FACTORS ASSOCIATED WITH THE HIV TRANSMISSION RATE IN 18 TO 24 MONTH-OLD CHILDREN ENROLLED IN THE PREVENTION OF MOTHER-TO-CHILD TRANSMISSION PROGRAMME AT THE CITY OF TSHWANE CLINICS

by

SOPHY MOGATLOGEDI MOLOKO

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SUPERVISOR: DR DGJ DA SERRA

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Student number: 46902546

DECLARATION

I, Sophy Mogatlogedi Moloko, declare that **Factors associated with the HIV transmission rate In 18 to 24 month-old children enrolled in the Prevention of Mother-to-Child Transmission Programme at the City of Tshwane Clinics** is my own work and all the sources used or quoted have been indicated and acknowledged by means of complete references and this work has not been submitted before for any other degree at any other institution.

_____ _____

SIGNATURE **DATE**

(Sophy Moloko)

FACTORS ASSOCIATED WITH THE HIV TRANSMISSION RATE IN 18 TO 24 MONTHS OLD CHILDREN ENROLLED IN THE PREVENTION OF MOTHER-TO-CHILD TRANSMISSION PROGRAMME AT THE CITY OF TSHWANE CLINICS

STUDENT NUMBER: 46902546
STUDENT: SM MOLOKO
DEGREE: MASTER OF PUBLIC HEALTH
DEPARTMENT: HEALTH STUDIES, UNIVERSITY OF SOUTH AFRICA
SUPERVISOR: DR DGJ DA SERRA

ABSTRACT

The purpose of the study was to identify factors associated with the HIV transmission rate in 18 to 24 month-old children enrolled in the PMTCT programme at two selected City of Tshwane clinics. Mother-to-child transmission of HIV during labour and breastfeeding accounts for 40% of all HIV infection in children. The prevention of mother-to-child transmission of HIV programme is one effective strategy to reduce the rate of HIV infection in children. The HIV transmission rate was low at six weeks of age but increases at 18 to 24 months of age due to several factors.

The researcher selected a descriptive retrospective correlational research design. A structured questionnaire was used to collect data from 60 mothers of children aged 18 to 24 months on the PMTCT programme and a data-collection form to collect data from 152 clinic records of children of the same age on the programme.

The study found that the PMTCT guidelines were not properly adhered to by the nurses and the respondents. Prophylactic treatment was not provided as required and mixed feeding was prominent. The uptake of HIV test at 18 to 24 months was low compared to at 6 weeks. The transmission rate was high at 18 to 24 months compared to at 6 weeks. No factors were associated with the transmission rate.

Key concepts

Nevirapine treatment; Cotrimoxazole treatment; prevention of mother-to-child transmission; exclusive breastfeeding; exclusive formula feeding; mouth thrush/sores; breast conditions; PCR test; HIV rapid test; Follow-up visits

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Dedication

This study is dedicated to

Absalom Moloko, my husband, for his love, support and motivation.
Without you I would not have been able to achieve this.

All mothers of children on the PMTCT programme everywhere.

All clinics and staff for dedicated health care services provision, especially the PMTCT programme.

Table of contents Page

Table of contents Page

Table of content Page

Table of contents Page

Table of contents Page

Table of contents Page

Table of contents Page

List of tables

Page

List of tables

Page

List of figures

Page

List of figures

Page

List of figures Page

List of abbreviations

AFASS	Acceptable Feasible Affordable Sustainable and Safety
AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
ARV	Antiretroviral
AZT	Zidovudine
CADRE	Centre for AIDS Development, Research and Evaluation
CAV	Cell-Associated Virus
CDC	Centre for Communicable Diseases
CD4	Cluster of Differentiation 4
CFV	Cell-Free Virus
CTX	Cotrimoxazole
FTC	Imitracitabine
HAART	Highly Active Antiretroviral Therapy
HIV	Human Immunodeficiency Virus
HCT	HIV Counselling and testing
HSRC	Human Science Research Council
ICAP	International Centre for AIDS Care and Treatment Programs
IMCI	Integrated Management of Childhood Illness
MRC	Medical Research Council
MTCT	Mother-to-Child Transmission of HIV
NICD	National Institute for Communicable Diseases
NSP	National Strategic Plan
NVP	Nevirapine
PCR	Polymerase Chain Reaction
PHC	Primary Health Care
PMTCT	Prevention of Mother-to-Child Transmission of HIV
RNA	Ribonucleic Acid
TBAs	Traditional Birth Attendants
TB	Tuberculosis
TDF	Tenofovir
UNAIDS	United Nations Programme on HIV/AIDS
UNGASS	United Nations General Assembly Special Session
UNICEF	United Nations Children's Fund
UNFPA	United Nations Fund for Population Activities
VCT	Voluntary Counselling and Testing
WHO	World Health Organization

List of annexures

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Mother-to-child transmission (MTCT) of the Human Immunodeficiency Virus (HIV) is the commonest source of HIV infection among children under five years old. MTCT can take place during pregnancy, labour and after birth (Department of Health [DOH] 2008:2). In 2010, the estimated number of new HIV infections among children in South Africa was 40 000 and the infant mortality rate was 46.9 per 1000 live births (Statistics South Africa 2010a:3). Children are most likely to be infected with HIV in countries where the HIV infection rate in women is high. In Sub-Saharan countries, 55% of all those with HIV are women and 40% of all HIV cases in children result from mother-to-child transmission during labour or breastfeeding. One-third of children born of HIV-infected mothers will themselves become HIV infected (Aids Action 2011). Without any interventions, the risk of MTCT is 20% to 45%, with the highest infection rates in populations with prolonged breastfeeding (WHO 2007:3).

The prevention of mother-to-child transmission (PMTCT) programme is a public health strategy with the aim of reducing the percentage of HIV-positive infants by 50% by 2010. To achieve this, pregnant women must have access to PMTCT (WHO & UNICEF 2007:8). The PMTCT programme was initiated in South Africa in 2001 and implemented nationally in 2002 (Frizelle, Solomon & Rau 2009:5). At the time, the PMTCT programme consisted of interventions, including routinely offered voluntary counselling and testing (VCT), counselling on child feeding practices, safe non-invasive obstetric procedures, single-dose Nevirapine (NVP), and the provision of infant formula feeding (DOH 2008:3).

The four elements of the PMTCT programme are the primary prevention of HIV among women of childbearing age; prevention of unintended pregnancy among women living with HIV; prevention of HIV transmission from HIV-infected women to their infants, and provision of appropriate treatment, care and support to women living with HIV, their children and families (DOH 2010:1).

In 2005, the PMTCT programme was evaluated in three sites and it was found that the impact of the programme depended on the degree of inequalities in the health system as well as the breastfeeding process. There were inequalities in the distribution of health care, medication and technological resources between urban and rural areas. The provision of NVP only was found to be insufficient to improve the outcome of both mother and baby. The PMTCT guidelines were revised in 2008 to dual therapy, using NVP and Zudovudine (AZT) instead of only NVP (DOH 2008:4). By the end of the year 2008, approximately 3 000 primary health care (PHC) facilities in South Africa offered PMTCT dual therapy (DOH 2008:21).

In 2010, the PMTCT dual therapy brought the mother-to-child transmission rate to 10.8% in South Africa, with Gauteng at 10.9% (HSRC, MRC, CADRE, CDC, NICD & UNICEF 2010:26). This transmission rate was still higher than the target set by the *HIV and AIDs and STI strategic plan for South Africa, 2007-2011* (DOH 2007:71). Despite the efforts to improve the outcome of PMTCT with the dual therapy, certain factors are associated with the current mother-to-child transmission rate. These factors include the child feeding practices, maternal breast conditions, child thrush, adherence to PMTCT prophylactic treatment and follow-up visits, and social stigma (Mekonnen 2009:42; Tolle & Dewey [s.a.]:94).

1.2 BACKGROUND TO THE PROBLEM

The City of Tshwane clinics started with the PMTCT dual therapy in 2008 (City of Tshwane 2010: 39). The dual therapy included the primary HIV-prevention programme for women of childbearing age; voluntary counselling and testing (VCT) for pregnant women; safe infant feeding counselling and support; safe obstetric practices; AZT and single dose of NVP to the mother, NVP and Cotrimoxazole (CTX) for the children, and the provision formula (DOH 2008:21). These PMTCT interventions were limited to the period of pregnancy and breastfeeding (Johnson 2009:1).

At the City of Tshwane clinics all HIV-exposed children were supposed to be given NVP from birth until six weeks after cessation of breastfeeding or only for six weeks in children who were not breast fed. At six weeks all exposed children were supposed to receive CTX therapy until they tested HIV negative and were no longer on breastfeeding (DOH 2010:28). All HIV-exposed children were expected to follow-up at the clinic weekly during

the first month of life, then monthly from 6 weeks until 12 months, followed by 3-monthly check-ups between 12 and 24 months regardless of their feeding method (DOH 2010:27).

In the follow-up sessions, mothers and/or guardians were supposed to receive counselling on the risk and benefits of various feeding options, and be offered specific guidance in selecting the most suitable feeding option for the child's individual situation. Exclusive breastfeeding was recommended for children of HIV-positive mothers for the first six months after birth unless replacement feeding was acceptable, feasible, affordable, sustainable and safe (AFASS) for the infant, while mixed feeding was discouraged (DOH 2008:49).

All children on the PMTCT programme were tested for HIV at 6 weeks after birth, six weeks after breastfeeding was stopped, and 18 months of age (DOH 2010:6). In 2009/2010, the District Health Information System (DHIS) reported a 13.6% PCR-positive rate of children with HIV at six weeks and 20.2% at 18 months (DHIS 2010). The PMTCT programme is considered a highly effective intervention with the potential to improve the health of both child and mother (WHO 2010:8). The reported findings, however, necessitate identifying factors associated with the increased HIV infection rate between 18 and 24 months of age, because HIV exposed children can only exit the programme at 24 months of age. Several factors have been found to be associated with the increased mother-to-child transmission rate, including:

- Child feeding practices, especially mixed feeding, increased the risk of HIV transmission, while the duration of breastfeeding was a determinant of HIV transmission (Becquet, Bland, Leroy, Rollins, Ekouevi, Coutsoudis, Dabis, Coovadia, Salamon & Newell 2009:6).
- Maternal breast condition like mastitis and nipple lesions has been associated with high HIV viral load and facilitate the HIV transfer from the blood to the breast milk which in turn increases the risk of transmission to the child during breast feeding (Lunney 2007:14).
- Child thrush interrupts the oral and gastrointestinal mucosal barrier to transmission which may increase the risk of HIV transmission (Embree, Njenga, Datta, Nagelkerke, Odinya-Achola, Mohammed, Ramdahin, Bwayo & Plummer 2000:2539).

- Social stigma has a relationship with mother's choice of feeding method and the adherence to PMTCT prophylactic treatment. In communities where breastfeeding is a norm, replacement feeding is considered abnormal and announcing that one is HIV positive results in isolation and negative reaction from the community (Thairu, Pelto, Rollins, Bland & Ntshangase 2005:5).

- In sub-Saharan African countries most people live in poverty. In Addis Ababa, Ethiopia, for example, the problem is exacerbated if women have to return to the health facilities for follow-up visits and other services. Inability to pay transport costs from residential areas to health services contributed to non-adherence to follow-up appointments and low utilization of the PMTCT (Mekonnen 2009:47).

In order to influence health policy makers to devise effective strategies to reduce the HIV transmission rate in 18 to 24 months old children on PMTCT. More strong and reliable data on factors associated with HIV transmissions rate in 18 to 24 months children on PMTCT is needed.

1.3 RESEARCH PROBLEM

Since the implementation of the PMTCT dual therapy in 2008, children enrolled in the PMTCT programme at the City of Tshwane clinics were tested for HIV at six weeks of age, at six weeks post-cessation of breastfeeding, and at 18 months of age (DOH 2010:6). Clinic records showed that some of the children who were negative at six weeks tested positive at 18 to 24 months. Consequently, factors associated with the increased positive rate between six weeks and 18 to 24 months needed to be identified and their relationship explored. The factors identified included the following:

- Child feeding practices
- Maternal breast conditions
- Child thrush
- Adherence to PMTCT prophylactic treatment
- Adherence to follow-up visits
- Social stigma

Professional health practitioners need to be aware of the above mentioned factors and develop strategies to address them. Reducing HIV transmission rate will help to reduce child mortality rate associated with HIV and AIDS.

1.4 PURPOSE OF THE STUDY

A research purpose is “a clear, concise statement of the specific goal or aim of the study. The goal of the study might be to clearly and concisely describe, identify, or predict a solution to the problem” (Burns & Grove 2009:38).The purpose of the study was to identify factors associated with the HIV transmission rate in 18 to 24 month-old children enrolled in the PMTCT programme at the City of Tshwane clinics.

In order to achieve the purpose, the objectives were to

- determine the HIV transmission rate among 18 to 24 month-old children enrolled in the PMTCT programme at City of Tshwane clinics
- identify factors associated with the HIV transmission rate in these children
- determine the relationship between the identified factors and the HIV transmission rate among these children

Accordingly, the study wished to answer the following research question:

> What are the factors associated with the HIV transmission rate in 18 to 24 month-old children enrolled in the PMTCT programme at City of Tshwane clinics?

1.5 SIGNIFICANCE OF THE STUDY

The findings of this study will contribute to nursing knowledge, thereby allowing nurses to treat patients holistically considering all factors that might be related to the HIV transmission rate of children on the programme. The information will help managers to track the progress on PMTCT implementation; evaluate the extent of service provision and proficiency, and allow them to plan, prioritise, allocate and manage resources effectively. The findings should assist the Gauteng Department of Health to examine factors that could affect the outcome of one of their priority programmes. This would enable the Department to plan for measures to strengthen health care services.

1.6 RESEARCH DESIGN AND METHODOLOGY

A research design is “an overall plan for obtaining answers to research questions” (Polit & Beck 2008:66). A research design guides researchers in planning and implementing the study in a way most likely to achieve the intended goal (Burns & Grove 2005:211; Stommel & Wills 2004:32). The research methodology describes the techniques and research procedures, including the setting, population, sample and sampling, data collection and analysis, and ethical considerations (see chapter 3 for detailed discussion).

1.6.1 Research design

The researcher selected a quantitative research design for the study. Quantitative studies move in an orderly manner from the definition of a problem following logical steps to reach the research objectives and answer the research question (Polit & Beck 2008:16). A quantitative approach was selected to identify factors associated with HIV transmission rate in 18 to 24 month-old children on PMTCT programme, and measure the association between the identified factors and the HIV transmission rate.

Descriptive correlational studies are undertaken to describe variables and examine the relationships that exist among them (Burns & Grove 2009:246). Retrospective studies link the phenomenon existing in the present with the phenomenon that occurred in the past before the study was conducted (Polit & Beck 2012:224). The researcher selected a retrospective descriptive correlational design to identify factors associated with HIV transmission rate and examine the relationship between factors identified and HIV transmission rate. It was retrospective because the HIV transmission rate in the 18 to 24 month-old children was linked with their past exposure to associated factors.

1.6.2 Setting

Polit and Beck (2012:74) define the setting as “one or more places and conditions in which data collection takes place”. The setting for the study was two PHC Clinics in the City of Tshwane Metropolitan Municipality. Both clinics are situated in City of Tshwane Region 3. One clinic is situated at the city centre of Pretoria and the other in Atteridgeville, one of the biggest townships in Tshwane.

The city centre clinic consists of 19 consultation rooms and 5 small HIV counselling and testing (HCT) rooms. It offers immunisations, family planning, integrated management of childhood illnesses (IMCI), Tuberculosis (TB), HIV counselling and testing (HCT), PMTCT, antenatal and postnatal, curative and chronic care, and emergency care. The clinic in the township consists of 18 consultation rooms, including three HCT rooms. This clinic offers the same services as the one in the city centre.

The two clinics were selected because they had higher catchment populations than other surrounding clinics possibly because one is situated in the city centre and the other is situated in one of the biggest townships in Tshwane. The communities utilising the two clinics also differ in their characteristics. The community in the city centre comprises mothers working in the city and those attending schools in the different higher education institutions around the city, while the community in the township mostly comprises unemployed mothers staying in houses and shacks around the township. Figure 1.1 presents a map of the City of Tshwane municipal boundaries according to wards and regions.

