were tape-recorded, and the voices later transcribed verbatim to understand the underlying reasons and causes for the various issues (quantitative data) established from the survey. Five (5) Key Informants (KI's) were recruited; county HIV coordinator, reproductive health coordinator, facility CCC in charge, community health volunteer, and mentor father in the CCC clinic. These key informants provided information as dictated by the KI interview guide.

3.8 Data collection procedure

The study was supervised over by the researcher himself with the assistance of five (5) research assistants who were recruited through an interview and taken through the research protocols. The research assistants to be involved in the study were required to have the training and practicing experience of Nursing or Clinical Medicine in the context of HIV. In observation of the COVID 19 prevention protocols, all the research assistants and the research participants were provided with surgical masks to be worn during the interview process. The in-person interview was also conducted in a well-ventilated area to allow social distancing during the interview process. Telephone interviews were also made an option for survey respondents uncomfortable with one-on-one interviews in light of the measures put in place for COVID – 19 mitigations. Kobo collect mobile platform was used to collect the data using android mobile devices to reduce the risk of COVID 19 transmission through paper handling.

3.9 Measurement of Variables

Adherence to ART: A client was classified as adhering to ART treatment if they had no missed appointments and had not missed taking their ARVs. Adherence to infant ARV guidelines was defined by not missing to provide infant prophylaxis to their children during the PMTCT follow up.

Compliance to infant feeding guidelines: Compliance to infant feeding guidelines was defined by if a client exclusively breastfed their children during the first six months from birth.

Compliance to ANC visits: The ANC visits by clients were classified as compliant to requirements if they attended first ANC visit within the first three months of pregnancy and the client had at least four visits before delivery.

Male partner involvement: Male partner involvement included the male partner having knowledge of the female partners' HIV status and accompanying her to PMTCT clinics, providing financial facilitation to clinic visits, providing reminders for clinic visits, providing reminders on providing ARV prophylaxis to the child or supportive of discussions on PMTCT interventions. Lack of male partner involvement includes lack of knowledge of the female partner's HIV status and not providing any support for PMTCT follow up.

3.10 Data Processing and Statistical Analyses

Survey data collected through the Kobo collect mobile application were downloaded from the server in the MS Excel format, from where it was cleaned and exported to IBM SPSS Version 20 for analysis using descriptive and inferential statistics. Chi-square test of the association was used to determine the existence of statistically significant associations between PMTCT outcomes and independent variables; maternal-related, health systems-related, and male partner involvement-related factors at $\alpha \leq 0.05$. For the variables depicting statistically significant associations with the PMTCT outcomes, binary logistic regression was used to measure the likelihood of determining PMTCT outcome among the study population as per the proposed conceptual framework. All relationships were tested at a 5% level of significance. Data from the abstraction process were used to complement the survey data at the analysis and reporting level. For the qualitative data, the voices captured in the KIIs were transcribed before coding into MS Word. The data was then coded and analytically organized into applicable sub-themes. The coding framework and analysis was done manually and designed based on the study guide and from reading the KIIs.

3.11 Validity and Reliability

A pre-test was conducted by administering the questionnaire to 24 people (Leung, n.d.)at Makongeni Health Center, which is within the same sub-county as the Homa Bay County Referral Hospital, to determine the validity of the questionnaire. This was in addition to training of research assistant and prearrangement of appointments to guarantee the reliability of the replies from the participants. Validity was ensured through triangulation of the results from both qualitative and quantitative surveys. The data collection plan ensured that mobilization and data collection for both quantitative and qualitative interviews was conducted concurrently to ensure

that respondents for the survey and the participants for KIIs are not the same. This harnessed diverse opinions to enrich the study findings.

3.12 Ethical Considerations

The proposal was submitted for approval by the Maseno University Graduate School (Appendix VIII), after which it was submitted to the Maseno University Ethical Review Committee for ethical clearance (Appendix IX). Permission to collect data was sought from relevant authorities, including the National Council of Science and Technology (NACOSTI) (Appendix X) and the Ministry of Health in Homa Bay County (Appendix XI). It adhered to the 1979 Belmont report on ethical research principles by ensuring that participation was voluntary and all the participants were taken through a consenting process (Appendix II). The participants provided their informed consent before participation.

Participants reserved the right to withdraw from answering further questions without giving explanations. The benefits of voluntary participating in the study were explicitly explained to the participants. The participants were made aware that there were no financial rewards or any form of inducements on offer to influence their decision to participate in the study. The participants were assured of confidentiality for the data they share with deliberate efforts made to ensure that no personal identifying data is included in the data collected, in the analysis output, and in the resultant publications. Field data were kept in lock and key, and the participants' voices and transcripts from the KIIs was disguised to hide the participants' identities and be kept in password-protected hard drives. There was a clearly laid out processes to ensure that the participants are not exposed to COVID 19.

CHAPTER FOUR
STUDY FINDINGS

This chapter contains the findings from the study. It is from these findings that discussions, conclusion, and recommendations were made regarding maternal, health-systems, and male involvement determinants of Prevention of Mother-To-Child Transmission (PMTCT) of Human Immuno-Deficiency Virus (HIV) transmission outcomes among HIV sero-positive women at the Homa Bay County Referral Hospital, Kenya. The findings are presented as per the study objectives, which were to; assess maternal, health-systems, and male partner involvement determinants associated with PMTCT outcomes amongst HIV seropositive mothers attending care and treatment at Homa Bay County Referral Hospital, Homa Bay County, Kenya.

4.1 Study Response Rate

The minimum mandatory sample size for this study was computed as two hundred and forty-nine (249) participants. After adjustment for non-response, a projected sample size of two hundred and seventy-four (274) was realized. Therefore, the expected sample size was 274, however, one (1) questionnaire was rejected for incompleteness; hence, a response rate of 99.6% (273 participants)is reported for this study.

4.2 Description of the Study Population

A majority of the participants; 158 (57.9%) were aged between 30 to 39 years. The mean age of the study participants was 32.16 (± 5.54 SD). A majority; 131 (48.0%) of the participants had completed secondary school level of education. In terms of marital status, more than three-quarters; 224 (82.1%) were married, with a majority of this; 175 (64.1%) reporting to be in monogamous type of marriage. In regards to occupation, most of the participants; 101 (37.0%) reported that they were self-employed Table 4.1).

Table 4.1: Socio- demographic features of the participants

Characteristic	N=273 n	Percentage (%)
Age in Years		
18 to 29	90	33.0
30 to 39	158	57.9*
40 to 49	25	9.2
Mean age: 32.16 (± 5.54 SD)		
Highest Level of Education Attained		
Never went to school	7	2.6
Primary	114	41.8
Secondary	131	48.0*
Tertiary	21	7.7
Marital Status		
Single	18	6.6
Married	224	82.1*
Divorced/Separated	12	4.4
Widowed	19	7.0
Marriage Type		
Married Monogamous	175	64.1*
Married Polygamous	49	17.9%
Occupation		
Employed	57	20.9
Self-employed	101	37.0
Casual Jobs	92	33.7
Not Employed	23	8.4

***:**Majority of the participants

4.3 Maternal determinants of prevention of mother to child HIV transmission outcomes

The maternal determinants of PMTCT outcomes that were assessed include knowledge of HIV status, ART adherence as well as compliance to infant feeding and ART prophylaxis guidelines. Slightly above three-quarters; 207 (75.8%) of the participants reported that they knew of their HIV status prior to conception. Slightly more than average; 145 (53.1%) indicated that they had never missed to attend scheduled clinic visits. For those who missed scheduled visits, having other engagements was the main reason for missing the clinic visit as noted by most of them; 49 (17.9%). A majority of the participants; 209 (76.6%) reported that they had not missed taking Anti-Retroviral Therapy (ART) medications during pregnancy and breastfeeding periods. For those reporting to have missed their ART medications during this period, forgetting was the main reason as postulated by most of them; 36 (13.2%). A high number of the participants; 243

(89.0%) reported that they had not missed to provide ART prophylaxis at least once during the HIV Exposed Infant (HEI) follow up period. For those reporting to have missed to provide the ART prophylaxis, being away from home was the commonly noted reason as indicated by 16 (5.9%) of the participants (Table 4.2 and Figure 4.1).

Almost all; 260 (95.2%) of the participants observed that they practiced Exclusive Breast Feeding (EBF) during the first six months from birth. Slightly more than two-thirds; 184 (67.4%) of the participants observed that they had planned for their last pregnancy with their spouse. In addition, almost all; 261 (95.6%) attended Ante-Natal Clinic (ANC) during the last pregnancy, with most of these; 200 (73.3%) reporting to have started attending clinic in the period between 4 to 6 months of their pregnancy, most of them; 133 (48.7%) reported to have attended ANC four times before delivery, and a high number of them; 252 (92.3%) indicated that they were given ART prophylaxis for the baby during the ANC visits. On the other hand, most of the respondents; 258 (94.5%) reported to have delivered their last pregnancy in hospital. Most of those who did not deliver at a hospital setting mentioned labor complications as the main reason as noted by 6 (2.2%) of them (Table 4.2 and Figure 4.1). For those who did not practice EBF, insufficient breast milk was the main reason as reported by 4 (1.5%) of them (Figure 4.2).

Notable information derived from the KIIs on maternal factors is that there are cases where mothers are engaged in other activities, which hinder their adequate involvement in PMTCT interventions. This was evident by notions expressed by KI_3 who said "… *most of the mothers are not taking care of their babies. They leave them there and the mother goes her own way, to do business or other engagements and then forget to give drugs to the baby for example*." On challenges to practicing EBF, the issue of "not having enough milk" also emerged whereby KI_2reiterated *"there are those mothers who may not be having enough milk, it becomes a challenge so at times we even help them…we try to give them all the best health education to make sure that they really breastfeed. But when a mother doesn't have enough milk it becomes a bit of a challenge for the child to get enough milk. So, we try to give the mother the best health education to eat what they can eat so that the milk can be there for the six months."*

