KNOWLEDGE ON INFANT FEEDING PRACTICES AMONG WOMEN RELATED TO THE PREVENTION OF MOTHER TO CHILD TRANSMISSION PROGRAMME AT CLINICS IN FRANCISTOWN, BOTSWANA

by

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DECLARATION

I declare that this dissertation: knowledge on infant feeding practices among women related to Prevention of Mother To Child Transmission program at clinics in Francistown, Botswana, is my own work. All the sources used and quoted have been indicated and acknowledged by means of a complete reference list. I have not previously in its entirety or in part submitted it for obtaining any qualification.

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ABSTRACT

Globally, an estimated 2.1 million children who are younger than 15 years old are infected with HIV, with a vast majority (90%) living in sub-Saharan Africa. Over 90% of these HIV infections in children occur through MTCT which happens during pregnancy, labour or breastfeeding. MTCT of HIV infections can be reduced to less than 1% through effective implementation of PMTCT interventions. However, the PMTCT strategy of replacing breastfeeding with formula feeding of infants has brought about an increase in morbidity and mortality, a practise which outweighs HIV reduction in children. Worldwide, an estimated 160,000 children died due to AIDS-related illnesses. In Botswana, a large number of HIV-exposed infants are hospitalized leading to high mortality rates, with an increased risk among formula fed infants at 42.7%. For a successful PMTCT programme that yields HIV free survival of infants, women need to be equipped with knowledge on MTCT and the essential contents of infant feeding practices. It is for this reason that this study sought to assess knowledge on infant feeding practices among women related to the PMTCT programme in order to establish factors contributing to high hospitalization and mortality rates among HIV-exposed infants.

Methods: A cross-sectional, descriptive quantitative survey was undertaken to assess knowledge on infant feeding practices to establish factors contributing to high hospitalization and mortality rates among women on PMTCT programme at clinics in Francistown, Botswana.

Results: Of the 126 mothers who participated in this study, their age ranged from 20 to 48 years, with a mean age of 32.2 (SD6.5). The majority ranged between 31 to 40 years (46.0%). Of these mothers the majority (36.5%) were unemployed, while 31.7% were self-employed, and 53.2% of mothers were earning less than P2000.00. About 92% of the mothers showed high knowledge of MTCT of HIV transmission modes during pregnancy (93.6%), during delivery (90.4%) and breastfeeding (92.8%). Most of the participants (95.2%) received infant feeding counselling which had a significant association with knowledge on MTCT of HIV (p= 0.009). However, a gap existed in the PMTCT counselling about caesarean section as a mode of HIV prevention to the child, as the majority (39.68%) of mothers did not know this preventive intervention. Stigma and discrimination showed a weak positive result as 53.7% of the respondents reported that formula feeding was not
associated with being HIV positive. From this study, only 14.2% opted to breast-feed with most of them stating that breast milk was important for the growth of the child. Results showed statistical significance between knowledge about MTCT of HIV and breastfeeding practices (p=0.002). The majority (85.7%) of mothers opted to formula feed with 50% saying that they feared transmitting HIV to the child. There was a statistically significant association between formula feeding and mixed feeding (p=0.000).

**Conclusion:** This study showed positive findings as to the knowledge levels about MTCT of HIV attributed to receiving infant feeding counselling which equipped women with knowledge on infant feeding practises. Although MTCT knowledge had a positive impact on infant feeding practises, low income status had a negative influence on household resources, resulting in suboptimal feeding practises with the formula feeding method possibly leading to compromised wellbeing of the child and hospitalisation and high mortality rates among HIV infected infants.

**Recommendations:**
Intensive infant feeding counselling should be done with regard to feeding options available to mothers, with emphasis on their household resources, given the finding that the majority of mothers with a low income status opt for formula feeding.

There is need for PMTCT interventions both locally and at the policy level to target individual women. This should take into consideration the context in which these mothers live in order to promote optimal infant feeding practises for a better HIV-free survival of infants.

Further research studies should be conducted to further determine the contributing factors to the high number of hospitalizations and mortality rates among HIV exposed infants.

**Keywords:** MTCT, Infant feeding counselling, factors influencing feeding choices, breastfeeding, formula feeding
ABBREVIATIONS

AFASS - Acceptable Feasible Affordable Sustainable Safe
AIDS - Acquired Immunodeficiency Syndrome
ANC - Antenatal Care
ART - Anti-Retroviral Therapy
ARV - Antiretroviral
BGARR - Botswana Global AIDS Response Report
BF - Breastfeeding
CDC - Center for Disease Control
CWC - Child Welfare Clinic
DHMT - District Health Management Team
EBF - Exclusive Breastfeeding
EFF - Exclusive Formula Feeding
FF - Formula Feeding
GoB - Government of Botswana
HAART - Highly Active Antiretroviral Therapy
HIV - Human Immunodeficiency Virus
MCH - Maternal and Child Health
MDG - Millennium Development Goals
MoH - Ministry of Health and Wellness
MTCT - Mother to Child Transmission
NACA - National AIDS Coordinating Agency
PMTCT - Prevention of Mother to Child Transmission
RF - Replacement Feeding
SADC - Southern African Development Community
UNICEF - United Nations Children’s Fund
UNAIDS - United Nation Joint Program on HIV/AIDS
WHO - World Health Organization
ZDV - Zidovudine
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CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This chapter introduces the worldwide magnitude of the HIV/AIDS burden among children and its impact in Botswana, which has very high HIV prevalence. The chapter further explains the research problem and discusses the motives for selecting Greater Francistown District Health Management Team (DHMT) as the setting for this study. The chapter closes with a brief account of the research methodology that was used and some definitions of important terms.

1.2 BACKGROUND TO THE RESEARCH

1.2.1 The setting

The Greater Francistown DHMT is located in Francistown city which is the second largest city in Botswana situated in the northern part of the country. Francistown city has an estimated population of 98,961 based on the 2011 census and the population projections. The city has grown due to its central location in the northern part of the country and has developed in terms of road networks, the mining sector and infrastructure.

Health care services in Botswana, Francistown, are primarily being provided by the Government of Botswana (GoB) through the Ministry of Health and Wellness (MoH). In Botswana, health care service delivery is pluralistic and includes public, private for profit, private non-profit and traditional medicine practices (MoH, 2018). Within the public sector, MoH is responsible for the provision of health services. It is responsible for the formulation of policies, regulations, norms, standards and guidelines of health services. The ministry is also a major provider of health services through a wide range of health facilities and management structures. The MoH provides primary health care services through District Health Management Teams (DHMTs). DHMTs are responsible for running a network of health facilities, hospitals, clinics, health posts and mobile stops as well as community based preventive and promotive services (MoH, 2018).
Francistown city has two hospitals, one government referral hospital and a private hospital. The referral hospital is the referral centre that caters for all the clinics and the primary hospitals in the northern region of the country. The Greater Francistown DHMT is comprised of four cluster clinics involving eighteen (18) clinics and two health posts around Francistown city that offers antenatal care (ANC), postnatal care (PNC), a child welfare clinic (CWC) and outpatient care. These clinics have antiretroviral (ARV) units which offer HIV counselling and testing catering for maternal and child health (MCH) services, including prevention of mother to child transmission (PMTCT) of HIV programme. One clinic offers a diabetic clinic and other general ailments are being offered in all the clinics in the outpatient departments daily from 07:30hours to 16:30hours with three clinics operating 24hours which also have maternity services. The MCH department is one area where PMTCT services are offered and was an ideal setting for this study.

The Greater Francistown DHMT was selected as the setting for this study considering the proximity of the clinics with the nearest about two kilometres from the town centre and the farthest about 15 kilometres. Furthermore, the Greater Francistown DHMT was selected as the setting for the study due to the fact that it has the highest HIV prevalence (23.1%), the second highest in the country which is also higher than the national HIV prevalence of 21.9%. It thus provides accessibility to mothers enrolled in PMTCT programme (BAIS IV, 2013; UNAIDS, 2017). Moreover, as mentioned earlier on, the public health referral centre, Nyangabgwe Referral Hospital (NRH), is based in the Greater Francistown DHMT where a large number of HIV exposed infants are admitted with diarrhoea, malnutrition and respiratory diseases (Creek, 2010; BGARR, 2012; Madondo et al, 2012; Shapiro, 2016); however, mothers with sick children were excluded from this study, hence the study was conducted at CWC and the MCH.

1.2.2 HIV/AIDS burden in children

Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) remains a major public health problem that the world currently faces. The impact of HIV/AIDS is felt across all age groups of the population. Globally, an estimated 36.7 million people were living with HIV in 2016, with the vast majority (25.5 million) living in
sub-Saharan Africa. Of these, 19.4 million are living in the East and Southern Africa region, with 59% of new infections occurring among young women aged 15-24 (UNAIDS, 2017). The Southern African Development Community (SADC) is the sub-regional body of sub-Saharan Africa with member states of fifteen countries. It has some of the areas most severely affected by the HIV/AIDS pandemic and represents 4% of the world population, yet accounted for more than 34% of all people living with HIV globally in 2009 (USAID, 2010).

Out of the global HIV population, 2.1 million are children younger than 15 years old, with 90% living in sub-Saharan Africa where the HIV/AIDS epidemic is a major health problem. Worldwide, new HIV infections among children have declined by almost half from 300 000 in 2010 to 160 000 in 2016, while the mortality rate remains high with 160 000 children dying due to AIDS-related illnesses, which equates to 438 deaths every day (UNAIDS, 2017). In Botswana, approximately 1.8% of new-borns were infected with HIV from HIV-positive women in 2014, compared to 2.4% in 2013 (fewer than 500 infants). However, high mortality rates are reported among HIV exposed than HIV unexposed infants (NACA, 2015; Shapiro, 2016).

In children, over 90% of HIV infections occur through mother to child transmission of HIV (MTCT), also known as vertical transmission. Most of the children who acquire HIV infection do so through MTCT during pregnancy, labour and delivery or breastfeeding (BF). Without effective intervention, half of the infected children won’t survive to their second birthday, with the risk of transmission ranging from 20%-45% (SADC, 2009; UNAIDS, 2010; WHO, 2010). However, with effective prevention interventions, the risk of MTCT can be reduced to less than 1% with PMTCT and antiretroviral therapy (ART) efficacy of short-course therapy (SADC, 2009). Essential components of the PMTCT programme relate to HIV counselling and testing, safe infant feeding counselling for HIV positive women, and availability of free ART to those pregnant women who test positive to HIV infection (WHO, 2010). Furthermore, through PMTCT services, the World Health Organization (WHO) promotes a comprehensive approach with four strategies used: prevention of primary infections, prevention of unintended pregnancy in HIV infected women, interventions aimed at the MTCT care, and support of infected families. Additionally, WHO advocates for individual counselling so that women can make informed choices about the best method for their infant feeding practices based on their socio-economic and medical situation (WHO, 2010a). Given the mode of MTCT of HIV through breastfeeding, many women are faced
with different challenges about making informed decisions on infant feeding practices, bearing in mind that breast milk carries the HIV virus at the same time it has the required nutrients for the infant’s wellbeing and developmental growth (WHO, 2009).

Infant feeding is an important aspect that provides nutritional requirements for the infant’s growth, development and health (WHO, 2015). It is also an essential component in a child’s wellbeing and survival, especially where diarrhoea, pneumonia and malnutrition are common causes of mortality among children younger than the age of five. In addition, infant feeding is one of the most important components of PMTCT of HIV infection which accounts for 5-15% of infections during breastfeeding (SADC, 2009). Thus, HIV-free survival of an exposed infant is a problem given that breast milk contains the HIV virus (Nduati, 2000). However, breastfeeding is the norm for feeding an infant. It is socio-culturally acceptable in that it plays a major role in nutrition, health and development for both HIV infected and non HIV infected infants. Furthermore, based on evidence, WHO recommends exclusive breastfeeding (EBF) for even HIV infected mothers for the first six months of life, introducing complementary foods thereafter, and continue breastfeeding for the first 12 months of life supported by ART (WHO, 2010; WHO, 2016). According to WHO (2010), the infant feeding recommendation for formula feeding (FF) should be considered if it is affordable, feasible, acceptable, sustainable and safe (AFASS). Nevertheless, in the Mashi study conducted in Botswana it was reported that FF protected infants against HIV infection; however, it was associated with higher mortality rates in the first six months of life than the combination of breastfeeding and infant zidovudine (ZDV) ARV (Thior et al, 2006).

1.3 RESEARCH PROBLEM

The burdens of infant morbidity and mortality rates have been significantly affected by the scourge of the HIV/AIDS epidemic in many resource-limited settings. Literature from African studies indicates a mortality of HIV-exposed infants between 39.3 and 49 per 1000 (Newell et al, 2004; Brahmbhatt et al, 2006).

A number of studies in Botswana have reported high numbers of hospitalization and mortality rates among HIV exposed infants, especially those who are formula fed (Mach, 2009; Creek, 2011; Shapiro, 2016; Zash et al, 2016). The country experiences high mortality
rates among HIV-exposed or infected children accounting for more than half of deaths in children younger than two years with infectious diseases (BGARR, 2012; Madondo et al, 2012; Shapiro, 2016).

Further, more HIV exposed infants are hospitalized at least once in 24 months with 75% HIV infected infants hospitalized for one to three weeks. In addition, HIV exposed babies were two times more likely to die with formula fed babies having higher rates of diarrhoea and pneumonia (Shapiro, 2016; Zash et al, 2016). Thus, in Botswana, higher mortality rates are reported among HIV exposed infants than HIV unexposed infant 42.7% and 1.6% respectively (NACA, 2015; Shapiro, 2016). The report for the 2006 diarrhoea outbreak of the country indicated that most vulnerable children who were formula fed were dying from both diarrhoea and pneumonia (Creek, 2011; Mach, 2009). This is a concern as such a high number of hospitalization and mortality rates occur among HIV exposed infants in the country with a successful PMTCT programme and high ART coverage.

Botswana has the highest PMTCT uptake of 91% with the highest ART programme in the region covering 95% pregnant women receiving ART, and a successful 3-4% of the HIV infection prevention (SADC, 2009; NACA, 2015; UNAIDS, 2017). However, despite the great PMTCT achievement in the country, the rates of infant morbidity and mortality for the category of formula fed remains high. Therefore, this study aimed to determine the factors that have led to missed opportunities in using PMTCT to help children who fall under this category, especially pertaining to the knowledge and socio-economic status concerning infant feeding practises.

**1.4 STUDY AIM**

The aim of this study was to assess the knowledge on infant feeding practises and factors influencing feeding choices among women enrolled in PMTCT programme at clinics in Francistown, Botswana.

**1.5 STUDY OBJECTIVES**

The study objectives were the following;

(i) To assess knowledge level of women enrolled in PMTCT programme about the MTCT of HIV.
To assess knowledge level on infant feeding practices of women enrolled in PMTCT programme.

To determine the factors influencing the feeding choices of women enrolled in PMTCT programme.

To determine if there is association between knowledge and feeding practices with regard to feeding choices amongst women in PMTCT programme.

**1.6 RESEARCH QUESTIONS**

The research questions of the study were the following;

(i) What is the knowledge level of women on PMTCT programme about MTCT of HIV?
(ii) What is the knowledge level on infant feeding practices of women enrolled on PMTCT programme?
(iii) What are the factors influencing the feeding choices of women enrolled on PMTCT programme?
(iv) Is there an association between knowledge and feeding practices with regard to feeding choices of women enrolled in PMTCT programme?

**1.7 SIGNIFICANCE OF THE STUDY**

Botswana’s PMTCT strategy move from breastfeeding to formula feeding has brought about morbidity and mortality increases which outweigh HIV reduction in children, as many women no longer breastfeed their infants according to the WHO recommendation for infant feeding guidelines which promotes EBF for HIV infected mothers for the first six months of infant life provided one continues ART (WHO, 2016). Thus, it is estimated that 3% of all under five mortalities in low-income countries could be prevented through optimal breastfeeding during the crucial first year of life (Jones et al, 2003). Literature from studies emphasised that child survival must be seen as the greater goal greater even than just avoiding HIV infection (Balh et al, 2005; Creek et al, 2010; Thior et al, 2006).

However, despite Botswana having the best primary health care system with successful PMTCT and ART prevention programmes that, the GoB was in fact the first to provide and advocate for FF for all HIV positive mothers (Creek, 2011). The high numbers of diarrhoea, malnutrition and respiratory illnesses leading to higher risks of infant morbidity and
mortality rates are a health concern that may be related to mothers making inappropriate infant feeding choices and feeding practises when their household circumstances cannot safely support them (Rollins, 2008). The improper feeding practises such as storage of formula at room temperature, inadequate cleaning of utensils, use of bottles with hard to clean nipples and frequent formula shortages are very common challenges among women (Creek, 2011). This reveals suboptimal as well as unsafe infant feeding practises according to WHO infant feeding recommendations (WHO, 2010; PMTC Guidelines, 2011).

According to the new Botswana 2016 HIV Clinical Care Guidelines, all pregnant women should be provided with infant feeding counselling starting from ANC with HIV positive women who are suppressed on ART to be encouraged to breastfeed their children for a maximum of six months (MoH, 2016). During infant feeding counselling all pregnant women are provided with appropriate feeding options and practises for the wellbeing of the child according to their settings. However, a lot of factors determine the success of the opted feeding practise with knowledge acquired playing an essential role and the socio-economic status in implementing the appropriate infant feeding strategy to attain the PMTCT programme goal. Therefore, this study will help to provide some insight into some considerations that should be taken into account in the PMTCT programme to reduce the high hospitalization and mortality rates among HIV-exposed infants in public health facilities in Francistown and in Botswana as a country for better infant survival.

1.8 METHODOLOGY

1.8.1 Study design

A cross-sectional descriptive survey was conducted and a quantitative approach was used in assessing knowledge on infant feeding practises among women on PMTCT programme at clinics in Francistown, Botswana. Quantitative research relies on the collection and analysis of numerical data to describe, explain, predict or control for variables and phenomena of interest (Gay et al, 2009). Thus, this design was appropriate for this study for its ability to provide results in a specific time period. Further, the study involved collecting data in order to answer the questions regarding knowledge on infant feeding practises among women in the PMTCT programme at Greater Francistown DHMT.
A knowledge survey questionnaire was used to assess knowledge on infant feeding practices among women enrolled on the PMTCT programme. A CW card was used to identify women enrolled in the PMTCT programme attending PNC and CWC. The convenience sample selection method was used for all consenting women enrolled in the PMTCT programme to participate in the study. Women were recruited immediately after being attended to using a CW card at the MCH unit during the time of data collection. Data collection was done in an enclosed room provided by the facility to ensure privacy. Clinics were visited on different dates so as to avoid repeating the same mothers in the study. Raw data was captured in Microsoft Excel, and coded and imported in STATA 13.0 for analysis.

1.9 DEFINITION OF CONCEPTS

1.9.1 Mother to Child Transmission

Mother to child transmission (MTCT) also known as vertical transmission of HIV is a mode of transmitting HIV infection from an infected mother to a child during pregnancy, labour or through breast feeding.

1.9.2 Breastfeeding

Breastfeeding (BF) is a way of feeding an infant on breast milk.

1.9.3 Exclusive breastfeeding

Exclusive breast feeding (EBF) is breastfeeding where an infant receives no other food or drink, not even water, other than breast milk (which can be expressed milk), for the first six months of life with the exception of drops or syrups consisting of vitamins, mineral supplements or medicines.

1.9.4 Formula feeding

Formula feeding (FF) also known as replacement feeding (RF) refers to the process of feeding a child who is not receiving any breast milk on commercial formula milk which provides all the nutrients the child needs.
1.9.5 Exclusive formula feeding

Exclusive formula feeding (EFF) involves the use of commercial infant formula alone that is formulated industrially in accordance with the applicable standards to meet the nutritional requirements of infants during the first six months of life.