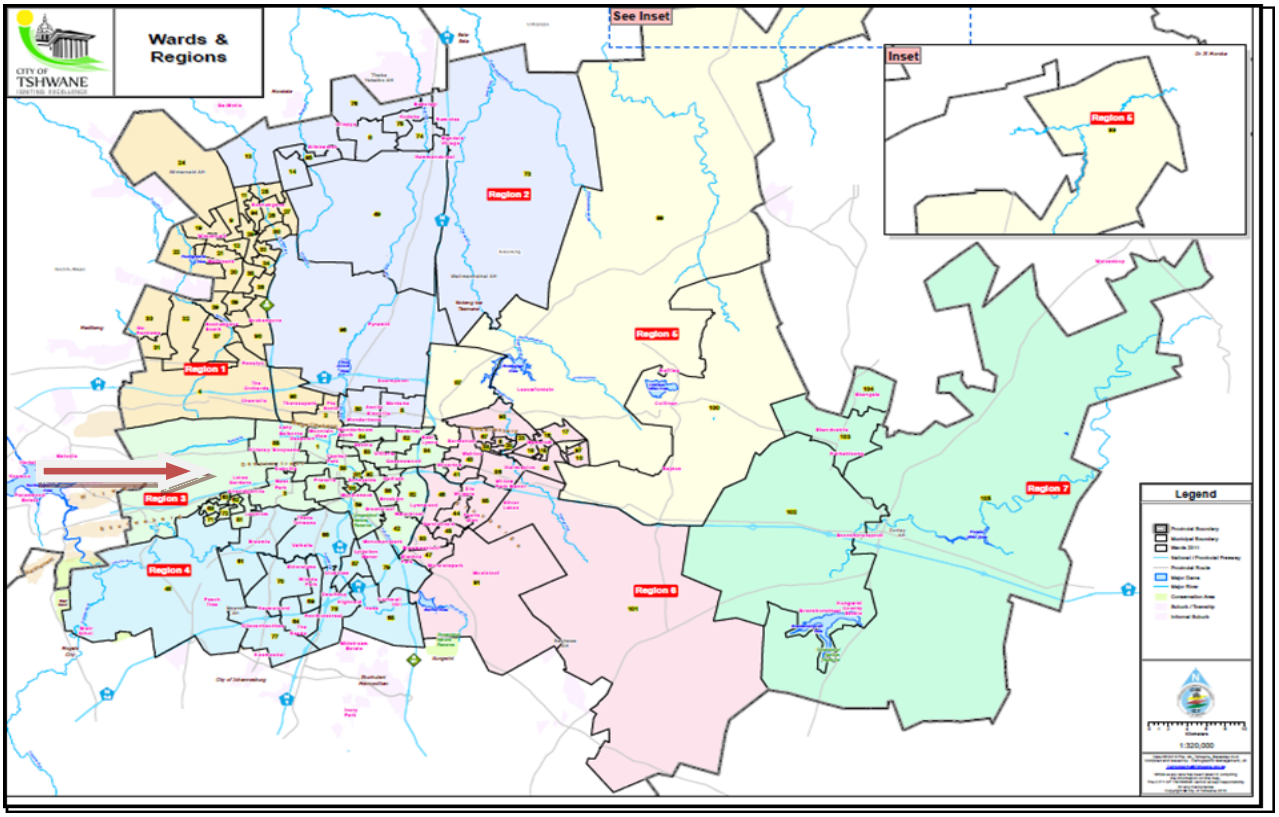

Figure 1.1 City of Tshwane wards and regions map

(Source: City of Tshwane 2013)

1.6.3 Population

A population is all the elements, individuals, objects or substances that meet certain criteria for inclusion in the study (Burns & Grove 2005:40). Polit and Beck (2008:761) define a population as the entire set of individuals or objects having some common characteristics.

A target population is the entire set of individuals who meet the sampling criteria (Burns & Grove 2009:343). Stommel and Wills (2004:297) define a target population as the elements or units the researcher wants to study. In this study, the target population was mothers of children on the PMTCT programme aged 18 to 24 months and the records of children on PMTCT aged 18 to 24 months.

Eligibility criteria include all the characteristics essential for a person to be included in the target population (Burns & Grove 2009:344). In this study only mothers and records of children attending the PMTCT programme aged 18 to 24 months were included. To be included in the study, mothers had to be able to read and write in English. Mothers of children under 18 months and over 24 months of age, their children's records, and those who were not on the PMTCT programme were excluded from the study.

1.6.4 Sample and sampling

A sample is a "subset of population elements" (Polit & Beck 2012:275). In this study the sample included 60 mothers of children on PMTCT and 152 records of children on the PMTCT programme.

Polit and Beck (2012:275) describe sampling as "a process of selecting a portion of the population to represent the entire population so that inferences about the population can be made". A non-probability sampling approach was adopted for the study. With non-probability sampling not every element of the population has a chance of being selected in the sample (Burns & Grove 2009:353).

Convenience sampling was used to select respondents. It involved the selection of readily available subjects for the study at the time of data collection (Polit & Beck 2012:276; Brink

2006:132). The researcher selected mothers bringing their children for PMTCT and immunisation follow-up, and all the records of children aged 18 to 24 months on the PMTCT programme.

1.6.5 Data collection

Data collection refers to the “precise, systematic gathering of information relevant to the research purpose or the specific objectives, questions, or hypothesis of a study” (Burns & Grove 2005:73). This study used a structured data-collection approach. Data was collected from two sources: mothers of the children and children’s records. Data collection took place in two phases. The first phase was the collection of data from the mothers of the children on PMTCT programme aged 18 to 24 month-old using the designed questionnaire (see Annexure 5). The second phase was the reviewing of children’s clinic records using a data-collection form (see Annexure 6).

1.6.6 Data-collection instruments

Data was collected using a structured questionnaire and data-collection form to allow quantitative measurements. The researcher utilised a questionnaire and data-collection form to collect data from the respondents and records, respectively. The data-collection instruments contained fixed questions to be answered in specific sequence and with a predesigned response options (Polit & Beck 2012:191).

The development of the questionnaire was based on the literature review. Items in the questionnaire measured respondents’ practices in relation to PMTCT expectations, their health status and that of their children. The assistance of the supervisor was sought for in the design of the questionnaire.

1.6.6.1 Questionnaire

Burns and Grove (2009:406) describe a questionnaire as a self-report document used to collect information through respondents’ written responses.

In this study, the questionnaire used to collect information from respondents (mothers) consisted of eight sections:

Section 1: Socio-demographic information
Section 2: Respondents' Antiretroviral Therapy (ART) status and parity
Section 3: Social stigma
Section 4: HIV test results of the child
Section 5: Provision and adherence to PMTCT prophylactic treatment
Section 6: Child-feeding practices
Section 7: Mother's breast conditions
Section 8: Child thrush

1.6.6.2 Data-collection form

Data-collection forms can be used to record demographic data, information from patient records and values from physiological measures (Burns & Grove 2009:432). The development of the data collection form was based on the literature review. The assistance of the supervisor was sought for in the design of the form. The data-collection form used to collect data from the children's records consisted of six sections:

Section 1: Child's demographic information
Section 2: Provision of the PMTCT prophylactic treatment
Section 3: Child thrush
Section 4: Duration of breastfeeding
Section 5: Follow-up visits
Section 6: HIV test results

1.6.7 Data analysis

The data collected was analysed using statistical procedures (Polit & Beck 2008:16). Data analysis is conducted to reduce, organise and give meaning to data (Burns & Grove 2009:44). A statistician analysed the data, using the SAS/JMP version 10 statistical software package. The analysis included descriptive and inferential statistics. The results were presented in frequencies, percentages, graph and tables. The presence or absence of relationships among variables and statistical differences were established (see chapter 4 for detailed discussion).

Brink (2006:171) states that descriptive statistics are used to describe, summarise and organise the collected data into a visual representation for elucidation and clarity. It uses measures such as frequency of distribution, measure of central tendency and measures of variability (Burns & Grove 2009:470).

1.7 VALIDITY AND RELIABILITY

Polit and Beck (2012:175) emphasise that validity and reliability are two of the most important criteria to measure the quality of a study. Validity is maintained when methods applied in the study measures the concept they supposed to measure. While reliability refers to "the accuracy and consistency of the information obtained in a study (Polit & Beck 2012:175).

1.7.1 Internal validity

Internal validity is the degree to which the results of the study are a true reflection of reality rather than the results of another variable that was not measured in the study (Polit & Beck 2012:244; Burns & Grove 2009:222).

Homogeneity was applied to limit the respondents to only one level of extraneous variable thereby reducing its impact on the study findings (Burns & Grove 2009:228). It was applied by selecting only mothers. The study environment was kept constant and a large sample of records was reviewed to allow representativeness of the accessible population.

1.7.2 External validity

External validity refers to the extent to which the research findings can be generalised to the entire population and other settings (Polit & Beck 2012:250; Brink 2006:101). Since the non-probability sampling approach was utilised in this study the results cannot be generalised to other populations or settings. In this study reactive effect was identified as a threat because respondent's participation in the study could not be hidden (Brink, Van der Walt & Van Rensburg 2012:111).

1.7.3 Validity of the data-collection instrument

The validity of an instrument refers to the degree to which an instrument measures what it is supposed to measure (Polit & Beck 2012:336). The face and content validity of the data collection instruments used in this study were accepted by the supervisor and nurses working at PMTCT sites as being relevant to identify factors associated with HIV transmission rate in 18 to 24 months old children on PMTCT. (see chapter 3 for full discussion).

1.7.4 Reliability of the data-collection instrument

The reliability of the instrument is the consistency with which the instrument measures the target attribute. It involves the degree to which the instrument can be depended on to generate the same results if used repeatedly over time on the same person, or if used by different researchers (Polit & Beck 2008:452). The researcher ensured that all items in the data-collection tools measured the factors associated with HIV infection rate in children on the PMTCT programme through the assistance of the supervisor. The pre-test to identify potential comprehension problems and to assess the adequacy of the data collection instrument was conducted on 5 respondents. (see chapter 3 for full discussion).

1.8 SCOPE AND LIMITATION OF THE STUDY

The scope of the research was to study the HIV transmission rate in 18 to 24 month-old children enrolled in the PMTCT programme and also identify factors associated with the HIV transmission rate. The study was conducted in two clinics in City of Tshwane Metropolitan Municipality and only mothers and the children's records were utilised as data sources. The questionnaires provided to the mothers were only in English; therefore mothers who were unable to read and write English were not included in the study. Since convenience sampling was used, the results might not be generalisable to all children on the PMTCT programme in other clinics and areas. Data was not collected from the health care workers nor were fathers and guardians included.

1.9 ETHICAL CONSIDERATIONS

Ethics is concerned with matters of right and wrong. *Collins English Dictionary* (1991:533) defines ethics as “a social, religious, or civil code of behaviour considered correct, esp. that of a particular group, profession, or individual”. Ethics deals with issues of morality and decisions about what is right and wrong for individuals and groups of individuals in particular circumstances (Mulaudzi, Mokoena & Troskie 2011:26; Stommel & Wills 2004:373). In this study, the researcher upheld the ethical principles of permission to conduct the study; informed consent; privacy, confidentiality and anonymity in order to protect the institutions and the respondents.

The researcher obtained written permission to conduct the study from the Department of Health Studies Research and Ethics Committee, University of South Africa (UNISA) and Tshwane Health and Social Development Research Committee (see Annexure 1 and 2).

The respondents were informed of the purpose and significance of the study, that participation was voluntary, and that they had the right to withdraw from the study at any time if they so wished. They were assured of anonymity, privacy and confidentiality (see chapter 3 for full discussion).

1.10 DEFINITION OF KEY TERMS

For the purposes of the study, the following terms are used as defined below.

- **Acceptability, Feasible, Affordability, Sustainable and Safety (AFASS) Criteria**

AFASS refers to criteria used to determine whether the mother will be able to practise safe replacement feeding. For an HIV-positive woman who does not meet all the AFASS criteria, the importance of exclusive breastfeeding with regard to child survival is emphasised (DOH 2008:49).

- **Acceptability**

Acceptability is a noun derived from accept; which is “agree to something” (*Compact Oxford English Dictionary* 2006:5).

In this study acceptability as a component of AFASS criteria refers to the absence of cultural or social reasons that could create a problem if the mother were to choose replacement feeding (DOH 2008:49).

- **Adherence to treatment**

Adherence to treatment refers to following the treatment regimen by taking the correct dose of each anti-HIV medication at the correct time and exactly as prescribed by the health care provider (AIDS Info 2012).

In this study adherence to treatment refers to drug collection from the clinic by the parent or guardian of the child rather than actual ingestion by the child (Kirsten, Sewangi, Kunz, Dugange, Ziske, Jordan-Harder, Harms & Theuring 2011:3).

- **Affordability**

Affordability is a noun derived from afford, which means “has enough money, time or other resources for something” (*Compact Oxford English Dictionary* 2006:15).

In this study affordability as a component of AFASS criteria refers to the mother and the family’s ability to pay for the cost of buying, preparing, storing the replacement food without compromising the health and the nutritional needs of the child (DOH 2008:49).

- **Complementary foods**

Complementary foods refer to any food, whether solid or semi-solid, given to the child after the age of six months as part of the transitional process in which the child learns to eat food appropriate for his or her developmental stage, while continuing to breast or formula feed (DOH 2010:iv).

In this study, complementary food refers to any liquid including non-human milk or solid food that the child receives after six months of age in addition to breast milk or formula milk (Dettwyler & Fishman 1992:173; Noel-Weiss, Boersma & Kujawa-Myles 2012:2)

- **Exclusive breastfeeding**

Exclusive breastfeeding is a feeding practice in which the infant receives only breast milk and no other liquids or solids, including water, but may receive drops or syrups consisting of vitamins, mineral supplements, or medicines that are deemed necessary and essential for the child (DOH 2010:iv).

In this study, exclusive breastfeeding refers to the feeding practice in which the child receives only breast milk (including milk expressed) and no other liquids or solids, including water in the first six months of life. The child may be given vitamin syrups, mineral supplements, or medicines prescribed by the nurse or doctor for prevention of illnesses, treating diseases or for supplementation of essential nutrients (Dettwyler & Fishman 1992:173; Noel-Weiss et al 2012:2).

- **Exclusive formula feeding**

Exclusive formula feeding refers to the feeding practice in which infants do not receive any breast milk, but receives formula milk that provides sufficient nutrients that resembles breast milk until the age at which they can be fed family foods (DOH 2010:iv).

In this study, exclusive formula feeding refers to the feeding practice in which the child does not receive any breast milk but receives only formula milk for the first 6 months of life. The child may also be given vitamin syrups, mineral supplements, or medicines prescribed by the nurse or doctor for prevention of illnesses, treating diseases or for supplementation of essential nutrients (Dettwyler & Fishman 1992:173; Zunza, Theron & Harvey 2011:275)

- **Feasibility**

Feasibility is a noun derived from feasible, which means “able to be done easily” (*Compact Oxford English Dictionary* 2006:364).

In this study feasibility as a component of AFASS criteria refers to the mother having enough time, knowledge, skills and other resources to prepare and feed the child, and the support to cope with family, community and social pressures (DOH 2008:48).

- **HIV-exposed children**

HIV-exposed children refer to children born of HIV-positive women (DOH 2010:iv).

In this study, HIV-exposed children refer to children born of HIV-positive women who are currently on the PMTCT programme.

- **Mixed feeding**

In this study mixed feeding refers to the feeding of the child with breast milk as well as formula milk or other milks including cow milk and also giving other foods or liquids including water (DOH 2010:v; Zunza et al 2011:276).

- **Mother-to-child transmission**

Mother-to-child transmission refers to the transmission of HIV from a mother who is HIV-positive to a child either during pregnancy, on delivery or by breastfeeding. (DOH 2010:v).

In this study mother-to-child transmission refers to transmission of HIV either during pregnancy, on delivery or after delivery through breastfeeding by an HIV positive mother to the child who is on the PMTCT programme.