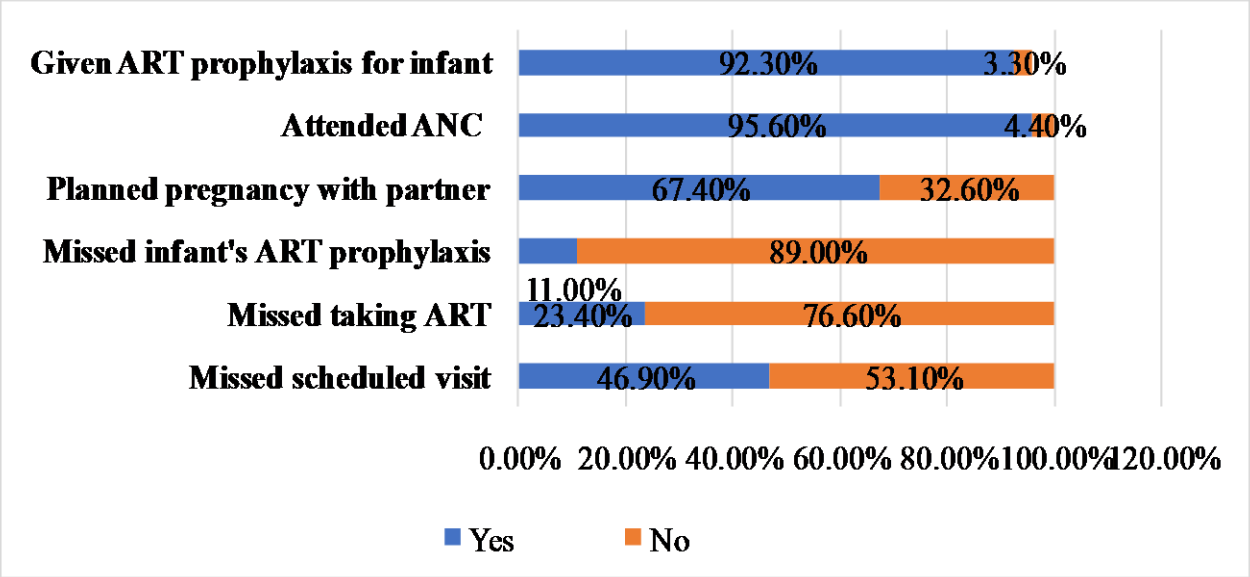

Figure 4.1: Maternal characteristics

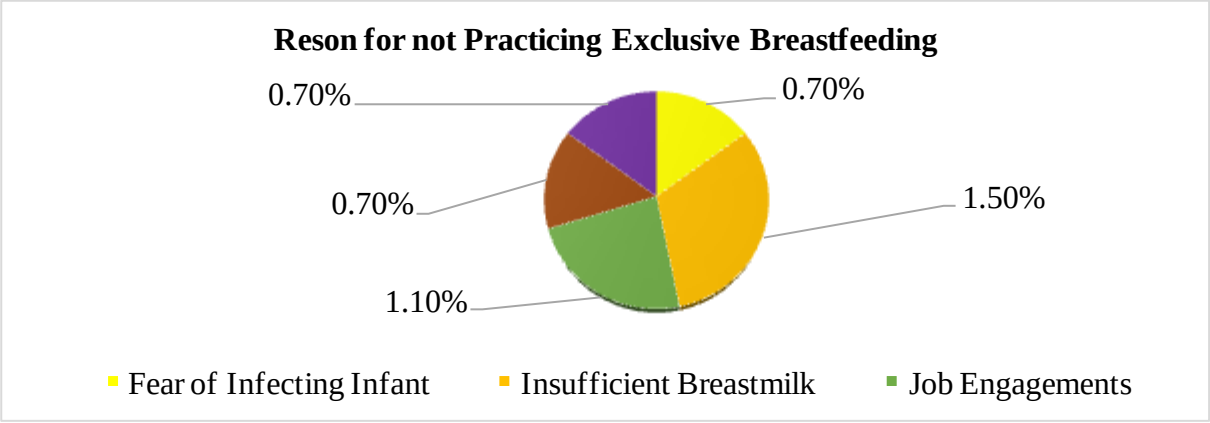

Figure 4.2: Reasons for not practicing Exclusive Breast Feeding (EBF)

4.3.1 Associations between Maternal determinants and PMTCT Outcome

Chi-square tested for associations between maternal characteristics and PMTCT outcome at $\alpha \leq 0.05$. As shown in Table 4.3, statistically significant associations did not exist between; time when the participants knew of their HIV status, missing scheduled clinic appointments, reason for missing to provide ART prophylaxis to the infant during the HEI follow up period, infant feeding option, barriers to EBF, planning pregnancy with partner, attended ANC clinic during last pregnancy, month of pregnancy when started ANC, number of ANC visits, given ART prophylaxis for infant during ANC visits, and Place of delivery with PMTCT outcome (Chi-square: p=0.303, p=0.136, p=0.158, p=0.428, p=0.354, p=0.120, p=0.490, p=0.643, p=0.252,

p=0.649, and p=0.740) respectively. However, the study observed statistically significant associations between; reason for missing scheduled clinic visit, missing to take ART medications during pregnancy and breastfeeding period, reason for missing to take ART medications during pregnancy and breastfeeding period, and missing to provide ART prophylaxis to the infant during the HEI follow up period with PMTCT outcome (Chi=square: p=0.002, p=0.005, p=0.006, p=0.050) respectively.

Table 4.2: Maternal characteristics

	N=273	
Maternal Characteristic	**n**	**Percentage (%)**
When they Knew of their HIV Status		
Before conceiving child	207	75.8*****
During pregnancy	53	19.4
Labour and delivery	6	2.2
During clinic visit after delivery	7	2.6
Reason for missing scheduled clinic visit		
Lacked transport (fare)	23	8.4
Forgot	46	16.8
Had other engagements	49	17.9*****
Was unwell	8	2.9
Other reason	2	0.7
Reason for missing ART during pregnancy/breastfeeding		
Forgot	36	13.2*****
Felt better	2	0.7
Run out of drugs	11	4.0
Was unwell	15	5.5
Reason for missing ART prophylaxis for infant/child		
Was away from home	16	5.9*****
Run out of ART prophylaxis	7	2.6
Forgot	7	2.6
Child/Infant feeding option in the first six months		
Breast milk only	260	95.2*****
Breastmilk and other foods	13	4.8
Month when started ANC		
0 to 3 months	49	17.9
4 to 6 months	200	73.3*****
7 to 9 months	12	4.4
Number ANC visits attended		
Two	16	5.9
Three	76	27.8
Four	133	48.7*****
More than four	36	13.2
Place of delivery		
Hospital	258	94.5*****
At traditional birth attendant	10	3.7
Others	5	1.8

*****: Majority of the participants

Table 4.3: Associations between maternal determinants and PMTCT outcomes

	N=273				
PMTCT Outcome (HIV sero-positive vs HIV Negative)	**Total n (%)**	**Positiven (%)**	**Negativen (%)**	**Chi-square (χ^2)**	**p value**
When they knew of their HIV status					
Before conceiving this child	207(75.8)	8(2.9)	199(72.9)	3.639	0.303
During pregnancy	53(19.4)	1(0.4)	52(19.0)		
Labour and delivery	6(2.2)	1(0.4)	5(1.8)		
After delivery	7(2.6)	0(0.0)	7(2.6)		
Missed going to scheduled clinic visit					
Yes	128(46.9)	7(2.6)	121(44.3)	2.227	0.136
No	145(53.1)	3(1.1)	142(52.0)		
Reason for missing scheduled clinic visit					
Lack of transport (fare)	23(8.4)	0(0.0)	23(8.4)	19.525	0.002*****
Forgot	46(16.8)	4(1.4)	42(15.4)		
Had other engagements	49(17.9)	1(0.4)	48(17.5)		
Was Unwell	8(2.9)	1(0.4)	7(2.6)		
Others	2(0.7)	1(0.35)	1(0.35)		
Missed ART at some point during pregnancy and breastfeeding					
Yes	64(23.4)	6(2.2)	58(21.2)	7.729	0.005*****
No	209(76.6)	4(1.4)	205(75.2)		
Reason for missing ART at some point during pregnancy and breastfeeding					
Forgot	36(13.2)	2(0.7)	34(12.5)	14.517	0.006*****
Felt better	2(0.7)	0(0.0)	2(0.7)		
Run out of drugs	11(4.0)	1(0.4)	10(3.6)		
Was Unwell	15(5.5)	3(1.1)	12(4.4)		
Missed to provide infant with ART prophylaxis during HEI follow up period					
Yes	30(11.0)	3(1.1)	27(9.9)	3.835	0.050*
No	243(89.0)	7(2.6)	236(86.4)		
Reason for missing ART prophylaxis during HEI follow up period					
Away from home	16(5.9)	1(0.4)	15(5.5)	5.202	0.158
Run out of drugs	7(2.6)	1(0.4)	6(2.2)		
Forgot	7(2.6)	1(0.4)	6(2.2)		
Infant feeding option in the first six months					
Breastmilk only (EBF)	260(95.2)	9(3.3)	251(91.9)	0.628	0.428
Breastmilk and other foods	13(4.8)	1(0.4)	6(2.2)		
Barrier to EBF					
Fear of infecting baby	2(0.7)	0(0.0)	2(0.7)	5.533	0.354
Insufficient milk	4(1.5)	1(0.4)	3(1.1)		
Job engagement	3(1.1)	0(0.0)	3(1.1)		
Sick	2(0.7)	0(0.0)	2(0.7)		
Was in school	2(0.7)	0(0.0)	2(0.7)		
Planned last pregnancy with partner					
Yes	184(67.4)	9(3.3)	175(64.1)	2.413	0.120
No	89(32.6)	1(0.4)	88(32.2)		
Attended ANC clinic during last pregnancy					

Yes	261(95.6)	10(3.7)	251(91.9)	0.477	0.490
No	12(4.4)	0(0.0)	12(4.4)		
Month when started ANC					
0 to 3 months	49(17.9)	1(0.4)	48(17.5)	1.675	0.643
4 to 6 months	200(73.3)	9(3.3)	191(70.0)		
7 to 9 months	12(4.4)	0(0.0)	12(4.4)		
Number of ANC visits					
Two	16(5.9)	0(0.0)	16(5.9)	4.090	0.252
Three	76(27.8)	2(0.7)	74(27.1)		
Four	133(48.7)	8(2.9)	125(45.8)		
More than Four	36(13.2)	0(0.0)	36(13.2)		
Given ART prophylaxis for infant during ANC visits					
Yes	252(92.3)	10(3.7)	242(88.6)	0.477	0.490
No	9(3.3)	0(0.0)	9(3.3)		
Place of birth					
Hospital	258(94.5)	10(3.7)	248(90.8)	0.604	0.740
Traditional birth attendant	10(3.7)	0(0.0)	10(3.7)		
Other	5(1.8)	0(0.0)	5(1.8)		

*: Significant at $\alpha \leq 0.05$.

4.3.2 Maternal-related determinants of PMTCT Outcome among women at Homa Bay County Referral Hospital

Binary logistic regression was performed to establish maternal-related determinants of PMTCT outcomes at 95% Confidence Interval (CI). Logistic regression was done to establish the manner in which maternal-related factors demonstrating statistically significant associations at Chi=Square; reason for missing scheduled clinic visit, missing to take ART medications during pregnancy and breastfeeding period, reason for missing to take ART medications during pregnancy and breastfeeding period, and missing to provide ART prophylaxis to the infant during the HEI follow up period determined PMTCT outcomes. Reason for missing scheduled visits had a higher likelihood of determining PMTCT outcome (OR=5.122, 95% CI:0.139-189.53; p=0.002). Similarly, reason for missing to take ART during pregnancy and breastfeeding period presented with a higher likelihood of determining PMTCT outcome (OR=5.751, 95% CI: 0.615-53.781; p=0.006). However, missing to take ART medications during pregnancy and breastfeeding period and missing to provide ART prophylaxis to the infant at some point during the HEI follow up period presented with lower likelihood of determining PMTCT outcome

(OR=0.085, 95% CI: 0.010-0.698; p=0.005) and (OR=0.553, 95% CI: 0.095-3.211; p=0.050) respectively (Table 4.4).

Table 4.4: Binary logistic regression model showing Odds Ratio and 95% Confidence Interval for maternal-related determinants of PMTCT outcome

Variable	P -value	Odds Ratio	95% C.I. for EXP(B)	
			Lower Limit	Upper Limit
Reason for missing scheduled clinic visit	0.002	5.122	0.139	189.353
Missed to take ART medications during pregnancy and breastfeeding period	0.005	0.085	0.010	0.698
Reason for missing to take ART during pregnancy and breastfeeding period	0.006	5.751	0.615	53.781
Missed to provide ART prophylaxis to the infant during the HEI follow up period	0.050	0.553	0.095	3.211

4.4 Health Systems Determinants

As shown in Figure 4.3, almost all; 271 (99.3%) of the participants observed health talks were regularly offered to them during scheduled clinic visits. More than average 165 (60.4%) reported that they have ever failed to get Family Planning (FP) services at the health facility. A further 152 (55.7%) of the participants reported that there are days when they were given fewer Anti-Retro Viral (ARV) drugs due to low availability of stocks. In addition, 146 (53.5%) indicated that they knew of their viral load count prior their last pregnancy. Slightly above three-quarters; 207 (75.8%) not to have missed scheduled viral load sampling/testing, and almost all; 271 (99.3%) reported that early infant diagnosis tests were done at during the HEI follow up period.