1.10 CHAPTER SUMMARY

Chapter 1

This chapter comprised the introduction or background information to elaborate the impact of the HIV/AIDS pandemic on children and why knowledge on infant feeding of women in the PMTCT programme needed to be investigated in public health settings. Further, it also, through the research problem, provided an overview of the high numbers of HIV exposed infant hospitalization and mortality rates despite the intensified PMTCT strategy implementation in HIV/AIDS prevention. The aim of the study is given as well as the objectives and the study questions. The chapter ended with a summary of important aspects of the research methodology and chapter summary.

Chapter 2

In this chapter, literature on knowledge about MTCT, factors influencing infant feeding choices and infant feeding practices are reviewed to cover the factors leading to high hospitalization and mortality rates of the HIV exposed infants. The reviewed information provided in each of these areas is linked to the research title, questions and objectives.

Chapter 3

This chapter discusses the research methodology. It gives the justification for a quantitative descriptive cross sectional survey design that was used. The study population and sampling method are described. It also describes the data collection approach used to ensure reliability, validity, minimised bias and data analysis techniques. Further, the chapter ends with a description of the processes that were employed to ensure that the study was ethical.

Chapter 4

In this chapter all the descriptive data analysis and the statistic inferences that were used to analyse the questionnaires and interpretation of the results are described.
Chapter 5

This chapter provides conclusions drawn from the data analysis and based on the research objectives. The results obtained from this study are compared with relevant literature. The chapter ends with recommendations and the limitations of the study.
CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter describes the HIV/AIDS burden of Botswana with its preventive measures to combat the epidemic, especially among women and children. It further reviews previous research studies on knowledge of MTCT and different findings about infant feeding practises among women in PMTCT programme. Literature on factors influencing infant feeding choices among HIV infected women is also discussed. The chapter closes with a brief conclusion.

2.2 HIV/AIDS BURDEN IN BOTSWANA

Botswana is a member of the SADC region that continues to be one of the countries most affected by the HIV epidemic, which is the third highest in the world after Lesotho and Swaziland, despite it being the first African country to launch free national ART to all people living with HIV. The first case of AIDS in Botswana was diagnosed in 1985. HIV prevalence in Botswana is at 21.9%, showing some improvement over the decade from 2005 when HIV prevalence stood at 25.4% (Creek, 2011; UNAIDS, 2014; UNAIDS, 2017), with Francistown at 23.1% which is slightly higher than the national HIV prevalence rate (BAIS IV, 2013). In Botswana, women aged 15 to 49 are the most affected by the epidemic with HIV prevalence of 26.3%, while men of the same age group are at 17.6%, with 12 000 children aged 0 to 14 living with HIV (UNAIDS, 2016). HIV prevalence among pregnant women aged 15 and 49 is 26% (Shapiro, 2016).

Given the magnitude of the HIV/AIDS epidemic in the country, the GoB demonstrated a political will and commitment towards combating the HIV epidemic through mobilization of resources, establishment of the National AIDS Coordinating Agency (NACA) and streamlined HIV care and treatment services. The GoB through its political will together with the donors’ support in addressing the epidemic has made the country an example for many countries in sub-Saharan Africa which has paved the way for them to follow. In
addition, with the designed national policies to combat HIV/AIDS, well implemented interventions, including the PMTCT programme, have led to a significant decrease of new HIV infections from 15 000 in 2005 to 9 100 in 2013, although showing a rise again of 9 700 in 2015. Further, AIDS-related deaths have also dramatically decreased from 14 000 recorded in 2005 to 3 200 in 2015 (Creek, 2011; UNAIDS, 2016).

2.3 PMTCT IN BOTSWANA

Globally, the PMTCT programme has gained political attention and financial support to curve HIV infection among children (UNAIDS, 2006). In 2011, a Global Plan was launched to reduce the number of new HIV infections through MTCT by 90% by 2015 (Aidsportal, 2015). The WHO identified 22 priority countries with the top ten, including Botswana, accounting for 75% of the global PMTCT service needed (WHO, 2013).

In Botswana, the PMTCT programme was launched in 1999 with interventions to reduce HIV transmission from an infected mother to her child (BGARR, 2012; Creek, 2011). Botswana’s PMTCT programme is one of the most successful implemented HIV programme responses in addressing the HIV epidemic of the country. In 2014, the PMTCT programme was available in all 634 health facilities that provide maternal child health services with 91% PMTCT uptake and more than 95% pregnant women receiving ART in 2016 (NACA, 2015; SADC, 2009; UNAIDS, 2016; UNAIDS, 2017). PMTCT interventions in Botswana have tremendously reduced MTCT of HIV infection from as high as 40% with prophylaxis to less than 4% in 2011 and to as low as 2.1% (BGARR, 2012; Creek, 2011; Zash et al, 2016). Particular attention is given to expectant mothers to prevent MTCT of HIV with currently about 26% HIV prevalence among pregnant women in Botswana (Shapiro, 2016). Thus, knowledge of the risk and timing of MTCT modes of HIV transmission have essential approaches to optimize its prevention. PMTCT can thus stop HIV transmission to such lower levels below 5% that it no longer constitutes a public health problem (WHO, 2015; WHO, 2016).

2.4 KNOWLEDGE ABOUT MTCT

Knowledge of mothers about MTCT in this context is referred to as the extent to which mothers understand HIV/AIDS, as well as the mode of transmission to infants and preventive measures of HIV infection from mother to child. Several research studies,
including from sub-Saharan Africa, have been conducted to assess knowledge levels among women enrolled in PMTCT programme.

Literature from Ethiopia, Togo and Nigeria reported that most women knew that HIV could be transmitted from an infected mother to the baby, mentioning mode of transmission as occurring during delivery, through mixed breastfeeding and that MTCT of HIV is preventable (Jebessa and Teka, 2005; Tatagan et al, 2011; Owoaje et al, 2012; Olugbenga-Bello et al, 2013; Tesfaye et al, 2014). In contrast, other studies from Ethiopia and Tanzania revealed low knowledge levels of MTCT and PMTCT with 57% and 46% respectively (Abtew et al, 2016; Haile et al, 2016). In line with this finding, almost similar results were reported in Botswana where only about half of the women had knowledge about PMTCT services and 53% women understood the modes of MTCT of HIV transmission during pregnancy, delivery and breastfeeding (Kasinga et al, 2008; Ndubuka et al, 2013). Furthermore, these studies reported that adequate MTCT knowledge was associated with higher education level, having more than one pregnancy experience, living in urban areas and being exposed to HIV education. This shows that different knowledge levels of mothers in the PMTCT programme exist in different settings characterised by different factors; despite that, the PMTCT programme is successful in most countries (Avert, 2017).

According to the Botswana HIV, new guidelines in line with the WHO recommendation advocate for women to be counselled on infant feeding choices for them to make informed decisions (MoH, 2016; WHO, 2016). Thus, studies from Botswana and Nigeria reported that mothers who received infant feeding counselling as part of the PMTCT programme portrayed higher knowledge of PMTCT practises. However, knowledge related to breastfeeding was negatively associated with the belief that breastfeeding could transmit HIV to the baby and reported concerns about AIDS stigma and discrimination related to HIV and infant feeding choices (Ndubuka et al, 2013; Olugbenga-Bello et al, 2013).

2.5 FACTORS INFLUENCING INFANT FEEDING CHOICES

Women in PMTCT programme are faced with a challenge of making an informed decision with regard to infant feeding options given the diverse factors around them, namely: knowledge about infant feeding, HIV disclosure, socio-economic and cultural factors, among others (Leshabari et al, 2007a; Ndubuka et al, 2013; Haile et al, 2016). According to
WHO (2009), HIV-infected mothers are challenged with infant feeding choices and how to balance the risk of HIV transmission through breastfeeding with the risk of death from causes other than HIV among formula-fed infants.

2.5.1 Maternal knowledge about infant feeding

Maternal knowledge about infant feeding options, especially in the context of HIV/AIDS, is an essential key factor toward a sound infant feeding choice. In many countries, all pregnant women during ANC visits are provided with health education and counselling according to the country’s infant and young child-feeding guidelines based on WHO recommendations regardless of their HIV status (WHO, 2010).

In Botswana, the PMTCT guideline (2011) recommends that all HIV infected pregnant women receive PMTCT services including infant feeding counselling. PMTCT strategies impact women with knowledge about HIV/AIDS and infant feeding options, and enable them to make informed infant feeding choices. Thus, a study by Ndubuka et al (2013) from Gaborone, Botswana, reported that receiving infant feeding counselling was significantly associated with the decision to exclusively breast feed. A similar finding was also reported from south-western Nigeria, where receipt of counselling on infant feeding options during ANC visits influenced the choice of EBF (Aishat et al, 2015). However, reports from Botswana revealed that only about half of the respondents had high knowledge about PMTCT and PMTCT-related practices in relation to breastfeeding, with 19.8% choosing to breastfeed their babies. In addition, it was also reported that knowledge of PMTCT practices related to breastfeeding was negatively associated with the belief that breastfeeding could transmit HIV to the baby (Ndubuka et al, 2013). Further to this finding, a report by Kasinga et al, (2008) from Gaborone, Botswana, showed that 43.3% of respondents indicated exclusive breastfeeding as a potential risk of transmitting HIV infection to the baby which demonstrated doubt and misconception towards the containment of MTCT of HIV.

In a study from western Kenya it was reported that a high percentage (85.5%) of respondents were aware of breastfeeding as a route of HIV transmission; however, there was a lack of knowledge about the range of infant feeding options, limiting their choices and hence preferences (Wachira et al, 2009). A study conducted in north-west Ethiopia reported that a small proportion (17.5%) of mothers knew that MTCT of HIV could be prevented by the use
of ARV drugs by only breastfeeding for up to six months and by safe delivery (Abtew et al, 2016). However, this result was lower than that from Addis Ababa and Gondar which were 76% and 83% respectively (Malaju and Alene, 2012; Solomon and Tilahun, 2005). In another study by Tesfaye et al (2014) from west Ethiopia Ambo Hospital ANC clinic, more than half of the respondents 52% reported that breastfeeding by HIV positive mothers was encouraged, with the majority of 86.4% aware of the exclusive breastfeeding option of infant feeding for the first six months of life. This reveals varying knowledge levels of women according to the geographical regions of the country.

In a study from Chinhoyi Hospital in Makonde district in Zimbabwe, it was reported that 50% of the mothers had adequate knowledge of the infant-feeding guidelines which improved the mothers’ ability to select an infant-feeding option making it easier (Marembo et al, 2014). A study conducted in Johannesburg, South Africa, it was found that women with HIV had better overall knowledge of safe feeding practices both in general and in the context of HIV infection (Mnyani et al, 2017). In addition, a report from the City of Tshwane, Gauteng Province, South Africa, showed that women who had a good understanding of the implications of infant feeding on transmission of HIV were able to resist pressure from the family to mix feed while those who did not understand MTCT of HIV and the implications of infant feeding introduced solids and other fluids before six months (Madiba and Letsoalo, 2013).

Literature from rural Kwa-Zulu Natal, South Africa, reported that previous experience with breastfeeding, being knowledgeable about the nutritional benefits of breast milk, and associating infant mortality with formula feeding influenced mothers to choose EBF. Thus, with a clear understanding on how EBF may reduce postnatal transmission, mothers were more willing to choose and adhere to the practise compared to mothers who did not have such privileged knowledge (Thairu et al, 2005). On the contrary, a report by Chisenga et al (2011) from Lusaka clinics in Zambia showed that even though mothers understood the dangers of mixed feeding, they found it difficult to avoid the practise. However, contrary to these findings, the findings from the three PMTCT sites across South Africa revealed that women were not counselled on infant feeding choices as they lacked knowledge on essential conditions of the benefits of breastfeeding and safe formula feeding practices (Chopra et al, 2005). Similar findings were reported from rural Papua New Guinea, where it was shown that even though most rural mothers regarded breastfeeding as the best for their babies,
knowledge about the benefits of breastfeeding and the hazards of infant formula feeding was very low (Kuzma, 2013). Thus, this demonstrates that infant feeding counselling during ANC visits is an important PMTCT intervention that provides women with knowledge on infant feeding options and practises.

2.5.2 HIV status disclosure

HIV status disclosure by HIV infected women is one of the most essential elements in the MTCT of HIV prevention and treatment interventions. HIV status disclosure remains central to improving both maternal and child health outcomes (Spangler et al, 2014). Women are faced with the issue of HIV disclosure as they are anxious about stigma and discrimination from the community and family members having uncertainty on how to disclose and fears of negative reactions. This belief was observed in a study from Gaborone, Botswana, where women who had not disclosed their positive HIV status had difficulties to exclusively formula feed and to receive free formula milk from the health facilities as this could draw attention to their unknown HIV status. Instead, they preferred to purchase formula and gave complementary feeds even though they knew that they were HIV positive (Kasinga et al, 2008). Ndubuka et al (2013) in their study also from Gaborone, Botswana, reported that 88.4% of respondents were concerned about the AIDS stigma related to HIV and infant feeding choices.

Nonetheless, disclosure of HIV status by a woman to her partner is a major condition for successful RF method, especially within the African cultural context. In a study from Zimbabwe, disclosure of HIV status to the partner was feared by most women as only 16.2% of them disclosed their HIV status to their partners (Marembo et al, 2014). Contrary to this finding, a study from Johannesburg, South Africa, by Mnyani et al (2017) reported that pregnant and postpartum HIV positive women disclosed their HIV status to their partners 87.8% and 91.0% respectively. Owoaje et al (2012) in a study from Oluyole Nigeria reported that, the FF option, although known to the majority of women, was not socio-culturally acceptable. Consequently, HIV-positive mothers adopting this infant feeding option ran the risk of labelling, stigmatisation and discrimination. These women would probably not receive the required social support to comply with this recommendation and may resort to mixed feeding, with the attendant risk of MTCT of HIV and diarrhoeal disease in their infants. Chisenga et al (2011) from Zambia reported that lack of disclosure to family and friends made it difficult for women to choose and adhere to RF, while those who chose
the feeding method often gave other reasons to family and neighbours as to why they were not breastfeeding, such as sores on breasts, baby refusing breast milk and when baby sucks on the breast, the cheeks get swollen.

However, literature from various studies reported that disclosure of HIV status contributed to great support that women received from both the spouses and family members which enabled adherence to the opted infant feeding option. Furthermore, in a study from West Ethiopia 66% of respondents shared the results of their HIV test with their husband or partner while 71.6% of them reported their willingness to support their spouses who tested positive for HIV (Tefsaye et al, 2014). In a study from South Africa it was reported that disclosure to family members made it easy for women to explain their infant feeding practises (Doherty et al, 2006). Fadnes et al (2010) in their study from eastern Uganda reported that many respondents mentioned more support from family and friends when they disclosed their HIV status.

Contrary to this report a study from South Africa by Madiba and Letsoalo (2013) revealed varying disclosure reactions from partners and family members such as rejection and divorce and denial of the HIV positive result, with stigma and discrimination by the family hindering them to fully participate in PMTCT interventions. Njunga and Blystad (2010) in a study from Malawi reported that, in a climate of animosity, men explained that the trauma of dealing with an HIV positive result became too much to bear when the mother-in-law and brothers-in-law became involved hence, men would find it easier to walk away and abandon their homes.

The weight of the stigma burden may be related to how well each setting has adapted to HIV which in many settings seems to require some maturation time (Fadnes et al, 2010). Stigmatization from the community makes HIV mothers prone to the practise of mixed feeding which increases childhood morbidity and mortality. In a study from Gaborone, Botswana, Kasinga et al (2008) reported that women indicated that the community associated infant feeding methods with HIV status with 56.7% stating that the community associated EFF with positive HIV status, and so did 30% with EBF, while 66.7% stated that BF was associated with HIV negative status. Finding from south-western Nigeria showed the association between practising EBF and the fear of stigmatization. Mothers who feared stigmatization were seven times more likely to practise EBF (Aishat et al, 2015). Similarly,
report from Abuja, Nigeria, by Muhammed et al (2010) showed that mothers practised EBF so as to prevent stigmatization.

2.5.3 Health workers’ influence

In sub-Saharan African countries many women accept the recommendations of healthcare workers as final and the opinions and advice given by them are highly respected (Piwoz et al, 2006). Madiba and Letsoalo (2013) in a study from South Africa reported that, because of the WHO recommendations, infant feeding methods were modified several times, and thus counselling of infant feeding became confusing for both health care providers and pregnant women. In some instances, healthcare providers were prescriptive and offered only one feeding option that was favoured by the counsellor, as a result of which women were forced to choose the feeding option that was promoted at the time.

In Botswana, the motive by the GoB to provide free formula milk to curtail the transmission of HIV infection to the child may be perceived as prescriptive to the mothers without taking into account their socio-economic aspects and their individual factors. This is revealed in a study conducted in Gaborone, Botswana, where the majority of women reported that the infant feeding option was being influenced by healthcare workers who encouraged formula feeding despite the availability of evidence supporting EBF benefits while on ART for the first six months of infant life (Ndubuka et al, 2013). Similarly, a study from the three PMTCT sites in South Africa reported that health workers had the greatest influence over mothers’ initial infant-feeding choices, thus some mothers expressed feeling forced to choose a particular feeding option because of their HIV status (Doherty et al, 2006).

Literature from north-west Ethiopia reported that poor results from the study on MTCT of HIV knowledge on specific methods of prevention were attributed to ineffectiveness of counselling, health education and promotion services given by health facilities (Abtew et al, 2016). However, each new change in the PMTCT approach requires changes in national policy, media messages, provider training and awareness of HIV-infected mothers. Thus, the complexities of changes have resulted in confusion at the programme and individual level (John-Stewart, 2008). For instance, a study from South Africa reported that healthcare workers’ knowledge did not conform favourably to latest WHO guidelines, thus confusion existed regarding the period for which an infant could be breast fed according to the newest
WHO guidelines, with only 26% providing the correct answer (van Rensburg et al, 2016). Furthermore, a study from Lilongwe, Malawi, reported that important differences were observed between the WHO recommendations and the attitudes and practices of healthcare workers. Inadequate knowledge regarding the newest guidelines for PMTCT can thus negatively impact the knowledge and practices offered to women (Piwoz et al, 2006).

Nevertheless, a report from the three PMTCT sites across South Africa revealed that HIV-negative women had been informed about the advantages of EBF, but only a minority of the HIV-positive women had been told about the risk of breast milk transmission when complementary food was added. Furthermore, it was also observed that lack of training by healthcare workers in the rationale, principle and strategies to educate women on infant feeding hinders the promotion of the recommended infant feeding (Chopra et al, 2005). In line with this, a study from northern Tanzania by Leshabari et al (2007b) reported that lack of motivation for and confidence in the work as PMTCT counsellor was encountered in contexts characterised by severe shortage of staff and immerse time constraints that left the nurse with merely a few minutes to present and discuss the complex pros and cons of the various infant feeding options with each client. This is in agreement with a study from eastern Uganda, where healthcare workers reported challenges related to workload, resources, scientific updating, adjustment to frequent changes in programmes, and recommendations and guidelines. As a result, counselling sessions were often improvised, offering simplified and one-sided contradicting information (Fadnes et al, 2010). Thus, a study from South Africa, reported that women felt confused and unsure about the best infant feeding option because of the conflicting messages provided by healthcare workers during counselling, hence the change from EBF to EFF was forced by nurses (Madiba and Letsoalo, 2013).

Chopra and Rollins (2008) pointed out related compromised counselling issues among healthcare workers in some sub-Saharan countries: Botswana, Kenya, Malawi and Uganda, where it was concluded that many over-estimated the risk of HIV transmission. Hence, there is need for training of healthcare workers as well as updating their training on various aspects of PMTCT services and provide infant feeding counselling that is based on current WHO recommendations and culturally acceptable practises (Owoaje et al, 2012; Ndubuka et al, 2013; van Rensburg, 2016). Thus, healthcare workers’ have an influence, especially on HIV-infected women about infant feeding choice outcomes given the challenge to reduce
HIV infection transmission and increase child survival by providing accurate information on infant feeding that addresses the risks and benefits of different feeding options.