- **Outcome of PMTCT**

Outcome of PMTCT in this study refers to the HIV status of children on PMTCT at 18 to 24 months of age.

- **Polymerase Chain Reaction (PCR)**

A PCR test refers to the test method used to detect the DNA of the HIV in the blood of a child below 18 months of age (Wilson, Cotton, Bekker, Meyers, Venter & Maartens 2008:45).

In this study PCR test refers to the HIV test done on children younger than 18 months.

- **Predominant breastfeeding**

Predominant breastfeeding means giving the child breast milk and non-nutritive liquids (Goga, Doherty, Jackson, Sanders, Colvin, Chopra & Kuhn 2012:2).

In this study, predominant breastfeeding refers to giving a child breast milk and other non-nutritious fluid like tea, juice and sugar water. No solids and formula milk given

- **Replacement feeding**

Replacement feeding refers to the feeding of infants who are receiving no breast milk with a diet that provides adequate nutrients until the age at which they can be exclusively fed on full family food. During the first six months of life, formula feeding should be with a suitable commercial formula. After six months complementary food should be introduced (DOH 2010:v).

Replacement feeding in this study refers to the feeding method where the child does not receive any breast milk but formula milk or other liquids found to be suitable for the child in the first six months of life.

- **Safety**

Safety is a noun derived from safe, which means “protected from danger or risk” (*Compact Oxford English Dictionary* 2006:908).

In the study safety as a component of AFASS criteria refers to the ability of the mother to correctly and hygienically prepare feeds by clean hands, using clean water, clean cups and other utensils, but not bottles or teats (DOH 2008:48).

- **Sustainability**

Sustainability is a noun derived from sustainable, which means “able to be continued” (*Compact Oxford English Dictionary* 2006:1044).

In this study sustainability as a component of AFASS criteria refers to the ability of the mother to have continuous, uninterrupted supply of replacement food (DOH 2008:49).

1.11 LAYOUT OF THE STUDY

The dissertation consists of five chapters.

Chapter 1 describes the background to, purpose and significance, research design and methodology, scope and limitations, and ethical considerations of the study and defines key terms used.

Chapter 2 discusses the literature review undertaken for the study.

Chapter 3 describes the research design and methodology

Chapter 4 discusses the data analysis and interpretation, and the results.

Chapter 5 briefly summarises the findings and makes recommendations for practice and future research.

1.12 CONCLUSION

This chapter introduced the background to the study on the factors associated with HIV transmission rate in 18 to 24 month-old children on the PMTCT programme. It also covered the problem, purpose, significance, research design and methodology and ethical considerations of the study, and defined key terms.

Chapter 2 discusses the literature review conducted for the study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses the literature review conducted on factors associated with the HIV transmission rate among 18 to 24 month-old children enrolled in the PMTCT programme. Polit and Beck (2012:732) describe a literature review as “a critical summary of research on a topic of interest, often prepared to put a research problem in context”.

2.2 PURPOSE OF A LITERATURE STUDY

The purpose of a literature review is to familiarise the researcher with the existing knowledge base on the topic (Burns & Grove 2009:9; Mouton 2001:87). It also gives meaning and direction to the development and implementation of a study, especially with regard to the problem statement, research design and data analysis (Burns & Grove 2009:91).

A literature review helps researchers to consolidate what they have collected from literature over time; clarify their perspective on the research done on the specific area, and helps them identify gaps in the literature (Aldous, Rheeder & Esterhuizen 2011:18)

2.3 SCOPE OF THE LITERATURE REVIEW

The literature review focused on factors associated with the HIV transmission rate in 18 to 24 month-old children on the PMTCT programme.

2.3.1 Overview of mother-to-child HIV transmission

Human Immunodeficiency Virus (HIV) is one of the most encompassing and highly recognized infectious diseases in the world. HIV contributes to high mortality rates, and to immense economic hardship in developing countries (UNAIDS & World Bank

2009:5). HIV-positive pregnant women are at risk of transmitting HIV to their infant during pregnancy and labour or by breastfeeding. Mother-to-child transmission is responsible for 90% of new HIV infections in infants and children. In the absence of any intervention, about 20% to 45% of infants may be infected with HIV through vertical transmission which may result in more children dying of HIV (WHO & UNICEF 2007:7).

In 2007, the under-five mortality rate in South Africa was estimated at 59 deaths per 1,000 live births and most of the deaths were caused by preventable and treatable diseases such as AIDS, diarrhoea and pneumonia while 35% of these deaths were due to AIDS-related illnesses (HSRC et al 2010:3).

In 2008, HIV prevalence among pregnant women in South Africa was estimated at 29.3%, with Gauteng at 29.9%. In 2009, the national vertical transmission rate was 10.8%, with Gauteng at 10.9% (UNAIDS 2010:21, 26). The 2008 under-five mortality rate in South Africa rose to 67 deaths per 1,000 live births, most of which were attributed to the deteriorating quality of health and increasing HIV pandemic (Sanders, Bradshow & Ngongo 2010:30). According to Sanders et al (2010:31), 60% of the under-five children who died were underweight, and most of the children who died of malnutrition were also HIV infected.

The risk of death in HIV-exposed children was higher than in non-exposed children. In a study in Rwanda, 4.2% (61 out of 1,455) children born to HIV-positive mothers died between the ages of 9 and 24 months compared to 1.5% (24 out of 1,565) children born to HIV-negative mothers (Mugwaneza, Ruton, Rukundo, Lyambabaje, Bizimana, Tsague, Wagner, Nyankesha, Muita, Mutubazi, Nyemazi, Nsanzimana, Karema & Binagwaho 2011).

2.3.2 PMTCT programme

Due to the high under-five mortality rates in sub-Saharan countries, the PMTCT programme was piloted in South Africa in 2001 and implemented in 2002 (Frizelle et al 2009:5). The purpose of the PMTCT programme was to prevent HIV transmission from mother to child during pregnancy, labour and breastfeeding (DOH 2007:13). At that time the programme consisted of interventions which included routinely offered voluntary counselling and testing (VCT), counselling on child feeding practices, safe non-invasive

obstetric procedures, single-dose NVP and the provision of infant formula feeding (DOH 2008:3).

In 2005, the programme was evaluated and it was found that the provision of NVP only was not sufficient to improve the outcome of both mothers and babies. The programme was consequently revised to involve dual therapy using NVP and AZT instead of NVP only (DOH 2008:4). In 2008, about three thousand Primary Health Care (PHC) facilities in South Africa offered PMTCT dual therapy (DOH 2008:21; Frizelle et al 2009:5).

The current aim of the programme is to reduce the mother-to-child transmission rate to less than 2% at around 6 weeks of age and to less than 5% at around 18 months of age by the year 2016 (DOH 2012b:14). This also includes interventions for HIV-positive pregnant women and for HIV-exposed children from birth until 24 months (DOH 2012b:27).

The current programme consists of four elements, namely the primary prevention of HIV among women of childbearing age; prevention of unplanned pregnancy among HIV-infected women; prevention of HIV transmission from HIV-infected women to their infants, and provision of treatment, care and support to women, their children and families living with HIV (DOH 2010:1).

The PMTCT interventions begin during pregnancy, continue through labour and only end when the child is 24 months old. The HIV-positive mothers are informed about the recommended feeding practices and alternative feeding options (WHO, UNAIDS, UNFPA & UNICEF 2010:24). Infant feeding counselling and advice is provided to HIV-positive mothers on every PMTCT visit as part of the programme (DOH 2010:24).

The feeding counselling takes into consideration each woman’s specific circumstances. Mothers are given a choice to either exclusively breastfeed for six months or exclusively formula feed. Mixed feeding in the first six months of life is discouraged since it is associated with a high rate of transmission. Women who cannot afford to practise replacement feeding, who do not meet the AFASS criteria, are advised to exclusively breastfeed their children in the first six months of life, then introduce complementary foods thereafter, and continue breastfeeding for the first 12 months of life (DOH 2008:50).

Children born to HIV-positive women who are not on lifelong antiretroviral therapy (ART) and are breastfed, are given NVP from birth until one week post-cessation of breastfeeding, and CTX from six weeks of life until when breastfeeding is stopped and they have tested HIV negative (DOH 2010:6) (see figure 2.1). Children who are breastfed and whose mothers are on lifelong ART are only given NVP for the first six weeks of life and CTX from six weeks until breastfeeding is stopped and the child has tested HIV negative (DOH 2010:5) (see figure 2.2). Children who are formula fed, on the other hand, only receive NVP for the first six weeks of life and CTX from six weeks. The CTX is stopped immediately when the six weeks HIV results are negative (DOH 2010:5) (see figure 2.3). All children who test HIV positive are referred for confirmation of status and ART.

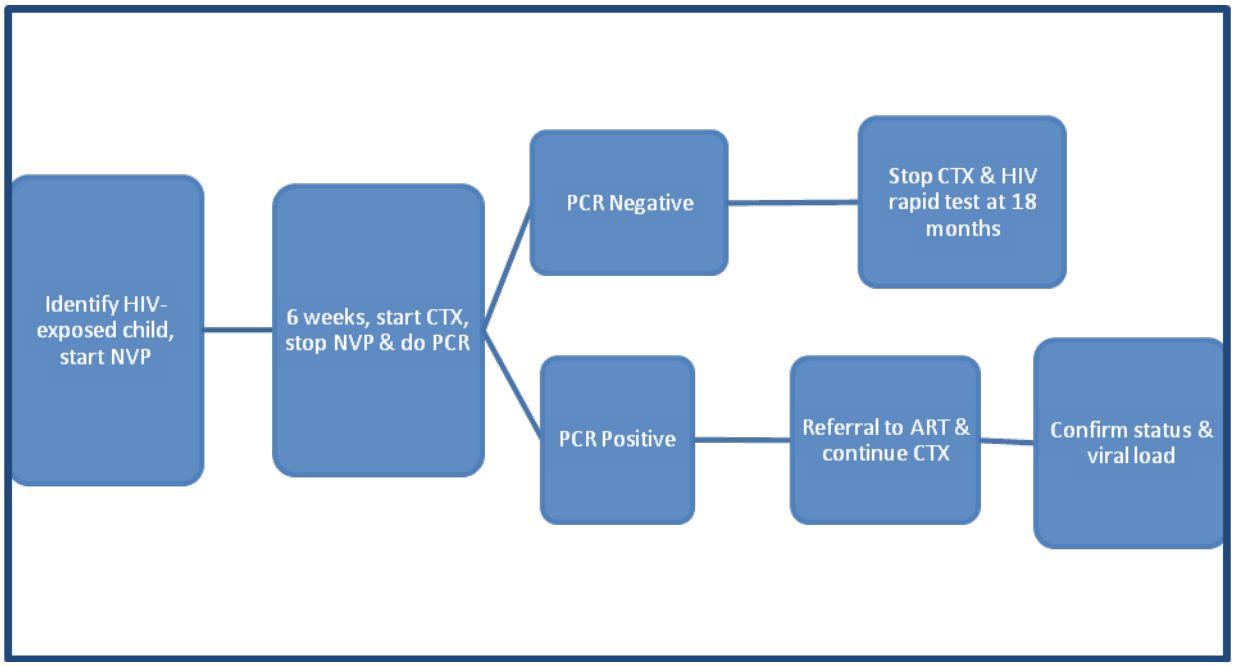

Figure 2.1 Children who are breastfed and mothers are not on lifelong ART

(Source: Department of Health 2010:5)

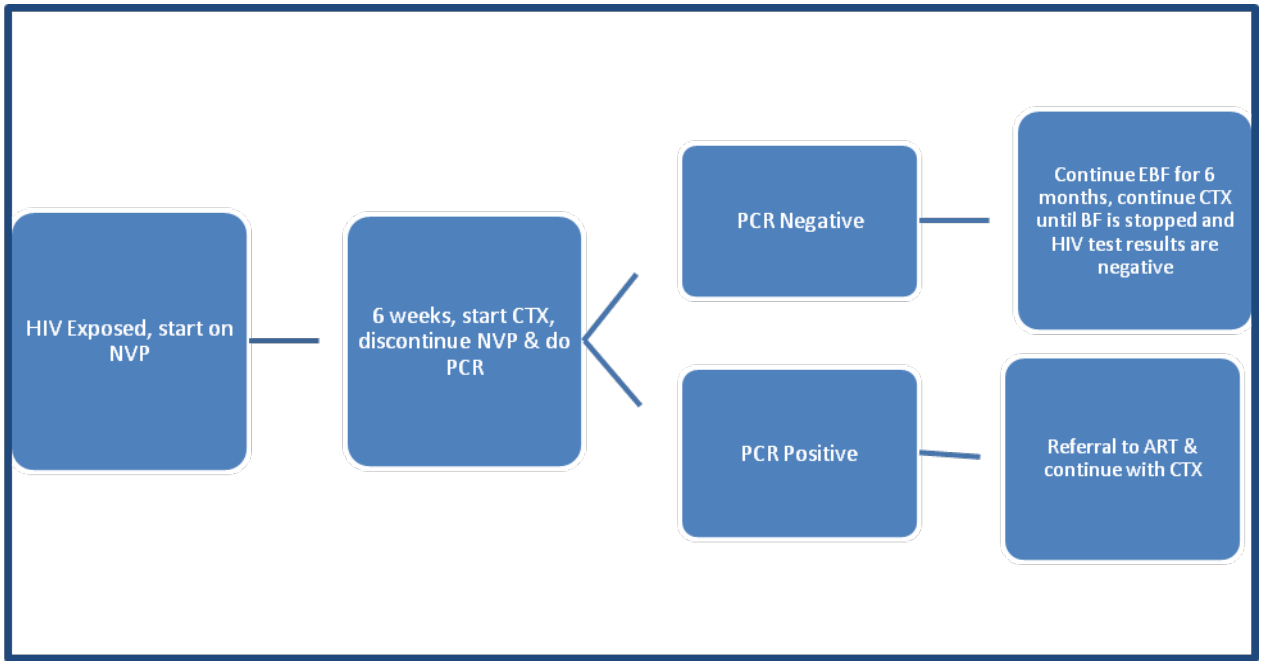

Figure 2.2 Children who are breastfed and mothers on lifelong ART

(Source: Department of Health 2010:6)

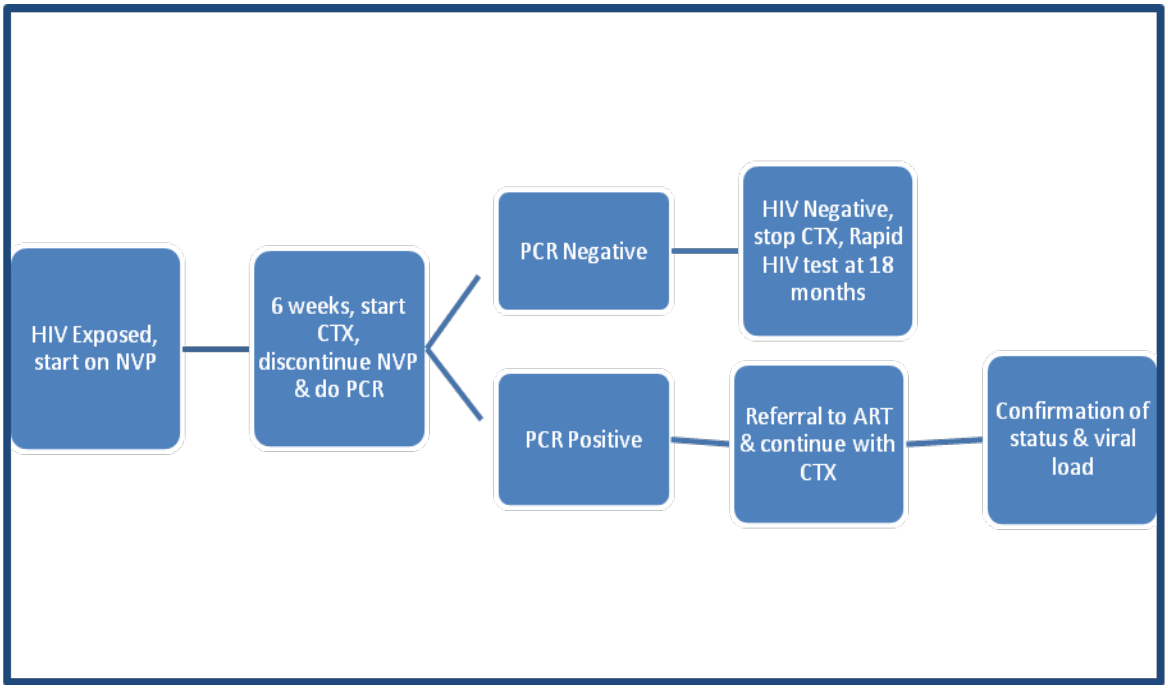

Figure 2.3 Children who are formula fed

(Source: Department of Health 2010:5)

Infants on the PMTCT programme should visit the clinic weekly in the first month of life, followed by monthly visits in the first 12 months, then three-monthly between 12 and 24 months (DOH 2010:27). All infants born to HIV-positive mothers should be routinely tested for HIV at 6 weeks after birth and at 6 weeks following cessation of

breastfeeding, using PCR testing, and an antibody test should be done at 18 months of age. Children only exit the programme at 24 months of age. All HIV-positive babies under one year should be started on ART (DOH 2010:25).