Table 4.5 further shows findings on health systems determinants assessed by the study. It shows that almost all; 268; 98.2% of the participants reported that waiting time at the clinic was short and a majority; 77 (28.2%) of those reporting to have missed FP services reported lack of FP commodities as the reason for missing the service. In addition, more than two thirds; 197 (72.2%) had undetectable viral load (LDL copies/ml). Besides, most; 62 (22.7%) of those who reported to have missed viral load sampling observed that stock out of commodities for viral load test as the main reason for missing this service. Further information on health systems factors

were provided by the KIIs, which were in concurrence with information provided by the participants. On health talks KI_1 observes; *"Yes, we have health talks. In the morning we always start with health talks. That is for general then as clients are coming in maybe during palpitation and even FP services then we also give one on one."*In terms of waiting time, KI_4 corroborates information from the participants by noting; "*We have structures to shorten waiting time for clients seeking PMTCT services such as triaging and sometimes we give consultations and medications under one roof such that the PMTCT mothers do not have to line up again for medications refill at the pharmacy."*

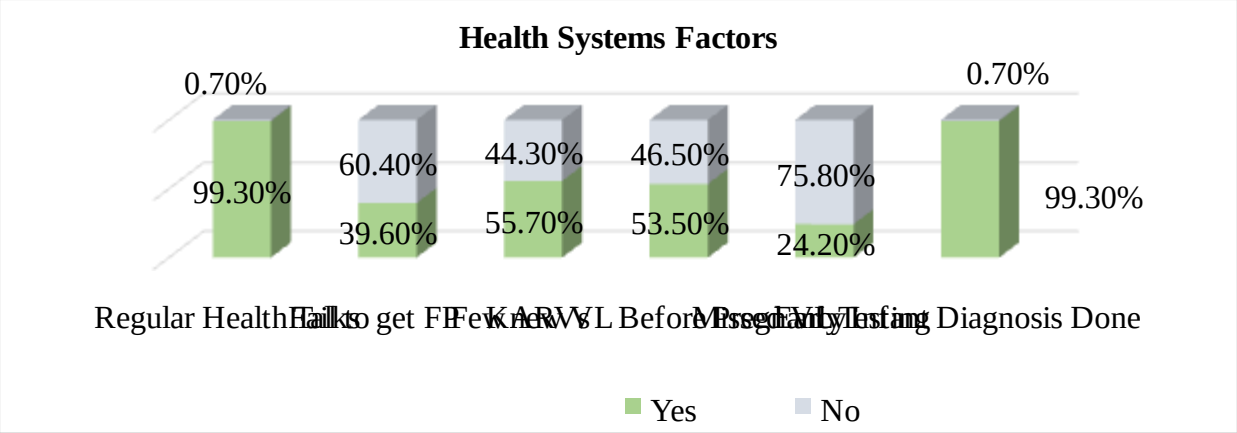

Figure 4.3: Health systems factors

Table 4.5: Health systems factors

Health Systems Factor	N=273 n	Percentage (%)
Waiting time during clinic visits		
Short	268	98.2*****
Long	5	1.8
Reason for failing to get FP service		
Lack of FP commodities	77	28.2*****
Inability to pay required fee	19	7.0
Long queue	6	2.2
Other reasons	6	2.2
Viral load count before pregnancy		
LDL copies/ml	197	72.2*****
Less than 1000 copies/ml	68	24.9
Above 1000 copies/ml	7	2.6
Don't know	1	0.4
Reason for missing schedule viral load testing		
Stock out of commodities for VL sampling	62	22.7*****
Lab staff was absent	4	1.5

*****: Majority of the participants

Health systems factors were also assessed based on the uptake on national PMTCT guidelines. Figure 4.4 shows participant's responses on the uptake of these guidelines at the study setting. As noted, a higher proportion; 191 (70.0%) agreed that FP services were readily available at the Comprehensive Care Clinic (CCC) and Maternal Child Health (MCH). Slightly more than two-thirds; 184 (67.4%) agreed that health care providers provided them with routine pre-conception counselling. In addition, a majority; 172 (63.0%) agreed that they were provided with regular talks on family planning during clinic visits. Similarly, most of the participants; 166 (60.8%) agreed that they were provided with infant feeding counselling during ANC visits, 159 (58.2%) further agreed that they were provided with infant prophylaxis during ANC visits, and 158 (57.9%) agreed that they were taught by health care providers and understood how to administer ART prophylaxis to the infant.

A further 166 (60.8%) indicated that health care providers discussed with them how to prevent transmission of HIV to the infant during HEI follow up period, with more than average; 150 (54.9%) agreeing that health provider provided and discussed with them the infant diagnosis

results, and 161 (59.0%) agreed that their viral load was monitored routinely and results given during pregnancy and HEI follow-up period. From the KII sessions, it was apparent that there are particular structures that help mitigate Mother-To-Child Transmission (MTCT) of HIV. As an example, KI_4 noted; "*So mostly we have got tools, we have pregnancy intention tool. Alongside the tool, if at all the tool is not there, we just guide PMTCT mothers on the prevention measures before conception, during conception and after conception plus any hormonal changes and the preparations during birth and after birth. Plus, we also teach them on breastfeeding, at the same time how to provide the prophylaxis and adherence issues concerning the preventive measures to the infants and themselves as well*."

Overall, the KIIs expressed continued commitment of health systems structures to ensure eradication of MTCT of HIV. In regards to this KI_3 observed *"... if I say from the CCC point of view, we make concerted effort to minimize MTCT of HIV. We continue screening for pregnancy so that when we realize a mother is pregnant, we make sure we put that patient on PMTCT as early as possible and we continue encouraging them to continue attending their ANC as usual, pick their ARVs as usual and ensure that they deliver in the hospital."* However, the KIIs further acknowledged that ART stock outs are a challenge to MTCT that has occurred in the past as KI_4 said *"Yes, there was a time, sometimes back I think was last year or the other year when we did not have the prophylaxis and there was a time also, we didn't have ARVs. Clients did not miss completely but it was being rationed because it was no enough. I think when now there was that issue of shortage on the country but they didn't miss completely."*

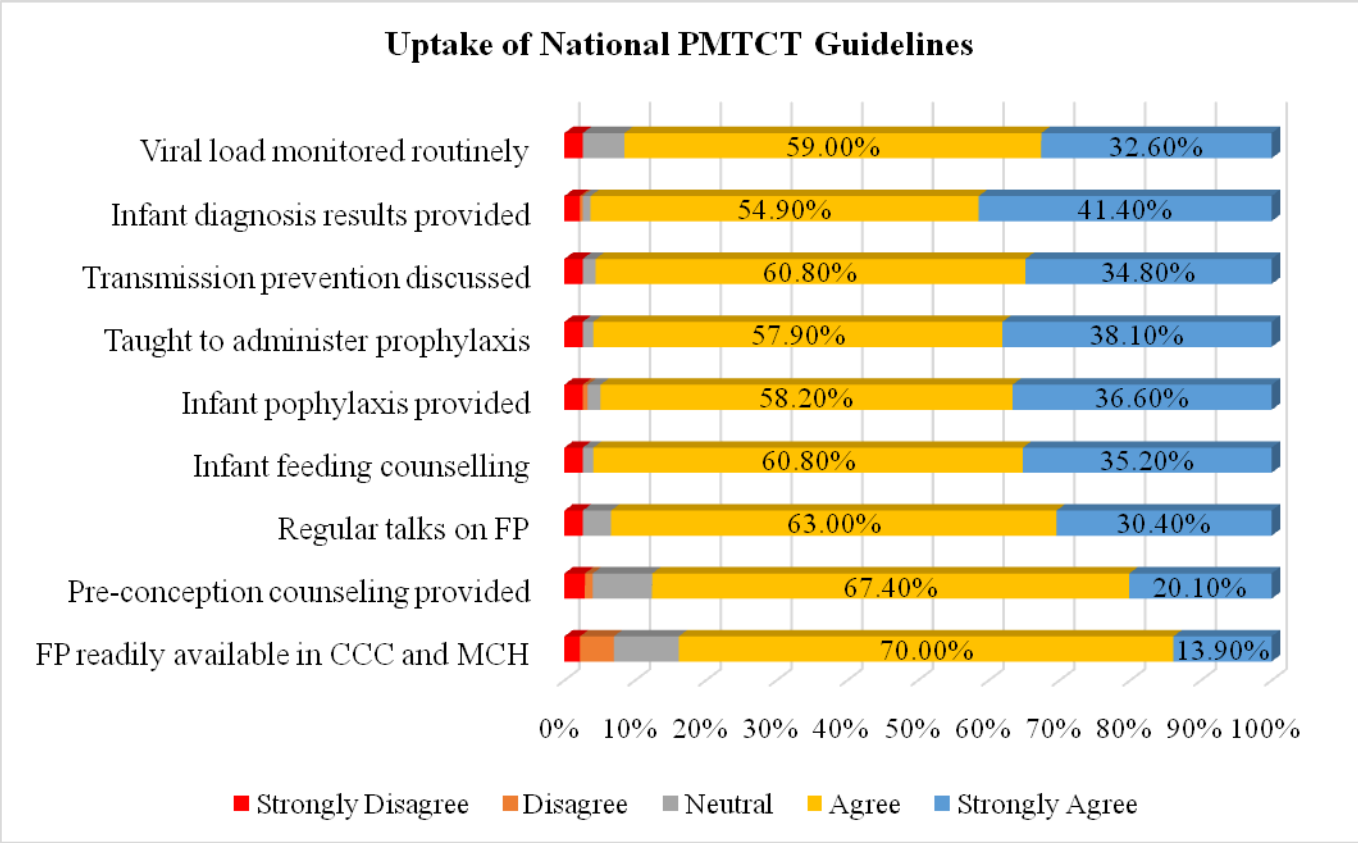

Figure 4.4: Uptake of national PMTCT guidelines

4.4.1 Associations between Health Systems Determinants and PMTCT Outcome

Chi-square tested for association between health systems determinants and PMTCT outcome at $\alpha \leq 0.05$. There was no existence of statistically significant associations between; having regular health talks, waiting time, failure to get FP, ever been given fewer ARV medications, knowing viral load before last pregnancy, viral load count before last pregnancy, and ever missing scheduled viral load sample being taken with PMTCT outcome (Chi-square: p=0.782, p=0.660, p=0.977, p=0.713, p=0.674, p=0.920, and p=0.753) respectively (Table 4.6).

Table 4.6: Associations between health systems determinants and PMTCT outcome

	N=273				
PMTCT Outcome (HIV sero-positive vs HIV Negative) Chi-square (χ^2)					**p value**
	Total n (%)	**Positiven (%)**	**Negativen (%)**		
Health talks regularly offered during clinic visits					
Yes	271(99.3)	10(3.7)	261(95.6)	0.077	0.782
No	2(0.7)	0(0.0)	2(0.7)		
Waiting time during clinic visit					
Short	268(98.2)	10(3.7)	258(94.5)	0.194	0.660
Long	5(1.8)	0(0.0)	5(1.8)		
Failed to get FP Service					
Yes	108(39.6)	4(1.5)	104(38.1)	0.001	0.977
No	165(60.4)	6(2.2)	159(58.2)		
Ever been given fewer ART medications					
Yes	152(55.7)	5(1.8)	147(53.9)	0.136	0.713
No	121(44.3)	5(1.8)	116(42.5)		
Knew viral load before pregnancy					
Yes	146(53.5)	6(2.2)	140(51.3)	0.177	0.674
No	127(46.5)	4(1.5)	123(45.0)		
Viral load count before last pregnancy					
LDL copies/ml	197(77.2)	8(3.1)	189(74.1)	0.493	0.920
<1000 copies/ml	68(24.9)	2(0.7)	66(24.2)		
>1000 copies/ml	7(2.6)	0(0.0)	7(2.6)		
Don't know	1(0.4)	0(0.0)	1(0.4)		
Missed having scheduled viral load sample taken					
Yes	66(24.2)	2(0.7)	64(23.5)	0.099	0.753
No	207(75.8)	8(3.1)	199(75.1)		

Chi-square also tested for associations of uptake of national PMTCT guidelines with PMTCT outcome at $\alpha \leq 0.05$. As shown in Table 4.7, there was no existence of statistically significant associations between; ready availability of FP services, provision of regular talks on FP, provision of infant feeding counselling during ANC, provision of infant prophylaxis during first ANC, being taught and understanding on how to administer ARV prophylaxis, discussion of transmission prevention with health care provider, and routine monitoring and provision of viral load results (Chi-square: p=0.171, p=0.355, p= 0.053, p=0.621, p=0.473, p=0.476, and p=0.367) respectively. However, there was statistically significant associations between; provision of routine pre-conception counselling and provision and discussion of infant diagnosis results with health care provider and PMTCT outcome (Chi-square: p=0.018 and p=0.000) respectively.