2.5.4 Infant feeding counselling

As alluded to earlier on, infant feeding counselling during ANC visits has a significant influence on the mothers’ infant feeding decision-making and feeding practices. Healthcare workers’ counselling practices are key factors to improve infant feeding practices (Doherty et al, 2006). Although counselling has been proven effective, there is lack of high quality infant feeding counselling materials and HIV counsellors for testing and for ARVs prescription as there are insufficient numbers of health care workers especially in sub-Saharan Africa. Hence, in some instances, infant feeding counselling is compromised (Frontières, 2007; Fadnes et al, 2009).

Some challenges exist in the PMTCT programme attributable to poor training of healthcare workers coupled by poor counselling offered to women (Koricho et al, 2010; Mnyani and McIntyre, 2013). Studies conducted in South Africa, Ghana, Botswana and Nigeria reported that women who received infant feeding counselling on infant feeding options recommended for HIV positive mothers had higher knowledge of MTCT practices related to appropriate infant feeding and thus chose the EBF option (Doherty et al, 2006; Laar and Govender, 2011; Ndubuka et al, 2013; Aishat et al, 2015). Contrary to this, a study conducted in South Africa showed that most women were not counselled on infant feeding choices for HIV positive mothers as few had knowledge on essential conditions for safe formula feeding and most of them could not define the term EBF (Chopra et al, 2005). Thus, literature reveals inconsistency in the PMTCT counselling offered to women leading to differences in knowledge related to MTCT with infant feeding practices. In a study from South Africa, most women perceived the counselling they received as good, thus, making it easier for them to deal with their HIV status (Madiba and Letsoalo, 2013). Hence, comprehensive and explanatory counselling has great potential influence of mothers’ understanding and dedication to EBF and to form holistic interventions to improve EBF rates (Aishat et al, 2015). It is thus important for PMTCT programme implementers to provide comprehensive infant feeding counselling. Nevertheless, informed decision-making can only take place when women are provided with individualised, unbiased and accurate information about infant feeding options with information that is aligned with women’s beliefs and at an
appropriate health literacy level. Therefore, the basic ethical principle of informed choice requires that HIV-positive women are provided with adequate information about their infant feeding options in the context of PMTCT of HIV (Thairu et al, 2005). Thus, infant feeding counselling is an important predictor of infant feeding choice for the women in PMTCT programme (Laar and Govender, 2011; Ndubuka et al, 2013; Aishat et al, 2015).

2.5.5 Cultural factors

Often time issues that relate to HIV transmission through breastfeeding are perceived with fears by mothers of infecting their infants with HIV. In many societies breastfeeding is considered the cultural mode of feeding an infant. For instance, studies conducted in Tanzania and Nigeria reported that breastfeeding is a cultural norm of feeding an infant that is healthy while a mother would not feel like a real mother if not breastfeeding, thus the power of breastfeeding is a cultural norm practise which is a moral commitment on the part of the mother (Leshabari et al, 2007a; Owoaje et al, 2012). On the contrary, these acts as negative perceptions for the non-breastfeeding option which lies deeply in the socio-cultural beliefs of many societies that needs to be addressed when offering infant feeding counselling to women in the PMTCT programme. However, the majority of women are surrounded with the belief that breastmilk contains HIV infection which is one mode of HIV transmission from an infected mother to the child. Such belief is in the context of studies that have detected HIV in breast milk (Van de Perre et al, 1995; Ruff, 1994; Nduati, 1995). In agreement, a study conducted in Botswana reported that 56.3% of the respondents believed that HIV infected mothers could transmit HIV infection to an infant when breastfed (Ndubuka et al, 2013). However, WHO infant feeding recommendations have been well-versed in the findings of studies which have shown that EBF for the first six months of infant life is associated with reduced risk of HIV transmission when taking ARVs (WHO, 2006; Coovadia et al, 2007). Thus, such recommendations should be incorporated into the PMTCT services more with infant feeding counselling with healthcare workers well equipped with such information in order to provide information that is relevant and accurate to the women despite the cultural beliefs around them.

Most mothers are influenced by the traditional beliefs of their cultural settings. For instance, studies from Malawi and Nigeria reported that cultural beliefs have influenced mothers’ infant feeding practises as many mothers perceives that breast milk is not enough for the
child’s growth and intend to mix feed even after receiving infant feeding counselling that breast milk alone is sufficient for the first six months of an infant’s life. Furthermore, such evidence has shown that traditional beliefs, practises and rites encourage the use of prelacteal feeds, giving water, herbs, and tea which is regarded as a cultural gesture to welcome the child to the world (Njunga, 2008; Nwanko and Brieger, 2012).

2.5.6 Family influence

Family influence is one of the factors that influences women in their decision-making for infant feeding option. In line to this notion, a study from Botswana revealed that the decision on the choice of infant feeding method was also based on the expectations of the spouse, the in-laws and other family members with 41% stating that their family members would like them to use mixed feeding while 35% stated EBF (Kasinga et al, 2008). In addition, a study conducted in Nigeria reported that 84% of mothers chose EBF because of their spouse’s influence while 81% chose it because of family influence (Ashait, 2013).

Other studies conducted in South Africa, Tanzania and Nigeria reported gaps between intentions and infant feeding practises as being influenced by: family members in some cultures who encouraged early introduction of various types of liquids, socio-economic factors and fear of disclosure of HIV. These are major influences on the choice they make so as to be culturally accepted and as being perceived as a good mother. (Doherty et al, 2006; Leshabari et al, 2007a; Leshabari et al, 2007b; Owoaje et al, 2012).

2.5.7 Socio-economic factors

The GoB has for many years recommended HIV-infected women to exclusively formula feed their infants and provided infant formula free of charge until the infant was one year old (Creek, 2011). Nevertheless, adherence to such a feeding option for the first six months of infant life, despite being offered free of charge formula milk, was reported to be suboptimal (Shapiro et al, 2003). This result may be attributable to other factors surrounding individual women settings. In many developing countries, many HIV-positive women do not have resources to prepare replacement feeds in accordance with WHO recommendations as in an AFASS and safe manner (WHO, 2010).
The socio-economic status factors of mothers who are HIV-positive, such as income among others has an important influence on their decision-making, particularly in relation to RF (Laar and Govender, 2011). Rollins (2008) reported that mothers make inappropriate infant feeding choices and feeding practises when their household circumstances cannot safely support them. Further studies conducted have reported that cost and socio-economic status of HIV positive mothers are significant barriers to RF (De Paoli et al, 2004; Kuhn et al, 2007). This shows that affordability in terms of buying power has important implications for being able to choose and adhere to appropriate feeding practise. In addition, studies conducted in Tanzania and Ghana reported that women were confident to use infant formula if distributed free of charge (De Paoli et al, 2004; Laar and Govender, 2011). In a study from Botswana by Creek (2011) reported that improper feeding practises such as storage of formula at room temperature, inadequate cleaning of utensils, use of bottles with hard to clean nipples and frequent formula shortages are very common challenges among women. Furthermore, similar challenges were reported in Tanzania and Ghana such as the issue of clean water, the utensils used in preparation of milk as well as the formula tin being too small, thus compelling women to supplement with tradition foods, thereby leading to mixed feeding (Leshabari et al, 2007; Laar and Govender, 2011). This is similar to the findings from Tanzania where mothers were generally uncertain about the use of infant formula, experiencing problems in calculating the right amounts of formula powder and water (Leshabari et al, 2006).

2.6 INFANT FEEDING PRACTISE AND HIV/AIDS

Infant feeding practises are important components in the promotion of effective PMTCT interventions. Knowledge imparted to women enables them to make informed choices concerning infant feeding practises determined by various factors surrounding them. Literature reveals that adherence to chosen infant feeding practises is hindered by various factors (Leshabari et al, 2007a; Kasinga et al, 2008; WHO, 2009; Owoaje et al, 2012). Infant feeding practise is critical in the first two years of the infants’ life as appropriate feeding practises are essential for nutrition, health promotion, growth and development, and they improve child survival, thus reducing the risk of infectious diseases and lowering morbidity and mortality rates (WHO and UNICEF, 2003; UNSAID, 2010; WHO, 2015). Thus, it is estimated that under nutrition causes 3.1 million child deaths annually or 45% of all child deaths (WHO, 2015). Infant feeding in the context of HIV is complex because of the major
influence that feeding practises exert on child survival, especially with EBF (WHO, 2010b). However, with the refined infant feeding recommendations, infants born to HIV-infected mothers with provision of ART are allowed to exclusively breastfeed until six months and continue up to 12 months of age with significantly reduced risk of HIV transmission (WHO, 2015). Infant feeding practises differ with individuals in different communities with common practises being breastfeeding, replacement feeding and mixed feeding with preferences depending on social, cultural and economic factors (Wapang’ana, 2013).

2.6.1 Breastfeeding

Breastfeeding is a normal way of feeding a baby which reduces infant morbidity and mortality and contributes to good health status, survival and development (Burgess et al, 2009). BF is most effective when it is exclusively provided for the first six months of the child’s life as it enhances the child’s immunity, hence providing protection against diseases like diarrhoea and respiratory infections which are the major causes of infant mortality in developing countries (UNICEF, 2006; UNAIDS, 2010; Botswana Global AIDS Response Report, 2012). In addition, when EBF is practised there is a lower risk of HIV transmission than mixed feeding (Chisenga et al, 2005). EBF is when an infant receives breast milk only no any other food and liquids, not even water with the exception of mineral supplements or medicines. EBF protects the intestinal mucosa, hence providing a more effective barrier to HIV infections. It is thus, a beneficial intervention in saving infants’ lives when practised for the first six months of life provided the mother receives ARV (Coovadia et al, 2007; WHO, 2010b; UNAIDS, 2010). A report from Botswana by Baggley et al (2002) stated that breastfeeding provides 100% nutrition to the baby in the first six months of life. Furthermore, the report stated that infants who are not breast fed have an increased risk of dying within the first year of life due to malnutrition and lowered immunity against childhood illnesses like diarrhoea and respiratory infections.

Nonetheless, given the benefits of BF which results from its practises, EBF rates remain low throughout the world with EBF rates globally estimated at 35%. However, different regions have reported an increase of EBF, for instance, in sub-Saharan Africa from 22% in 1996 to 30% in 2006, East Asia (excluding China) 27% to 32% from 1996 to 2006, and Latin America and the Caribbean (excluding Brazil and Mexico) 30% to 45%, but despite the reported increase of EBF the rates are still low (WHO, 2012).
Data from a study in Botswana reported similar findings of low EBF even among HIV-unexposed infants only where 99% were breastfed for at least one month and 75% for more than six months. However, only 16% of HIV-exposed infants were ever breastfed; 13% breastfed for at least one month and 1.4% for more than six months. Furthermore, the study revealed that introduction of solid food was similar between HIV-exposed and HIV-unexposed infants (74% and 71% respectively) by six months of age (Zash et al, 2016). This reveals suboptimal EBF practices even among HIV uninfected mothers according to the WHO infant feeding recommendation for the first six months of the infants’ life (WHO, 2010a). In addition, in other studies from Botswana, low rates of BF among HIV infected women were reported by Kasinga et al (2008) and Ndubuka et al (2013) as intended methods to feed their infants 15% and 19.8% respectively.

According to the Botswana family health survey IV, it was reported that only 40% of infants were initiated to breastfeeding within one hour of birth, 20.3% were exclusively breastfed for the first six months of life with median duration of 12.5 months and complementary feeding at six to nine months among breastfed babies at 45%. Generally, there is non-adherence to infant feeding practices despite the majority (94.1%) of mothers attending ANC, giving birth at health facilities (93.8%) and attended by skilled health workers in most cases (94.6%) (BAR, 2010). However, EBF rates have shown some increase in the EBF method of the country as is revealed even globally, due to sensitization on the benefits of breastfeeding even with the HIV/AIDS epidemic. Additionally, MTCT of HIV infection is higher among mixed fed infants than exclusively breastfed infants. It is thus estimated that 13 to 15% deaths of children below five years of age could be averted in low and middle-income countries with EBF (Coovadia et al, 2007).

Studies conducted around Africa have reported different adherence in relation to EBF. In a study conducted in Ethiopia, most of the mothers (82.2%) practised EBF for the first six months. Furthermore, it was revealed that BF initiation within one hour after birth was at 71% with 25.1% initiating within twenty-four hours after birth. Such positive infant feeding practices were associated with mothers’ knowledge about EBF, ANC follow up and occupation (Bayissa et al, 2015). In addition, this is attributed to the cultural norm of breastfeeding as the only norm of feeding an infant which has raised hopes that MTCT can be reduced where breastfeeding is culturally normative (Coutsoudis et al, 1999; Iliff et al, 2005). On the contrary, a study from Kenya revealed a lower number of 40% of mothers
practising EBF for the first six months of infant life with a small number (5.5%) initiating the infant to breast milk within one hour after birth. However, the majority (55.6%) reported having breastfed infants on demand, while 11.1% breastfed four times or less and 33.3% breastfed at least five times a day (Wapanga’na, 2013). This report reveals that complementary foods were introduced earlier than the WHO recommended period of after six months of infant life (WHO, 2010). Similarly, such low EBF adherence was also observed in Botswana in both EBF and EFF methods as such practises are highly recommended in an effort to reduce the incidence of HIV infection among children. Several factors were cited that alluded to non-adherence to EBF like mothers giving water to quench the babies’ thirst, expectations from the family to breastfeed, cultural pressure and fear of stigma, especially for those who had not disclosed their HIV status (Shapiro et al, 2005).

The aspect of adherence to EBF of infants poses a challenge to mothers owing to the intended and the actual practise of infant feeding. Thus, a study conducted in Nigeria reported a gap between infant feeding preference and adherence to standard practise as a result of socio-cultural challenges associated with risk for mixed feeding and the risk for MTCT of HIV (Lawani et al, 2014). Furthermore, a study from Ghana revealed that all HIV-positive mothers expressed great concern over the social consequences of not breastfeeding with fears over stigmatization. Immediately people realize that you are not breastfeeding your baby, they conclude that you have AIDS and they make you the subject of discussion and a laughing stock in the area (Laar and Govender, 2011). Similar findings are reported by Leshabari et al (2006) in Tanzania where mothers preferred mixed feeding to EBF which is not feasible beyond three months believing that breast milk was insufficient for a fast growing child. Furthermore, mothers believed that babies need water in the first month because they ‘feel thirsty’. Thus, many reportedly gave babies water before initiating breastfeeding (Leshabari et al, 2006). Breastfeeding also requires feeding on demand at least 8 – 10 times per day and working women may find it difficult to breastfeed exclusively once they return to work (Botswana PMTCT Guideline, 2011).

Nevertheless, in HIV positive mothers this option of feeding may transmit HIV infection from the mother to the baby. The risk of HIV transmission through breastfeeding from an infected mother to the child, especially when mixed feeding is practised in the first six months of life is about 15% and 40% respectively (Jackson, 2000; Nduati et al, 2000). Furthermore, literature shows that, without preventive interventions, about 10-20% of
infants born to HIV infected mothers will contract the virus through breast milk (WHO, 2010). However, with effective PMTCT interventions of ARV therapy as well as exclusive infant feeding for the first six months of infants’ life breast milk is less a risk for HIV transmission. This notion is in line with the findings from the Mashi trial study in Botswana which concluded that MTCT rate at one month was 1.2% among breast feeders and 1.1% among formula feeders, hence, breastfeeding was not a risk for MTCT (Thior et al, 2006). This is also in agreement with the study conducted in South Africa where it was reported that EBF carried a significantly lower risk of HIV transmission than mixed breastfeeding (Coovadia et al, 2007). Furthermore, it was reported by Doherty et al (2006) from South Africa that mothers who had chosen to breastfeed had knowledge that breast milk is the best and often outweighed the perceived risk of HIV transmission through milk. Thus, positive knowledge and adherence to infant feeding practices are important aspects among HIV infected women for HIV free survival of the child (Lawani et al, 2014). Additionally, EBF is the solely most important strategy for reducing child morbidity and mortality associated with infectious diseases in both resource rich and poor settings particularly in the first months of life (Doherty et al, 2006). The WHO (2010) infant feeding recommendations are based on positive outcomes for HIV-free survival through provision of ARVs to breastfed HIV-exposed infants. Thus, the strategy is focused on making sure HIV-free survival not just on preventing HIV transmission (UN, 2010).

2.6.2 Formula or replacement feeding

Formula feeding is feeding an infant on milk other than breast milk (Botswana PMTCT, 2011). Thus, the exclusively formula-fed child receives only formula milk for the first six months of life and no other liquids or solids; however, the infant may be given drops or syrups consisting of vitamins, mineral supplements or medicine as directed by healthcare workers. Nevertheless, infant formula does not contain antibodies to protect infants from infections like diarrhoea, respiratory infections and malnutrition if not well prepared (Botswana PMTCT Guide, 2011). Formula feeding is used in the context of HIV to prevent HIV infection transmission from the mother to the child. In communities where breastfeeding is a social norm and a culturally entrenched practice, FF has negative implications in the context of HIV/AIDS for HIV-positive mothers (Leshabari et al, 2007a). In such communities, HIV-positive mothers who opt for FF face social disapproval due to deeply ingrained beliefs about the benefits of breastfeeding. Fear of HIV disclosure may be
a hindrance to opt for FF to many HIV-positive mothers (Kuhn et al, 2004). Furthermore, a study from Ghana revealed that all HIV-positive mothers expressed great concern over the social consequences of not breastfeeding with fears over stigmatization in that immediately people realize that you are not breastfeeding your baby, they conclude that you have AIDS. In addition, it was reported that HIV-positive mothers often felt compelled to hide the fact that they formula fed over fear of stigma (Laar and Govender, 2011). In contrast, in the Mashi sub-study trial, very high levels (91%) of adherence to formula feeding were reported compared to only 18% adherence to exclusive breastfeeding (Thior et al, 2006).

In Botswana, as mentioned earlier on, EFF by HIV-infected women has been promoted by the Government for so many years; however, currently women are allowed to make informed infant feeding choices (MoH, 2016). Similarly, in a study conducted in Nigeria it was reported that FF was a known infant feeding method to the majority of women though it was not socio-culturally acceptable. Thus, HIV-positive mothers adopting this infant feeding option faced the risk of labelling, stigmatisation and discrimination leading to lack of social support. They hence resorted to mixed feeding leading to increasing risk of MTCT of HIV infection (Owoaje et al, 2012).

### 2.6.3 Mixed feeding

Introduction of fluids and solids to infants in the first six months of infant life is a common practise. For instance, literature from Ghana reported that about 40% of HIV-positive mothers practised mixed feeding, giving breast milk in addition to other foods, including water, traditional medicines, cereal foods and these were often initiated between one and three months. However, a report from Ghana indicated that mothers who mixed-fed their infants were aware of the guideline recommendations of not introducing complementary feeds prior to six months of EBF and cited transmission of HIV to the infant as the basis for this recommendation (Laar and Govender, 2011). Furthermore, literature from Zambia reported that HIV positive women changed to mixed feeding very early whether they started out with RF or BF (Omari et al, 2003). Similarly, studies from Botswana and Uganda revealed sub-optimal feeding practises both in the general population and among HIV infected mothers (Shapiro et al, 2003; Fadnes et al, 2009).

This finding is similar to a study from Kenya which reported that, regardless of high levels of maternal knowledge, the majority of respondents practised mixed infant feeding before
six months leading to an increased MTCT of HIV infection (Wapanga’na, 2013). Studies from Ghana, Uganda and South Africa revealed that women who practised mixed feeding were influenced by non-disclosure of HIV status, pressure from family members, cultural attitudes and level of income (Laar and Govender, 2011; Fadnes et al, 2010; Madiba and Letsoalo, 2013). However, reports from South Africa revealed that women were eager to maintain adherence to PMTCT interventions despite not disclosing to family members and partners (Madiba and Letsoalo, 2013). Thus, women in PMTCT programme are faced with various challenges that pressurise them to practise mixed feeding.