At six weeks post-delivery mothers are expected to come for a check-up visit. At this visit mothers on lifelong ART receive support and adherence is monitored throughout their lives at PHC level. For mothers who are not on lifelong ART, CD4 count tests are done with clinical staging and TB screening is performed. If their CD4 count is below 350 cells/mm^3, they will be referred for ART and if it is above 350cells/mm^3 they will be referred to wellness services. At the wellness service, support and health promotion measures are offered to the mothers in order to keep them healthy. All these measures are done with the aim of keeping the viral load at low level in order to prevent transmission to the child during the breastfeeding (DOH 2010:6).

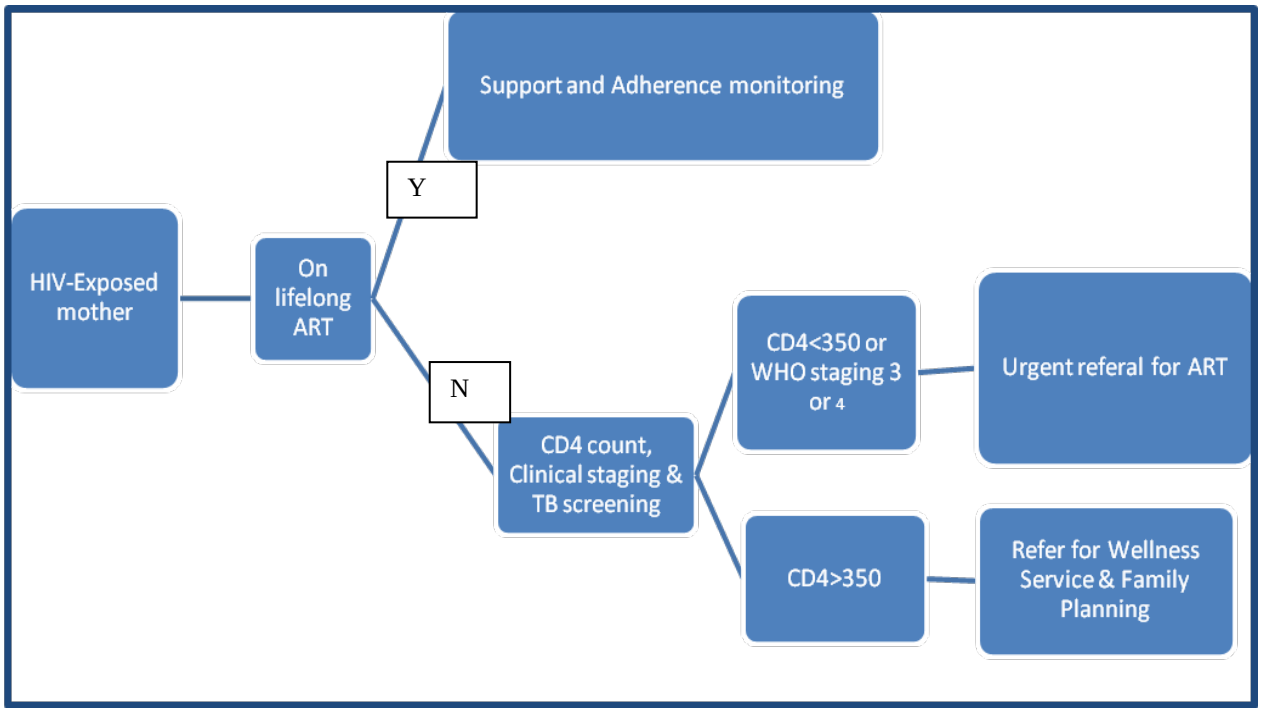

Figure 2.4 Mother's six weeks postpartum follow-up

(Source: Department of Health 2010:6)

2.3.3 Factors associated with HIV transmission rate in children on the PMTCT programme

In 2011, the Department of Health and Social Development (2011:45) reported that the PMTCT programme had lowered the mother-to-child transmission rate at 6 weeks of

age in Gauteng from 8.0% to 6%. Despite this decreased rate by means of the PMTCT prevention strategies, there was still a noticeable increase in the HIV transmission rate at 18 months. In 2010, the transmission rate in Tshwane district was 13.6% at around 6 weeks rising to 20.2% at around 18 months of age (DHIS 2010).

In a study in KwaZulu-Natal, Becquet et al (2009:2) found that 7.2% of breastfed children who tested HIV negative at 6 weeks tested HIV positive at 18 months. In their study on HIV-free survival and morbidity among formula-fed infants in a PMTCT programme in rural Haiti, Ivers, Appleton, Wang, Jerome, Cullen, Smith and Fawzi (2011:4) found that 9.4% of children on the programme were HIV infected at 18 months and the HIV-free survival at 18 months was 90.6%.

2.3.3.1 Effects of PMTCT prophylactic treatment

Taha, Hoover, Kumwenda, Fiscus, Kafulafula, Nkhoma, Chen, Piwowar, Broadhead, Jackson and Miotti (2007:12) investigated the risk of late postnatal HIV transmission and associated factors by measuring the NVP and HIV viral load in the breast milk. The breast milk of mothers who received a single dose of NVP during delivery was tested for the NVP level and HIV viral load. A high concentration of NVP was detected in the breast milk at birth while at 6 to 8 weeks only 1 in 75 mothers had a detectable NVP. The proportion of mothers with detectable HIV RNA in the breast milk at 1½ to 3 months was lower in mothers who received NVP than in mothers who did not receive NVP. Therefore, the probability of detecting HIV RNA in the breast milk of mothers who took NVP during labour was lower during 1½ to 9 months compared to 12 to 24 months because of the NVP level in the first months after birth (Taha et al 2007:12).

A randomised clinical trial in Botswana tested 547 infants who were breastfed and HIV free at birth. The study found that 4.4% of those infants, who were uninfected at 1 month of age, became infected later. The MTCT occurred in the children whose mothers received AZT and a single dose of NVP as PMTCT prophylactic therapy. No infections occurred in those whose mothers were on Highly Active Antiretroviral Therapy (HAART) before delivery (Shapiro, Smeaton, Lockman, Thior, Rossenkhan, Wester, Stevens, Moffat, Arimi, Adase, Asmelash, Leidner, Novitsky, Makhema & Essex 2009:415).

In Rwanda, 4.0% of children on the PMTCT tested HIV positive at 9 to 24 months. Children whose mothers received HAART for PMTCT were 40.0% less likely to be infected that those whose mothers were not on HAART (Ruton, Mugwaneza, Shema, Lyambabaje, Bizimana, Tsague, Nyankesha, Wagner, Mutubazi, Nyemazi, Nsanzimana, Karema & Binagwaho 2012:5).

The mother-to-child transmission rate in the South-South region of Nigeria, where both mother and child received some form of PMTCT chemoprophylaxis, was 4.8% at birth to six weeks and 6.6% from six weeks to six months of age despite the feeding method. However, when neither mother nor child received PMTCT chemoprophylaxis, the transmission rate was 19.5% at birth to six weeks and 39.8% from six weeks to six months (Anoje, Aiyenigba, Suzuki, Badru, Akpoigbe, Odo, Odafe, Adedokun, Torpey & Chabikuli 2012:4).

In Rwanda, Peltier, Ndayisaba, Lepage, Van Griensven, Leroy, Omes, Ndimubanzi and Courteille (2009:2418) found the HIV transmission rate in children aged 3 to 7 months on breastfeeding with mother on HAART or formula feeding to prevent HIV postnatal mother-to-child transmission was 0.4%. The cumulative risk of HIV transmission in breastfed children was 1.3% at six weeks and 1.8% at nine months, while the cumulative risk of HIV infection in the formula fed group was 1.0% at both six weeks and nine months.

HIV infections in the first month of life were rare in areas where mothers and infants received antiretroviral prophylaxis or mothers were on HAART. The main risk factor for MTCT during breastfeeding was associated with higher breast milk and plasma level of HIV-1 RNA, and the low CD4 cell count (Shapiro et al 2009:417). ARV interventions have positive effects in preventing postnatal transmission of HIV, and also making breastfeeding more advantageous to child development and survival (WHO et al 2010:23).

2.3.3.2 Adherence to PMTCT prophylactic treatment

Adherence to PMTCT prophylactic treatment is affected by several factors, such as level of education and knowledge; the place of delivery and resources, and availability of health care providers and services.

2.3.3.2.1 Level of education and knowledge

In Addis Ababa, Ethiopia, Mekonnen (2009:26) found that low level of education and lack of adequate information about PMTCT for women at the reproductive age contributed to a lack of understanding of the importance of the therapy, which led to non-adherence to treatment instructions. In Mpumulanga, South Africa, Peltzer, Phaswane-Mafuya, Ladzani, Davids, Mlambo, Phaweni, Dana and Ndabula (2009:84) found maternal NVP consumption and administration of NVP to the baby were associated with mothers' knowledge about HIV and PMTCT. Of the mothers, 74.2% knew that HIV can be transmitted to the child during delivery, while 77.9% knew that it can also be transmitted through breastfeeding. Moreover, 7.7% of the mothers reported that they did not know that Azidothymidine (AZT) and NVP reduced the chances of the child contracting HIV and did not even know how to take the medication (Peltzer et al 2009:99).

In a study in Addis Ababa, Ethiopia, on prophylactic treatment uptake and compliance with recommended follow-up among HIV-exposed infants, Shargie, Eek and Abaychew (2011:3) found 42.2% adherence among children whose mothers had primary education; 41.0% among children whose mothers had secondary education, and 6.0% among children whose mothers were unable to read and write.

2.3.3.2.2 Place of delivery and resources

The place of delivery was associated with adherence to PMTCT prophylactic treatment. More than 50.0% of non-adherence to children's PMTCT prophylactic treatment was with home deliveries. In Addis Ababa, institutional delivery was a significant determinant of mother-infant pairs taking of medication at birth (Mirkuzie, Hinderaker, Sisay, Moland & Mørkve 2011:7).

In rural Lilongwe, Malawi, where hospitals were 5 to 15 kilometres away from their homes, women found it difficult to deliver at the hospital, especially if labour started at night. The women were delivered by traditional birth attendants (TBAs) and were unable to take their children for NVP the next morning because they felt ill after delivery (O'Gorman, Nyirenda & Theobald 2010:3). The mothers preferred to be delivered by TBAs despite the need for NVP by them and their babies. They described nurses as harsh and disrespectful to them (O'Gorman et al 2010:3).

Home deliveries in South Africa account for only 5.0% of all deliveries reported (HSRC et al 2010:xix). Of all deliveries carried out by TBAs, only 18.0% of mothers were asked about HIV and the need for NVP (Peltzer et al 2009:159).

2.3.3.2.3 *Influence of health care providers and services on adherence to prophylactic treatment*

Nurses and health care services have an influence not only on mothers' feeding choice but also on their adherence to prophylactic treatment. In South Africa, unavailability of NVP and poor ownership of the PMTCT service by nurses were found to cause non-adherence to PMTCT prophylactic treatment. Poor ownership of the service by the nurses was associated with lack of training (Doherty, Chopra, Nsibande & Mngoma 2009:5).

In Addis Ababa, the place where the mothers were enrolled for ART care and the antiretroviral prophylaxis taken by the infant at birth were associated with adherence to CTX prophylaxis. Adherence was also observed when both the mother and father of the child tested HIV positive (Shargie et al 2011:3).

2.3.3.3 Child feeding practices

Breastfeeding has been found to significantly improve child survival by protecting against diarrheal diseases, pneumonia and other potentially fatal diseases. Exclusive breastfeeding for the first six months is considered the best feeding option for children born to HIV-positive mothers because it reduces the risk of postnatal HIV transmission. Exclusive breastfeeding facilitates the normal physiological regulation of milk production, which helps to prevent milk stasis and the development of mastitis and other

breast problems (Kuhn, Sinkala, Kankasa, Semrau, Kasonde, Scott, Myiya, Vwalika, Walter, Tsai, Aldrovandi & Thea 2007:1).

The effect of ARV in reducing the viral load in breast milk has made breastfeeding safer. Nevertheless, unavailability of ARV should not be an obstacle to breastfeeding, especially in areas where replacement feeding is not safe or cannot be sustained. Breastfeeding is still regarded as safe for children regardless of availability of ARV (WHO et al 2010:22).

Replacement feeding in the form of formula milk can be given to the HIV-exposed child only if there is safe water and sanitation; the mother can prepare and provide sufficient formula, and can easily access a child health care service. In the first six months the mother should practise exclusive formula feeding (WHO et al 2010:37). The *South African National HIV Prevalence, Incidence, Behaviour and Communication Survey, 2008* revealed that 51.3% of children below the age of six months were mixed fed, 22.5% were exclusively formula fed, and only 25.7% were exclusively breastfed (HSRC et al 2010:xix). In a high HIV-prevalence rural district of KwaZulu-Natal, Ghuman, Saloojee and Morris (2009:76) found that 81.0% of children on PMTCT were still breastfed at 14 weeks of age but only 18.0% were exclusively breastfed; 47.0% were also receiving formula but only 1.0% were exclusively formula fed, and 73.0% of these children were already receiving solids and water.

In a study on infant feeding practices amongst HIV-exposed and -unexposed infants in KwaZulu-Natal, Goga et al (2012:5) found that by week 12 only 18.0% of HIV-positive women practised exclusive breastfeeding. Of the 82.0% that were not exclusively breastfeeding, 73.0% practised predominantly breastfeeding while 27.0% practised mixed feeding. The hazard of HIV transmission in Rietvlei and Umlazi was high among the mixed feeding group. In Rietvlei, the hazard ratio for the mixed feeding group was 5.6 (95% CI 1.8, 17) compared with 2.8 (95% CI 0.6, 13.1) of the exclusively breastfed, while in Umlazi the hazard ratio for mixed feeding was 4.1 (95% CI 1.2, 13.7) compared with 1.9 (95% CI 0.7, 5.2) for exclusive breastfeeding and stopping at 12 weeks. Exclusive breastfeeding with stopping at 12 weeks was safer than mixed feeding or avoiding breastfeeding (Goga et al 2012:5).

Regarding infant feeding practices and associated factors of HIV-positive mothers attending PMTCT and antiretroviral therapy clinics in Gondar Town health institutions, Northwest Ethiopia, only 10.5% were mixed fed, 5.7% were formula fed, and 87.7% were exclusively breastfed for the first six months (Muluye, Woldeyohannes, Gizachew & Tiruneh 2012:4).

According to Becquet et al (2009:4), the risk of HIV transmission in children exclusively or predominantly breastfed was equal for the first six months. Mixed feeding by giving breast milk with solids increased the risk of HIV transmission, while concurrent use of breast milk and non-human milk was associated with a lesser risk of postnatal HIV transmission. Children exposed to solids at least once in the first two months of life were 2.9 times more likely to be infected postnatally than children of the same age who had never been exposed to solids. The risk of HIV transmission through breast milk was strongly associated with advanced immune deficiency of the women.