Table 4.7: Associations between uptake of national PMTCT guidelines and PMTCT outcomes

	N=273				
PMTCT Outcome (HIV sero-positive vs HIV Negative)	**Total n (%)**	**Positiven (%)**	**Negativen (%)**	**Chi-square (χ^2)**	**p value**
FP services readily available at CCC and MCH					
Strongly Disagree	6(2.2)	1(0.3)	5(1.9)	6.396	0.171
Disagree	13(4.8)	0(0.0)	13(4.8)		
Neutral	25(9.2)	0(0.0)	25(9.2)		
Agree	191(70.0)	6(2.2)	185(68.8)		
Strongly Agree	38(13.9)	3(1.1)	35(12.8)		
Routine pre-conception counselling provided					
Strongly Disagree	8(2.9)	2(0.7)	6(2.2)	11.851	0.018*****
Disagree	3(1.1)	0(0.0)	3(1.1)		
Neutral	23(8.4)	0(0.0)	23(8.4)		
Agree	184(67.4)	7(2.6)	177(64.8)		
Strongly Agree	55(20.1)	1(0.3)	54(19.8)		
Provided with regular talks on FP					
Strongly Disagree	7(2.6)	1(0.4)	6(2.2)	3.250	0.355
Disagree	0(0)	0(0.0)	0(0)		
Neutral	11(4.0)	0(0.0)	11(4.0)		
Agree	172(63.0)	5(1.9)	167(61.1)		
Strongly Agree	83(30.4)	4(1.5)	79(28.9)		
Provided with infant feeding counselling during ANC visits					
Strongly Disagree	7(2.6)	1(0.4)	6(2.2)	7.677	0.053
Disagree	0(0)	0(0.0)	0(0)		
Neutral	4(1.5)	1(0.4)	3(1.1)		
Agree	166(60.8)	5(1.9)	161(58.9)		
Strongly Agree	96(35.2)	3(1.1)	93(34.1)		
Provided with infant prophylaxis during first ANC visit					
Strongly Disagree	7(2.6)	1(0.4)	6(2.2)	2.635	0.621
Disagree	2(0.7)	0(0.0)	2(0.7)		
Neutral	5(1.8)	0(0.0)	5(1.8)		
Agree	159(58.2)	6(2.2)	153(56.0)		
Strongly Agree	100(36.6)	3(1.1)	97(35.5)		
Taught and understood how to administer ARV prophylaxis to infant					
Strongly Disagree	7(2.6)	1(0.4)	6(2.2)	2.512	0.473
Disagree	0(0)	0(0.0)	0(0)		
Neutral	4(1.5)	0(0.0)	4(1.5)		
Agree	158(57.9)	5(1.8)	153(56.1)		
Strongly Agree	104(38.1)	4(1.5)	104(36.6)		
Transmission prevention discussed with health care provider					
Strongly Disagree	7(2.6)	1(0.4)	6(2.2)	2.498	0.476
Disagree	0(0)	0(0.0)	0(0)		

Neutral	5(1.8)	0(0.0)	5(1.8)		
Agree	166(60.8)	6(2.2)	160(58.6)		
Strongly Agree	95(34.8)	3(1.1)	92(33.7)		
Infant diagnosis results provided and discussed					
Strongly Disagree	6(2.2)	0(0)	6(2.2)	27.250	0.000*****
Disagree	1(0.4)	1(0.4)	0(0)		
Neutral	3(1.1)	0(0.0)	3(1.1)		
Agree	150(54.9)	4(1.5)	146(53.4)		
Strongly Agree	113(41.4)	5(1.8)	108(39.6)		
Viral load routinely monitored and result given during pregnancy and HEI follow-up period					
Strongly Disagree	7(2.6)	1(0.4)	6(2.2)	3.163	0.367
Disagree	0(0)	0(0.0)	0(0)		
Neutral	16(5.9)	0(0.0)	16(5.9)		
Agree	161(59.0)	5(1.8)	156(57.2)		
Strongly Agree	89(32.6)	4(1.5)	85(31.1)		

*****: Significant at $\alpha \leq 0.05$.

4.4.2 Health Systems Determinants of PMTCT Outcomes among Women at the Homa Bay County Referral Hospital

Binary logistic regression was performed to establish health systems-related determinants of PMTCT outcomes at 95% Confidence Interval (CI). Logistic regression was done to establish the manner in which health systems related factors aligned with uptake of national guidelines on PMTCT demonstrating statistically significant associations at Chi-square; routine pre-conception counselling provided and infant diagnosis results provided and discussed with health care provider determined PMTCT outcomes. As shown in Table 4.8, provision of routine pre-conception counselling had lower likelihood of determining PMTCT outcome (OR=0.404, 95% CI:0.046-3.521; p=0.018). Nonetheless, provision and discussion of infant diagnosis results had a high likelihood of determining PMTCT outcome (OR=1.530, 95% CI: 0.361-6.486; p=0.000).

Table 4.8: Binary logistic regression model showing Odds Ratio and 95% Confidence Interval for health systems-related determinants of PMTCT outcome

Variable	P -value	Odds Ratio	95% C.I. for EXP(B)	
			Lower Limit	Upper Limit
Provided with routine pre-conception counselling	0.018	0.404	0.046	3.521
Infant diagnosis results provided and discussed	0.000	1.530	0.361	6.486

4.5 Male Partner Involvement Determinants

In regards to male-partner involvement, a majority; 224 (82.1%) of the participants indicated that their partners were aware of the HIV status, 165 (60.4%) did not provide them with transport facilitation to the clinic, 153 (56.0%) did not remind them of PMTCT clinic dates, 154 (56.4%) paid for their services at the clinic, 157 (57.5%) did not remind them on time to provide ART prophylaxis to child, and 143 (52.4%) were not able to administer infant prophylaxis in their absentia (Figure 4.5).Figure 4.6 further showcases the participant's responses on their male partner's reaction about discussions on interventions to prevent transmission of HIV to the child whereby three quarters; 206 (75.5%) were supportive.

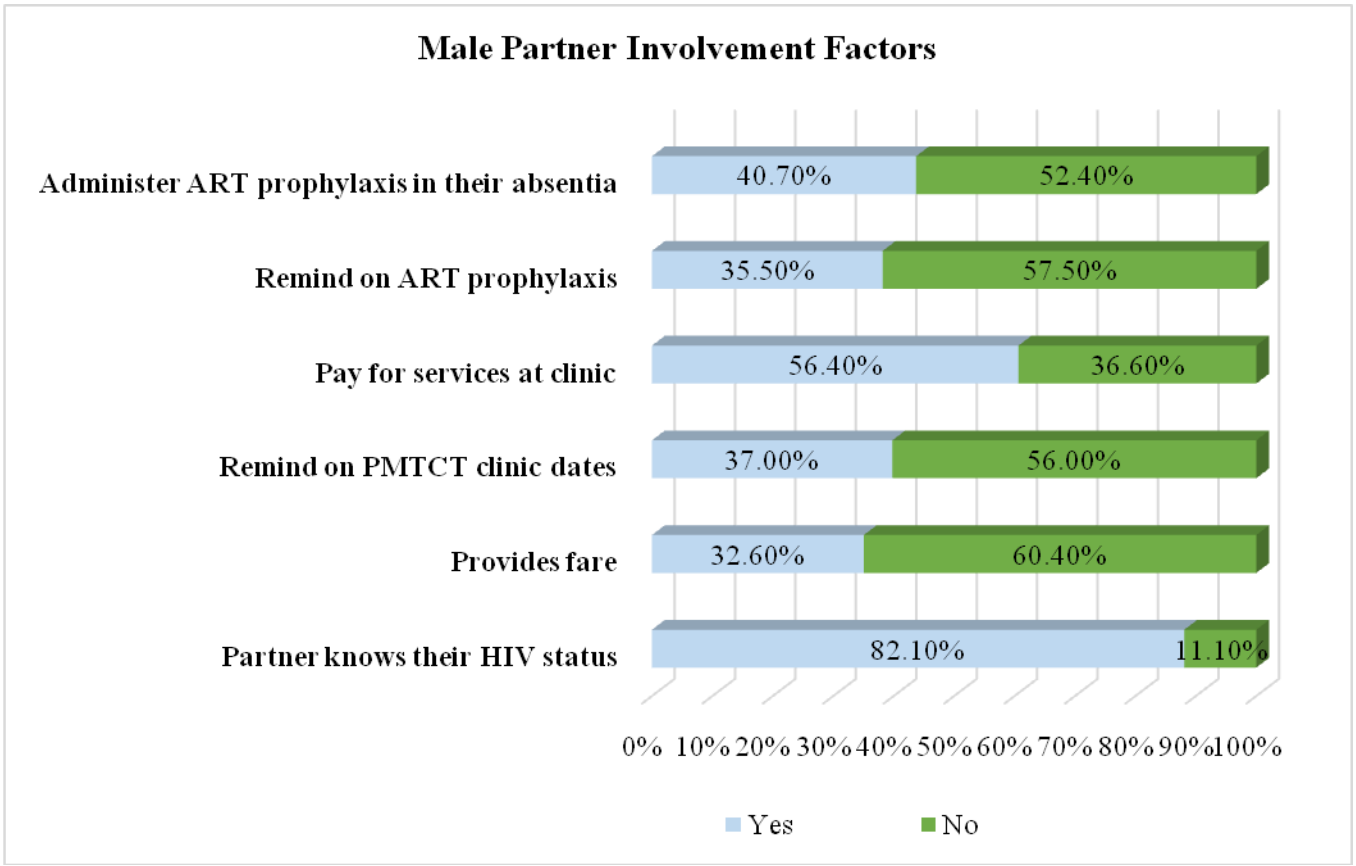

Figure 4.5 Male partner involvement factors

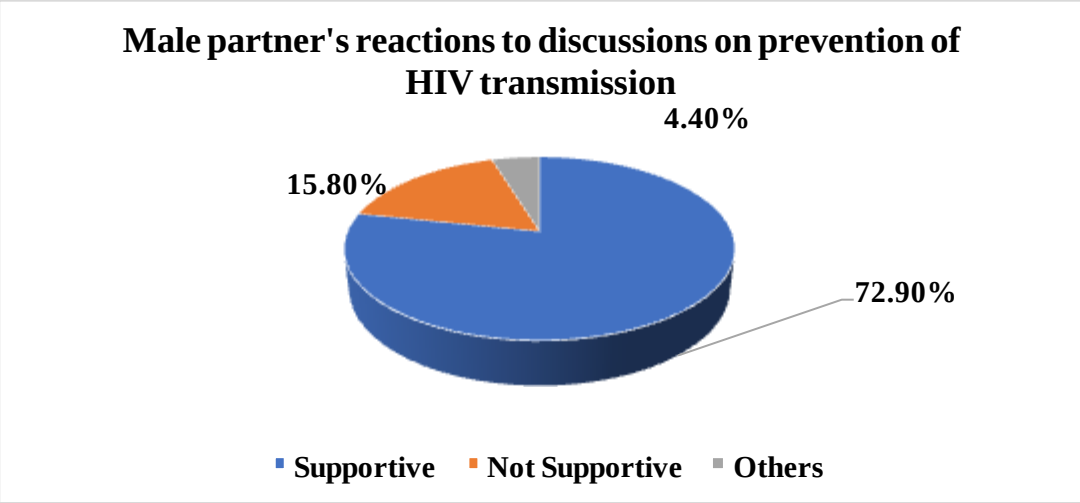

Figure 4.6 Male partner's involvement in discussions on prevention of HIV transmission to child

On male partner involvement factors, KIIs further expressed notions that various strategies have been devised to enhance male partner involvement in PMTCT strategies. To encourage ANC attendance for example, PMTCT mothers accompanied by their spouses are often given services promptly to prevent longer waiting time at the clinic area by men who are often shy to be seen in such areas (KI_1& KI_3, 2022). On a similar note, KI_4 reported that *"...some men don't want to come near where women are and they know what happens in the MCH or PMTCT clinic. And some are just too busy; they don't have time for the women after giving the pregnancy. So, a few support others are not interested but we pass the information."*

4.5.1 Associations between Male Partner Involvement determinants and PMTCT Outcomes

Chi-square test was performed to establish association between male partner involvements related factors and PMTCT outcome at $\alpha \leq 0.05$. As shown in Table 4.9, there was no existence of statistically significant associations between; male partner providing transport facilitation, male partner reminding on PMTCT clinic dates, male partner paying for services at the clinic, male partner reminding of ART prophylaxis time, and male partner administering ART prophylaxis to child when PMTCT mother is absent with PMTCT outcome (Chi-square: p=0.670, p=0.520, p=0.057, p=0.057, and p=0.132) respectively. However, the study observed existence of statistically significant associations between male partner knowing HIV status of the

participant(s) and male partners reaction to discussion on prevention of HIV transmission to child and PMTCT outcome (Chi-square: p=0.000 and p=0.000) respectively.