2.7 CONCLUSION

The literature reviewed has shown that PMTCT services have a positive effect on the women’s knowledge of MTCT and infant feeding options that determine their infant feeding options. Thus, PMTCT services that incorporate infant feeding counselling should be a key component of the PMTCT intervention strategy that is aimed at reducing MTCT of HIV and improves infant HIV free survival. In the literature reviewed, a number of factors have been identified as barriers to infant feeding choices, such as HIV status disclosure, cultural norms, socio-economic factors and family and medical influences which hinder appropriate infant feeding practise.
CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter discusses the research design and method taken to conduct the study giving justification for the cross-sectional design. It describes the procedure followed to determine the research population, sample size and recruitment. The chapter also discusses the data collection approach employed to ensure reliability and validity and minimize bias. The chapter ends with the ethical considerations that were observed to ensure that the research was credible and a brief conclusion.

3.2 JUSTIFICATION FOR THE PARADIGM AND METHODOLOGY

This is a cross-sectional descriptive study with a quantitative approach and constitutes non-experimental observational research in which the researcher only identifies the characteristics of an observed phenomenon or explores possible correlations among two or more phenomena without modifying the situation under investigation or determining cause and effect relationships (Leedy and Ormrod, 2010). Thus, this study is, therefore, a non-experimental research as in this research the researcher just observes and analyses knowledge on MTCT and infant feeding practices as well as factors influencing feeding choices and any factors associated with feeding practices among women in a PMTCT programme and does not manipulate or intervene subjects through may be giving them health education. It is also a survey as data was collected through asking people to respond to questions (Totten et al, 1999). In this study, data was collected through interviewer administered questionnaire. It is a quantitative research because the researcher collected only objective data consisting of numbers which was collected using a structured questionnaire and was coded in the form of numbers as opposed to qualitative data which is subjective data collected as language and words produced by the minds of the respondents.

A quantitative approach is the analysis of quantitative data that involves production and interpretation of frequencies, tables and graphs to describe the data; thus, data is collected systematically and presented to give a clear picture of a particular situation (Varkevisser et
al, 1993). It is also a survey as there is no planned intervention or random assignment of participants to groups (Welman et al, 2009). Participants already belonged to various levels of both the dependant (breastfeeding and formula feeding) and independent variables (socio-demographic variables).

This design was appropriate for this study for it was able to provide result at a specific time period since data was collected to give description of patterns to ascertain knowledge on infant feeding practices among women on PMTCT programme. No attempt was made to find casual relationships or make comparisons with maybe other groups like uninfected mothers.

3.3 STUDY POPULATION AND SAMPLING

3.3.1 Study population

The study population involved HIV infected women over 18 years old attending PNC and CWC at Greater Francistown DHMT who were enrolled in the PMTCT programme presenting at the clinics during the period of data collection from June to July 2016. The Greater Francistown DHMT is comprised of four cluster clinics involving eighteen (18) clinics around Francistown city council. From the eighteen clinics, fourteen clinics were visited and only nine clinics were used in the study due to lack of participants on the days that were visited for data collection.

3.3.2 Sampling method

A facility-based cross-sectional study was conducted involving 120 mothers who attended PNC and CWC at the 18 government health clinics from June to July 2016. A convenient sampling method was used to select the clinics as it was applicable in this study for the availability and accessibility of the mothers during the data collection period according to their convenience, accessibility and proximity (Gravetter and Forzano, 2012).

The Greater Francistown DHMT records showed that from the 18 clinics on average 172 women attend the PMTCT programme per month. A sample size of 120 within a margin error of 5%, confidence level of 95% and distribution of 50% was calculated (Rao soft,
2004). The sample size was increased to 130 in order to compensate for any eventualities that may occur during data cleaning. From the women who attended PNC and CWC during the period of data collection enrolled in the PMTCT programme, one hundred and twenty-six (N=126) participated in the study.

A Child Welfare card was used to identify women who were enrolled in the PMTCT programme to participate in the study attending PNC and CWC. Convenient sampling selection was used by approaching every woman who was enrolled in the PMTCT programme using the CW card to identify them. A convenient sample selection was used to recruit all consenting women to participate in the study. Convenient sampling selection was used due to the small study population of women enrolled in PMTCT programme. According to Dudovskiy (2012) convenience sampling also known as availability sampling is a specific type of non-probability sampling that relies on data collection from population members who are conveniently available to participate in the study.

A total number of 139 women were approached, eight declined and 131 participated in the study. Women were recruited immediately after they finished being attended to by the use of the CW card and only one respondent was interviewed at a time. Additionally, women were taken to a separate room where further recruitment was done as explained in the data collection. Clinics were visited on different dates so as to avoid repeating the same women in the study.

3.4 INCLUSION AND EXCLUSION CRITERIA

3.4.1 Inclusion criteria

All HIV infected women aged 18 and above who were enrolled in the PMTCT programme were eligible. Thus, HIV infected women who were on the PMTCT programme participated in the study if they consented to do so.

3.4.2 Exclusion criteria

All HIV negative women attending the CWC were not eligible for the study, as well as HIV infected women aged below 18 enrolled on the PMTCT programme.
Women who did not meet the above two criteria were not eligible to participate in the study, since the study was conducted at CWC where both HIV negative and positive women are in-attendance, hence all women who were HIV negative were not eligible to participate as well as those women who were HIV positive below the age of 18 and who were under age to give consent.

3.5 DATA COLLECTION

3.5.1 Data collection tool

Data collection was conducted in an enclosed room provided by the facility to ensure privacy. The study purpose was explained to the women as stated in the objectives and informed consent (Appendices 1, 2 and 3) was obtained from women who agreed to participate in the study. Data was collected using an English researcher-administered questionnaire (See Appendix 4) and Setswana researcher-administered questionnaire (See Appendix 5) depending on the mother’s language preference. Closed-ended questions were used in the questionnaire. A field worker conversant with the local language of Setswana was engaged in data collection and was orientated on ethical conduct of research and data collection. The data collection tool which was a researcher administered questionnaire was used for data collection where-by the researcher completed the questionnaire as the participant answered the questions. According to Burns and Groeve (1997) a questionnaire tool is designed to elicit information that can be obtained through the written or verbal responses of the subject. The questionnaire was structured in three major sections A to C.

Section A: Contained questions pertaining to socio-demographic information of the mother involving nine questions such as age, residential area, marital status, number of children, age of the youngest, occupation status, monthly income and religion. The researcher ticked the relevant boxes or filled in the blanks as the respondents answered the questions.

Section B: Collected data on knowledge about mother to child transmission of HIV and preventive measures. This involved nine questions such as: Do you believe that an HIV positive mother can transmit HIV to the child during delivery? Do you believe that breastfeeding the child when taking ARVs can prevent the child from getting HIV?
**Section C:** Comprised of three components with the first questions on infant feeding choices with seven questions such as: Did you receive infant feeding counselling in the PMTCT programme? What feeding practise did you choose? What influenced the feeding practise that you chose? The section that followed involved choosing between breastfeeding and formula feeding practices.

The thirteen breastfeeding questions collected data on time of initiating breastfeeding after delivery, period for exclusive breastfeeding, introduction of solids, breastfeeding as embarrassing, difficulties of breastfeeding in public and pain experienced while breastfeeding.

The last segment of section C asked ten questions about formula feeding such as availability of formula milk, preparation and storage of milk, formula feeding associated with being HIV positive, formula feeding mixing with solid food first six months and so on.

**3.5.2 Data collection methods**

Permission to conduct the study at the nine clinics was obtained formally from the nurse in-charge by personally producing the approval letter from the Department of Research Unit in the Ministry of Health (Appendix 7) and the permission letter from Francistown DHMT (Appendix 8). The principal investigator was responsible for collection of data with the help of the field worker. Upon being given the go-ahead, an outline of the study was presented to the staff for them to know what the research was all about and how it would be conducted.

Women were approached individually as they were being served at CWC by checking the card and identifying those with HIV exposed children. An enclosed separate room was then used where all necessary study details were explained to the mother including that the study was voluntary and they were requested to be study participants. The researcher had access to the participants when they had finished with the health educators so as not to compromise the client’s services during the data collection process.

Women who agreed to participate in the study were allowed to ask questions and clear any misconceptions with the principal investigator before being given the participant information leaflet form (Appendix 1) and consent form (Appendix 2) to read or have read for them.
Participants were given the opportunity to ask questions regarding the consent form before signing. The interviewer also clarified participants’ questions resulting in more accurate responses (Totten et al, 1999). The questionnaire was completed only after consent was obtained from the participant. The researcher completed the questionnaire as the participants were answering the questions. Data was collected in two months from June to July 2016. Pre-testing of the questionnaire was done with a total of ten questionnaires done at the clinics in order to ensure that the tool captured the intended data and thereafter debriefing was done with the supervisor.

3.6 RELIABILITY

Reliability refers to a measurement that supplies consistent results with equal values (Blumberg et al, 2005). It measures consistency, precision, repeatability and trustworthiness of a research (Chakrabartty, 2013). It indicates the extent to which it is without bias. In quantitative research, reliability is considered reliable if consistent results have been obtained in identical situations but different circumstances (Twycross and Shields, 2004).

An appropriate language in this case English and Setswana as the local language was used for the content to be understood in order to attain objectivity in the study. Reliability was ensured by pre-testing the questionnaire in order to assess the comprehensiveness of the questions. This was conducted at two clinics through a convenience selected number of ten women who were not included in the study. The overall feedback was positive, and the layout and length of the questionnaire was acceptable.

3.7 VALIDITY

Validity is often defined as the extent to which an instrument measures what it claims to measure (Blumberg et al, 2005). According Robson (2011), the validity of a research instrument assesses the extent to which the instrument measures what it is designed to measure. Two types of validity were used in this study: content validity and construct validity. Content validity is the degree to which the questions on the instrument and the scores from these questions represent all possible questions that could be asked about the content or skill (Creswell, 2005). On the other hand, the construct validity is especially important for the empirical measures and hypothesis testing for the construction of theories.
It creates theoretical constructs to better understand, explain and predict behaviour (Thatcher, 2010).

The validity of the formulated data collection tool was ensured by having it reviewed by the supervisor, lecturers from the Department of Public Health as well as the ethical committee of the Sefako Makgatho Health Sciences University. Formulated questions were accurate and clear, bearing the same contents to ensure the validity of the study that pertained to the degree to which the instrument fully measured the objectivity of the study.

3.8 BIAS

In research, bias occurs when systematic error is introduced into sampling or testing by selecting or encouraging one outcome or answer over others (Pannucci and Wilkins, 2010). The study was liable to selection bias as women who came for CWC would want to participate in the study. This was minimized as the participants’ selection criteria were defined from the onset of the study using the following criteria: a convenient sampling selection identifying women through the CW card, and all consenting HIV infected women aged 18 and above who were enrolled in the PMTCT programme attending PNC and CWC. The study was liable to information bias as mothers could give inaccurate information. In order to minimise information bias, mothers were assured of anonymity and confidentiality of the information. A conducive atmosphere of trust and openness was established between the researcher and the participants in order to obtain honest responses from the participants.

3.9 DATA ANALYSIS

Questionnaires were checked for completion in the field to ensure that all the information was properly collected and recorded. Data from the questionnaires was coded and captured on Microsoft Excel spread-sheets. After data was captured in Microsoft Excel it was imported to STATA software version 10.0 for data analysis. Summary statistics were used to describe and interpret data such as the mean, standard error, median, minimum and maximum, and standard deviation of variables under investigation. Frequency tables were formulated for variables such as age, level of education and marital status to interpret data. Knowledge scores was graded as: Don’t know – 0; Yes – 1; No – 2, and scores were graded as high for 60% and above and low as below 60%. The Pearson Chi-square test was used to
test for association of data between variables of interest such as knowledge on feeding practices and factors influencing feeding choices. Inferential statistics were used to test the strength of association between the desirable variables at P-values less than 0.05 which were considered to be significant.

3.10 ETHICAL CONSIDERATIONS

Before the study was conducted, the research proposal was submitted to the School of Healthcare Sciences Research Committee (SREC) and to the Sefako Makgatho University Research Ethics Committee (SMUREC) from where the ethical clearance certificate was obtained with SMUREC Ethics Reference Number: SMUREC/H/02/2016:PG (See Appendix 6).

In Botswana, permission to conduct the study was obtained from the Department of Research Unit - Ministry of Health Reference Number: HPDME 13/18/1 X (392) (Appendix 7). Further permission was obtained from the Francistown DHMT for the clinics where the study was conducted-Reference: GFHMT 4/2/1 (68) (Appendix 8).

Women were clearly informed about the purpose of the study and the aim and the objective in order for them to make an informed decision on whether to participate or not. Enough time after explaining the scope of the research study was given to every participant for them to make a decision to participate or not in the study. The researcher obtained a written informed consent in English (See Appendix 2) and Setswana (See Appendix 3) for every participant who agreed to participate in the study. The questionnaire tool was in English (See Appendix 4) and the Setswana local language (See Appendix 5) in order to cater for everyone.

Further, measures towards confidentiality and anonymity were explained to participants, indicating that their names would not be written on the questionnaire which would be handled only by the researcher. Furthermore, they were informed that during the write up of the research findings, their identity would not be reflected in the discussion or linked to them in any publication of the research study.
3.11 INDUCEMENT TO PARTICIPATE

There was no payment offered to the participants as a way of motivating them to participate in the study. Participants did not require transport money from the researcher since they were interviewed on their scheduled days for PNC and CWC services. They were only offered a token of appreciation for participating in the study in the form of a snack pack.

3.12 CONCLUSION

This chapter has discussed the study design and methodology that guided the study. Ethical considerations in relation to data collection were also described in detailed. The process of conducting scientific research is designed to ensure that the knowledge or results obtained can be replicated through independent research by other members in the scientific community. The reproducibility is ensured through the use of systematic observation in a controlled manner which is the methodology (Welman et al, 2009). This study involved scientific research and the methodology was carefully chosen to allow generalizability of the results obtained through analysis of a sample obtained in a systematic manner under controlled conditions.
CHAPTER FOUR
DATA ANALYSIS AND RESULTS

4.1 INTRODUCTION

This chapter documents the results of the study based on the responses given by women who were enrolled in the PMTCT programme who participated in the study. Thus, the results are summarised and presented in the form of text, figures and tables. The results are categorized into five sections, namely: socio-demographics of women, knowledge about MTCT, factors influencing infant feeding choices and knowledge on infant feeding practices. The association between specific desirable valuables is also included.

4.2 Socio-demographic characteristics

A total of 126 mothers attending CWC enrolled in the PMTCT programme completed the researcher-administered questionnaire. The respondents’ socio-demographic information is summarized in Table 1. The results showed that mothers’ age ranged from 20 to 48 years with a mean age of 32.2 years and (standard deviation of 6.5). The majority of the mothers’ ages ranged between 31 to 40 years (46.0%; n=58) followed by 20 to 30 years (42.0%; n=53) and 41 to 48 years (11.9%; n=15) (See figure 4.1 below).

![Figure 1: Number of mothers per age group](image-url)
Of the mothers who participated in the study, the majority (88.8%; n=112) had one to four children while a few (11.1%; n=14) had five to seven children. Furthermore, results indicated that the youngest child was one month old and the oldest was sixty months old with the mean age of 20.6 months and (standard deviation of 14.0). A large proportion of children were within the age range of 0 to 12 months (36.4%; n=46), followed by 13-24 months (30.9%; n=39), 25-36 months (21.4%; n=27), 37-48 months (8.7%; n=11) and only a few (2.3%; n=3) were aged between 49 to 60 months (See figure 4.2 below).

![Figure 2: Children’s age in months](image)

Large proportions (92.0%; n=116) of the participants lived in urban areas while a few (7.9%; n=10) lived in rural areas. It was also found that the majority of mothers (46.0%; n=58) were in cohabiting relationships, while (40.4%; n= 51) were single, a few (12.7%; n=16) were married and only one (0.7%) was a widow.

Almost half of the mothers (47.6%; n=60) had junior education while almost a quarter (23.8%; n=30) had secondary education, (12.7%; n=16) had primary education, (11.1%; n=14) had tertiary education while (4.7%; n=6) had no formal education. Most of the mothers (36.5%; n=46) were unemployed while (31.7%; n=40) were self-employed engaged in small businesses. Only (29.3%; n=37) of the mothers were employed and (2.3%; n=3) were students at tertiary level. Many of the mothers (27%; n=34) were earning less than P1000.00 or between P1000.00 – P2000.00 (26.2%; n=33). Only (9.5%; n=12) mothers were earning more than P2000.00 and the majority of mothers (37.3%; n=47) had no income. In
terms of religion, the majority (82.5%; n=104) of the respondents were Christians, while (3.1%; n=4) were practising traditional religion and the remaining (14.2%; n=18) were not practising any form of religion.

**Table 1: Socio-demographic characteristics of women (N126)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Levels</th>
<th>Frequency (n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>20 – 30</td>
<td>53</td>
<td>42.0</td>
</tr>
<tr>
<td></td>
<td>31- 40</td>
<td>58</td>
<td>46.0</td>
</tr>
<tr>
<td></td>
<td>41 -50</td>
<td>15</td>
<td>11.9</td>
</tr>
<tr>
<td>Residential Area</td>
<td>Urban</td>
<td>116</td>
<td>92.0</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>10</td>
<td>7.9</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Single</td>
<td>51</td>
<td>40.5</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>16</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>Cohabiting</td>
<td>58</td>
<td>46.0</td>
</tr>
<tr>
<td></td>
<td>Widowed</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Number of Children</td>
<td>1 - 4</td>
<td>112</td>
<td>88.9</td>
</tr>
<tr>
<td></td>
<td>5 – 8</td>
<td>14</td>
<td>11.1</td>
</tr>
<tr>
<td>Educational Level</td>
<td>Primary</td>
<td>16</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>Junior education</td>
<td>60</td>
<td>47.6</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>30</td>
<td>23.8</td>
</tr>
<tr>
<td></td>
<td>Tertiary</td>
<td>14</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>No formal education</td>
<td>6</td>
<td>4.8</td>
</tr>
<tr>
<td>Occupation</td>
<td>Employed</td>
<td>37</td>
<td>29.4</td>
</tr>
<tr>
<td></td>
<td>Self employed</td>
<td>40</td>
<td>31.8</td>
</tr>
<tr>
<td></td>
<td>Unemployed</td>
<td>46</td>
<td>36.5</td>
</tr>
<tr>
<td></td>
<td>Student</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>Monthly Income</td>
<td>Less than P1000</td>
<td>34</td>
<td>27.0</td>
</tr>
<tr>
<td></td>
<td>P1000-2000</td>
<td>33</td>
<td>26.2</td>
</tr>
<tr>
<td></td>
<td>More than 2000</td>
<td>12</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>No income</td>
<td>47</td>
<td>37.3</td>
</tr>
<tr>
<td>Religion</td>
<td>Christian</td>
<td>104</td>
<td>82.5</td>
</tr>
<tr>
<td></td>
<td>Traditional</td>
<td>4</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td>No Religion</td>
<td>18</td>
<td>14.3</td>
</tr>
</tbody>
</table>
4.3 KNOWLEDGE ABOUT MTCT

Of the 126 mothers who participated in the study, most of them demonstrated a good understanding of the modes of MTCT of HIV as well as the prevention measures. Find the summarised results of knowledge about MTCT in Table 2 below. In this study, the level of knowledge scored by mothers was on two rating scales with the highest more than 60% and the lowest below 60%. The knowledge level was based on mothers’ understanding about HIV, their belief whether HIV can be transmitted from the mother to child during pregnancy, delivery and breastfeeding as well as the prevention of HIV from the mother to the child.

The result showed that the majority of mothers (94.4%; n=119) believed that an HIV positive mother can transmit HIV to the child, indicating the following HIV modes of transmission: during pregnancy (93.6%; n=118), through delivery (90.4%; n=114) and through breastfeeding (92.8%; n=117). With regard to MTCT prevention, (94.4%; n=119) believed that a mother during pregnancy can prevent her child from getting HIV by taking ARVs. However, regarding caesarean section during delivery as a mode of HIV prevention to the child, most of the mothers (39.6%; n=50) did not know that, while (30.9%; n=39) believed it can prevent the child from getting HIV and (29.3%; n=37) believed it cannot prevent HIV for the child. This result reveals the gap in the PMTCT counselling mothers receive during ANC as (39.6%; n=50) did not know about caesarean section being a mode of HIV prevention to the child while a significant proportion (29.3%; n=37) believed it cannot prevent HIV to the child. Further analysis findings on MTCT prevention revealed that most of the mothers (83.3%; n=105) believed that condom use during pregnancy can prevent HIV transmission to the unborn child.