In Nigeria, the HIV transmission rate at six months in children exclusively breastfed, continuously formula fed, and those who were breastfed and formula fed was 8.1%, 9.5% and 29.2%, respectively. Mixed feeding and maternal CD4 counts below 200 were associated with an increase in HIV transmission rate (Charurat, Datong, Matawal, Ajene, Blattner & Abimiku 2009:11). According to Anoje et al (2012:4), the HIV transmission rate in children on exclusive breastfeeding was 2.7% at six weeks and 11.8% from six weeks to six months regardless of the mother or child taking the chemoprophylaxis whereas the transmission rate in mixed fed children was 13.4% at birth to six weeks and 25.6% from six weeks to six months of age.

Mothers give supplementary feeds for several reasons. In Malawi, mothers gave supplementary feeds because they thought that they did not have enough breast milk. If their children cried loudly and they were unable to calm them quickly, they gave them supplementary feeds to calm them and this made the children full and sleep as long as possible (Østergaard & Bula 2010:218). While some mothers associated their loss of weight and feeling unenergetic with the frequent breastfeeding, others indicated a lack of nutritious food for themselves as the cause of insufficient milk production (Østergaard & Bula 2010:218). In South Africa, 43.0% of mothers decided to give solids because their children were still hungry after completing breastfeeding (Ghuman et al 2009:77).

2.3.3.3.1 Family influence on feeding practice

Some mothers find it difficult to adhere to their decision to exclusively breastfeed their children, because mothers-in-law play an important role in the upbringing of the children (Kuhn et al 2007:1). The notion of either exclusive breastfeeding or exclusive formula feeding is not well understood by family members, like mothers-in law. In Jos, Nigeria, HIV-infected mothers mixed fed their children despite their intention to exclusively formula feed because of social determinants, such as pressure from family members to breastfeed (Maru, Datong, Selleng, Mang, Inyang, Ajene, Guyit, Charurat & Abimiku 2009:1116). Regarding factors affecting HIV-infected mothers' ability to adhere to antenatal intended infant feeding choice in Tshwane, Matjie, Wittenberg, Makin, Jeffery, Macintyre & Forsyth (2009:22) found that 10.0% of the mothers changed from their intention to formula feed to breastfeed because of family member pressure.

In the Kilimanjaro Region of Northern Tanzania, mothers-in-law had knowledge about PMTCT and perceived HIV testing for pregnant women, medication for HIV-infected mothers and delivery at the hospital as important and beneficial to mother and child. However, mothers-in-law had greater resistance to exclusive breastfeeding and exclusive formula feeding because they were incongruent with their customary feeding practices (Falnes, Moland, Tylleskar, De Paoli, Leshabari & Engebretsen 2011:7).

Many mothers-in-law encouraged mothers to breastfeed for at least two years while introducing water and other nutrients before the infant was one month old. They found it difficult to understand the concept and reasons for exclusive breastfeeding as this contradicted the information they received from the nurses (Falnes et al 2011:8). Some parents would continue to give their children water because they did not want to oppose mothers-in-law, while other parents indicated that if they told their mothers-in-law that it was the clinic's advice to exclusively breastfeed, their mothers-in-law would accept it due to the respect they had for health care professionals (Falnes et al 2011:8).

In Malawi, mothers indicated that if the grandmother decided to give the child water, porridge or herbal infusions, the mother could not refuse unless she had enough support from the husband (Østergaard & Bula 2010:218). Grandmothers believed that women often had insufficient breast milk and a child needed water and porridge to supplement breast milk, while herbal medicines were given because of the dangers of

promiscuity for young children's health (Kerr, Dakishoni, Shumba, Msachi & Chirwa 2007:1099).

In South Africa, female and male community elders indicated that even though breastfeeding is important for the child's health, it is not enough on its own to satisfy the child. As soon as the child starts crying, they give watery porridge even if the child is one day old (CADRE & UNICEF 2010:33).

2.3.3.3.2 Duration of breastfeeding

Breastfeeding is considered beneficial for children's development, but the duration of breastfeeding is regarded as a determinant of postnatal HIV transmission. Each additional month of breastfeeding beyond six months was associated with a 1.0% risk of being infected with HIV. The risk of postnatal HIV infection was 3.9% among children who breastfed for less than six months and 8.7% among children who breastfed for six months and longer (Becquet et al 2009:4).

In Malawi, the risk of HIV infection in children who were HIV negative at birth was less between 1.5 to 6 months with a hazard risk of 1.22%, increasing to 4.5% during 6 to 12 months, declining to 3.48% during 12 to 18 months and 1.27% during 18 to 24 months. The risk of infection was high in children aged between 6 and 18 months. The cumulative risk for HIV infection after birth was found to be 9.68%. The major associated risk factor for late postnatal HIV transmission in breastfed children was associated with high maternal plasma viral load, mastitis and primiparity (Taha et al 2007:13). These findings indicate that breastfeeding beyond six months increases the risk of HIV transmission.

In a study on predictors of early and late mother-to-child transmission of HIV in a breastfeeding population in Kampala, Uganda, 114 (18.6%) of 610 children were either diagnosed with HIV or died as a result of HIV at or before 8 weeks of age. Of the remaining 491 who were HIV negative at 8 weeks old, only 23 (4.7%) tested HIV positive after 8 weeks. The transmission rate was higher at or before 8 weeks compared to after 8 weeks of age. The transmission rate before and after 8 weeks was related to breastfeeding with high maternal viral load (greater than 50,000 copies per millilitre) and

low CD4 cell count of less than 200 cells per cubic millilitre (Mmiro, Aizire, Mwatha, Eshleman, Donnell, Fowler, Nakabiito, Musoke, Jackson & Guay 2009:37).

As a measure to reduce HIV transmission through breastfeeding, the DOH (2010:24) recommends that HIV-exposed children should be exclusively breastfed for 6 months and continue to be breastfed for 12 months. The child should receive NVP from birth until breastfeeding is stopped. The NVP given to the child is considered highly effective in reducing transmission through breast milk regardless of whether the mother received ARV or not (DOH 2010:20). Exclusive formula feeding is only recommended when the mother meets the AFASS criteria (DOH 2008:53).

2.3.3.3.3 Lack of knowledge and understanding of feeding practice

In their study in Malawi, Østergaard and Bula (2010:217) found that most of the mothers had knowledge about HIV and different feeding methods but did not understand what was meant by exclusive breastfeeding. They indicated that exclusive breastfeeding was required to reduce the risk of HIV transmission and they gave breast milk immediately after birth. These women, however, did not think that giving water was mixed feeding. They believed that mixed feeding was only when they give other food and other milk products before 6 months of age. They also gave medications like Gripe water and other traditional medications (Østergaard & Bula 2010:217).

In Southern Ghana, Laar and Govender (2011:131) found that 90.0% of mothers understood the meaning of exclusive breastfeeding and replacement feeding. They explained replacement feeding as feeding a non-breastfed child with other suitable milk products like formula milk. Of the mothers, 10.0% did not understand that in the first 6 months, replacement feeding should be in the form of suitable formula feeding. They thought that porridge and other foods could be given together with the formula from birth (Laar & Govender 2011:131).

2.3.3.3.4 Impact of health care providers and services on feeding practices

Nurses at the clinics offer counselling on feeding practices to the mothers. The counselling includes the advantages and disadvantages of different feeding methods and the fact that HIV can be transmitted from the mother to the child through

breastfeeding. Mothers decide on the feeding methods for their children, while being made aware that the feeding method they decide on influences the chances of the child becoming infected with HIV (Doherty, Chopra, Nkanki, Jackson & Greiner 2006:92).

In South Africa, nurses have been found to be biased towards one method of feeding, leading to concealment of important information that would enable mothers to make an informed decision, or coercion by not giving the mothers the opportunity to make up their minds (CADRE & UNICEF 2010:30). Matjie et al (2009:22) found that 38.0% of mothers changed from their intention to bottle-feed to breastfeeding because the hospital staff forced them to breastfeed. The “Baby Friendly Facilities” initiative promoted by the WHO also pressured nurses to encourage breastfeeding at all times so that the facilities can fulfil the requirements of a “baby-friendly hospital” and be accredited as such (CADRE & UNICEF 2010:31).

Despite the promotion of breastfeeding by nurses, some women still opt for replacement feeding (WHO et al 2010:7). The PMTCT programme was expected to provide assistance to HIV-positive women choosing replacement feeding by providing them with free formula milk, but the provision of the formula had shortcomings. When the supplied formula was finished before the return date, some mothers were afraid to go back to the clinic for another supply (Doherty et al 2006:93). It was envisaged that it might encourage women who initially intended to breastfeed not to breastfeed. The Minister of Health recommended the removal of free commercial formula milk from the PMTCT programme and encouraged promotion of breastfeeding (DOH 2012a). Consequently, facilities stopped supplying formula milk to mothers who opted for formula feeding and left most HIV-positive women not knowing what to give to their children.

2.3.3.4 Adherence to follow-up visit

2.3.3.4.1 Integration of services

The PMTCT aims to provide an expanded package that will integrate the follow-up of HIV-exposed children with routine child health practices and the Integrated Management of Childhood Illness (IMCI) services. Follow-up of children born to HIV-positive mothers is crucial for the success of the prevention of mother-to-child transmission of HIV (DOH 2010:1). The level of adherence to the PMTCT postnatal

follow-up visit varies. In sub-Saharan Africa, 38.0% of mothers honoured the six-week follow-up appointment for their HIV-exposed children or came within 14 days after the exact date of appointment, while other HIV-exposed children honoured follow-up visits in other services in the clinic, such as immunisation, but did not come for PMTCT follow-up (Nassali, Nakanjako, Kyabayinze, Beyeza, Okoth & Mutyaba 2009:1127).

In Kenya, 86.0% of HIV-exposed children who received PMTCT prophylactic treatment came for their six-week immunisations, but only 52.0% came for six-week early infant diagnosis (Mirkuzie et al 2011:6). In Nkangala District, Mpumulanga, only 61.7% of mothers brought their children for the PCR test around 6 weeks, while the immunization coverage was 76.0% (Peltzer, Mlambo, Matseke, Shikwane, Louw & Kekana 2011:19). Most HIV-exposed children are brought for follow-up appointments at other health care services but miss the PMTCT follow-up appointments. This could affect the effectiveness of the PMTCT programme. In addition, it shows a lack of integration of PMTCT with other health care programmes. Creating an integrated health care system where all under-five, including HIV-exposed children can receive service at a single point could contribute to the success of PMCTC programme (Mirkuzie et al 2011:8).

2.3.3.4.2 Socio-economic factors

In sub-Saharan African countries most people live in poverty. In South Africa, lack of financial resources for transport and the distance to the health facilities contributed to poor utilisation of PMTCT services (Tlebere, Jackson, Loveday, Matizirofa, Mbombo, Dorherty, Wigton, Treger & Chopra 2007:346). Affordability is associated with direct payment of the health service, cost of productive labour time, transportation costs, and time spent attending PMTCT service. Inability to pay transport fares from home to health services contributed to non-adherence to follow-up visits and low utilisation of the PMTCT (Mekonnen 2009:44).

In a rural district hospital in Zambezia, Mozambique only 25.0% of mothers on the PMTCT programme returned for early infant diagnosis of HIV. Independent maternal income, through formal employment or agriculture, increased adherence to follow-up visits. The financial independence of the mother decreased the age of first infant testing by two months (Cook, Ciampa, Sidat, Blevins, Burlison, Davidson, Arroz, Vergara, Vermund & Moon 2011:e107)

2.3.3.4.3 Maternal age and prior exposure to postnatal care or ART

The mother's age and previous exposure to postnatal care had an influence on adherence to follow-up visits. Mothers under 25 years old were four times more likely to adhere to the six-week follow-up if they had previously been exposed to postnatal care than those who had not attended postnatal care before. Mothers older than 25 who were living with a partner and had one or no child were also likely to adhere to postnatal PMTCT follow-up visits. However, previous involvement in PMTCT by the mother whose child remained negative was a motivator for returning for follow-up visits (Nassali et al 2009:1128).

Mothers who are on ART were more likely to bring their children for early infant diagnosis of HIV, because of their HIV status. These mothers have more frequent medical visits and there were more opportunities for health care providers to identify the children at risk of HIV transmission. However, these mothers were also found to bring their children for testing later than the expected date (Cook et al 2011:e107). Even though services are offered at the same health facility, poor integration between PMTCT and the adult HIV services contributed to loss of follow-up (Cook et al 2011:e108).

2.3.3.5 *Maternal breast condition*

Sub-clinical mastitis was associated with the breast milk viral load. Mastitis was increasingly seen in women with high plasma viral load and the risk of HIV transmission during sub-clinical mastitis was great in those with high viral load because mastitis facilitates the transfer of HIV from the blood to the breast milk (Lunney, Illiff, Mutasa, Ntozini, Magder, Moulton & Humphrey 2010:766). Inflammation causes the opening of the tight junction of the alveolar cell allowing some blood components and sodium to pass in to the milk. This can increase the viral load in the breast, which increases the risk of infant exposure to HIV through breastfeeding (Lunney 2007:14).

Supplementation with Vitamin B-complex, C, and E to HIV-positive breastfeeding mothers was related to increased risk of subclinical mastitis. The subclinical mastitis was measured by the increased Sodium/Potassium (NA/K) ratio in the breast milk, which has been associated with high concentration of immunological and inflammatory factors in the breast milk (Arsenault, Aboud, Manji, Fawzi & Villamor 2010:1789).

The high NA/K ratio in the breast milk of HIV-infected mothers was associated with an increase in HIV transmission. Women with highly raised NA/K were 3.4 times more likely to have high Cell-Associated Virus (CAV) concentrations in the breast milk compared to mothers with normal ratio. Cell-Free Virus (CFV) shedding in milk seems to be a stronger predictor of late breastfeeding transmission, while CAV shedding is a risk factor for transmission throughout breastfeeding (Kantarci, Koulinska, Aboud, Fawzi & Villamor 2007:652; Lunney et al 2010:766).

2.3.3.6 Child oral thrush

Children with oral thrush during the breastfeeding period were found to be susceptible to HIV infection. The infection of the oral and the gastrointestinal mucosa with Candida interrupts the mucosal barrier to transmission leading to breakages in the mucosa allowing access of HIV in to the system. The infection with Candida results in migration of large numbers of CD4 cells and microphages to the site, which increases the infants' susceptibility of HIV infection because the CD4 cell and the microphages are the primary target of HIV-1 (Embree et al 2000:2539; ICAP 2007:5).

2.3.3.7 Disclosure and social stigma of HIV infection

In most Southern African societies there is still a stigma attached to HIV and discrimination against HIV-positive patients, which leads to social isolation and even loss of support from the family (UNAIDS 2010:124). In rural Lilongwe, Malawi, most women who test HIV positive decide not to tell their partners for fear of violence, divorce or being left alone by their partners (O'Gorman et al 2010:4).

There is an association between violence and HIV infection since it is common in most societies for men to blame their partners for being infected even though they are HIV-positive themselves (UNAIDS 2010:124). Women who disclose their HIV status experience different responses from their partners. In Sub-Saharan Africa, Nassali et al (2009:1129) found that out of 42.0% of respondents who disclosed their status, 14.0% experienced violence, withdrawal of support, and divorce. In rural Malawi, women who disclosed their status to their husband were frequently abandoned by them (Njunga & Blystad 2010:4).

In a study in Gondar Town health institutions, Northwest Ethiopia, Muluye et al (2012:4) found that most of the respondents had disclosed their HIV status to their husbands and also to family members. In South Africa, Visser, Neufeld, de Villiers, Makin and Forsyth (2008:1140) found that many newly diagnosed HIV-positive pregnant women had disclosed their status to their husbands and other family members. Furthermore, women who disclosed their status indicated that they wanted to inform their husbands about the risk of infection; encourage them to go for testing, or to change risk behaviour; prepare them for the possibility of having an HIV-positive baby, and obtain their support. They also saw disclosure as an obligation to the relationship. Some parents, friends and relatives' reaction to disclosure was supportive and accepting, while others reacted with sadness, fear and hurt (Visser et al 2008:1141).

In the Kilimanjaro Region, Northern Tanzania, some women regarded their mother-in-law as the last person to whom they would disclose their HIV status. The women did not trust that their mothers-in-law would support them. Some indicated that they were mistreated by their mothers-in-law after disclosing their status to them (Falnes et al 2011:12).