Table 4.9: Associations between male partner involvement and PMTCT outcome

	N=273				
PMTCT Outcome (HIV sero-positive vs HIV Negative)				**Chi-square (χ^2)**	**p value**
	Total n (%)	**Positiven (%)**	**Negativen (%)**		
Male partner knows my HIV status					
Yes	224(82.1)	3(1.1)	221(81.0)	26.255	0.000*
No	30(11.0)	6(2.2)	24(8.8)		
Male partner provides transport facilitation					
Yes	89(32.6)	2(0.7)	87(31.9)	8.000	0.670
No	165(60.4)	7(2.6)	158(57.8)		
Male partner reminds on PMTCT clinic dates					
Yes	101(37.0)	2(0.7)	99(36.3)	1.309	0.520
No	153(56.0)	7(2.6)	146(53.4)		
Male partner pays for services at the clinic					
Yes	154(56.4)	2(0.7)	152(55.7)	5.733	0.057
No	100(36.6)	7(2.6)	93(34.0)		
Male partner reminds of time to provide ART prophylaxis for child					
Yes	97(35.5)	0(0)	97(35.5)	5.732	0.057
No	157(57.5)	9(3.3)	148(54.2)		
Male partner's reaction to discussion on prevention of HIV transmission to child					
Supportive	199(72.9)	2(0.7)	197(73.6)	23.973	0.000*****
Not supportive	43(15.8)	7(2.6)	36(13.2)		
Others	12(4.4)	0(0.0)	12(4.4)		
In absentia, male partner administers ART prophylaxis to child					
Yes	111(40.7)	1(0.4)	110(40.3)	4.049	0.132
No	143(52.4)	8(2.9)	135(49.5)		

*****: Significant at $\alpha \leq 0.05$.

4.5.2 Male Partner Involvement Determinants of PMTCT Outcome

Binary logistic regression was performed to establish male partner involvement-related determinants of PMTCT outcomes at 95% Confidence Interval (CI). Logistic regression was done to establish the manner in which male involvement-related factors demonstrating statistically significant associations at Chi-square; male partner knowing HIV status of the participant(s) and male partner's reaction to discussion on prevention of HIV transmission to child determined PMTCT outcomes. Male partner knowing the HIV status of the participant(s) presented with high likelihood of determining PMTCT outcome (OR=6.0, 95% CI:0.655-54.997; p=0.000). Male partner's reaction to discussion on HIV transmission to child/infant presented with an infinite likelihood of predicting PMTCT outcome (OR=0.000, 95% CI: 0.000-; p=0.000) as shown in Table 4.10 below.

Table 4.10: Binary logistic regression model showing Odds Ratio and 95% Confidence Interval for male partner involvement-related determinants of PMTCT outcome

Variable	P - value	Odds Ratio	95% C.I. for EXP(B)	
			Lower Limit	Upper Limit
Male partner knowing HIV status of participant	0.000	6.000	0.655	54.997
Male partner reaction to discussion on HIV transmission to infant	0.000	0.000	0.000	

4.6 Summary of Qualitative Data from Key Informant Interviews

Qualitative data were collected from five (5) Key Informants (KI's) who were purposelfully recruited into the study; one (1) county HIV coordinator, one (1) reproductive health coordinator, one (1) facility CCC in charge, one (1) community health volunteer, and one (1) CCC nutritionist. Table 4.11 provides a summary of the findings from the KIIs.

Table 4.11: Summary of key findings derived from KIIs

Theme	Description of Theme	Relevant Quotes
Maternal-Related Factors	KIIs generally indicated that there are variations in maternal PMTCT related characteristics, however, most mothers adopted features that conform with recommended individual PMTCT related practices.	*"Provision of PMTCT related services such as Family Planning, and ART are convenient, well-structured and readily available. This makes it easy for PMTCT mothers to adopt positive and recommendable individual PMTCT strategies"* (KI3, 2022).
Health Systems Factors	KIIs reported that health systems structures are well laid to ensure sustained provision of PMTCT intervention strategies.	"*All PMTCT health systems structures such as FP are readily available and domiciled in the CCC and MCH to enable PMTCT mothers' access then when they need. Furthermore, other PMTCT commodities such as ART prophylaxis, laboratory and reagents for viral loading, and requisite support services such as counselling are readily available, except in very rare occasions when these service provisions are interrupted*"(KI_2, 2022)
Male-Partner Involvement Factors	KIIs reported that male involvement still remains a challenge since initiatives were initially supported but have since been disregarded.	KI_5 (2022) says "*we have always attempted to encourage PMTCT mothers to convince their male partners to be involved, but these efforts have been futile. Men generally are not receptive of HIV management options and even during early stages of their diagnosis, they do not show up in hospital unless they are extremely sick*."

CHAPTER FIVE
DISCUSSIONS

This section provides a discussion on the study findings in comparison with findings from other studies done in various settings all around the globe. Findings on the dependent variable; Prevention of Mother-To-Child-Transmission (PMTCT) outcome, which was assessed based on the Mother-To-Child-Transmission (MTCT) of Human Immune-Deficiency Virus (HIV) rate were discussed. The findings were discussed in tandem with study objectives. Thus, deductions were made, based on the discussions articulated in this chapter.

5.1 Determinants of Prevention of Mother-To-Child Transmission Outcome

The present study reports MTCT of HIV rate of3.7% amongst HIV sero-positive women of reproductive age (aged 18 to 49 years) on PMTCT follow up at the study setting; Homa Bay County Referral Hospital, Kenya. The rate reported herein is lower than that reported by the Kenya HIV Estimate Report of 2018which reported an MTCT rate of 8.1% for Homa Bay County (National AIDS Control Council, 2018b).However, the Kenya HIV Estimate report covered the entire Homa Bay County while the current study was limited to a single health facility in Homa Bay County

A study done in India by Potty et al. (2019) reported a MTCT rate of 7.8%. However, the Indian study focused on children with maternal exposure period of 24 months whereas the current one focused on maternal exposure of between 18 and59 months. Another study done in Rwanda by Remera et al. (2021)in a cohort of 5,308 children born of HIV sero-positive mothers from data collected in the years 2013, 2014, and 2015 reports aMTCT of HIV rate of 1.6%, which is lower than the rate observed in the current study. Remera et al. (2021) measured PMTCT outcome attributable to maternal exposure amongst 5,308 PMTCT mothers at 18 months compared to 273 PMTCT mothers sampled by the current study whose children's HIV status was assessed in the period between 18 to 60 months. This shows that the variations in MTCT of HIV rate are dependent on exposure period and sample of the population studied. Despite the differences in methodologies or study designs used to assess MTCT of HIV rates in the studies referenced above, it is apparent that contextual factors play a role in determining MTCT of HIV rates. It was on this basis that the current study was informed to assess maternal, health systems, and male involvement related determinants of PMTCT outcome.

5.2 Maternal determinants and PMTCT Outcomes

The current study investigated a host of maternal determinants with the sole intent of establishing their role in determining MTCT of HIV among women at the Homa Bay County Referral Hospital. Based on the present study findings, reason for missing scheduled clinic visit exhibited statistically significant association with PMTCT outcome (chi-square (χ^2): p=0.002).Similar findings were observed in a Cameroonian study by Bigna et al. (2014), which reported the existence of statistically significant associations between missed clinic visits and effectiveness of PMTCT interventions (χ^2: p=0.04). The present study and the Cameroonian study are comparable because both were done in developing country settings. However, they differ in the methodologies used in that the Cameroonian study used a case-control whereas the present study used a cross-sectional study approach. Despite this difference in methodologies, both study findings show that missed clinic visits regardless of the reason for missing the visits hinder the realization of the goal of eliminating MTCT of HIV. This is because when HIV sero-positive women on PMTCT follow up miss scheduled clinic visits, it results in non-adherence issues, which enhances attrition of PMTCT interventions (Ndaimani et al., 2017).

The current study further established that there was a statistically significant association between missing to provide ART prophylaxis to infant and PMTCT outcome (χ^2: p=0.050).This conforms with findings from a previous study done in Kenya by Okoko et al. (2017), which reported that poor adherence, failure to access ART, and failure to provide ART prophylaxis to infant significantly contributed to MTCT of HIV. The present and the afore-mentioned study are comparable in that both were done in rural Kenyan contexts. They differ in methodology in that the later study used a case-control approach, whereas we used a cross-sectional approach. This further shows that variations in methodologies employed or study contexts may not result in much differences in associations between maternal determinants and MTCT to HV outcomes. This is because an Ethiopian study using case-control approach Ethiopia by Hussen et al. (2022) reports that maternal failure to continually provide ART prophylaxis and overall non-adherence had higher odds of predicting MTCT of HIV (AOR: 4.89, 95% CI: 1.34 to 17.88). Deductively, non-adherence to ART medication is the primary factor that lowers maternal viral load; hence, providing a viable platform for minimal MTCT of HIV.

On the other hand, the current study reports that time when participants knew of their status did not depict any statistically significant associations (χ^2: p=0.303). This finding is contrary to findings from a study done in Western Kenya by Onono et al. (2015) who observe that mother knowing their status during pregnancy presented with higher chances of mothers transmitting HIV infection to their infants. The Western study is similar to the current study in that both settings are situated in the Western Kenyan regions, nonetheless, the methodologies used were different. This shows that there are other factors other than knowledge of HIV status that may predict the associations with MTCT to HIV outcomes, factors which may be explored further by future studies. Based on the existing body of knowledge, a HIV sero-positive mother knowing their HIV status prior conception enhances participation of PMTCT processes; hence, determine PMTCT outcome(Dionne-Odom et al., 2016), however, this was not the case in the current study.

On another note, type of infant feeding option adopted for infants aged 0 to 6 months by participants in the current study did not exhibit any association with PMTCT outcome (χ^2: p=0.428). This contradicts notions expressed by studies by Beyene et al. (2018) and Yah & Tambo (2019), who report that Exclusive Breast Feeding (EBF) lowers the risk of MTCT of HIV by three (3) to four (4) times. Despite most of the participants; 260 (95.2%) practicing EBF, there were no statistically significant associations with PMTCT outcome. The apparent variations in associations between infant feeding option and MTCT to HIV outcomes are a result of variations in the assessment of infant feeding option Beyene et al. (2018). However, the observation on non-significant associations in the present study should not water-down proven evidence on the colossal role played by EBF in averting MTCT of HIV.

Ante-Natal Clinic attendance was examined as part of the potential maternal determinants of PMTCT outcome. The study did not observe statistically significant associations between number of ANC visits made by the PMTCT mothers and PMTCT outcome (χ^2: p=0.252). This finding contradicts findings from a study done in Lodwar County Referral Hospital, Kenya by Ongaki et al. (2019), which report significant association between PMTCT outcome and attending one or more ANC visits (OR=2.8, 95% CI: 1.3-6.2).Significant associations between ANC attendance and PMTCT outcome vary depending on maternal factors such as age. In a study done in Kwa-Zulu Natal in South Africa, higher ANC clinic attendance did not guarantee a

reduction in MTCT risk (Horwood et al., 2013). This finding is similar to that observed in the current study despite the fact that Horwood et al. (2013)study was done amongst adolescent's HIV sero-positive mothers contrary to adult HIV sero-positive mothers investigated by the current study. This means that similarities in determinants of PMTCT outcomes may be noted even in cases of socio-demographic differences in the population under study.