With regard to knowledge about breastfeeding practises, it was found that more than half of the mothers (55.5%; n=70) believed that breastfeeding the child when taking ARVs can prevent HIV to the child, whereas (36.5%; n=46) believed breastfeeding could transmit HIV to the child and (7.9%; n=10) did not know. However, only a few mothers (14.2%; n=18) opted to breastfeed while the rest (85.7%; n=108) choose formula feeding. The majority of the mothers (88.1%; n=111) believed that HIV can be prevented when the new-born child is given ARVs at birth, though a few (7.9%; n=10) did not believe that and only (3.9; n=5) did not have knowledge of that.
Table 2: Knowledge levels of mothers about MTCT (N 126)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Levels</th>
<th>Frequency (n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you believe that an HIV positive mother can transmit HIV to the child?</td>
<td>Yes</td>
<td>119</td>
<td>94.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>5</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
<td>2</td>
<td>1.6</td>
</tr>
<tr>
<td>Do you believe that HIV can be transmitted from the mother to the child during pregnancy?</td>
<td>Yes</td>
<td>118</td>
<td>93.6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>6</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
<td>2</td>
<td>1.6</td>
</tr>
<tr>
<td>Do you believe that HIV can be transmitted from the mother to the child through delivery?</td>
<td>Yes</td>
<td>114</td>
<td>90.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>Do you believe that HIV can be transmitted through breastfeeding?</td>
<td>Yes</td>
<td>117</td>
<td>92.8</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>5</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
<td>4</td>
<td>3.2</td>
</tr>
<tr>
<td>Do you believe that a mother during pregnancy can prevent her child from getting HIV by taking ARVs?</td>
<td>Yes</td>
<td>119</td>
<td>94.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>4</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>Do you believe that caesarean section during delivery can prevent the transmission of HIV to the child?</td>
<td>Yes</td>
<td>39</td>
<td>31.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>37</td>
<td>29.4</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
<td>50</td>
<td>39.7</td>
</tr>
<tr>
<td>Do you believe that condom use during pregnancy can prevent HIV transmission to the unborn child?</td>
<td>Yes</td>
<td>105</td>
<td>83.3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>12</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
<td>9</td>
<td>7.1</td>
</tr>
<tr>
<td>Do you believe that breastfeeding the child when taking ARVs can prevent HIV to the child?</td>
<td>Yes</td>
<td>70</td>
<td>55.6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>46</td>
<td>36.5</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
<td>10</td>
<td>7.9</td>
</tr>
<tr>
<td>Do you believe that HIV can be prevented when the new-born child is given ARVs at birth?</td>
<td>Yes</td>
<td>111</td>
<td>88.1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>10</td>
<td>7.9</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
<td>5</td>
<td>4.0</td>
</tr>
</tbody>
</table>
4. 4 FACTORS INFLUENCING FEEDING CHOICES

Table 3 summarizes the factors influencing feeding choices. In this study, results showed that the majority of mothers (95.2%; n=120) received infant feeding counselling for HIV-infected mothers at PMTCT with a few (4.7%; n=6) not having been counselled. From the 126 mothers, a large number (85.7%; n=108) opted to exclusively formula feed while a few (14.2%; n=18) opted to exclusively breastfeed. The result, furthermore, indicated that mostly their feeding option was influenced by healthcare workers (29.3%; n=37), followed by partners (28.5%; n=36), self (25.4%; n=32), mothers (15.0%; n=19) and sisters (1.9; n=2). This study showed that all the mothers (100%; n=126) had disclosed their HIV status to their family members with fear of disclosure not influencing the feeding option they chose.

In this study, mothers indicated the following factors as influencing the feeding options they opted to practise with half of the mothers (50%; n=63) being afraid of transmitting HIV infection to the child, while (12.7%; n=16) made their choices due to availability of milk, (9.5%; n=12) due to work commitment, (8.7%; n=11) due to breast milk being important for the child, while (6.3%; n=8) were influenced by the place of delivery and only (3.1%) did so due to being on HAART.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Levels</th>
<th>Frequency (n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you receive infant feeding counselling at PMTCT?</td>
<td>Yes</td>
<td>120</td>
<td>95.2</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>6</td>
<td>4.8</td>
</tr>
<tr>
<td>If yes, what feeding practise did you choose?</td>
<td>EBF</td>
<td>18</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>EFF</td>
<td>108</td>
<td>85.7</td>
</tr>
<tr>
<td>Who influenced your infant feeding choice?</td>
<td>Partner</td>
<td>36</td>
<td>28.6</td>
</tr>
<tr>
<td></td>
<td>Mother</td>
<td>19</td>
<td>15.1</td>
</tr>
<tr>
<td></td>
<td>Health workers</td>
<td>37</td>
<td>29.4</td>
</tr>
<tr>
<td></td>
<td>Self</td>
<td>32</td>
<td>25.4</td>
</tr>
<tr>
<td></td>
<td>Sister</td>
<td>2</td>
<td>1.6</td>
</tr>
<tr>
<td>Have you disclosed your HIV positive status to</td>
<td>Yes</td>
<td>126</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
4.5 INFANT FEEDING PRACTISES

In this study, only breast feeding and formula feeding methods were practised. The results showed that the majority of the mothers (85.7%; n=108) practised formula feeding while a few (14.2%; n=18) practised breastfeeding.

4.5.1 Breastfeeding practises

Breastfeeding practise was assessed by asking 14 questions which included “yes” or “no” answers among other answers. Table 4 below indicates the responses of mothers with regards to breastfeeding practises. From the 18 mothers who practised breastfeeding, results showed that more than half (55.6%; n=10) initiated breastfeeding within one hour after delivery while (44.4%; n=8) initiated it within twenty-four hours after delivery. The majority of mothers (88.9%; n=16) reported that there was milk in the breast the first twenty-four hours after delivery with only (11.1 %; n=2) reporting no breast milk within
twenty-four hours post-delivery. The results showed that all the mothers (100%; n=18) did not give their children fluid or food after birth before breastfeeding.

Furthermore, more than half of the mothers (61.1%; n=11) breastfed between 8-12 times per day, others less than 8 times (27.8%; n=5) and only (11.1%; n=2) breastfed more than 12 times. Almost all the mothers (94.4%; n=17) responded that their families supported breastfeeding, while only one mother (5.6%; n=1) responded that her family did not support breastfeeding. With regard to breastfeeding being embarrassing and difficult in public, only one mother (5.6%; n=1) answered yes while the rest (94.4%; n=17) answered no. With breastfeeding physically causing breasts to be painful and uncomfortable, more women (77.8%; n=14) indicated no while (22.2%; n=4) indicated yes. Regarding the length of EBF for the period of six months (feeding the child only on breast milk) all the mothers (100%; n=18) answered yes. All the mothers (100%; n=18) responded that giving the child breast milk and solid foods (mixed feeding) for the first six months was not safe for the child. Furthermore, practising breastfeeding alone for the first six months, all the mothers (100%; n=18) answered yes, hence no reason for not practising breastfeeding was given and they fed their children with solids only after six months.

Table 4: Infant feeding practices (N=126)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Levels</th>
<th>Frequency (n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you breastfeeding/did you breast feed the child?</td>
<td>Yes</td>
<td>18</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>108</td>
<td>85.7</td>
</tr>
<tr>
<td>When did you initiate breastfeeding after delivery?</td>
<td>Within 1 hour</td>
<td>10</td>
<td>55.6</td>
</tr>
<tr>
<td></td>
<td>Within 24 hours</td>
<td>8</td>
<td>44.4</td>
</tr>
<tr>
<td>Was there milk in the breast the first 24 hours after delivery?</td>
<td>Yes</td>
<td>16</td>
<td>88.9</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>2</td>
<td>11.1</td>
</tr>
<tr>
<td>Did you give the child fluids or food after birth before breastfeeding?</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>18</td>
<td>100</td>
</tr>
<tr>
<td>How many times per day did you breast feed the child?</td>
<td>Less than 8</td>
<td>5</td>
<td>27.8</td>
</tr>
<tr>
<td></td>
<td>Between 8-12</td>
<td>11</td>
<td>61.1</td>
</tr>
<tr>
<td></td>
<td>More than 12</td>
<td>2</td>
<td>11.1</td>
</tr>
<tr>
<td>Does your family support breastfeeding?</td>
<td>Yes</td>
<td>17</td>
<td>94.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1</td>
<td>5.6</td>
</tr>
<tr>
<td>Is breastfeeding embarrassing and</td>
<td>Yes</td>
<td>1</td>
<td>5.6</td>
</tr>
</tbody>
</table>
difficult in public?  No  17  94.4
Does breastfeeding physically cause breasts to be painful and uncomfortable?  Yes  4  22.2  No  14  77.8
Is giving the child breast milk and solid foods (mixed feeding) for the first six months safe for the child?  Yes  -  -  No  18  100
For how long was exclusive breastfeeding (feeding the child only on breast milk) undertaken?  3 months -  -  6 months  18  100
Were you able to practise exclusive breast feeding for the first six months?  Yes  18  100  No  -  -
If no to question 11, what was the reason for not practising EBF?  Yes  18  100  No  -  -
If no to question 11, on what did you feed the child?  Yes  18  100  No  -  -
How old was the baby when you fed the food you mentioned above?  Yes  -  -  No  -  -

4.5.2 Formula feeding practises

Formula feeding practises were assessed by asking ten questions which were answered with “yes” or “no” or “don’t know” responses. From the 126 mothers who participated in this study, the majority (85.7%; n=108) practised formula feeding. Table 5 presents a summary of the responses. The majority of the mothers (75.0%; n=81) responded that it was easy to acquire formula milk while (25.0%; n=27) responded that it was not easy. With regards to preparation of formula milk, the majority (95.4%; n=103) answered yes it was easy while a few (4.6%; n=5) answered no. The results showed that slightly above half (58.3%; n=63) answered that, yes, it was easy to store prepared milk and (41.7%; n=45) answered no. The majority of mothers (73.2%; n=79) responded that they fed on demand while (26.9%; n=29) fed when the child was crying. With regards to family support for formula feeding, most of the mothers (91.7%; n=99) responded yes with only (8.3%; n=9) responding no.

In this study, although slightly above half of the mothers (54.0%; n=58) responded that formula feeding was not associated with being HIV positive, (42.0%; n=45) responded yes
and (4.6%; n=5) did not know. The majority of mothers (79.6%; n=86) responded that giving the child formula milk and solid foods (mixed feeding) for the first six months was not safe for the child, (15.7%; n=17) responded that it was safe while (4.6%; n=5) did not know. With regards to practising EFF (giving formula milk alone) for the first six months, the majority of mothers (90.7%; n=98) indicated yes while (9.3%; n=10) indicated no. Most of the mothers (80.0%; n=8) responded that they fed babies with soft porridge while only (20.0%; n=2) fed with purity. Most of the mothers (40.0%; n=4) fed at four months while (30.0%; n=3) fed at three months and five months respectively.

Table 5: Formula feeding practises (N=108)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Levels</th>
<th>Frequency (n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is it easy to acquire formula milk?</td>
<td>Yes</td>
<td>81</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>27</td>
<td>25.0</td>
</tr>
<tr>
<td>Is it easy to prepare formula milk?</td>
<td>Yes</td>
<td>103</td>
<td>95.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>5</td>
<td>4.6</td>
</tr>
<tr>
<td>Is it easy to store prepared milk?</td>
<td>Yes</td>
<td>63</td>
<td>58.3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>45</td>
<td>41.7</td>
</tr>
<tr>
<td>How often do you feed the child?</td>
<td>On demand</td>
<td>79</td>
<td>73.2</td>
</tr>
<tr>
<td></td>
<td>When child is crying</td>
<td>29</td>
<td>26.9</td>
</tr>
<tr>
<td>Does your family support formula feeding?</td>
<td>Yes</td>
<td>99</td>
<td>91.7</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9</td>
<td>8.3</td>
</tr>
<tr>
<td>Is formula feeding associated with being HIV positive?</td>
<td>Yes</td>
<td>45</td>
<td>41.7</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>58</td>
<td>53.7</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
<td>5</td>
<td>.6</td>
</tr>
<tr>
<td>Is giving the child formula milk and solid foods (mixed feeding) for the first six months safe for the child?</td>
<td>Yes</td>
<td>17</td>
<td>15.7</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>86</td>
<td>9.6</td>
</tr>
<tr>
<td></td>
<td>Don’t Know</td>
<td>5</td>
<td>4.6</td>
</tr>
</tbody>
</table>
Were you able to practise exclusive formula feeding (giving formula milk alone) for the first six months?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Chisq</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive formula feeding</td>
<td>98</td>
<td>10</td>
<td></td>
<td>90.7</td>
</tr>
</tbody>
</table>

If no to question 8, what did you feed the child?

<table>
<thead>
<tr>
<th></th>
<th>Porridge</th>
<th>Purity</th>
<th>Chisq</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive formula feeding</td>
<td>8</td>
<td>2</td>
<td></td>
<td>80.0</td>
</tr>
</tbody>
</table>

How old was the baby when you fed the food you mentioned above?

<table>
<thead>
<tr>
<th></th>
<th>3 months</th>
<th>4 months</th>
<th>5 months</th>
<th>Chisq</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive formula feeding</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>30.0</td>
<td></td>
</tr>
</tbody>
</table>

4.6 FACTORS ASSOCIATED WITH FEEDING PRACTICES

For this analysis, the Pearson Chi-square test of association was used to test the strength of the characteristics of mothers, MTCT knowledge, infant feeding counselling, factors influencing feeding choices and feeding practices. A p-value less than 0.05 (p<0.05) indicated that there was a significant association between the two factors whereas a p-value of 0.05 or above (p> 0.05) indicated that there was no significant association between two variables.

4.6.1 Association between feeding choice and knowledge about MTCT

The result showed a statistically significant association between the knowledge that HIV positive mother can transmit HIV to the child and the feeding choice the mother opted for (p= 0.002) suggesting an association. The following MTCT of HIV transmission modes: pregnancy, delivery, breastfeeding and HIV preventions; taking ARVs during pregnancy; caesarean section and condom use did not show statistically significant association with the feeding choice of mothers as they showed a p-value of more than (p=0.05). However, the relationship between feeding choice and the belief that breastfeeding the child when taking ARVs can prevent HIV transmission to the child was statistically significant (p=0.002) as summarised in Table 6 below.
Table 6: Feeding choice and knowledge about MTCT

<table>
<thead>
<tr>
<th>Valuables</th>
<th>Samples Size</th>
<th>Breastfeeding</th>
<th>Formula Feeding</th>
<th>Fisher’s exact</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you believe that an HIV positive mother can transmit HIV to the child? (n=126)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>119</td>
<td>16 (12.6)</td>
<td>103 (81.7)</td>
<td>0.025</td>
<td>0.002</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>0</td>
<td>5 (3.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>2</td>
<td>2 (1.5)</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you believe that breastfeeding the child when taking ARVs can prevent HIV to the child? (n=126)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>70</td>
<td>17 (13.4)</td>
<td>53 (42.0)</td>
<td>0.001</td>
<td>0.002</td>
</tr>
<tr>
<td>No</td>
<td>46</td>
<td>1 (0.7)</td>
<td>45 (35.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>10</td>
<td>0</td>
<td>10 (7.94)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P value <0.05

4.6.2 Association between feeding choice and factors influencing feeding method

The result showed that feeding choice was significantly associated with the infant feeding method mothers opted for (p=0.000). The variables feeding counselling and the person who influenced the feeding choice did not show a statistical significant association with feeding choice as they revealed a p-value of more than 0.05. The results showed that the feeding method mothers opted for was statistically significantly associated with factors that influenced infant feeding choice (p=0.000) as revealed in Table 7 below.

Table 7: Feeding choice and factors influencing infant feeding choice

<table>
<thead>
<tr>
<th>Valuables</th>
<th>Samples Size</th>
<th>Breastfeeding</th>
<th>Formula Feeding</th>
<th>Fisher’s exact</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>What feeding practise did you choose? (n=126)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBF</td>
<td>18</td>
<td>18 (14.2)</td>
<td>0</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>EFF</td>
<td>108</td>
<td>0</td>
<td>108 (85.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What influenced the feeding practise that you chose? (n=126)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affordability</td>
<td>12</td>
<td>1 (0.7)</td>
<td>11 (8.7)</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Place of delivery</td>
<td>8</td>
<td>0</td>
<td>8 (6.35)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability of milk</td>
<td>16</td>
<td>4 (3.1)</td>
<td>12 (9.5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.6.3 Association between infant feeding counselling and knowledge of MTCT

The results showed a statistical significant association between feeding counselling and knowledge of MTCT of HIV (p=0.009). MTCT through pregnancy was significantly associated with infant feeding counselling (p=0.003). However, the variables MTCT during delivery, MTCT prevention through caesarean section, taking ARVs during breastfeeding and giving the child ARVs at birth showed no statistical association as their p-values were more than 0.05. Nevertheless, there was significant association between receiving infant feeding counselling and MTCT through breastfeeding (p=0.000), taking ARV during pregnancy (p=0.09) and condom use (p=0.032) as indicated in Table 8 below.

<table>
<thead>
<tr>
<th>Valuables</th>
<th>Samples Size</th>
<th>Feeding counselling</th>
<th>Feeding counselling</th>
<th>Fisher’s exact</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you believe that an HIV positive mother can transmit HIV to the child? (n=126)</td>
<td></td>
<td>119</td>
<td>114 (90.4)</td>
<td>5 (3.9)</td>
<td>0.110</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you believe that HIV can be transmitted from the mother to the child during pregnancy? (n=126)</td>
<td></td>
<td>118</td>
<td>114 (90.4)</td>
<td>4 (3.1)</td>
<td>0.023</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you believe that HIV can be transmitted through breastfeeding? (n=126)</td>
<td></td>
<td>117</td>
<td>113 (89.6)</td>
<td>4 (3.1)</td>
<td>0.014</td>
</tr>
</tbody>
</table>

*P value < 0.05
<table>
<thead>
<tr>
<th>No</th>
<th>5</th>
<th>5 (3.97)</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don’t know</td>
<td>4</td>
<td>2 (1.5)</td>
<td>2 (1.5)</td>
</tr>
</tbody>
</table>

Do you believe that a mother during pregnancy can prevent her child from getting HIV by taking ARVs? (n=126)

<table>
<thead>
<tr>
<th>Yes</th>
<th>119</th>
<th>115 (91.2)</th>
<th>4 (3.1)</th>
<th>0.036</th>
<th>0.009</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>4</td>
<td>3 (3.2)</td>
<td>1 (0.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>3</td>
<td>2 (1.5)</td>
<td>1 (0.7)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you believe that condom use during pregnancy can prevent HIV transmission to the unborn child? (n=126)

<table>
<thead>
<tr>
<th>Yes</th>
<th>105</th>
<th>104 (82.5)</th>
<th>1 (0.7)</th>
<th>0.093</th>
<th>0.032</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>12</td>
<td>12 (9.52)</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>9</td>
<td>7 (5.5)</td>
<td>2 (1.5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P value < 0.05

4.6.4 Association between infant feeding counselling and breastfeeding

There was a significant association between breastfeeding and infant feeding counselling with the valuables availability of breast milk within 24 hours (p=0.004) and family support of breast feeding (p=0.000) as shown in Table 9 below. Results showed no significant association between receiving infant feeding counselling and other breast feeding variables as they showed a p-value of more than 0.05.