In Northern Nigeria, Sagay, Musa, Ekwembu, Imade, Babalola, Daniyan, Malu, Idoko and Kanki (2010) found that husbands' or partners' reactions to disclosure included being supportive, indifferent, quarrelsome, and abusive.

In Malawi, HIV-related stigma led to HIV-positive mothers and their children being negatively labelled. The children were called "Nevirapine babies", because the community knew that the women were given NVP during labour and their children received NVP after birth (Østergaard & Bula 2010:219).

Disclosure and social stigma also impact on mothers' implementation of the PMTCT interventions. Stigma affects their decision to breastfeed. In areas where breastfeeding is the norm, replacement feeding is considered abnormal. For example, in rural KwaZulu-Natal, Thairu et al (2005:5) found that HIV-positive women's knowledge about HIV transmission through breast milk made it difficult for them to choose a feeding method, especially because of socio-cultural influences. Deciding on replacement feeding was considered an announcement that the woman is HIV positive. In order not

to be labelled and shunned by the community and family, then, the women breastfed their children (Thairu et al 2005:6).

HIV-positive women who have not disclosed their status to their families have less chance of taking prophylactic treatment because they do not want to be seen taking the medication (CADRE & UNICEF 2010:29). Women who are still dependant on their husbands for money and transport cannot go to the clinic to collect treatment for their children without their husbands' permission (Kirsten et al 2011:6).

Despite the negative impact of stigma on HIV-positive mothers, disclosing their status has been a contributory factor to the mothers' ability to exclusively breastfeed. Mothers who lived with their husbands only were more likely to sustain exclusive breastfeeding for some time because there was no interference from their mothers-in-law (Østergaard & Bula 2010:219). At the same time, a few women who disclosed their HIV status to their husbands and mothers-in-law managed to breastfeed exclusively for the first six months, because of the support they received from the husband and the mother-in-law (Østergaard & Bula 2010:219).

In Northwest Ethiopia, Muluye et al (2012:4) found that mothers who disclosed their status to their husbands were 7.7 times more likely to adhere to either exclusive breastfeeding or exclusive formula feeding. Disclosing their status had a positive psychological effect on the women because they did not have to hide while formula feeding.

In Bindura town, Zimbabwe, most women who disclosed their status to their partners were more likely to adhere to PMTCT prophylactic treatment than those who did not (Kuonza, Tshuma, Shambira & Tshimanga 2010: 4).

Regarding paediatric follow-up care for HIV-exposed children in Rwanda, Moreland (2010:94) found that disclosure of HIV status to the partner did not to play a major role in non-adherence to paediatric follow-up visits. The mother's understanding of the importance of follow-up care influenced her to take the child to the clinic (Moreland 2010:94). However, more unmarried women adhered to paediatric follow-up and other paediatric guidelines compared to married women who required their husbands' permission to go to the clinic (Moreland 2010:100).

2.4 CONCLUSION

This chapter discussed the literature review on the implementation of the PMTCT programme and factors that impacted on the overall outcome of the programme, both nationally and internationally. The literature review identified factors associated with postnatal HIV transmission, including mixed feeding prior to 6 months of age; prolonged breastfeeding; non-adherence to PMTCT prophylactic treatment; non-adherence to follow-up visits; maternal breast conditions; child thrush, and disclosure and social stigma.

Family influence on infant feeding practice and stigmatisation strongly influenced feeding practices resulting in mixed feeding, non-adherence to prophylactic treatment and non-adherence to follow-up visits. Adherence to PMTCT prophylactic treatment and follow-up visits was influenced by socio-economic status and lack of knowledge and understanding. Mixed feeding, breastfeeding beyond 6 months of age, mastitis, and child thrush led to increased HIV transmission rate at 18 months. Mothers on HAART and financially independent mothers adhered more to follow-up visits and the transmission rate was lower in children whose mothers were on HAART.

Chapter 3 covers the research design and methodology.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter describes the purpose, research design and methodology, population, sample and sampling, data collection and analysis, validity and reliability, and the ethical considerations of the study.

A research purpose is “a clear, concise statement of the specific goal or aim of the study. The goal of the study might be to clearly and concisely describe, identify, or predict a solution to the problem” (Burns & Grove 2009:38).The purpose of the study was to identify factors associated with the HIV transmission rate in 18 to 24 month-old children enrolled in the PMTCT programme at the City of Tshwane clinics. In order to achieve the purpose, the objectives were to

- determine the HIV transmission rate among 18 to 24 month-old children enrolled in the PMTCT programme at City of Tshwane clinics
- identify factors associated with the HIV transmission rate in these children
- determine the relationship between the identified factors and the HIV transmission rate among these children

Accordingly, the study wished to answer the following research question:

> What are the factors associated with the HIV transmission rate in 18 to 24 month-old children enrolled in the PMTCT programme at City of Tshwane clinics?

3.2 RESEARCH DESIGN

A research design is “an overall plan for obtaining answers to research questions” (Polit & Beck 2012:66). A research design guides researchers in planning and implementing the study in a way most likely to achieve the intended goal (Burns & Grove 2005:211; Stommel & Wills 2004:32).

3.2.1 Quantitative

Quantitative research is a formal, objective, systematic process in which numerical data are used to obtain information about the world (Burns & Grove 2009:22). Quantitative research moves in an orderly manner from the definition of a problem following logical steps to reach the research objectives and answer the research question (Polit & Beck 2008:16).

A quantitative approach was selected to identify factors associated with HIV transmission rate in 18 to 24 month-old children on the PMTCT programme, and measure the association between the identified factors and the HIV transmission rate. Data was gathered using structured data-collection tools, a questionnaire and data collection form, to allow quantitative measurements. Statistical tests were used to examine the relationship between the variables (Polit & Beck 2012:13).

3.2.2 Descriptive retrospective correlational design

A descriptive retrospective correlational design was adopted for the study. According to Burns and Grove (2009:246), descriptive correlational designs are undertaken to describe variables and examine the relationships that exist among them. The design may also be used to examine variables in the current situation or in the past. Retrospective studies are used to link the phenomenon existing in the present with the phenomenon as it occurred in the past before the study was conducted (Polit & Beck 2012:224).

The researcher selected a retrospective descriptive correlational design to identify factors associated with the HIV transmission rate and examine the relationship between the factors identified and HIV transmission rate. It was retrospective because the HIV transmission rate in the 18 to 24 month-old children was linked with their past exposure to associated factors.

3.3 RESEARCH METHODOLOGY

The research methodology describes the techniques and research procedures followed when conducting a study, including the setting, population, sample and sampling, data collection and analysis, validity and reliability, and ethical considerations.

3.3.1 Study setting

Polit and Beck (2012:74) define the setting as “one or more places and conditions in which data collection takes place”. The setting for the study was two PHC clinics in the City of Tshwane Metropolitan Municipality. Both clinics are situated in City of Tshwane Region 3. One clinic is situated at the city centre of Pretoria and the other in Atteridgeville, one of the biggest townships in Tshwane.

The city centre clinic consists of 19 consultation rooms and 5 small HIV counselling and testing (HCT) rooms. It offers immunisations, family planning, integrated management of childhood illnesses (IMCI), Tuberculosis (TB), HIV counselling and testing (HCT), PMTCT, antenatal and postnatal, curative and chronic care, and emergency care. The clinic in the township consists of 18 consultation rooms, including three HCT rooms. This clinic offers the same services as the one in the city centre.

The community utilising the two clinics also differed in their characteristics. The community at the city centre comprised of mothers working in the city and those attending schools in different higher education institutions around the city. While the community at the township mostly comprised of unemployed mothers staying at the houses and shacks around the township. These two settings allowed the researcher to determine if the difference in their characteristics had any effect on the HIV transmission rate.

3.3.2 Population

A population is all the elements, individuals, objects or substances that meet certain criteria for inclusion in the study (Burns & Grove 2005:40). Polit and Beck (2008:761) define a population as the entire set of individuals or objects having some common characteristics.

A target population is the entire set of individuals who meet the sampling criteria (Burns & Grove 2009:343). Stommel and Wills (2004:297) define a target population as the elements or units the researcher wants to study. In this study, the target population was mothers of children on the PMTCT programme aged 18 to 24 months and the records of children on the programme aged 18 to 24 months. These children were born from July 2010 to March 2011, which made them to be between 18 and 24 months old from July to September 2012.

3.3.2.1. *Eligibility criteria*

Eligibility criteria include all the characteristics essential for inclusion in the target population (Burns & Grove 2009:344).

In this study the criteria included the following:

- Being a mother of a child enrolled on PMTCT programme aged 18 to 24 months.
- The mother should be aged 18 years and older
- The mother should be able to read and write in English
- Records of children aged 18 to 24 months enrolled on PMTCT programme

3.3.2.2 *Exclusion criteria*

Burns and Grove (2009:344) describe exclusion criteria as all the characteristics that can cause the person or an element to be excluded from the target population.

In this study the criteria excluded the following:

- Mothers of children under 18 months and over 24 months of age; and their children's records.
- Children not on PMTCT programme.
- Mothers below 18 years because according to the law, a person can only consent independently to take part in research at the age of 18 years (Human Research 2009:5).

- Mothers who could not read or write in English because the questionnaire was only in English and respondents were expected to complete the questionnaires themselves.
- Fathers and other relatives were excluded as measure to maintain confidentiality of the mother's HIV status. For the child to be on PMTCT the mother has to be HIV positive, which may not be known to the father or other relatives.

3.3.3 Sampling

Sampling refers to the process for selecting a group of people, events, behaviours, or other elements with which to conduct a study in order to obtain information on the phenomenon of interest (Burns & Grove 2005:341; Polit & Beck 2008:339)

A non-probability sampling approach was adopted for the study. With non-probability not every element of the population has a chance of being selected in the sample (Burns & Grove 2009:353). Convenience sampling was used to select the respondents. This involves the selection of readily available or most convenient subjects for the study at the time of data collection (Brink 2006:132; Joubert & Ehrlich 2007:100). The advantage of convenience sampling is that it is inexpensive, accessible and less time consuming (Burns & Grove 2009:354; LoBiondo-Wood & Haber 2010:226). Available subjects are entered into the study until the desired sample size is reached (Burns & Grove 2005:350). This sampling technique was selected because it provided easy access to the respondents as the researcher used mothers who were bringing their children to the clinic for 18 to 24 months PMTCT follow-up and immunisation clinic.

In this study, the researcher selected the first 30 respondents meeting the eligibility criteria from each clinic.

3.3.3.1. ***Sampling frame***

A sampling frame is a complete list in which each person or record under study is mentioned (Burns & Grove 2009:348; Welman, Kruger & Mitchell 2005:57). The sampling frame was compiled by using the PMTCT register of the names and the clinic records reference numbers of all children attending the programme. The sampling frame consisted of 187 children on PMTCT aged 18 to 24 months.

3.3.3.2. *Sampling procedure*

In this study, the following procedures were used to select the sample from respondents and records:

The researcher sought the assistance of the administration officer at the clinic to identify children aged 18 to 24 months attending Immunization, IMCI and PMTCT from the daily attendance register and to retrieve their records.

- The clinic had a daily register where the admin officer captures the names, ages and the reference number of the patients as they arrive.
- The researcher used the reference numbers from the sampling frame to identify records of children meeting the inclusion criteria.
- All respondents meeting the eligibility criteria were identified and approached individually using their children's records until the sample size is reached.
- The purpose of the study was explained to the respondents and they were asked if they were willing to take part in the study.
- If they gave their verbal consent, they were issued with respondent's information sheet, consent form and questionnaire to complete at a private room identified.

For sampling of records, the sample frame was used to identify records of children meeting the inclusion criteria. All available records were retrieved by the clinic administration officer.

3.3.3.3. *Sample size*

Sample size refers to the number of subjects recruited and consenting to take part in a study (Grove, Burns & Gray 2013:709).The larger the sample size, the smaller the error will be in estimating the characteristics of the whole population (Polit and Beck 2008:348).

Since non-probability convenience sampling approach was used, the researcher selected the first 30 respondents meeting the eligibility criteria from each clinic. There were 187 children on PMTCT aged 18 to 24 months old. Eighty eight (88) were from the clinic in the city centre, while 99 were from the clinic in the township. The sample for the

respondents was determined at 95% confidence level and 10.5% margin of error. Sixty mothers participated in the study. Thirty were from the city centre clinic and 30 mothers from the township clinic.

The sample was considered adequate due to time constrains, although it was smaller and has larger margin error. Some children were not brought for 18 months follow-up at the scheduled dates, while one child was brought by the father. Four mothers did not take part in the study because they could not read and write in English. No one refused to take part in the study and all respondents were 18 years and older. A larger sample will have taken much longer. The sample may not be a representative of the whole population and the results may not be generalised to the whole population due to the above mentioned reasons.

The sample for the records was determined at 95% confidence level and 3.5% margin error. Consequently, the researcher sampled the first 152 records and reviewed them. Seventy-two records were from the city centre clinic and 80 records from the township clinic. At the end 81% of the total population was selected. The sample of the records was large enough to represent the accessible population.

3.4 DATA COLLECTION

Data collection refers to the “precise, systematic gathering of information relevant to the research purpose or the specific objectives, questions, or hypothesis of a study” (Burns & Grove 2005:73). This study used a structured data-collection approach. Polit and Beck (2008:766) state that a structured approach often takes considerable effort to develop and refine, but yields data that are relatively easy to analyse. Structured methods are appropriate for in-depth examination of a phenomenon. Data was collected from two sources, namely the mothers of the children, and the children’s records. Data collection took place in two phases. In the first phase, data was collected from the mothers of the children on the PMTCT programme aged 18 to 24 months old, using the questionnaire (see Annexure 5). In the second phase, the children’s clinic records were reviewed, using the data-collection form (see Annexure 6).

3.4.1 Data-collection instruments

Data was collected using a structured questionnaire and data-collection form to allow quantitative measurements. They included a fixed set of questions to be answered in a specific sequence and with predesigned response options (Polit & Beck 2008:371). The researcher developed and utilised a structured questionnaire and data-collection form to collect data from the respondents and the records, respectively.

3.4.1.1 Questionnaire

A questionnaire is a self-report document used to collect information through respondents' written responses (Burns & Grove 2009:406; Joubert & Ehrlich 2007:107). The questionnaire was used to collect all the required information known by the respondents (e.g. social stigma).

3.4.1.1.1 Development and structure of the questionnaire

The researcher developed a questionnaire to ensure uniformity and consistency in the data collection. The questionnaire was based on the literature review, including the Department of Health PMTCT guidelines, and the problem, purpose and objectives of the study. Items in the questionnaire measured respondents' practices in relation to PMTCT expectations, their health status and that of their children. The assistance of the supervisor was sought for in the design of the questionnaire. The questionnaire was also assessed for content, wording and clarity by the two PMTCT nurses at the clinics.

The questionnaire contained closed and open-ended questions, allowing the respondents to choose from possible options and providing space for elaboration where necessary (Burns & Grove 2009:406). The questionnaire was in English, because this is the language commonly used for communication in the city and most of the women at child-bearing age would have at least primary education. Therefore, all the respondents had to be able to read and write English. The questionnaire consisted of eight sections (see Annexure 5):

- *Section 1: Socio-demographic information*. The socio-demographic data included the respondents' age, marital status, educational level and employment status.

The information was useful in determine whether or not the data had any influence on the women's practices in relation to PMTCT programme requirements.

- *Section 2: Respondents' ART status and parity*. This included number of pregnancies and live children they had. The information was useful in determining whether the number of children the respondents had, influenced their practices in relation to the PMTCT programme. The ART status helped to determine the relation between HIV transmission and the mother's ART status.
- *Section 3: Social stigma*. This assessed the level of disclosure and the social stigma associated therewith. Disclosure and stigma can be associated with either compliance or non-compliance with PMTCT protocols.
- *Section 4: HIV-test results of the child*. This determined the HIV test results of the child around 6 weeks, 6 weeks post-cessation of breastfeeding and at 18 months.
- *Section 5: Provision and the adherence to PMTCT prophylactic treatment*. This examined the provision and adherence to PMTCT prophylactic treatment, because adherence to treatment may be associated with the HIV transmission rate.
- *Section 6: Child-feeding practices*. The respondents were expected to indicate the feeding method used from birth until 18 months because feeding method could be associated with HIV transmission.
- *Section 7: Mother's breast conditions*. The questions covered the respondents' breast conditions while they were breastfeeding, because mastitis has been associated with increased risk of HIV transmission.
- *Section 8: Child thrush*. The questions examined child thrush, because oral thrush or any damage to the gastrointestinal mucosal membrane has been associated with risk of HIV transmission through breastfeeding.