An array of studies on maternal determinants of PMTCT outcomes report finding on collective rather than individual maternal determinants. Maternal determinants are often multifactorial in nature, with each posing varying influence on PMTCT outcome. Presence of significant associations between some of the maternal factors investigated by the study does not mean that factors that did not show significance should be accorded lesser consideration in matters PMTCT. This is because achievement of elimination of MTCT of HIV calls for concerted consideration of potential determinants, which as previously connoted herein, are multi-factorial (Anigilaje et al., 2016). Deductively, maternal factors determine the intention of HIV sero-positive women on PMTCT follow up to sustainably partake in PMTCT interventions. Sustained participation in PMTCT interventions entails pursuing PMTCT interventions during pregnancy, delivery, and breastfeeding period. While it is true that a host of PMTCT interventions domiciled in the health settings, individual maternal factors determine adoption of practices recommended by such health systems structures (Moses et al., 2021). Overall, maternal factors work in tandem with health systems factures/structures to ensure success of PMTCT.

5.3 Health Systems-Related determinants and PMTCT Outcomes

Health systems structures remain the core determinants of PMTCT outcomes. This is based on the primary fact that PMTCT interventions are often domiciled in health care contexts. Furthermore, success of other determinants such as maternal and male related determinants are often dependent on the nature of health systems factors (Silumbwe et al., 2018). As an example, health systems factors may ensure provision of viable platforms where males can confidently partake in PMTCT interventions. On the same note, health systems factors determine the ability of mothers to adopt positive maternal related determinants such as Family Planning (FP). The current study assessed a set of health systems factors that determine PMTCT outcomes. An array of health systems factors assessed by the study did not demonstrate significant associations with PMTCT outcome. Regular provision of health talks on PMTCT issues at the PMTCT clinics did

not show significant association with PMTCT outcome (χ^2: p=0.782). Despite almost all participants; 271 (99.3%) reporting that they were accorded regular talks at the clinic, this did not show association with PMTCT outcome. These findings contradict findings from(Onono et al., 2015)who report absence of health talks on HIV caused MTCT of HIV (OR=3.57, 95% CI: 1.36–9.33), since presence of regular health talks did not determine the observed PMTCT outcomes.

Waiting time is another health systems determinant that was investigated by this study. Waiting time determines different facets aligned with client retention, not only in HIV patient care contexts, but across all the health service provision contexts (Genberg et al., n.d.). This notion is confirmed by Anigilaje et al. (2016)who observe that longer waiting times in PMTCT clinics is associated with client attrition because its results in client's failure to honor scheduled clinic visits for ART care and other PMTCT management options. Shorter waiting time at HIV clinics often results in alleged satisfaction with care amongst HIV sero-positive persons attending ART clinic (Atnafu et al., 2015; Olowookere et al., 2012). This leverages the attainment of positive treatment outcomes; hence, may contribute to success in PMTCT outcomes. Nonetheless, in this study, there was no significant association between client waiting time and PMTCT outcomes. Waiting time for most of the participants; 268 (99.8%) was short, however, this did not demonstrate association with PMTCT outcome (χ^2: p=0.660).

Family Planning has been identified as an integral factor in mitigating MTCT of HIV. Therefore, access to FP has been integrated as a crucial component of PMTCT interventions. According to Sarnquist et al. (2014), use of FP by PMTCT mothers prevents more than 28.6% of MTCT of HIV cases when compared to nevirapine prophylaxis. This shows that enhanced provision of FP can provide a viable means of attaining effective PMTCT outcomes. Even so, this was not the case in the current study whereby we found no statistically significant association between failing to get FP service and PMTCT outcome (χ^2: p=0.977). However, the study observed that there was an unmet need for FP as 165 (60.4%) of the participants reported to have ever failed to get FP service of their choice at the facility. Such an unmet need for FP has a wider array of implications, especially on matters PMTCT because provision of FP is a critical pillar to planning pregnancy amongst HIV sero-positive persons, which is a core aspect in the control and prevention of MTCT of HIV (Wilcher et al., 2013).

A high proportion of health systems factors dictate the success of PMTCT interventions. To be precise, health systems factors help mitigate common drop offs along the PMTCT cascade; hence, ensuring success of PMTCT (Osório et al., 2021). Drop offs are often evident from an array of factors such as lack of viral load testing, which hinders the monitoring of ViralLoad (VL) as a means of averting high VL incidences amongst mothers as a factor that increases MTCT of HIV(van Heerden et al., 2022). Worth noting is the fact that VL testing is domiciled in the health systems; hence, mothers' intention to ensure routine monitoring of VL may be hindered by the lack of requisite laboratory supplies at the facilities they attend for PMTCT services. In the current study, 24.20% of the participants reported to have missed VL testing schedule, whereby most of this; 22.7% reported that stock out of commodities for VL sampling was the main reason for missing VL testing schedule. This finding shows that the participants experienced drop offs along the PMTCT cascade as a result of missing VL sample collection schedule.

Despite the apparent drop off mentioned above, the study did not find an association between missing VL sampling and PMTCT outcome (χ^2: p=0.753). Therefore, for this study components on VL did not have a relationship with PMTCT outcome as further evident by the absence of significant association between VL count before pregnancy and PMTCT outcome (χ^2: p=0.920). More than three-quarters of the participants; 77.2% had undetectable VL, which shows that drop offs related to missing VL sampling were perhaps rare; hence, posing minimal influence on PMTCT outcome. Nonetheless, appropriate action should be taken by stakeholders involved in PMTCT care in the current study settings and other settings to avert any form of drop offs. This is because leakage or drops offs related to health systems factors may impacts on health care delivery, especially for PMTCT mothers; hence, reducing the effectiveness of PMTCT interventions (Sanga et al., 2019).

For this study, specific health system aspects related to uptake of national PMTCT guidelines, which were provision of routine pre-conception counselling and provision and discussion of infant diagnosis results demonstrated significant associations with PMTCT outcome (χ^2: p=0.018 and p=0.000) respectively. Health care providers attached to PMTCT points of care are the primary custodians of the national PMTCT guidelines. Therefore, adequate implementation of these guidelines in patient care processes has a colossal impact on patient care; hence, determine

effectiveness of PMTCT outcomes (Genberg et al., n.d.). Adequate provision of pre-conception counselling and appropriate discussion of infant diagnosis results are dependent on competency of PMTCT service providers. Therefore, the presence of significant associations between PMTCT outcome and uptake of national PMTCT guidelines in the current study may be a proxy indicators of high competency levels of PMTCT providers in the study setting (Cheema et al., 2019). Deductively, the current study affirms that adherence to guidelines on PMTCT care plays a role in mitigating MTCT of HIV. This was also the case in (Onono et al., 2015)study, which reports that risk of MTCT of HIV are increased by health care providers failing to comply with guidelines on ART prescription (OR= 8.61, 95% CI: 2.83-26.15).

5.4 Male Partner Involvement and PMTCT Outcomes

The success of PMTCT outcomes is often dependent on the support that PMTCT mothers receive from their families. Adequate implementation of PMTCT interventions is demanding and requires concerted efforts amongst those involved, including partners to PMTCT mothers. We assessed specific aspects related to male involvement whereby some aspects demonstrated significant associations whereas others did not. For this study male partner involvement assessed based on male partners knowledge on HIV status of the PMTCT mother showed significant association with PMTCT outcome (χ^2: p=0.000). For this study, out of the 82.1% of children born of HIV seropositive mothers whom the male partners knew of their HIV status, 81.0% were HIV negative. This shows that only 1.1% of children of PMTCT mothers whose partner knew their HIV status had ineffective PMTCT outcome (child being HIV positive). In fact, the male partner knowledge on HIV status of PMTCT mother had 6 times likelihood (OR=6.00, 95% CI: 0.655–54.997) of determining the occurrence of successful PMTCT outcome (child being HIV negative).

The findings that male partner Knowledge of PMTCT mother's HIV status determines the success of PMTCT outcome is supported by findings by Aluisio et al., 2016)who observe that mere involvement of male partner on any PMTCT intervention such as accompanying mother to ANC enhances infant and child HIV free survival. Despite this association, male involvement remains a challenge as was evident in the current study whereby (KI_4, 2022) asserts that male involvement in matters PMTCT is a taboo; hence, men are rarely involved. This is despite efforts by the health care providers to pass information to males to be involved in PMTCT care and

management. Similar finding on challenges in male partner involvement are reported by (Kalembo et al., 2013)who note that male partner, especially from rural settings remain reserved on matters PMTCT involvement. On the other hand, other peer-reviewed studies have failed to observe any associations of male involvement with vertical transmission of HIV (Kalembo et al., 2013).

While it is true that males are rarely involved directly in PMTCT care, they provide other form indirect support such as facilitating access to PMTCT mother by providing means of transport (fare), reminding PMTCT mother of clinic dates, and reminding PMTCT mother on ART prophylaxis. Such forms of indirect support do not seem to pose a significant association with PMTCT outcomes. This was evident in the current study whereby indirect male involvement through; male partner providing transport facilitation, male partner reminding on PMTCT clinic dates, male partner paying for services at the clinic, male partner reminding of ART prophylaxis time, and male partner administering ART prophylaxis to child when PMTCT mother is absent with PMTCT outcome (χ^2: p=0.670, p=0.520, p=0.057, p=0.057, and p=0.132). These findings deduce that direct male partner involvement in PMTCT is persistently low, which was further evident in a study done in Ethiopia where male involvement rate was 20% (F. Haile & Brhan, 2014).

For this study male partner involvement assessed by their reactions on discussions HIV transmission was significantly associated with PMTCT outcome (χ^2: p=0.000), however, this factor had infinite odds of determining PMTCT outcome (OR=0.000, 95% CI: 0.000-).These findings show that male partner involvement has a role in leveraging the success of PMTCT. This confirms assertions by Kalembo et al. (2013) and Muwanguzi et al. (2019) that male partner involvement enhance uptake of PMTCT, which ensures low MTCT of HIV. Male partner involvement provides an environment whereby PMTCT interventions can thrive with ease. This is because male involvement ensures that both the mother and father of a child born of them is provided with adequate means that can assure HIV-free child survival. Male involvement further supports critical elements of PMTCT such as use of FP, which ensures that pregnancies are well-planned as a means of minimizing MTCT of HIV (Adelekan et al., 2014).

Deductively, male involvement entails direct and indirect involvement. Drop offs along the cascade of PMTCT are often common when male partners are not involved (Melis & Fikadu,

2022). A reflection on PMTCT services across various health care settings shows that they are structured in such a way that it places much of the responsibilities as for the females (PMTCT mothers). Overall, PMTCT service provisions represent a female-dominated responsibility and this is a barrier to direct male involvement (Theuring et al., 2009). Indirect male involvement does not make much contribution and support for PMTCT. Indirect male involvement in PMTCT care continuum creates a situation whereby male partners remain unaware of certain requisites of PMTCT such as provision of ART prophylaxis for infant. For this study, more than average; 52.4% of the male partners of the participants did not provide ART prophylaxis during situations when the participants were absent. Such situations result in drop offs along the cascade of PMTCT, which augments the risk of MTCT of HIV.

CHAPTER SIX

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 Summary of Study Findings

The study participants mostly comprised of women aged between 30 to 39 years, with most of them reporting to have completed secondary school level of education. A majority of them were married and reported to be in monogamous marriages. A high number of the participants were self-employed. Mother-To-Child Transmission (MTCT) of Human Immune-Deficiency Virus (HIV) rates was 3.7%, however, this is not a population/community-based rate, but a hospital-based MTCT of HIV rate.

Specific maternal factors that were assessed; reason for missing scheduled clinic visit and reason for missing ART during pregnancy and breastfeeding period were established as the maternal determinants of Prevention of Mother-To-Child Transmission (PMTCT) outcome as they had higher odds of determining PMTCT outcomes (Odds Ratio (OR): 5.122 and 5.751) respectively. Maternal factors aligned with missing ART medications during pregnancy and breast feeding and missing to give ART prophylaxis at some point during showed significant associations with PMTCT outcome (Chi-square (χ^2): p=0.005 and p=0.050) respectively. However, these two maternal factors did not have the likelihood of determining PMTCT outcome as they presented with lower odds (OR=0.085 and 0.553 respectively).