Table 9: Infant feeding counselling and breastfeeding

<table>
<thead>
<tr>
<th>Valuables</th>
<th>Samples size</th>
<th>Feeding counselling Yes</th>
<th>Feeding counselling No</th>
<th>Fisher’s exact</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was there milk in the breast within the first 24 hours of delivery? (n=18)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
<td>16 (88.8)</td>
<td>0</td>
<td>0.111</td>
<td>0.004</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>1 (5.5)</td>
<td>1 (5.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does your family support breastfeeding? (n=18)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>17</td>
<td>17 (94.4)</td>
<td>0</td>
<td>0.056</td>
<td>0.000</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>0</td>
<td>1 (5.5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P value < 0.05
4.6.5 Association between infant feeding counselling and formula feeding

The results showed a statistical significant association between formula feeding and receiving infant feeding counselling with the variables availability of formula milk (p=0.004) and mixed formula feeding (p=0.000). However, there was no significant association between infant feeding counselling and other formula feeding variables as they showed a p-value of more than 0.05 as indicated in table 10 below.

Table 10: Infant feeding counselling and formula feeding

<table>
<thead>
<tr>
<th>Valuables</th>
<th>Samples size</th>
<th>Feeding counselling Yes</th>
<th>Feeding counselling No</th>
<th>Fisher’s exact</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is it easy to acquire formula milk? (n=108)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>81</td>
<td>80 (74.0)</td>
<td>1 (0.9)</td>
<td>0.013</td>
<td>0.004</td>
</tr>
<tr>
<td>No</td>
<td>27</td>
<td>23 (21.2)</td>
<td>4 (3.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is it easy to prepare formula milk? (n=108)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is giving the child formula milk and solid foods (mixed feeding) for the first six months safe for the child? (n=108)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>17</td>
<td>16 (14.8)</td>
<td>1 (0.9)</td>
<td>0.012</td>
<td>0.000</td>
</tr>
<tr>
<td>No</td>
<td>86</td>
<td>84 (77.7)</td>
<td>2 (1.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t Know</td>
<td>5</td>
<td>3 (2.7)</td>
<td>2 (1.8)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P value < 0.05
CHAPTER FIVE

CONCLUSION AND IMPLEMENTATION

5.1 INTRODUCTION

In this chapter, the findings of this study and conclusion are discussed compared with other findings from studies conducted previously in relation to the objective of this study. Knowledge on infant feeding practices among HIV infected women is an important aspect for the promotion of HIV-free infant survival. The purpose of this study was to assess knowledge on infant feeding practices and factors influencing feeding choices of mothers enrolled in a PMTCT programme who attended CWC in Francistown in order to establish contributing factors to the high numbers of HIV-exposed infant hospitalization and high mortality rates. Furthermore, the study examined the relationship between knowledge about MTCT, infant feeding practices and factors influencing feeding choices. This chapter also discusses the study limitations and recommendations for future research.

5.2 SOCIO-DEMOGRAPHICS

Findings from this study indicated that the majority (46%) of the mothers were in cohabiting relationships with a significant number of 40.4% in single relationships. Also noteworthy, most of the women (88.8%) had one to four children. However, it was found that 36.5% of the mothers were unemployed while 31.7% were self-employed with 53.2% of mothers earning less than P2000.00. The low income finding of this study, might have had been an impact on the majority of mothers (85.7%) who opted to formula feed their infants with limited household resources, leading to suboptimal infant feeding practices. Furthermore to this finding, Rollins (2008) reported that mothers make inappropriate infant feeding choices and feeding practices when their household circumstances cannot safely support them. In line with this finding, a study from Ghana by Laar and Govender (2011) reported that the socio-economic status of mothers who were HIV-positive had an important influence on their decision-making, particularly in relation to RF faced with the challenges of clean water and utensils used in preparation of milk.
5.3 MTCT OF HIV KNOWLEDGE

In Botswana, a number of studies have been conducted about PMTCT programme with the aim of curving HIV transmission as well as improving infant feeding practises among HIV infected mothers (Thior et al, 2006; Kasinga et al, 2008; Shapiro et al, 2016; Zash et al, 2016). Given the scourge of the HIV epidemic among infants and the modes of transmission, correct knowledge of HIV transmission is important in order to enhance effective preventive action, more so with breastfeeding which accounts for 15% and 40% respectively (Jackson, 2000; Nduati et al, 2000). In this study, high knowledge levels of HIV transmission modes (92%) were observed which implies that, as the knowledge on MTCT increases among women, also the knowledge on infant feeding practises ultimately increases showing a positive influence on infant feeding practises. However, in other studies conducted in Gaborone, Botswana by Kasinga et al (2008) and Ndubuka et al (2013) reported low knowledge levels of 53.3% and only about half of respondents had knowledge on MTCT of HIV transmission modes. Similar findings were reported from studies in other African countries where low knowledge levels of less than 50% on MTCT and PMTCT measures were observed (Tatagan et al, 2011; Atwiine et al, 2013; Olugbenga-Bello et al, 2013; Wapanga’na, 2013; Haile et al, 2016). This shows that different knowledge levels among mothers in PMTCT programme exist in different settings despite the programme being implemented in most African countries (Kak et al, 2011).

With regard to knowledge of MTCT prevention, this study revealed 70.4% of good understanding of HIV prevention modes. However, the preventive measure for caesarean section showed a low knowledge level of 30.9%. Similar to this low finding, the result from Ethiopia was very low where 10.4% of women knew about caesarean section as a preventive method of HIV transmission to the child (Jebessa and Teka, 2005). This gives an assumption that gaps exist with the information women receive which might be selective and non-holistic according to the PMTCT guidelines in different settings.

5.4 INFANT FEEDING COUNSELLING

Infant feeding counselling is an important component in the decision making for infant feeding choice. In this study, the majority of women (95.2%) received infant feeding counselling for HIV infected women in the PMTCT programme. Like in other studies, this study found that infant feeding counselling is an important predictor for women in decision
making for infant feeding choices (Young et al, 2010; Laar and Govender, 2011; Ndubuka et al, 2013; Aishat et al, 2015). This positive result of mothers who received infant feeding counselling is attributable to the fact that Botswana has a strong health care system with priority given to pregnant mothers with most of HIV infected mothers (91%) being enrolled in the PMTCT programme (NACA, 2015). This service enhances women with knowledge on infant feeding options that enables them to make informed decisions considering their individual socio-economic circumstances. However, although not assessed in this study, the follow up on infant feeding counselling is an essential aspect to determine mothers’ coping mechanisms and experiences of their infant feeding practises in terms of socio-economic factors with regard to their income, in relation with the issue of household resources among formula feeding method which pose a high risk of hospitalization and mortality rates among HIV exposed infants (Zash et al, 2016). Nevertheless, this study showed that most of the women were able to adhere to EBF and EFF in the first six months of infant life (100% and 90% respectively).

However, contrary to this finding, other previous studies conducted by Kasinga et al (2008) and Ndubuka et al (2013) showed low exposure of women in the PMTCT programme having received infant feeding counselling, that is 57% and 70% respectively. This shows inconsistency in the actual implementation of PMTCT interventions in different settings of the country. Kak et al (2011) reported that even in settings where effective prophylaxis is available to prevent transmission during pregnancy and childbirth, there is often a major gap in service provision in the postnatal period. Few PMTCT programmes successfully reach mothers and new-borns after discharge to provide support for the infant feeding choices or provide on-going care and treatment.

Findings from this study indicated that women’s feeding choice was mostly influenced by health care workers (29.4%). This result can be attributable to the fact that health care workers promote the feeding option recommended by the national guidelines of the country and hence these guidelines are perceived as having a great influence on the mother’s feeding option. For example, the GoB had been promoting the FF option for all HIV infected women and providing free of charge formula milk to support the FF recommendation until 2011 when women were allowed to make their own decisions regarding infant feeding options guided by the WHO recommendation (MoH, 2011). This finding is in agreement with other findings where health workers were reported to have had great influence over women’s
infant feeding options as being promoted at the time. In addition, women felt pressured by health providers to choose a particular feeding method as a result of their HIV status (Doherty et al, 2006; Madiba and Letsoalo, 2013; Ndubuka et al, 2013). Although, as noted earlier, the majority (29.4) of the women’s feeding choices in this study were influenced by health care workers, significant proportions were influenced by family members such as partners (28.5%), mothers (15%) and sisters (1.9%). Nevertheless, a significant number (25%) stated that they made the decision for feeding choice on their own. Similar findings of family influence were reported by Kasinga et al (2008) where infant feeding choice were influenced by spouse, in-laws and other family members with 41% indicating that family members advocated for complementary feeding while 35% stated EBF. This indicates that infant feeding choice for mothers is determined by family members. This might have an impact on the aspect of adherence to the advocated feeding choice without much input in the decision making from mothers. Thus, pressure from family members who may be influential may have a negative or positive impact on the infant feeding practises.

Other feeding factors reported in this study such as affordability, availability, work commitments and place of delivery are socio-economic factors that influence women to choose FF as a large number of women was unemployed (36.5%) and most of them were engaged in small businesses (31.7%) for their income resources. This result showed that low income status among the respondents had an impact on their feeding choice which might mean that their infant feeding practises were limited to income status. In addition, Creek (2011) from Botswana reported that improper feeding practises such as storage of formula at room temperature, inadequate cleaning of utensils, use of bottles with hard to clean nipples and frequent formula shortages are very common challenges among women. Findings from other African countries showed that low monthly income influenced women to opt for BF which is even perceived as a cultural norm or feeding an infant in some settings (Wapangana 2013; Aishat et al 2015).

5.5 HIV STATUS DISCLOSURE

Given the importance of HIV status disclosure by HIV positive people as an essential step towards HIV prevention practises, it enables one to adhere to the stipulated treatment guidelines. HIV status disclosure in this study to family members was a hundred percent, thus it did not influence their feeding choice. This positive disclosure result gives an indication that women were well informed, and understood and accepted HIV/AIDS as any
other disease in the society. With regard to high HIV status disclosure, most women from this study were able to practise EBF and EFF for the first six months of the child’s life (100% and 90.7% respectively).

This result is similar to the findings by Madiba and Letsoalo (2013) and Aishat et al (2015) where there were high HIV disclosure rates among HIV positive women to partners and significant family members, thus reducing the risk of mixed feeding, MTCT of HIV infection transmission and a high childhood mortality rate. HIV disclosure has the emotional benefit of being psychologically free and enables one to gain support from family members to even practise the intended option without fear and not being embarrassed (Aishat et al, 2015). In contrast, other studies reported that lack of HIV disclosure to family members made adherence to infant feeding difficult, and increased mixed feeding practises as women reported to be pressurised by family members to give the infants soft porridge or water before six months (Doherty et al 2006; Fadnes et al, 2010; Madiba and Letsoalo, 2013).

Regarding the aspect of stigma and discrimination towards formula feeding associated with being HIV positive, this study revealed that slightly above half (54%) responded that FF was not associated with being HIV positive while a significant 42% responded that FF was associated with being HIV positive. This misconception of stigma may lead to non-adherence to EFF practises according to the infant feeding recommendation (WHO, 2010). Furthermore, other studies revealed varying disclosure reactions from partners and family members such as rejection and divorce, denial of HIV positive result, stigma and discrimination by family members (Adejuyigbe, 2008; Madiba and Letsoalo, 2013; Ndubuka et al, 2013).

5.6 BREAST FEEDING

Breastfeeding is an essential component for a child’s nutrition, health, growth and development in the first year of infants’ life even with the risk of HIV transmission. In addition, infants and young children are at risk of high chances of mortality as the majority of women do not breastfeed their infants as recommended by WHO (2010), thus exposing infants to infections other than HIV. Furthermore, in a randomised study trial it was observed that giving zidovudine to infants exposed to HIV while breastfeeding resulted in more infants surviving and not being infected with HIV than giving formula milk to infants from birth. (UNICEF and UNAIDS, 2004; Thior et al, 2006). It is in line with this that
knowledge on MTCT of HIV infected mothers is an essential component for HIV prevention and infants’ survival.

In this study, 14.2% of women opted to breast feed for the first six months of their infant’s life. However, this figure was lower compared to the findings from previous studies conducted by Kasinga et al (2008) and Ndubuka et al (2013) at 15% and 19.8% respectively. These lower proportions of breastfeeding in the country may be attributable to the GoB advocacy for FF for many years as a preventive strategy for MTCT (MoH, 2011). Furthermore, results from this study revealed that all the mothers practised EBF for the first six months of the child’s life and 61.1% breastfed their infants between 8-12 times per day. However, lower EBF proportions were observed in previous studies by Zash et al (2016) and Kasinga et al (2008) where it was found that only 1.4% and 16.7% practised breastfeeding respectively. Nevertheless, a higher EBF proportion of 82.2% was reported in Ethiopia for infants in their first six months of life. This is due to the fact that in this setting breastfeeding is culturally perceived as a universal norm for feeding an infant (Bayissa et al, 2015). Around Southern Africa, overall prevalence of EBF was 56.57% from 2010 to 2015 which was higher than the thirty-five global percentage (Issaka et al 2017; WHO, 2012). Nonetheless, results from Kenya and Ghana revealed lower EBF rates of 40.4% and 42% respectively. The reasons for suboptimal EBF practises ranged from lack of education, inadequate knowledge of EBF, inadequate breast milk and in some settings mixed feeding is a cultural norm for the feeding of an infant (Wapang’ana, 2013; Mogre, 2016). A study from Kenya by Wachira et al (2009) reported that mothers rarely practised EBF as they gave their infants other foods as early as two weeks.

With regard to initiation to breastfeeding after delivery within one hour and within 24 hours, this study revealed 55.5% and 44.5% respectively which showed some improvement compared to the Botswana family health survey IV which reported only 40% within one hour with EBF 20.3% (BAR, 2012). Similar findings were observed in a cohort study in Western Nepal where 42.2% reported early initiation of breastfeeding (Khanal et al, 2015). However, a report from sub-Saharan Africa revealed that the overall prevalence of early initiation of breastfeeding varies between the lowest of 37.8% in Central Africa to the highest of 69.3% in Southern Africa (Issaka et al, 2017). This suggests a positive practise of early initiation of breastfeeding in this study as compared to other previous findings.
In this study, a majority of mothers (88.9%) reported that there was milk in the breast the first twenty-four hours after delivery which was higher compared to findings from Uganda by Fadness et al (2010) where some mothers experienced lack of milk within 24 hours after delivery. The results, furthermore, showed that all the mothers (100%) did not give their children fluid or food after birth before breastfeeding. Noteworthy, though, they might have been introduced to fluid or food within the first 24 hours for the 11% of mothers who reported that they had no breast milk the first twenty four hours post-delivery. This may suggest suboptimal feeding practises in the first six months of infants’ life. From this study, a positive EBF was practised with 94.4% reporting family support with only 22.2% indicating that breastfeeding physically caused painful and uncomfortable breasts while a small proportion of 5.5% reported that breastfeeding was embarrassing and difficult in public.

5.7 FORMULA FEEDING

In Southern Africa, FF is commonly practised with a highest of 30% (Issaka et al, 2017). Botswana as part of the Southern African region has a high FF practise among HIV infected women as a strategy for MTCT prevention considering that its citizens have access to clean water and can prepare infant formula milk safely (Creek, 2011). In other African countries, it was reported that socio-cultural factors such as economic circumstances, family influences on feeding practises, maternal age, stigma of HIV/AIDS and beliefs about HIV transmission through breast milk influenced the decision to formula feed (Thairu, 2005; Doherty, 2006; Leshabari et al, 2007a; Laar and Govender, 2011; Wapang’ana, 2013). In this study, 85.7% of women practised FF with 90% practising EFF for the first six months of an infants’ life. With regards to acquiring formula milk, most of the mothers (75%) indicated that it was easy. This result assumes that, despite formula milk being provided free of charge to all HIV infected women for the first year of an infant’s life in Botswana MoH (2011), a significant proportion (25%) had challenges in acquiring formula milk which might have compromised the aspect of EFF for the first six months of infant life despite 90% mothers stated that they practised EFF. This is in line with the WHO (2006) report which stated that mothers in low resource settings rarely opt for commercial formula because it is expensive and therefore not feasible and sustainable.

Findings from this study showed that 95.3% of women had knowledge of formula milk preparation; however, only slightly above half (58.3%) of the women indicated that it was
easy to store prepared milk while 41.6% mentioned that it was not easy. This finding revealed that women had varying experiences concerning storage of prepared milk which might had been a challenge they faced, thus creating a negative impact in terms of meeting the WHO (2010) recommendation criteria of AFASS. An assumption may therefore be made that women who opt to formula feed due to the fact that they would get free formula milk without considering their individual socio-economic aspects involving their household facilities may not be able to practise safe formula feeding. In line with this finding, a study by BOTUSA in 2006 revealed that improper feeding practises involving storage of formula milk at room temperature, inadequate cleaning of utensils, use of bottles with hard to clean nipples and frequent formula shortages were still very common issues observed (Creek, 2011). It is thus, with this finding of suboptimal feeding practises (Shapiro et al, 2003; Fadnes et al, 2009) that high rates of hospitalization and mortality among formula fed HIV exposed infants occurred (Zash et al, 2016). Furthermore, unsafe formula feeding practises may pose risks of respiratory infections and diarrhoeal diseases which may also lead to childhood mortality (Botswana Global AIDS Response Report, 2012; Madondo et al, 2012; Aishat et al, 2015).

Result from this study showed that the majority of women (73.1%) who practised formula feeding fed their infants on demand. The findings of this study showed that the majority of women (91.6%) reported that their families supported FF. With regards to stigma and discrimination, findings of this study revealed that, although slightly more than half (54%) of the mothers responded that FF was not associated with being HIV positive, however, a significant proportion (42%) stated that FF was associated with being HIV positive. Although not of much worth, it may be assumed that among the 4.6% of women who did not know might be those also who could have been faced with fears of stigma and discrimination towards the method. In line with this, the finding by Kisinga et al (2008) was that a slightly higher percentage (56.7%) of women stated that the community associated FF with a positive HIV status. In other findings elsewhere from Ghana and Tanzania it was reported that HIV positive mothers who opted to formula feed were carefully watched and often felt compelled to hide this practise over fear of stigma and thus fed in secret (Leshabari et a, 2007a; Laar and Govender, 2011).

This study revealed that a majority of 79.6% reported that it was not safe to give the child formula milk and solid foods (MFF) for the first six months of the child’s life while a
significant proportion (15.7%) indicated that it was safe. This result revealed some gaps in
the information women acquire during their ANC visits. In line with this finding from
Gaborone Botswana, Ndubuka et al (2013) reported that gaps exist within the PMTCT
programme guidelines and actual practise. Furthermore, this study observed that 90.7% of
mothers practised EFF for the first six months while 9.3% did not. Of the 9.3% of mothers
who practised MFF, 80% gave soft porridge and 20% Purity food, initiating at three, four and
five months with 30%, 40% and 30% respectively. However, it may be assumed that the
number of mothers who did not practise EFF for the first six months might be higher given a
significant proportion (15.7%) who responded that it was safe to feed with formula milk and
solids in the first six months of an infant’s life. Thus, high suboptimal formula feeding
practises were observed in previous studies (Shapiro et al, 2003; Fadnes et al, 2009; Zash et
al, 2016) with the introduction of liquids and solids before six months of an infant’s life
(Shapiro et al, 2005; Madiba and Letsoalo, 2013). Furthermore, previous studies indicated
that maintaining the selected method of feeding is low among women in resource-constrained
countries in Southern Africa (Shapiro et al, 2003; Doherty et al, 2005).

5.8 FACTORS ASSOCIATED WITH BREASTFEEDING

Infant feeding practices among HIV infected mothers is predetermined by the quality of the
infant feeding counselling mothers receive during ANC visits as it has a significant
influence on infant feeding choice and thus improves infant feeding practises (Doherty et al,
2006). Therefore, mothers who receive infant feeding counselling are equipped with the
relevant information regarding the appropriate feeding practices for HIV infected mothers.