3.4.1.1.2 Rationale for using a questionnaire

A questionnaire was selected because it enabled the researcher to acquire factual information about the respondents with the purpose of finding out their experiences and practices associated with the mother-to-child transmission of HIV on children on the PMTCT programme at 18 to 24 months (Brink 2006:146). It allowed the researcher to

collect retrospective data from the respondents and contained quantifiable data that could be analysed statistically (Polit & Beck 2008:369, 372).

3.4.1.1.3 Advantages of questionnaires

Questionnaires are cost effective because they require less time to administer and can be distributed to a large sample. They offer the possibility of complete anonymity, especially where sensitive and personal information is required, e.g. HIV status. The format is the same for all respondents and does not depend on the mood of the interviewer (Burns & Grove 2009:406; Polit & Beck 2008:424; Brink 2006:147).

3.4.1.1.4 Disadvantages of questionnaires

Respondents might misunderstand questions and there is usually no time for clarification. They require respondents to be literate and some may fail to answer some questions or provide socially acceptable or desirable responses. They do not offer opportunity for elaboration on responses (Polit & Beck 2012:313; Burns & Grove 2005:398; Brink 2006:147).

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3.4.1.1.5 Pre-test of the questionnaire

Waltz, Strickland and Lenz (2010:145) describe pretesting as a trial run of a data-collection tool that is undertaken to reveal problems relating to content, administration and scoring. Pretesting of a new data-collection instrument is required to determine how much time it takes to administer and to identify areas of misunderstanding so that the tool can be evaluated and refined (Polit & Beck 2012:296).

The questionnaire was pre-tested on five (5) respondents who were not included in the study. The researcher asked the respondents to ask for clarification of any questions that they did not understand. The time taken to complete the questionnaire was also recorded. At the end of the pre-test, the respondents were asked how they felt about the nature and style of the questions. The questionnaire was then revised based on the respondents' feedback.

3.4.1.2 Data-collection form

Data-collection forms can be used to record demographic data, information from patient records and values from physiological measures (Burns & Grove 2009:432). The researcher used a structured data-collection form to collect data from the children's clinical records, mainly the HIV test results and other PMTCT information as guided by the PMTCT guidelines.

3.4.1.2.1 Development and structure of the data-collection form

The researcher developed a structured data-collection form using the literature review as a frame of reference. The assistance of the supervisor and the statistician were sought in the design of the data collection form. The data-collection form consisted of six sections (see Annexure 6):

- *Section 1: Child's demographic information*. The demographic data included the age and the gender of the child.
- *Section 2: Provision of the PMTCT prophylactic treatment*. This examined the provision of PMTCT prophylactic treatment by the hospital at birth and by the clinic as reflected in the records. The place of delivery is associated with mother's intake of NVP and child receiving NVP in the first 72 hours after birth.
- *Section 3: Child thrush*. This examined the treatment of oral thrush as reflected in the records.
- *Section 4: Child feeding practices*. This examined child feeding practices as reported by the mothers at every clinic visit.
- *Section 5: Follow-up visits*. This examined the adherence to follow-up visits as required by the programme. It was used to record the interval between clinic visits.
- *Section 6: HIV test results*. This examined the HIV test results of the child at around 6 weeks; 6 weeks post cessation of breastfeeding and at 18 months.

3.4.1.2.2 Rationale for using data-collection form

The data-collection form was selected because it allowed consistency in recording data from the client records. The researcher recorded the events that occurred during the

child's visits to the clinic, including physiological measures like HIV test results recorded in the clinic record (Polit & Beck 2008:424).

The researcher used the data-collection forms to record the frequency of the child's visits to the clinic, the PMTCT interventions that took place at all visits, and the HIV test results at 6 weeks, 6 weeks post-cessation of breast feeding and at 18 to 24 months as reflected in the clinic records.

3.4.1.2.3 Advantages of data-collection forms

Data-collection forms permit the collection of existing data from clinic records. The data can be collected in raw form or coded at the time of collection (Burns & Grove 2009:432).

3.4.1.2.4 Disadvantages of data-collection forms

Structured data-collection forms require considerable effort to develop and design and may not be appropriate for an in-depth examination of the phenomenon under study (Polit & Beck 2008:371). The coding categories on the data-collection form must be mutually exclusive and exhausting; no values should overlap (Burns & Grove 2005:424).

3.4.1.2.5 Pre-testing the data-collection form

The data-collection form was pre-tested on five (5) records that were not included in the main study. The researcher took 5 records of 18 to 24 month-old children on the PMTCT programme and extracted the data required for the study. The available and omitted data from the records was identified. The data-collection form was then revised for efficient collection of data from records.

3.4.2 Administration of the data-collection instruments

In the first phase, data was collected from the mothers of children on the PMTCT programme aged 18 to 24 months old, using the structured questionnaire (see Annexure 5). All mothers arriving at the clinic for 18 to 24 months PMTCT follow-up, IMCI and immunisation follow-up were identified by their children's records, approached

and asked to take part in the study. The mothers were informed about the purpose of the study and the researcher's expectations from them. Those who agreed were issued with a participant information letter and consent form to complete before completing the questionnaire. Each respondent was taken to a room at the clinic that was not in use at the time and given the opportunity to complete their questionnaires privately without any interruptions. The room had a table and two chairs. After completion, the participants handed the questionnaire back to the researcher.

The researcher was at the clinic all the time during the data-collection period. The respondents were left alone in the room while completing the questionnaires, but were given the opportunity to ask questions or for clarification of any questions. The respondents were allowed to call the researcher if they did not understand a question and she then clarified it for them. The average time it took for respondents to complete the questionnaire was 17 minutes, ranging from 12 to 25 minutes.

In the second phase, the researcher reviewed the children's clinic records, using the data-collection form (see Annexure 6). The researcher utilised the sampling frame to identify the 18 to 24 month-old children on the PMTCT programme. She then requested their records from the clinic administration officer and sat in one of the unutilised rooms while reviewing the children's clinic records. The average time it took the research to complete the data collection form was 15 minutes, ranging from 5 to 20 for each record.

Permission to conduct the study and to handle patients' record was requested from the Research Committee of Tshwane Health and Social Development Department as well as the Health Studies Research and Ethics Committee of UNISA. Data collection only commenced after permission to conduct the study was granted.

3.4.3 Data management

The completed questionnaires and data-collection forms were kept secure and safely by the researcher. No patients' names were written on the data-collection tools. Although each child's file number had been recorded on the data-collection form, only the researcher could trace a specific file should it be necessary to check any recorded information.

3.5 DATA ANALYSIS

Data analysis is conducted to reduce, organise and give meaning to data (Burns & Grove 2009:44). The data collected was analysed using statistical procedures (Polit & Beck 2008:16). A statistician analysed the data, using the SAS/JMP version 10 statistical software package. The analysis included descriptive and inferential statistics, such as frequency of distribution, measure of central tendency and measures of variability (Burns & Grove 2009:470). The results were presented in frequencies, percentages, graphs and tables. The presence or absence of relationships among variables and statistical differences was established.

The demographic information included the mothers' and children's ages. HIV infection rate among the children and the duration of breastfeeding was analysed. The duration of NVP and CTX intake was analysed and compared with the duration of breastfeeding because the duration of NVP intake should be the same as the duration of breastfeeding.

Brink (2006:183) describes the Chi-square as a non-parametric statistic which is used to analyse data where no assumptions are made regarding the normal distribution of the target population and the variables are measured on nominal and ordinal scale. The Chi-square was used to analyse the significance of the relationship between feeding practices and the HIV status at 18 to 24 months of age, and also to analyse the significance of the relationship between duration of breastfeeding and HIV status at 18 to 24 months in order to determine whether the child feeding practices had any impact on the outcome of the PMTCT programme. The association of other factors like adherence to PMTCT prophylactic treatment, socio-demographic factors, maternal breast condition, child thrush and social stigma with the HIV status of the children was also analysed using the Chi-square.

3.6 VALIDITY AND RELIABILITY

Polit and Beck (2012:175) emphasise that validity and reliability are two of the most important criteria to measure the quality of a study. The quality of a research instrument is determined by its validity and reliability. Validity is maintained when methods applied in the study measures the concept they supposed to measure. While reliability refers to

"the accuracy and consistency of the information obtained in a study" (Polit & Beck 2012:175). The measure is reliable if the same results are achieved each time the same situation is measured (Burns & Grove 2005:45).

3.6.1 Internal validity

Internal validity is the degree to which the results of the study are a true reflection of reality rather than the results of another variable that was not measured in the study (Burns & Grove 2009:222).

The concepts indicates the extent to which the factors identified as child feeding practices, adherence to PMTCT prophylactic treatment, maternal breast conditions, child thrush and social stigma are associated with HIV transmission rate in 18-24 months old children on PMCTC rather than being attributable to extraneous variables.

To enhance the internal validity the researcher did the following:

- Homogeneity was used as a measure to control extraneous variables by ensuring that the subjects were homogeneous with respect to both variables (Polit & Beck 2008:287). It was applied by selecting only mothers so that the sample was the same with regard to paternity and HIV status. All children on PMTCT are HIV exposed, meaning that their mothers are HIV positive.

- The study environment was kept constant by providing privacy (completing questionnaire in a private room) to all respondents. Interruptions were prevented by placing a "do not disturb" sign on the door to avoid disturbing the respondents while completing questionnaires. Disturbance may cause anxiety or irritability which may affect the answering of questions.

- The researcher attempted to make the sample of the records as representative of the accessible population as possible by retrieving and reviewing a large sample of 152 records.

However, the representativeness of the respondents could not be achieved because the researcher selected only mothers who can read and write in English. One child

was brought by the father, while 4 mothers could not read or write in English. These resulted in a small respondent's sample.

3.6.2 External validity

External validity is the extent to which the research findings can be generalised to the entire population and other settings (Botma, Greeff, Mulaudzi & Wright 2010:177; Brink 2006:101). Since non-probability sampling was utilised and the respondent's sample was relatively small, the results cannot be generalised to other populations or areas.

Reactive effects occur when the subjects try to please the researcher by providing the results that they believe are desired (Brink, Van der Walt & Van Rensburg 2012:111). Reactive effects could not be avoided as respondents participation in the study could not be hidden since they had to consent to participate in the study. However it was minimized by explaining the importance of the study and the implications of giving the correct or wrong answers to the respondents prior to completion of the questionnaire.

3.6.3 Validity of data-collection instrument

The validity of an instrument refers to the degree to which an instrument measures what it is supposed to measure (Polit & Beck 2012:336). The validity of an instrument is a determination of the extent to which the instrument actually reflects the abstract construct being examined (Burns & Grove 2005:42). In this study, face validity and content validity were utilised to establish the accuracy of the data-collection instrument.

3.6.3.1 Face validity

Face validity refers to an instrument appearing to measure what it is supposed to measure (Polit & Beck 2012:336). The questions should make sense to those knowledgeable about the subject (Joubert & Ehrlich 2007:120). The researcher ensured that the data-collection tools measured the appropriate constructs, based on the literature reviewed. The questionnaire and the data-collection form were compiled and sent to the supervisor for approval. The instruments were also assessed by the two PMTCT nurses from both clinics in order to check whether or not the questions were relevant, unambiguous and clear. The statistician reviewed the questionnaire and the data collection form. In addition, the instruments were pre-tested and the respondents

were asked about their opinions regarding the clarity of the instrument. Suggestions made were implemented.

3.6.3.2 Content validity

Content validity is concerned with the extent to which the data-collection instrument contains appropriate items for the construct being measured and adequately covers the construct domain. It is used when developing questionnaires (Polit & Beck 2012:336; Waltz et al 2010:165)

The researcher reviewed relevant literature on the research topic in order to ensure that the questionnaire and the data-collection form contained the content necessary to measure the factors associated with HIV infection rate in 18 to 24 month-old children on the PMTCT programme. The data- collection tools contained questions about the child feeding practices, adherence to PMTCT prophylactic treatment, maternal breast conditions; child thrush, social stigma and HIV test results as indicated in the records.

Secondly the two PMTCT nurses at the clinics and the PMTCT programme manager were consulted and their comments were included to ensure that the instruments addressed all elements required. Lastly the instruments were reviewed by the supervisor to ensure that appropriate content had been included. This helped in refining the questions for better meaning, clarity and conceptualisation.

3.6.4 Reliability of data-collection instrument

Reliability of the instrument is the consistency with which the instrument measures the target attribute. It involves the degree to which the instrument can be depended on to generate the same results if used repeatedly over time or if used by different researchers (Polit & Beck 2008:452; Botma et al 2010:177). The less the variation the instrument produces in repeated measurement of an attribute, the higher the reliability (Polit & Beck 2008:452).

The researcher conducted the pre-test of the questionnaire to identify words that were not understood and questions that required explanations. The respondents were informed about the purpose of the study and of the need to respond truthfully. At the

end of each pre-test, the respondents were asked about how they felt about the nature and phrasing of the questions. To pre-test the data collection form; 5 records were reviewed and the form was revised.

The researcher obtained supervisor's assistance to ensure that the instrument was reliable. All the observed shortcomings were addressed during the revision of the instruments. The researcher phrased the questions accurately and carefully to avoid ambiguity and leading questions. The questionnaire and the

Data collection instruments (questionnaire and data collection form) were standardised to reduce variation between measures. Lack of reliability testing was a drawback in this study.

3.7 ETHICAL CONSIDERATIONS

Ethics is concerned with matters of right and wrong. *Collins English Dictionary* (1991:533) defines ethics as "a social, religious, or civil code of behaviour considered correct, esp. that of a particular group, profession, or individual". Ethics deals with issues of morality and decisions about what is right and wrong for individuals and groups of individuals in particular circumstances (Mulaudzi et al 2011:26; Stommel & Wills 2004:373). In this study, the researcher upheld the ethical principles of permission to conduct the study; informed consent; privacy, confidentiality and anonymity in order to protect the institutions and the respondents.

3.7.1 Permission

The researcher protected the rights of the institution by requesting permission to conduct the study from the Research Committee of the Tshwane Health and Social Development Department and Health Studies Research and Ethics Committee of UNISA. The study was only conducted after approval by both committees. The study would benefit the institution because it wished to identify factors associated with the outcome of the PMTCT programme at 18 to 24 months, which also affected the outcome of the health care provided to the patients. The study findings should enrich nurses' and the doctors' knowledge at the clinics, which would help them to counsel and

educate patients better. The running of the clinic was not interrupted and there was no interference with the patient care while data was collected.

3.7.2 Protecting the rights of the participants

The respondents were selected on the topic under study. The respondents' right to self-determination; privacy, confidentiality and anonymity; equal and fair treatment, and beneficence were protected throughout the study.

3.7.2.1 Autonomy

Individuals are autonomous; they are able to control their activities. They have the right to self-determination meaning that respondents have the right to decide voluntarily whether to participate in the study or not (Polit & Beck 2012:154). In this study, the respondents were given the opportunity to decide whether to take part or not, without being threatened. They were informed of their right to ask questions, refuse to give information or to withdraw from the study at any time (Polit & Beck 2012:154).

3.7.2.2 Justice

The principle of justice means that all respondents should be treated equally and fairly and have the right to privacy (Flick 2011:216; Stommel & Wills 2004:383). In clinical research studies that involve collecting and examining data about health and other personal information, the concern is about how the information will be used. To ensure confidentiality, all information collected during the study should be safeguarded (Stommel & Wills 2004:383).

3.7.2.2.1 Right to equal and fair treatment

The respondents were selected on the basis of the problem being studied, had an equal chance of being selected, and were all treated fairly (Mulaudzi et al 2011:201; Brink 2006:33).