Certain health systems factors related to uptake of PMTCT guidelines that were assessed were established to pose significant associations with PMTCT outcome. These factors were provision of routine pre-conception counseling and infant diagnosis results provided and discussed with health care provider (χ^2: p=0.018 and p=0000) respectively. However, the later; provision and discussion of infant diagnosis results with health care provider was proven as a determinant of PMTCT outcome (OR: 1.5). Provision of routine pre-conception counseling was not proven as a determinant as it had lower odds (OR: 0.361).

Male involvement factors that were assessed by the study demonstrated varying associations with PMTCT outcome. The aspect on male partner knowing the status of the PMTCT mothers was six (6) times more likely to determine PMTCT outcome when compared with cases where male partner was not aware of the HIV status of the PMTCT mother. Male partner's reaction to

discussion on HIV transmission demonstrated associations with PMTCT outcome but presented with infinite odds; hence, not regarded a determinant of PMTCT outcome by this study.

6.2 Conclusions

The study has established that specific maternal, health systems, and male involvement factors can determine PMTCT outcomes. This means that the success of PMTCT will not occur in isolation, but will be as a result of consolidation of these factors as a means of leveraging the strengths conferred by each of the factors.

The study provides crucial insights, which supplement information on maternal, health systems, and male involvement related determinants of PMTCT outcomes in the study setting and other similar contexts. The MTCT of HIV rate observed shows that there is further need to upscale the PMTCT interventions in the quest to eliminate MTCT of HIV. Advent of Anti-Retroviral Therapy has certainly led to immense progress in the elimination and management of HIV, which remains a disease of public health concern. Furthermore, PMTCT remains one of the novel public health accomplishments as it has provided a comprehensive platform that enables prevention of MTCT of HIV. Even so, success of PMTCT calls for concerted efforts from health systems factors and individual factors attributable to HIV sero-positive women and men seeking to raise HIV-free children.

6.3 Recommendations

Based on the study findings, the study has the following recommendations;

6.3.1 Recommendation for policy

The study found that male involvement determinants play a crucial role in determining PMTCT outcome, yet male involvement in PMTCT is often ignored. It is for this reason that the study recommends PMTCT policies be developed and adopted by the County Government of Homa Bay and national government that would make PMTCT programs a responsibility for both PMTCT mothers and fathers, as opposed to the current approach where PMTCT is programmed as a female responsibility.

6.3.2 Recommendation for Practice

The study has established that maternal, health systems, and male involvement factors have a synergistic relationship with each posing varying influence on PMTCT outcome. It is on this

basis that the study recommends that the Department of Medical and Public Health services in Homa Bay County to;

- ✓ Development and execution of health awareness campaigns targeting PMTCT mothers and fathers with the aim of enhancing their knowledge on the importance of all components along the cascade of PMTCT care. This will reduce drop offs attributable to maternal and male involvement factors.
- ✓ In collaboration with relevant stakeholders; they should strengthen the capacity of health care facilities and health care workers involved in PMTCT interventions as a means of averting drop offs attributable to health care factors such as lack of Viral Load (VL) sampling commodities and lack of motivation amongst PMTCT service providers.

6.3.4 Recommendations for Further Research

The study recommends further research on the maternal, health system and male partner involvement determinants of PMTCT outcomes covering more than one health facility and having health facilities at all tiers represented.

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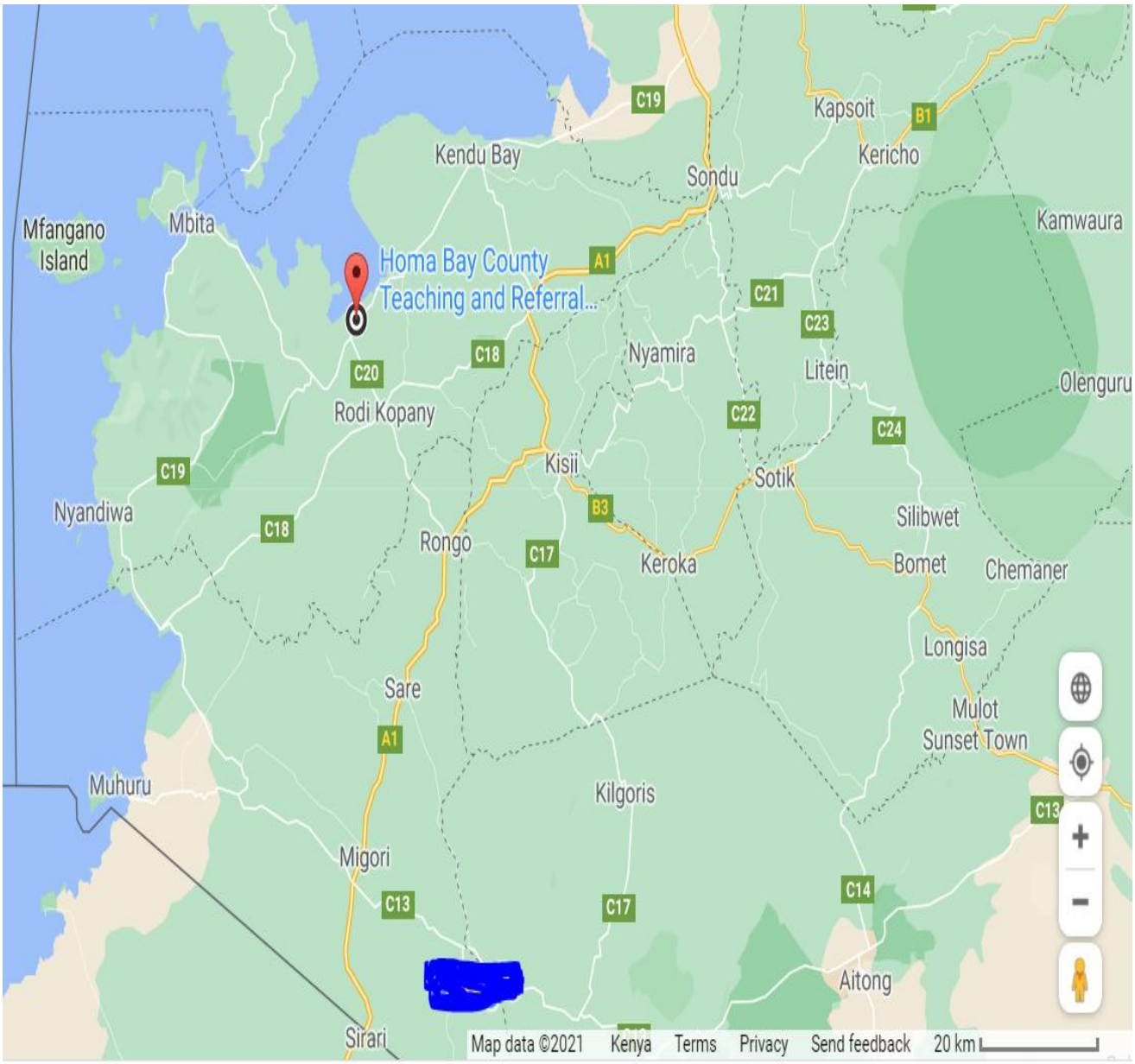
APPENDICES

APPENDIX I: MAP OF THE STUDY SETTING



(Source: Google Map)

APPENDIX II: INFORMED CONSENT FORM

My name is **Osoti Osoti Robert**, a student at Maseno University. I am conducting research to understand why children get HIV from their mothers. The study is based at the Homa Bay County Referral Hospital. This is not a study by the hospital, but the hospital management has approved it.Your file has been picked for participation in this study. Participation in this research does not guarantee any direct benefits to you, but its findings will go a long way in finding better ways to eliminate mother-to-child transmission of HIV for clients receiving treatment in this facility and beyond. Please confirm if you are willing to participate in the study.

Voluntary participation and confidentiality: Your participation in this study will be voluntary, and you are at liberty to withdraw participation at any time without any obligation to explain why. No names shall be used in the study as all the participants will be coded with a number to maintain confidentiality from analysis to publication of the study findings. The interview will be conducted in a private room with you and the interviewer to guarantee sufficient privacy. All the data collected will be secured with passwords that only the research team can access.

COVID 19 safety measures: ALL COVID 19 prevention measures will be applied.

Respondents signature: The study has been discussed with me; I have been given satisfactory information and understood the nature of the study. I hereby give my informed and voluntary consent to participate in the study.

Sign…… Date……

Should you have any questions, please contact; Osoti Osoti on 0725937401 Dr. Louisa Ndunyu on 0720647534 Professor Ng'wena Magak on 0720804606**OR**Maseno University Ethical Review Committee Secretariat on 0722203411, 0721543976, 0733230878 Email address: muerc-secretariate@maseno.ac.ke, muerc-secretariate@gmail.com

APPENDIX III: QUESTIONNAIRE

DETERMINANTS OF PREVENTION OF MOTHER TO CHILD HIV TRANSMISSION OUTCOMES AMONG WOMEN AT THE HOMA BAY COUNTY REFERRAL HOSPITAL, KENYA

(Please tick or fill where appropriate)

Questionnaire No……..

Date……

Interviewer's name; …….....Date of Interview……

INSTRUCTIONS

(a) Ensure compliance with the COVID 19 prevention measures before the start of the interview

(b) Consent before proceeding with the questions.

(c) Tick as appropriate

PART I: RESPONDENTS DEMOGRAPHIC CHARACTERISTICS			
	Questions	**Coding category**	**Skip pattern**
1.1	What is your age? ……..	18 to 29 [1] 30 to 39[2] 40 o 49[3]	
1.2	What is the highest level of education you've attained?	Never went to school [1] Primary [2] Secondary [3] Tertiary [4]	
1.3	What is your marital status?	Single [1] Married [2] Divorced/separated [3] Widowed [4]	If 1, or 3, or 4 skip to Q.1.5
1.4	If married, what type of marriage are you in?	Monogamous [1] Polygamous [2]	
1.5	What is the nature of your occupation?	Self-employed [1] Employed [2] Casual jobs [3] Not employed [4]	
PART II: MOTHERS KNOWLEDGE OF HIV STATUS, COMPLIANCE TO TREATMENT AS WELL AS INFANT FEEDING AND INFANT PROPHYLAXIS			
	Questions	**Coding category**	**Skip pattern**
2.1	At what point did you get to know that you are HIV sero-positive?	Before conceiving this child [1] During pregnancy[2] Labour and delivery [3] During clinic visit after delivery[4]	
2.2	Have you ever missed going for your scheduled hospital visit?	Yes [1] No [2]	If No. Skip to Q. 2.4

2.3	Why did you miss your scheduled clinic visit?	Lacked fare to the facility [1] Forgot [2] Had other engagements [3] Was unwell [4] Other, specify [5]	
2.4	Did you at any point miss taking your ARVS during pregnancy or the breastfeeding period?	Yes [1] No [2]	If No. Skip to Q. 2.6
2.5	Why did you miss taking the ARVS?	Forgot [1] Felt better [2] Run out of drugs [3] Was unwell [4]	
2.6	Did you once or more miss to provide your baby with ARV prophylaxis during the HEI follow up period?	Yes [1] No [2]	If No. Skip to Q. 2.8
2.7	Why did you miss to provide your baby with ARV prophylaxis during the HEI follow up period?	Was away from home [1] Run out of drugs [2] Forgot [3]	
2.8	What did you give to your child in the first six months after birth?	Breast milk ONLY [1] Breast milk and other foods [2]	If [1] Skipto Q. 2.10
2.9	If gave breast milk and other foods, what was the challenge to EBF practice?	Fear of infecting the baby [1] Insufficient milk [2] Job engagement [3]	
2.10	At what month of your pregnancy did you start attending Ante-Natal Clinic	0 to 3 months [1] 4 to 6 months [2] 7 to 9 months [3]	
2.11	How many Ante-Natal Clinic did you attend?	Two times [1] Three times [2] Four times [3] More than four times [4]	
2.12	Where did you deliver during your last pregnancy?	Hospital [1] At a traditional birth attendant [2] Other, specify [3]	
PART III (A): HEALTH SYSTEMS FACTORS			
	Questions	**Coding category**	**Skip pattern**
3.1	Are health talks offered regularly during your clinic visits?	Yes [1] No[2]	
3.2	What is the waiting time during your clinic visits?	Short [1] Long [2]	
3.3	Where are family planning services offered in your health facility?	At CCC and the MCH [1] In FP clinic within the facility [2] No FP services in the facility [3]	
3.4	Ever failed to get FP in the facility at	Yes [1]	If No. skip to

	any point when you needed to use FP?	No [2]	3.6
3.5	What was the reason why you did not get FP services?	Lack of FP commodities [1] Inability to pay required fee [2] Long ques [3] Other, specify [4]	
3.6	Were you given ARV prophylaxis for your baby during ANC visit?	Yes [1] No [2]	
3.7	Have you ever been given fewer days of ARV drugs because of low stocks in your facility	Yes [1] No [2]	
3.8	Before the last pregnancy, did you know your viral load count?	Yes [1] No [2]	
3.9	What was your last viral load count before pregnancy?	LDL copies/ml [1] Less than 1000 copies/ml [2] Above 1000 copies/ml [3] Don't know [4]	
3.10	Have you ever missed having scheduled viral load blood sample taken?	Yes [1] No [2]	If No. skip to 3.12
3.11	What was the reason why you missed scheduled viral load blood sample being taken?	Lack of supplies for VL sampling [1] Lab staff was absent [2]	
3.12	Did you take your child for early infant diagnosis tests during the HIV Exposed Infant (HEI) follow up period?	Yes [1] No [2]	
3.13	What was the final HIV test result for the child (PMTCT outcome)?	Negative [1] Positive [2]	

PART III (B): HEALTH SYSTEMS FACTORS (Uptake of the National PMTCT Guidelines)

The following statements are related to the provision of PMTCT services in line with the national guidelines in your facility. Please note that there are no right or wrong answers. Please select the number that best describes your feelings about each statement.