5.8.1 Infant feeding counselling

Infant feeding counselling acts as a direction that guides women in making sound decisions
concerning infant feeding choices. This is an essential component of the PMTCT
programme which even WHO (2016) and MoH (2016) advocate for women to receive. The
results from this study showed a significant association between infant feeding counselling
and knowledge of MTCT of HIV (p=0.009). Furthermore, results showed a statistical
association between infant feeding counselling and MTCT knowledge during pregnancy
(p=0.003), during breastfeeding (p=0.000), taking ARV during pregnancy (p=0.09) and
condom use (p=0.032).
Additionally, a further statistical association from this study was revealed between MTCT knowledge and the feeding choice women opted to practise (p = 0.002). Results showed a statistical significant association between feeding choice and the belief that breastfeeding the child when taking ARVs can prevent HIV transmission to the child (p=0.002). The results furthermore showed that the feeding method mothers opted for was statistically significantly associated with factors that influenced infant feeding choice (p=0.000). Thus, these positive findings are attributed to receiving infant feeding counselling during ANC visits that enables women to acquire knowledge on MTCT of HIV infection. In line with this finding, studies conducted showed that having received infant feeding counselling options recommended for HIV positive mothers resulted in higher knowledge of MTCT practises related to appropriate infant feeding, and they thus chose the EBF option (Doherty et al, 2006; Laar and Govender, 2011; Ndubuka et al, 2013; Aishat et al, 2015).

5.8.2 Infant feeding practises

Literature showed that women who received PMTCT measures and received infant feeding counselling had better overall knowledge on infant feeding recommendations for safe feeding practises for HIV infected mothers (Ndubuka et al, 2013; Tesfaye et al 2014; Aishat et al, 2015 Madiba and Letsoalo, 2013; Mnyani et al, 2017). The results from this study revealed a statistical significance between knowledge about MTCT of HIV and breast feeding practises (p=0.002). This result showed a statistical significance between infant feeding counselling and breast feeding with variables of availability of breast milk within 24 hours (p = 0.004) and family support of breast feeding (p=0.000).

The results showed a statistically significant association between receiving infant feeding counselling and formula feeding with the variables availability of formula milk (p=0.004) and mixed formula feeding (p=0.000). Thus, comprehensive and explanatory counselling has the potential to greatly influence mothers’ understanding and dedication to exclusive breastfeeding, thus, this should constitute the holistic intervention to improve breastfeeding and exclusive breastfeeding rates (Ashait, 2013).

5.9 CONCLUSIONS ABOUT THE RESEARCH PROBLEM

This study, in line with other studies, has shown that the majority of the HIV infected mothers have knowledge of MTCT of HIV transmission modes, whereas knowledge of
MTCT prevention modes were lower especially with the caesarean section measure which gives an assumption that gaps exist in the implementation of PMTCT programme according to the guidelines (Jebessa and Teka, 2005; Owoaje et al, 2012).

Findings of this study and previous studies showed non-adhere to the recommended safe feeding practises especially with the formula feeding method as a significant proportion of the mothers reported that it was not easy to store prepared milk (Leshabari et al, 2007; Rollins, 2008; WHO, 2010; Creek, 2011). This finding of suboptimal feeding practises is also in line with other studies which pose risk of infectious diseases among infants which lead to high rates of hospitalization and mortality among formula fed HIV exposed infants (Shapiro et al, 2003; Fadnes et al, 2009; Zash et al, 2016).

In addition, findings of this study showed that the majority of the mothers were unemployed with limited income as in line with previous studies which, has an important influence on the decision-making particularly in relation to RF (Laar and Govender, 2011). This study showed that a significant proportion of the mothers had challenges in acquiring formula milk despite being offered free of charge by the GoB. Further studies conducted have reported that cost and socio-economic status of HIV positive mothers are significant barriers to RF (De Paoli et al, 2004; Kuhn et al, 2007). This is in line with the WHO (2006) report which stated that mothers in low resource settings rarely opt for commercial formula because it is expensive and therefore not feasible and sustainable.

5.10 IMPLICATIONS FOR POLICY AND PRACTICE

This study generally revealed positive infant feeding practises among HIV infected mothers according to the WHO (2010) infant feeding recommendation for HIV infected women. PMTCT interventions require that HIV infected women are provided with adequate information about infant feeding options in the context of PMTCT of HIV principles for their informed choices (Thairu et al, 2005).

The majority of women in this study received infant feeding counselling; however, it may be assumed that women made their choices without focusing on their individual socio-economic factors considering that most of them had no monthly income while others were engaged in small businesses earning less than P1000.00 per month. This may have had an impact on their household resources to meet the criteria for safe formula feeding practises
(WHO, 2010). There is, therefore, the need to emphasise the importance of considering the issue of socio-economic aspects of individual mothers, especially those who intend to practice formula feeding in order to provide safe infant feeding practises.

The results from this study revealed gaps in the PMTCT interventions as it showed misconceptions towards MTCT prevention through caesarean section as close to half did not know about it, while a third believed it can prevent HIV transmission to the child, while the remaining one third believed it cannot do so. Thus, this requires more emphasis on the implementers of the PMTCT services to ensure they follow stipulated guidelines and deliver holistic PMTCT services and interventions on all the HIV transmission modes and prevention modes for enhancement of knowledge to women on PMTCT to enable them to ultimately make informed decisions on infant feeding choices for HIV-free survival of infants.

There is a need for promotion of breast feeding among HIV infected mothers as the GoB for a long time has been advocating for FF which has proved to have increased hospitalization and mortality rates among the formula fed infants. Hence, there is need to sensitize health care workers on new PMTCT guidelines for them to offer accurate information to mothers for the success of the PMTCT programme, thus, ultimately for the HIV-free survival of infants given the benefits of breast feeding supported by ARVs (MoH, 2016).

Although the majority of mothers receive initial infant feeding counselling, there is need for follow-up on infant feeding counselling in order to determine how mothers are coping and to determine adherence and safe feeding practises of the opted feeding method especially with formula fed infants.

5.11 LIMITATIONS OF THE STUDY

Even though this study has provided essential information on knowledge about MTCT, infant feeding practises and factors influencing feeding choices among women enrolled in the PMTCT programme at clinics in Francistown, this study had some limitations. There was lack of participants: as some infants of the HIV infected mothers enrolled in the PMTCT programme were not accompanied by biological mothers.
Some facilities could not provide space for conducting interviews hence this posed a challenge to continue with those facilities for data collection as a result only nine clinics participated in the study out of 18. In addition, in this study knowledge about MTCT and infant feeding practices were self-centred by respondents. Thus, the knowledge the mothers portrayed may not be the correct knowledge expected. Based on the sensitive nature of the study and the research design used for the questionnaire, the findings are subject to information bias although measures were employed to limit this bias.

The report from this study is based on only nine clinics in Francistown with a relatively small sample size of 126 participants which, therefore, means generalising the findings to the national level for the PMTCT programme in Botswana is not possible. Thus, this limits the capability to generalise the findings to all HIV-infected women enrolled in PMTCT in Francistown for the PMTCT programme.

5.12 RECOMMENDATIONS

The recommendations are based on the findings of this study as well as the challenges and limitations experienced when conducting it, thus the following recommendations are suggested:

There is a need to intensify infant feeding counselling with regard to the feeding option mothers desire to practise with emphasis on their household resources that might hinder them to adhere to the opted feeding practice. This is especially so for the majority of the women in the country who opt for formula feeding with formula initially is provided by the government free of charge for one year. According to findings of this study, the majority of the mothers were unemployed while those who were in some form of employment earned less than P2000.00, thus making it almost impossible for them to sustain the feeding of their infants with formula which they must purchase themselves given a significant proportion (25%) from this study who had challenges in acquiring formula milk.

There is also need to promote breastfeeding as only a tiny proportion of 14.5% from this study practised breastfeeding as recommended by MoH (2016) while on ARVs. This has benefits of enhancing immunity and preventing infectious diseases. Infant feeding counselling follow ups should also continue during the MCH visits so as to identify any
challenges that mothers might be faced with during feeding, more so with the formula feeding that requires other resources to be utilised successfully.

Specific PMTCT interventions should be provided to the mothers with much emphasis on the MTCT transmission modes and preventive measures that are there, such as caesarean section, something which a significant proportion in this study did not know about. There is also a need to continue educating the communities on the issue of MTCT of HIV to enhance acceptability of the disease and minimise stigma and discrimination that might hinder adherence to the intended infant feeding choice. At the same time more emphasis should be provided on safe sex practices as the findings from this study revealed that the majority of participants were in cohabiting relationships and significant numbers of mothers were single.

Policy makers, programme implementers and communities should jointly promote the PMTCT services as PMTCT programme are proven to curtail the vertical transmission of HIV with lower rates of MTCT.

5.13 FURTHER RESEARCH

This was a cross-sectional study; therefore, a qualitative study is recommended as it can further explain and explore the challenges faced by HIV infected women concerning infant feeding practises especially with the formula feeding method.

There might, however, be some socio-economic and cultural challenges that might lead to suboptimal feeding practises among formula-fed which mothers are faced with in different settings that can be assessed as a high number of mortality rates is observed among HIV exposed infants.

5.14 CONCLUSION

Infant feeding is an important aspect in the early life of a child and a key determinant of a child’s survival and development. The majority of HIV infected mothers in Francistown DHMT had high knowledge on MTCT of HIV and infant feeding practises, despite a low proportion who opted to practise breastfeeding. However, a significant proportion of mothers had misconceptions about MTCT prevention like breastfeeding when taking ARVs
as well as caesarean section as a preventive measure for HIV transmission. Despite most of the mothers having generally positive knowledge towards infant feeding practices, a significant, although, a lower, proportion of mothers, especially with formula feeding, showed suboptimal feeding practices. Low income status had an impact on the livelihood and household facility thus compromising the WHO safe infant feeding recommendation. PMTCT interventions both locally and at the policy level should target individual women and the context in which they live in order to promote optimal infant feeding practices for a better HIV-free survival of infants.
REFERENCES


population and HIV-positive mothers-a mixed method approach. BMC health services research, 10(1), 260.


http://www.hiv.gov.bw/content/prevention-mother-child-hiv-transmission


Tugwete M. (2013). Relationship between knowledge on infant nutrition and infant feeding practices among mothers aged 15 to 40 years with infants 7 months to 1 year old at Marondera’s three urban health centres.


APPENDIX 1

Participant information leaflet

STUDY TITLE: Knowledge about Infant Feeding Practices among women in the Prevention of Mother to Child Transmission Program at Clinics in Francistown, Botswana.

Please read this information about the study and feel free to ask any questions should you need clarity before deciding to take part in this study on Knowledge about Infant Feeding Practices among women in the Prevention of Mother to Child Transmission Program at Clinics in Francistown, Botswana.

I am a student researcher from Sefako Makgatho Health Sciences University. For the purpose of my Master’s degree course in Public Health, I am going to conduct a study at Clinics in Francistown to find out Knowledge about Infant Feeding Practices among women in the Prevention of Mother to Child Transmission Program at Clinics in Francistown, Botswana.

A researcher administered questionnaire will be used to collect the data. The questionnaire will be completed anonymously, in a private area and will take approximately 20 minutes to complete. You can ask the data collector if any of the questions included in the questionnaire are not clear.

At anytime you are free to let me know if you no longer wish to participate in the study and you will not be declined to leave. In addition, your name will not be recorded and all personal information about you will be kept confidential during and after the study.

The study has been approved by Sefako Makgatho University Research Ethics Committee (SMUREC), and permission has been granted by The Ministry of Health Ethics Committee and The Greater Francistown District Health Management Team (DHMT). All the facility managers at the clinics where the research will be conducted have also given me permission of access.

If you agree to participate in the study, you will be required to sign a consent form to indicate your willingness to participate. Because of the significance of the study, we will be very grateful if you will be prepared to take part.

Please feel free to contact myself on Tel No: 2418353 or my supervisor Ms/Mr/Dr/Prof: ........................................ at Tel: ..........................., if you have any further questions regarding this study on Knowledge about Infant Feeding Practices among women in the Prevention of Mother to Child Transmission Program at Clinics in Francistown, Botswana.
Statement concerning participation in a Research Project.

STUDY TITLE: Knowledge about Infant Feeding Practices among women in the Prevention of Mother to Child Transmission Program at Clinics in Francistown, Botswana.

The purpose of this study is to assess knowledge on infant feeding practices among women in the PMTCT programme.

I have read the information on aims and objectives of the proposed study and was provided the opportunity to ask questions and given adequate time to rethink the issue. The aim and objectives of the study are sufficiently clear to me. I have not been pressurized to participate in any way.

I am aware that this material may be used in scientific publications which will be electronically available throughout the world. I consent to this provided that my name is not revealed.

I understand that participation in this study is completely voluntary and that I may withdraw from it at any time and without supplying reasons. This will have no influence on the regular treatment that holds for my condition neither will it influence the care that I receive from my regular doctor.

I know that this study has been approved by the Sefako Makgatho University Research Ethics Committee (SMUREC), Sefako Makgatho Health Sciences University. I am fully aware that the results of this study will be used for scientific purposes and may be published. I agree to this, provided my privacy is guaranteed.

I hereby give consent to participate in this Study.

....................................................
Name of patient/volunteer

......................................                .............................................
Date.                                        Witness                              Place

Statement by the Researcher

I provided verbal and written information regarding this Study. I agree to answer any future questions concerning the Study as best as I am able. I will adhere to the approved protocol.

.......................................    ....................................    ...............……
Name of Researcher                Signature                        Date
Seteitemente se se ka ga go tsaya karolo mo patlisisong.

Leina La Patlisiso: Dipatiso ka bomme ba ba molehaneong la thibelo mogare go tswa mo go mmangwana go ya leseeng mo dikokelong tsa Francistown, Botswana.

Dithuto tse maikaelelo a tsone ke go itse ka botlalo ka fa bomme ba ba molehaneong la thibelo mogare go tswa mo go mmangwana go ya leseeng.

Ke buisitse tshedimosetso mo maitlhomo le maikemisetso a patlisiso e e tshitshintsweng mme ke filwe tšhono ya go botsa dipotso le go fiwa nako e e lekaneng ya go akanya gape ka ntlha e. Maitlhomo le maikemisetso a patlisiso e a tlhaloganyega sentle. Ga ke a patelediwa ke ope ka tsela epe go tsaya karolo. Ke tlhaloganya gore go tsaya karolo mo Patlisiso ke boithaopo le gore nka ikhogela morago mo go yona ka nako ngwe le ngwe kwa ntle ga go neela mabaka. Se ga se kitla se nna le seabe sepe mo kalafong ya me ya go le gale ya bolwetsi jo ke nang le jona e bile ga se kitla se nna le tlhotheletso epe mo tlhokomelong e ke e amogelang mo ngakeng ya me ya go le gale. Ke a itse gore Patlisiso e e rebotswe ke Patlisiso le Molao wa Maitsholo ts'a Khampase ya Sefako Makgatho University Research Ethics Committee (SMUREC), Yunibesithi ya Sefako Makgatho Health Sciences / Bookelo jwa Ngaka George Mukhari. Ke itse ka botlalo gore dipholo tsa Patlisiso di tla dirisetswa mabaka a saentifiki e bile di ka nna tsa phasaladiwa. Ke dumelana le seno, fa fela go netefadiwa gore se e tla nna khupamarama. Fano ke neela tumelelo ya go tsaya karolo mo Patlisiso e.

............................................................

Leina ka molwetse/moithaopi
........................................... ........................................... ...........................................
etlha.

Seteitemente ka Mmatlisisi

Ke tlametse tshedimosetso ka molomo le/kgotsa e e kwadilweng malebana le Patlisiso. Ke dumela go araba dipotso dingwe le dingwe mo nakong e e tlang tse di amanang le Patlisiso ka moo nka kgonang ka teng. Ke tla tshegetsa porotokolo e e rebotsweng.

........................................... ........................................... ...........................................
Leina la Mmatlisisi Tshaeno Letlha Lefelo
APPENDIX 4
RESEARCHERS ADMINISTERED QUESTIONNAIRE
Study Title: Knowledge about Infant Feeding Practices among Women in the Prevention of Mother to Child Transmission Program at Clinics in Francistown, Botswana.

SERIAL NO: 

Rating: Don’t know – 0; Yes – 1; No – 2;

Thank you for agreeing to participate in the study of women on PMTCT programme. My name is Ruth Mwenya, a student of Masters of Public Health from Sefako Makgatho Health Sciences University, Medunsa Campus in South Africa. This study intends to assess knowledge about infant feeding practices among women on PMTCT programme. Before you participate in the study you need to sign the consent form and then complete the questionnaire. Please feel free to tell me when you are not comfortable about any of the questions, but I would appreciate if you could answer all the questions in this questionnaire.

**Instruction:** Please cycle the relevant block or provide the information requested.

<table>
<thead>
<tr>
<th>A</th>
<th>Socio-Demographic Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>What is your age?</td>
</tr>
<tr>
<td>2.</td>
<td>What is your residential area?</td>
</tr>
<tr>
<td></td>
<td>1. Rural</td>
</tr>
<tr>
<td></td>
<td>2. Urban</td>
</tr>
<tr>
<td>3.</td>
<td>Marital Status</td>
</tr>
<tr>
<td></td>
<td>1. Single</td>
</tr>
<tr>
<td></td>
<td>2. Married</td>
</tr>
<tr>
<td></td>
<td>3. Cohabiting</td>
</tr>
<tr>
<td></td>
<td>4. Separated</td>
</tr>
<tr>
<td></td>
<td>5. Divorced</td>
</tr>
<tr>
<td></td>
<td>6. Widowed</td>
</tr>
<tr>
<td>4.</td>
<td>How many children do you have?</td>
</tr>
<tr>
<td>5.</td>
<td>How old is the youngest child?</td>
</tr>
<tr>
<td>6.</td>
<td>What is your educational level?</td>
</tr>
<tr>
<td></td>
<td>1. Primary level</td>
</tr>
<tr>
<td></td>
<td>2. Junior Education</td>
</tr>
<tr>
<td></td>
<td>3. Secondary level</td>
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<td></td>
<td>4. Tertiary level</td>
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<td></td>
<td>5. No formal</td>
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<td></td>
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</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>education</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 7. | What is your occupation? | 1. Employed  
2. Self employed  
3. Unemployed  
4. Student |
| 8. | What is your monthly Income? | 1. Less than P1000  
2. P1000 – P2000  
3. More than P2000  
4. No income |
2. Muslim  
3. Traditional  
4. Other  
specify........... |

**B KNOWLEDGE OF MOTHERS ABOUT MTCT**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
</table>
| 1. | Do you believe that an HIV positive mother can transmit HIV to the child? | 0. Don’t know  
1. Yes  
2. No |
| 2. | Do you believe that HIV can be transmitted from the mother to the child during pregnancy? | 0. Don’t know  
1. Yes  
2. No |
| 3. | Do you believe that HIV can be transmitted from the mother to the child through delivery? | 0. Don’t know  
1. Yes  
2. No |
| 4. | Do you believe that HIV can be transmitted through breastfeeding? | 0. Don’t know  
1. Yes  
2. No |
| 5. | Do you believe that a mother during pregnancy can prevent her child from getting HIV by taking ARVs? | 0. Don’t know  
1. Yes  
2. No |
| 6. | Do you believe that caesarean section during delivery can prevent the transmission of HIV to the child? | 0. Don’t know  
1. Yes |
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>Do you believe that condom use during pregnancy can prevent HIV transmission to the unborn child?</td>
<td>2. No</td>
</tr>
<tr>
<td></td>
<td>0. Don’t know</td>
<td>1. Yes</td>
</tr>
<tr>
<td>8.</td>
<td>Do you believe that breastfeeding the child when taking ARVs can prevent HIV to the child?</td>
<td>2. No</td>
</tr>
<tr>
<td></td>
<td>0. Don’t know</td>
<td>1. Yes</td>
</tr>
<tr>
<td>9.</td>
<td>Do you believe that HIV can be prevented when the newborn child is given ARVs at birth?</td>
<td>2. No</td>
</tr>
<tr>
<td></td>
<td>0. Don’t know</td>
<td>1. Yes</td>
</tr>
</tbody>
</table>

C. INFANT FEEDING CHOICES AND PRACTICES

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Did you receive infant feeding counselling at PMTCT?</td>
<td>1. Yes</td>
</tr>
<tr>
<td></td>
<td>2. No</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>If yes, what feeding practice did you choose?</td>
<td>1. Exclusive Breastfeeding</td>
</tr>
<tr>
<td></td>
<td>2. Exclusive Formula feeding</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Who influenced your infant feeding choice?</td>
<td>1. Partner</td>
</tr>
<tr>
<td></td>
<td>2. Mother</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Health Workers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Other specify............</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Have you disclosed your HIV positive status to anyone?</td>
<td>1. Yes</td>
</tr>
<tr>
<td></td>
<td>2. No</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>If no, did the fear of HIV disclosure influence your feeding choice?</td>
<td>1. Yes</td>
</tr>
<tr>
<td></td>
<td>2. No</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>What influenced the feeding practice that you chose?</td>
<td>1. Affordability</td>
</tr>
<tr>
<td></td>
<td>2. Place of delivery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Availability of milk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Work commitment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Other</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Options</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
</tbody>
</table>
| 7  Are you breastfeeding? If yes answer question 8 to 20 and is the end. If No, answer from questions 20 to 30 and that is the end. | 1. Yes  
2. No                                                                                       |
| 8  When did you initiate breast feeding after delivery?                   | 1. Within 1 hour  
2. Within 24 hours  
3. Other specify.......................... |
| 9  Was there milk in the breast the first 24 hours after delivery?        | 1. Yes  
2. No                                                                                       |
| 10 Did you give the child fluids or food after birth before breast feeding? | 1. Yes  
2. No                                                                                       |
| 11 How many times per day do you breastfeed the child?                   | 1. Less than 8  
2. Between 8-12  
3. More than 12                                                                 |
| 12 Does your family support breastfeeding?                               | 1. Yes  
2. No                                                                                       |
| 13 Is breastfeeding embarrassing and difficult in public?                | 1. Yes  
2. No                                                                                       |
| 14 Does breastfeeding physically cause breasts to be painful and uncomfortable? | 1. Yes  
2. No                                                                                       |
| 15   Is giving the child breast milk and solid foods (mixed feeding) for the first six months safe for the child? | 0. Don’t know  
1. Yes  
2. No                                                                                       |
| 16 For how long was exclusive breastfeeding (feeding the child only on breast milk) undertaken? | 1. 3 months  
2. 6 months  
3. Other specify....... |
| 17 Were you able to practice exclusive breast feeding for the first six months? | 0. Don’t know  
1. Yes  
2. No                                                                                       |
| 18 If no to question 11, what was the reason for not practising           | 1. Insufficient milk  
2. Painful breasts                                                                 |
<table>
<thead>
<tr>
<th>Question</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>exclusive breast feeding?</td>
<td>3.Caesarean delivery</td>
</tr>
<tr>
<td></td>
<td>4.Other specify....................</td>
</tr>
<tr>
<td>19 If No to question 11, on what did you feed the child?</td>
<td></td>
</tr>
<tr>
<td>20 How old was the baby when you fed the food you mentioned above?</td>
<td></td>
</tr>
<tr>
<td>21 Is it easy to acquire formula milk?</td>
<td>1.Yes</td>
</tr>
<tr>
<td></td>
<td>2.No</td>
</tr>
<tr>
<td>22 Is it easy to prepare formula milk?</td>
<td>1.Yes</td>
</tr>
<tr>
<td></td>
<td>2.No</td>
</tr>
<tr>
<td>23 Is it easy to store prepared milk?</td>
<td>1.Yes</td>
</tr>
<tr>
<td></td>
<td>2.No</td>
</tr>
<tr>
<td>24 How often do you feed the child?</td>
<td>1.On demand</td>
</tr>
<tr>
<td></td>
<td>2.When child is crying</td>
</tr>
<tr>
<td>25 Does your family support formula feeding?</td>
<td>1.Yes</td>
</tr>
<tr>
<td></td>
<td>2.No</td>
</tr>
<tr>
<td>26 Is formula feeding associated with being HIV positive?</td>
<td>0.Don’t know</td>
</tr>
<tr>
<td></td>
<td>1.Yes</td>
</tr>
<tr>
<td></td>
<td>2.No</td>
</tr>
<tr>
<td>27 Is giving the child formula milk and solid foods (mixed feeding) for the first six months safe for the child?</td>
<td>0.Don’t know</td>
</tr>
<tr>
<td></td>
<td>1.Yes</td>
</tr>
<tr>
<td></td>
<td>2.No</td>
</tr>
<tr>
<td>28 Were you able to practice exclusive formula feeding (giving formula milk alone) for the first 6 months?</td>
<td>1.Yes</td>
</tr>
<tr>
<td></td>
<td>2.No</td>
</tr>
<tr>
<td>29 If no to question 8, what did you feed the child?</td>
<td></td>
</tr>
<tr>
<td>30 How old was the baby when you fed the food you mentioned above?</td>
<td></td>
</tr>
</tbody>
</table>

Thank you for participating
APPENDIX 5

RESEARCHERS ADMINISTERED QUESTIONNAIRE

STUDY TITLE: Dipatiso ka bomme ba ba molehaneong la thibelo mogare go tswa mo go mmangwana go ya leseeng mo dikokelong tsa Francistown, Botswana.

SERIAL NO: □□□

Rating: Ga ke itse – 0; Ee – 1; Nnyaa - 2
Ke go lebogela go dumela go tsaya karolo mo patlisisang e ya lenaneo la thibelo mogare go tswa mo go mmangwana go ya leseeng, e e itebagantseng le bomme thata. Leina la me ke Ruth Mwenya. Ke moithuti wa tsa botsogo jwa sechaba kwa mmadikolo wa Sefako Makgatho kwa Afrika Borwa.
Dithuto tse maikaelelo a tsone ke go itse ka botlalo ka fa bomme ba ba molehaneong la thibelo mogare go tswa mo go mmangwana go ya leseeng.
Pele o ka tsaya karolo mo patlisisong e o tswanetse go saena pompitshana e e supang fa o dumalana, e bo e le gone o araba dipotso tse di latelang. O letlelelwa go bua fa o sa phuthologa go araba dipotso tse dingwe mme fela nka leboga fa o ka di araba tsotlhe. Tshwaya lepokoso le le tshwanetseng.
Instructions: Ka tswee tswee tshwaya mo lebokosong kgotsa araba dipotso

<table>
<thead>
<tr>
<th>A</th>
<th>Socio-Demographic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>O dingwaga tse kae?</td>
</tr>
<tr>
<td>2.</td>
<td>O nna kae?</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>A o nyetswe?</td>
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</tr>
</tbody>
</table>
| 4. | O na le bana ba le kaee? | 5. Thladilwe  
6. Motlhologadi |
| 5. | Gofejene e dingwaga tse kaee? | |
2. Sekolo se potlana  
3. Sekolo sa magare  
4. Sekolo se segolwane  
5. Sekolo sa ithutelo tiro ya diatla |
| 7. | A o a bereka? | 1. O a bereka  
2. O a ipereka  
3. Ga o bereke  
4. O tsena sekolo/ O moithuti |
| 8. | O amogela bokae fa kgwedi e fela? | 1. Kwa tlase ga sekete sa dipula  
2. Sekete go ya kwa diketeng tse pedi tsa dipula  
3. Go feta dikete tse pedi tsa dipula  
4. Ga o na letseno lepe fa kgwedi e fela |
2. Semuselemu  
3. ngwao  
4. Mabaka ae eng............. |

**B Kitso ya bomme ka lenaneo la thibelo mogare go tswa mo go mmangwana go**
<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>0. Ga ke itse</th>
<th>1. Ee</th>
<th>2. Nnyaa</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A o dumela gore mogare wa HIV o kgona go tshelanwa go tswa mo go mmangwana go ya leseeng?</td>
<td></td>
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<tr>
<td>2.</td>
<td>A o dumela gore mogare wa HIV o kgona go tswa mo go mmangwana o fetela kwa leseeng ka nako ya boimana?</td>
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<td>3.</td>
<td>A o dumela gore mogare wa HIV o kgona go tswa mo go mmangwana o fetela kwa leseeng ka nako ya pelegi?</td>
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<td>4.</td>
<td>A o dumela fa go nale kgonagalo ya fitisetsa mogare wa HIV go tswa mo go mmangwana go ya leseeng ka go amusa ka lebele?</td>
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<tr>
<td>5.</td>
<td>A o dumela fa mmangwana a tsaya diritibatsi tsa mogare go ka kganela mogare wa HIV go ya leseeng?</td>
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<tr>
<td>6.</td>
<td>A o dumela fa pelegi ka loaro e ka sereletsa mogare wa HIV go tswa mo go mma ngwana go ya losieng?</td>
<td></td>
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<tr>
<td>7.</td>
<td>A o dumela fa tiriso ya sekausu ka nako ya boimana e ka sireletsa losea mo mogareng wa HIV.</td>
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<tr>
<td>8.</td>
<td>A dumela fa go babalesegile go amusa ka lebele o tsaya diritibatsi?</td>
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<tr>
<td>9.</td>
<td>A o dumela fa mogare o ka thibilwa fa losea lo fiwa diritibatsi fa le belegwa?</td>
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**C. INFANT FEEDING CHOICES AND PRACTICES**

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>0. Ga ke itse</th>
<th>1. Ee</th>
<th>2. Nnyaa</th>
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<tbody>
<tr>
<td>1.</td>
<td>A o kile wa neelwa dikgakololo ka go fepiwa ga lesea</td>
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<td>ke ba PMTCT?</td>
<td>2. Nnyaa</td>
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<tr>
<td>2.</td>
<td>Fa ele ee, o ne o itlhophetse mofuta ofe wa go amusa?</td>
<td>1. Go amusa ka lebele go le nosi</td>
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<td></td>
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<td>2. Go siela mashi a thini a le nosi</td>
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<td>3.</td>
<td>Ke mang yo a neng a na le seabe mo go tseeng tshwetso ga gago ka mofuta o o dirisang go fepa lesea la gago?</td>
<td>1. Mokapelo</td>
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<td>2. Mmago</td>
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<td>3. Ba botsogo</td>
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<td>4. Mabaka ae eng</td>
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<td>4.</td>
<td>A o kile wa bolelela mongwe ka seemo sagago sa mogare?</td>
<td>1. Ee</td>
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<td></td>
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<td>2. Nnyaa</td>
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<tr>
<td>5.</td>
<td>Fa ele nnyaa, A letshogo ke lone le dirileng gore o amuse?</td>
<td>1. Ee</td>
<td></td>
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<td></td>
<td></td>
<td>2. Nnyaa</td>
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<tr>
<td>6.</td>
<td>Ke eng se se dirileng gore o itlhophele go amusa jaalo?</td>
<td>1. Gokgona</td>
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<td>2. Ko o be;etseng teng</td>
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<td>3. Gonna teng ga mashi</td>
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<td>4. Gobereka</td>
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<td>5. Mabaka ae eng ......</td>
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<td>7.</td>
<td>A o amusa ka lebele? Fa karabo ele ee araba dipotso 8 to 20. Fa karabo ele nnyaa araba dipotso 21 to 30.</td>
<td>1. Ee</td>
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<td>2. Nnyaa</td>
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<td>8.</td>
<td>O simolotse go amusa leng ka lebele fa o sena go belega?</td>
<td>1. Mo aureng</td>
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<td>2. Mo letsatsing</td>
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<td>4. Mabaka ae eng..............</td>
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<td>9.</td>
<td>A mashi nne a tswa mo lebeleng dioura tsa ntlha tse di masome mabedi le bone?</td>
<td>1. Ee</td>
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<td>2. Nnyaa</td>
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<td>10.</td>
<td>A o ne wa siele ngwana metsi kana wa mo fa dijo pele o mo amusa morago ga pelegi?.</td>
<td>1. Ee</td>
<td></td>
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<td>2. Nnyaa</td>
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<td>2. Fa gare ga borobabobedi le lesome le bobedi</td>
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</table>
2.Nnyaa |
| 13. | A go amusa ka lebele fagare ga batho go thabisa dithong kana go dingalo? | 1.Ee  
2.Nnyaa |
| 14. | Go amusa ka lebele a go na le botlhoko kana wena fela osa gololesega? | 1.Ee  
2.Nnyaa |
| 15. | A go amusa ngwana lebele le go mo siela mashi a thini le go mo fa dijo mo kgweding tsa ntlha tse thataro go siame? | 0.Ga ke itse  
1.Ee  
2.Nnyaa |
2.Kgwedi tse thataro  
3. Mabaka ae eng.......... |
| 17. | A o dirisitse kamuso ka lebele fela mo ngwaneng dikgwedi tsa ntlha tse thataro? | 0.Ga ke itse  
1.Ee  
2.Nnyaa |
| 18. | Fa karabo ya potso 17 ele nnyaa, tlhalosa lebaka le le dirileng gore o seka wa amusa ka lebele? | 1.Mashi a seyo mo lobeleng  
2.Bothoko ja lebele  
3.Loaro  
4. Mabaka ae eng.......... |
| 19. | Fa ele ee, o ne wa mo jesa eng? |   |
| 20. | Ngwana o ne ale dikgwed di kafe fa o mo jesa dijo tse o di buileng ga godimo? | 1.Ee  
2.Nnyaa |
| 21. | A ne go mothofo go bona mashi a thini? | 1.Ee  
2.Nnyaa |
| 22. | A go mothofo go dira mashi a thini? | 1.Ee  
2.Nnyaa |
| 23. | A ne go mothofo go baya mashi fa o sena go a dira? | 1.Ee  
2.Nnyaa |
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</thead>
</table>
| 24 | O amusa ngwana ga kafe ka letsatsi? | 1.Fa a batla  
2.Fa ngwana alela |
| 25 | Ba lelwapa la gago a ba amogela gore o nose ngwana mashi a thini? | 1.Ee  
2.Nnyaa |
| 26 | A go nosa ngwana mashi a thini go amangwa le ba ba nang le mogare fela? | 0.Ga ke itse  
1.Ee  
2.Nnyaa |
| 27 | A go siela ngwana mashi a thini le go mo fa dijo mo kgweding tsa ntlha tse thataro a go babalesigile? | 0.Ga ke itse  
1.Ee  
2.Nnyaa |
| 28 | A o kgonee go nosa ngwana mashi a thini mo dikgweding tsa ntlha tse thataro? | 1.Ee  
2.Nnyaa |
| 29 | Fa ele nnyaa, o ne o mo jesa eng? |   |
| 30 | Ngwana o ne ale dikgwed tse kafe fa o mo jesa dijo tse o di buileng ga godimo? |   |

Ke lebogela go tsaya karolo ga gago
APPENDIX 6
SMUREC CLEARANCE CERTIFICATE

Sefako Makgatho Health Sciences University
Research & Postgraduate Studies Directorate
Sefako Makgatho University Research Ethics Committee
(SMUREC)

Molofogl Street, Ga-Rankuwa 0203
Tel: (012) 521 5817/3868 | fax: (012) 521 3749
Email: lronto.chhr@smu.ac.za
P.O. Box 163 Medunsa 0204

APPROVAL NOTICE - NEW APPLICATION

04 February 2016

Ms RK Mmesa
Department of Public Health
P.O. Box 216
Wits, RSA

MEETING: 16/2/2016

SMUREC Ethics Reference Number: SMURECH/0012/2016

The New Application number 10 October 2016, was reviewed by members of Sefako Makgatho University Research Ethics Committee 01 November 2015 and was approved on 04 February 2016.

Title: Knowledge about infant feeding practices among women in the prevention of mother to child transmission program at clinics in Ficksburg, Eastern Cape.

Researcher: Ms R Kiwana
Supervisor: Dr D Mavudza
Department: Public Health
School: Health Care Sciences
Degree: MPhil

Please note the following information about your approved research protocol:

Protocol Approval Period: 04 February 2016 - 04 February 2017

Please remember to use your protocol number (SMURECH/0012/2016: FG) on any documents or correspondence with the REC concerning your research protocol.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modification, or monitor the conduct of your research and the consent process.

After Ethical Review: Please note that the protocol is available in the Research Office and should be submitted to the Committee before the year is up. The Committee will consider the continuation of the project for another year if necessary. Any applicant may submit an application during the year. Translation of the primary document in the language applicable to the study participants should be submitted.

International Organization (ORD004239), Institutional Review Board (SBIR00083522), Federal Wide Assurance (FWA00000410)

Date of: 15 October 2016 and MiHREC No: REC 2016008-002

Sincerely,

DR C BAKER
DEPUTY CHAIRPERSON SMUREC

Sefako Makgatho Health Sciences University
SMU Research Ethics Committee
Chairperson

Date: 15/10/2016

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APPENDIX 7
PERMISSION LETTER (MINISTRY OF HEALTH)

REFERENCE NO.: UPDME/14/18/1X (392)
08 March 2016

Health Research and Development Division

Notification of HRE Review: New application

Ms. Nita K. King
P.O. Box 213
Gaborone, BB201
Botswana

Protocol Title: KNOWLEDGE ABOUT INFANT FEEDING PRACTICES AMONG WOMEN IN THE PREVENTION OF MOTHER TO CHILD TRANSMISSION PROGRAM AT CLINICS IN FRANCISTOWN, BOTSWANA

HRE Approval Date: 08 March 2016
HRE Expiration Date: 07 March 2017
HRE Review Type: IRB
HRE Review Determination: Approved
Risk Determination: Minimal risk

Dear Ms. Mwanyi,

Thank you for submitting new application for the above referenced protocol. The permission is granted to conduct the study.

This permit does not however give you authority to collect data from the selected sites without prior approval from the management. Consent from the identified individuals should be obtained at all times.

The research should be conducted as outlined in the approval proposal. Any changes to the approved proposal must be submitted to the Health Research and Development Division in the Ministry of Health for consideration and approval.

Furthermore, you are requested to submit at least one hardcopy and an electronic copy of the report to the Health Research, Ministry of Health within 3 months of completion of the study. Approval is for academic fulfillment only. Copies should also be submitted to all other relevant authorities.
REFERENCE NO: P/RMRE. 11/18/1 X (392) 08 March 2016

Health Research and Development Division

Notification of IRB Review: New application

Ms. Ruth Katel Mwanya
P.O Box 215
Ndola, 8024
South Africa

Protocol Title: KNOWLEDGE ABOUT INFANT FEEDING PRACTICES AMONG WOMEN IN THE PREVENTION OF MOTHER TO CHILD TRANSMISSION PROGRAM AT CLINIC IN FRANCISTOWN, BOTSWANA

HRI Approval Date: 08 March 2016
HRI Expiration Date: 07 March 2017
HRI Review Type: HRI Unreviewed
HRI Review Determination: Approved
Risk Determination: Minimal risk

Dear Ms. Mwanya

Thank you for submitting new application for the above referenced protocol. The permission is granted to conduct the study.

This permit does not however give you authority to collect data from the selected sites without prior approval from the Management. Consent from the identified individuals should be obtained at all times.

The research should be conducted as outlined in the approved proposal. Any changes to the approved proposal must be submitted to the Health Research and Development Division in the Ministry of Health for consideration and approval.

Furthermore, you are required to submit at least one hardcopy and an electronic copy of the report to the Health Research, Ministry of Health within 3 months of completion of the study. Approval is for academic fulfillment only. Copies should also be submitted to all other relevant authorities.
APPENDIX 8
PERMISSION LETTER (FRANCISTOWN DHMT)

GREATER FRANCISTOWN DHMT

ALL CORRESPONDENCE TO BE ADDRESSED TO DHMT COORDINATOR

Republic of Botswana

PRIVATE BAG Fy72
FRANCISTOWN BOTSWANA
TELEPHONE: 2496008
FAX: 249678

REF: GFHMT 4/2/1 (68) DATE: 11th May 2016

TO: Ms Ruth K. Mwenya
    P.O.Box 40198
    Francistown

Dear Sir/Madam

PERMISSION TO CONDUCT RESEARCH

Reference is made to your request letter dated 12/04/2016 on the above mentioned subject.

Permission is hereby granted to you to do research at Greater Francistown District Health Management Team health facilities as per your request.

You are therefore requested to contact nurses in charge of the facility you will be visiting, who will take all the necessary steps to enable you to do your research.

Thank you.

Yours Faithfully

Dr Gobetze Worku Solomon
GFDHMT Coordinator

cc: Nurses in charge – All Health Facilities