	Statement	**Coding category**
3.14	Family planning services are readily available at the CCC and MCH.	Strongly Disagree [1] Disagree [2] Neutral [3] Agree [4] Strongly Agree[5]
3.15	Before conception, health care providers provide routine preconception counselling.	Strongly Disagree [1] Disagree [2] Neutral [3] Agree [4] Strongly Agree [5]
3.16	We are provided with regular talks by service providers on family planning during clinic visits.	Strongly Disagree [1] Disagree [2]

		Neutral [3] Agree [4] Strongly Agree [5]
3.17	I was provided infant feeding counselling during my antenatal clinic visits.	Strongly Disagree [1] Disagree [2] Neutral [3] Agree [4] Strongly Agree [5]
3.18	I was provided with infant prophylaxis during my first ANC visit.	Strongly Disagree [1] Disagree [2] Neutral [3] Agree [4] Strongly Agree [5]
3.19	I was taught and understood how to administer ARV prophylaxis to the infant by healthcare providers.	Strongly Disagree [1] Disagree [2] Neutral [3] Agree [4] Strongly Agree [5]
3.20	The healthcare provider discussed with me how to prevent transmission of HIV to the infant during pregnancy and during the HEI follow up period.	Strongly Disagree [1] Disagree [2] Neutral [3] Agree [4] Strongly Agree [5]
3.21	The healthcare provider provided and discussed with me the infant diagnosis results	Strongly Disagree [1] Disagree [2] Neutral [3] Agree [4] Strongly Agree [5]
3.22	My viral load was monitored routinely, and results were given during pregnancy and the HEI follow-up period.	Strongly Disagree [1] Disagree [2] Neutral [3] Agree [4] Strongly Agree [5]
PART IV: QUESTIONS ON PMTCT MALE PARTNER INVOLVEMENT		
	Question	**Coding Category**
4.1	Does your male partner know your status?	Yes [1] No [2]
4.2	In what ways does your partner support your uptake of PMTCT services? *Select all that apply*	Provide Transport [1] Remind on PMTCT clinic dates [2] Pay for services at the clinic [3] Remind me to give ART prophylaxis to child [4] Administer ART prophylaxis when am absent [5]
4.3	What is your male partner's response to discussion on interventions to prevent transmission of HIV to child	Supportive [1] Not Supportive [2] Other, specify [3]

APPENDIX IV: KEY INFORMANT INTERVIEW GUIDE

Title	
Position	
Gender	
Name of interviewer	

1. Let us talk about the provision of PMTCT services in our health facilities. Are the health services in our facilities friendly to the provision of PMTCT services? Yes/No
- Are there structures in place to ensure a shorter waiting time for clients seeking PMTCT services? If yes, which ones? If no, why not?
- Are there clients who miss services because of distance and lack of transport to the facility? If yes, why don't we refer them to sites closer to them?
- Are long term family planning services available in our CCC and MCH clinic?
- Are there health talks on PMTCT in the health clinics?
- How is the provision of family planning services at the CCC and MCH?
- Do we have family planning services integrated in our CCC and MCH clinics?
- The health facilities mostly provide Which types of family planning methods?
- Are there barriers to the provision of long-term family planning methods?
- Are there sessions for preconception counselling for all the HIV sero-positive clients on treatment?
- Are we able to provide infant prophylaxis to all pregnant and breastfeeding mothers? What do we do when a mother declines?
- Based on the workload at CCC and PMTCT clinics, do we have sufficient human resources for health to attend to clients?
- Do we have PMTCT mothers and infants missing ARVS in some instances? If yes, what are the reasons?
    - How is the testing of HIV for ANC, maternity and Post ANC mother?
2. Are there measures to empower and support PMTCT mothers towards ensuring negative HIV outcomes for all HIV exposed infants?
- Are there barriers to exclusive breastfeeding for PMTCT mothers?
- Are all our PMTCT mothers able to deliver through skilled birth attendants? If no what are the gaps?
- What are your thoughts about ANC attendance by PMTCT mothers?
- How do we support PMTCT mothers with their viral load monitoring?
3. Do we have systems to support the involvement of male partners in the provision of PMTCT services?
- What do we do to ensure that male partners participate in PMTCT follow-ups?
- Are there known reasons for male partners not participating in PMTCT follow-ups?
- Are the male partners shown how to administer infant prophylaxis to their infants?
4. The government has made some efforts towards ensuring the transmission of HIV services, such as providing guidelines for HIV treatment, providing free ARVs for people on treatment and preventing transmission to infants, and free laboratory investigation to monitor client viral load. Why do you think there are still cases of children getting HIV infection?

Appendix V: ABSTRACTION FORM

	HEI NO.	DOB	Age at initial PCR Test	Initial PCR Test Results (Positive/ Negative/ Not Done)	Test results for PCR at six months (Positive/Negative/Not Done/NA)	Feeding option at six months (EBF/ERF/ MF)	Test results for PCR at 12 months (Positive/Negative/Not Done/NA)	Antibody test at 18 months (Positive/Negative/Not Done/NA)	Status of pair at 24 months (Active/LTFU/ Dead/Dead/TO/ Invalid	Linkage to CCC (Yes/No/NA)
1										
2										
3										
4										
5										
6										
7										
8										
9										

APPENDIX VI: BUDGET

SN	Item	Quantity	Cost per Item in Kshs.	Total cost
1	Printing proposal 1st Draft	30	20	600
2	Printing proposal 2nd Draft	40	20	800
3	Printing proposal final draft	240	20	4800
4	Binding proposals	6 pieces	100	600
5	Photocopying questionnaires	1450 pages	5	7250
6	Folders	5 pieces	250	1250
7	HB Pencils	10 pieces	30	300
8	Sharpeners	10 pieces	20	300
9	Erasers	10 pieces	10	100
11	Ball Pens	10 pieces	20	200
12	Sanitizer	2 liters	800	1600
13	Surgical Masks	350 Pieces	10	3500
14	Research Assistant allowance for (15 days)	5 persons	1,000	75000
15	Data analysis		25,000	25000
16	Printing thesis	5 pieces	1000	5000
17	Airtime		5000	5000
	Total			**131300**

APPENDIX VII: PROPOSAL APPROVAL LETTER

MASENO UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Office of the Dean

Our Ref: MPH/PH/06006/016

Private Bag, MASENO, KENYA
Tel:(057)351 22/351008/351011
FAX: 254-057-351153/351221
Email: sgs@maseno.ac.ke

Date: 16th December, 2021

TO WHOM IT MAY CONCERN

RE: PROPOSAL APPROVAL FOR OSOTI OSOTI ROBERT— MPH/PH/06006/016

The above named is registered in the Master of Public Health programme in the School of Public Health and Community Development, Maseno University. This is to confirm that his research proposal titled "Determinants of Prevention of Mother to Child HIV Transmission Outcomes among Women at the Homabay County Referral Hospital, Kenya" has been approved for conduct of research subject to obtaining all other permissions/clearances that may be required beforehand.

Prof. I.O. Agure
DEAN, SCHOOL OF GRADUATE STUDIES

APPENDIX VIII: ETHICAL CLEARANCE LETTER

MASENO UNIVERSITY ETHICS REVIEW COMMITTEE

Tel: +254 057 351 622 Ext: 3050
Fax: +254 057 351 221

Private Bag – 40105, Maseno, Kenya
Email: muerc-secretariate@maseno.ac.ke

REF: MSU/DRPI/MUERC/01046/22 **Date:** 15th February, 2022

TO: Osoti Osoti Robert
MPH/PH/06005/2016
Department of Public Health
School of Public Health and Community Development
Maseno University
P. O. Box, Private Bag, Maseno, Kenya

Dear Sir,

RE: Determinants of Prevention of Mother to Child HIV Transmission Outcomes among Women at the Homa Bay County Referral Hospital, Kenya

This is to inform you that **Maseno University Ethics Review Committee (MUERC)** has reviewed and approved your above research proposal. Your application approval number is MUERC/01046/22.The approval period is 15th February, 2022 – 14th February, 2023.

This approval is subject to compliance with the following requirements:

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by Maseno University Ethics Review Committee (MUERC).
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to Maseno University Ethics Review Committee (MUERC) within 24 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to Maseno University Ethics Review Committee (MUERC) within 24 hours.
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to Maseno University Ethics Review Committee (MUERC).

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely

Prof. Philip O. Owuor, PhD, FAAS, FKNAS
Chairman, MUERC

MASENO UNIVERSITY ETHICS REVIEW COMMITTEE 15 FEB 2022 P.O. BOX PRIVATE BAG MASENO

MASENO UNIVERSITY IS ISO 9001: 2015 CERTIFIED

APPENDIX IX: RESEARCH PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **141237**

Date of Issue: **04/March/2022**

RESEARCH LICENSE

This is to Certify that Mr.. Osoti Osoti Robert of Maseno University, has been licensed to conduct research in Homabay on the topic: DETERMINANTS OF PREVENTION OF MOTHER TO CHILD HIV TRANSMISSION OUTCOMES AMONG WOMEN AT THE HOMA BAY COUNTY REFERRAL HOSPITAL, KENYA for the period ending : 04/March/2023.

License No: **NACOSTI/P/22/16004**

141237

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

APPENDIX X: RESEARCH AUTHORIZATION LETTER

DEPARTMENT OF HEALTH

Telegrams: "MOH" Homa Bay
Telephone: 21039
When replying please quote
homabaychc@gmail.com

MINISTRY OF HEALTH
HOMA BAY COUNTY
P.O. BOX 52
HOMA-BAY.

Ref: MOH/HB/CTY/RA /VOL.V/83

7th March, 2020

Osoti Osoti Robert
MPH/PH/06006/2016
Department of Public Health
School of Public Health and Community Development
Maseno University
P.O.Box, Private Bag ,Maseno ,Kenya

Att. CEO
HBCTRH

RE: AUTHORITY TO CONDUCT RESEARCH

This is to inform you that your request to carry out Research on **"Determinants of Prevention of Mother to Child HIV Transmission Outcomes among Women at the Homa Bay County Teaching and Referral Hospital"** has been approved with effect from 7th March, 2022 to 14th February, 2023.

You will be required to adhere to the hospital's norms regulations and you are also expected to communicate your findings to the Directors' Office at the end of the research period.

Wish you all the best in your study.

Dr. Gordon Okomo
County Director of Health Services
HOMA BAY COUNTY

DEPARTMENT OF HEALTH SERVICES,
COUNTY DIRECTOR OF HEALTH
07 MAR 2022
P. O. BOX 52 - 4300, HOMA BAY - KENYA