3.7.2.2.2 Privacy, anonymity and confidentiality

Privacy is the freedom the respondent has to decide to what extent the information provided may be shared or withheld from others (Brink 2006:33; Mulaudzi et al 2011:200). All the data was therefore collected in private rooms.

In order to ensure anonymity, the respondents did not provide their names on the questionnaires (Brink 2006:34; Mouton 2001:244). The respondents' personal identity was strictly protected because the questionnaires contained no identifying information about the respondents. Therefore no information could be linked to any respondents.

Confidentiality refers to the researcher's responsibility to protect all data collected from being divulged or made available to any other person (Brink 2006:35; Mulaudzi et al 2011:200). The researcher collected the questionnaires directly from the respondents and kept them out of reach of anyone not involved in the study. No clinic staff had access to the completed questionnaires.

3.7.2.4 Beneficence

Beneficence refers to the principle of at least doing no harm, or refraining from exploitation of the study respondents, and promoting both individual and societal benefits related taking part in the study (Stommel & Wills 2004:377). The study should not expose the respondents to personal harm (Flick 2011:216; Mouton 2001:245). No physical harm was caused by this study because the respondents completed the questionnaires when they attended the clinic for their children's PMTCT and immunisation follow-up. Moreover, no questions in the questionnaire induced any psychological disturbance or anxiety in the respondents. Finally, the respondents were informed of their right to withdraw from the study if they felt uncomfortable or not to answer questions that they felt uncomfortable with.

3.7.2.5 Informed consent

Informed consent means that the respondents have sufficient information regarding the study, are able to understand all the information provided, and are free to decide to either consent or to decline participation (Polit & Beck 2012:157). The respondents were

informed of the nature, purpose and significance of the study and that participation was voluntary. They were given the information sheet and consent form and asked to sign informed consent if they decided to participate. Questionnaires were issued to those who had signed consent forms.

3.7.2.6 Dissemination of findings

A study is not complete until its findings have been communicated to others (Polit & Beck 2012:680). Not disseminating the findings would be unethical and a waste of time for all stakeholders involved in the study (Iphofen 2009:131). Findings can be communicated in writing through research reports, dissertations and journal articles or orally through professional conferences (Polit & Beck 2012:680). The findings from this study will be disseminated to the Research Committee of the Tshwane Health and Social Development Department, City of Tshwane Clinic Management and also presented at Tshwane Annual District Research Conference.

3.7.3 Scientific integrity of the study

The data in this study was not fabricated and the findings were reported as they were without any changes (Polit & Beck 2012:169; Mouton 2001:240). No relevant formation was omitted or the results distorted in order to suit the researcher's expectation or otherwise. The researcher upheld ethical principles and scientific research methods throughout the study.

3.8 CONCLUSION

This chapter described the research design and methodology, including the target population, sample, sampling, data collection, data-collection instrument, data analysis and ethical considerations of the study.

Chapter 4 discusses the data analysis and interpretation, and results.

CHAPTER 4
DATA ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

Chapter 3 discussed the research design and methodology. This chapter presents the data analysis and interpretation, and the results. The purpose of the study was to identify factors associated with the HIV transmission rate in 18 to 24 month-old children enrolled in the PMTCT programme at the City of Tshwane clinics.

In order to achieve the purpose, the objectives of the study were to

- determine the HIV transmission rate among 18 to 24 month-old children on the PMTCT programme at City of Tshwane clinics
- identify factors associated with the HIV transmission rate in these children
- determine the relationship between the identified factors and the HIV transmission rate among these children

The study, therefore, wished to answer the following question:

> What are the factors associated with the HIV transmission rate in 18 to 24 month-old children enrolled in the PMTCT programme at City of Tshwane clinics?

The researcher selected a quantitative research design for the study. A quantitative approach was selected to identify factors associated with HIV transmission rate in 18 to 24 month-old children on PMTCT programme, and measure the association between the identified factors and the HIV transmission rate.

Descriptive correlational studies describe variables and examine the relationships that exist among them (Burns & Grove 2009:246). Retrospective studies link the phenomenon existing in the present with the phenomenon that occurred in the past before the study was conducted (Polit & Beck 2012:224). The researcher selected a retrospective descriptive correlational design to identify factors associated with HIV transmission rate and examine the relationship between factors identified and HIV

transmission rate. It was retrospective because the HIV transmission rate in the 18 to 24 month-old children was linked with their past exposure to associated factors.

4.2 DATA COLLECTION

The data was collected from the respondents by means of a structured questionnaire consisting of eight sections:

- Section 1: Socio-demographic information
- Section 2: Respondents' ART status and parity
- Section 3: Social stigma
- Section 4: HIV test results of the child
- Section 5: Provision and the adherence to PMTCT prophylactic treatment
- Section 6: Child feeding practices
- Section 7: Respondents' breast conditions
- Section 8: Child thrush

The data from children's clinical records was collected by means of a structured data-collection form consisting of six sections:

- Section 1: Child's demographic information
- Section 2: Provision of the PMTCT prophylactic treatment
- Section 3: Child thrush
- Section 4: Duration of breastfeeding
- Section 5: Follow-up visits
- Section 6: HIV test results

The population consisted of mothers of children aged 18 to 24 months on the PMTCT programme and the clinical records of children on the programme aged 18 to 24 months. The sample consisted of 60 mothers (30 from clinic A and 30 from clinic B) and 152 clinical records (72 from clinic A and 80 from clinic B).

4.3 DATA ANALYSIS AND RESULTS

A statistician analysed the data, using the SAS/JMP version 10 statistical software package. The analysis included descriptive and inferential statistics, such as frequency of distribution, measure of central tendency and measures of variability (Burns & Grove 2009:470). The results were presented in frequencies, percentages, graphs and tables. The presence or absence of relationships among variables and statistical differences was established. The conventions for chapter 4 are as follows:

- N=total number of respondents
- n=total number of responses
- %=percentage

4.3.1 Findings from the questionnaires

4.1.1.1 Clinic representation

Table 4.1 presents the respondents' clinic representation in the study.

Table 4.1 Respondents' clinic representation

Clinic	Number (N)	Percentage (%)
A	30	50
B	30	50
Total	**60**	**100**

A total of 60 respondents participated in the study: 30 from the city centre clinic and 30 from the township clinic. They all completed the questionnaires.

4.3.1.2 Section 1: Respondents' socio-demographic information

This section covered the respondents' socio-demographic information of age, marital status, living with a spouse/partner, educational level, employment status and financial support.

4.3.1.2.1 Respondents' age distribution

The respondents were asked to indicate their age (see figure 4.1).

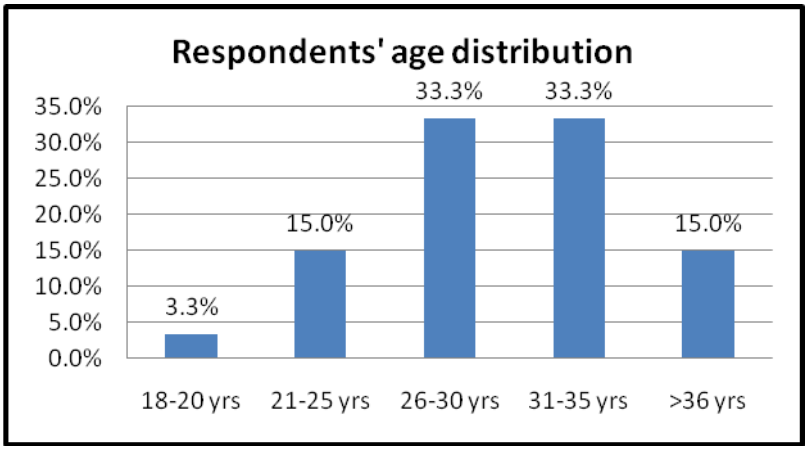

Figure 4.1 Respondents' age distribution (N=60)

Of the respondents, 3.3 (n=2) were 18-20 years old; 15.0% (n=9) were 21-25; 33.3% (n=20) were 26-30; 33.3% (n=20) were 31-35, and 15.0% (n=9) were 36 and older. The mean age for the respondents was 30 years.

In this study the mean age was low as compared to 32.2% found in Rwanda (Ruton et al 2012:4).The study found that 85.0% (n=51) of the respondents were between 18 and 35 years old, meaning they were in the reproductive age. According to Statistics South Africa (2010b:5) and Akpa and Ikpotokin (2012:169), women between 15 and 49 years old are in the reproductive or child-bearing stage

4.3.1.2.2 Respondents' marital status

The respondents were asked to indicate their marital status (see figure 4.2).

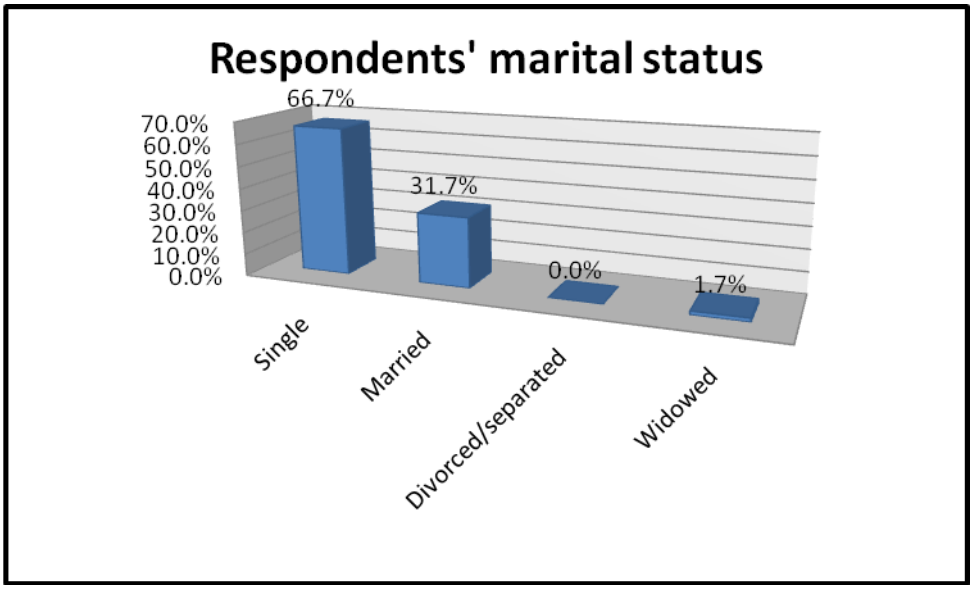

Figure 4.2 Respondents' marital status (N=60)

Of the respondents, 66.7% (n=40) were single; 31.7% (n=19) were married, no one (0%; n=0) was divorced/separated, and 1.7% (n=1) was widowed.

Figure 4.2 indicates that the majority of the respondents (66.7%; n=40) were not married. In a study in Lusaka, Kuhn et al (2007:5) found that 86.3% of the respondents were married, 8.2% were single, and 5.5% were widowed.

4.3.1.2.3 People living with the respondents

The respondents were asked to indicate who they lived with (see figure 4.3).

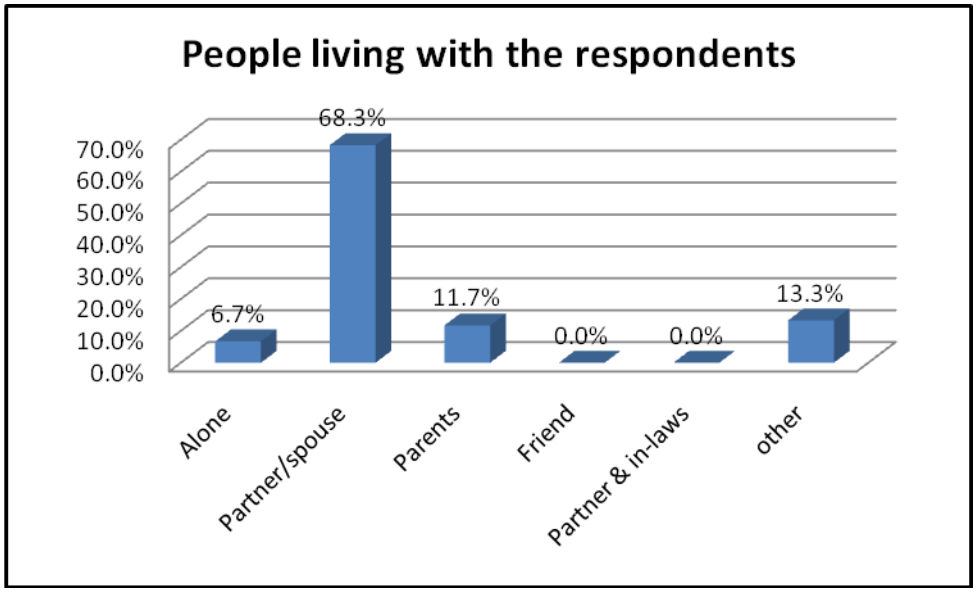

Figure 4.3 People living with the respondent (N=60)

Figure 4.3 indicates that of the respondents, 6.7% (n=4) lived alone; 68.3% (n=41) lived with their spouses/partners; 11.7% (n=7) were with their parents, and 13.3% (n=8) lived with other relatives (siblings, aunts, uncles and grandparents). No one (0%; n=0) was living with a friend or partner and in-laws. The majority of the respondents (68.3%; n=41) lived with their partners or spouses, even though only 31.7% (n=19) were married.

Majority of the respondents were living with their spouses/partners and they could be positively or negatively influenced by them in decisions regarding PMTCT. Husbands have been found to be the main decision makers for the mothers to seek health and transportation to the hospital (Kirsten et al 2011:6). These findings were lower than those of Laar and Govender (2011:132) in Southern Ghana where 85.0% of respondents were staying with their spouses or cohabiting with their partners.

4.3.1.2.4 Respondents' educational level

The respondents were asked to indicate their educational level (see figure 4.4).

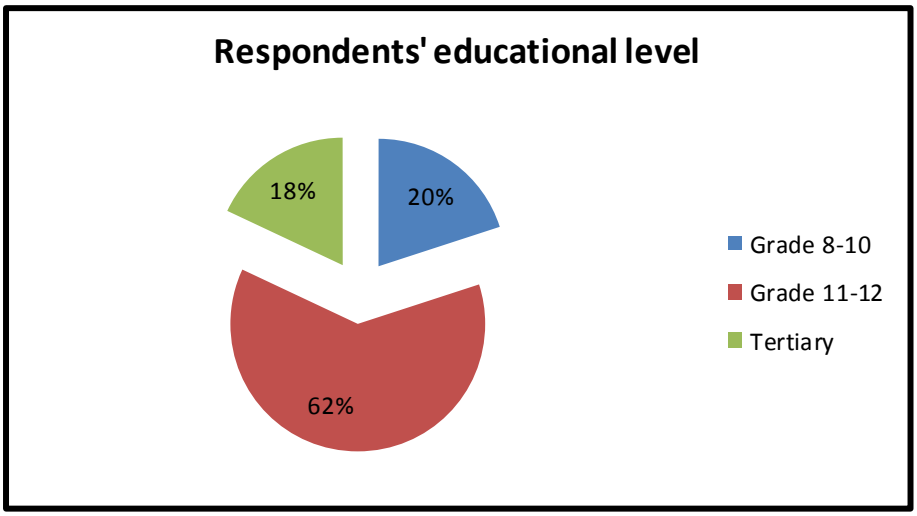

Figure 4.4 Respondents' educational level (N=60)

All the respondents (100%; N=60) had completed at least primary education. Of the respondents, 20.0% (n=12) had passed Grade 8-10; 62.0% (n=37) had passed Grade 11-12, while 18.0% (n=11) had obtained tertiary education. In this study, all the respondents could read and write. Women with at least primary or secondary education are in a better position to understand the PMTCT programme requirements. This

possibility was supported by a study conducted in South Africa reported: “Women with at least primary or secondary education have knowledge about PMTCT programme and are able to adhere to PMTCT prophylactic treatment as compared to those who cannot read or write” (Peltzer et al 2009:84 & Shargie et al 2011).

The respondents’ level of education in this study was higher than Becquet et al’s (2009:5) in West and South Africa where 7.0% had no education; 36.0% had primary education, while 57.0% had secondary or higher education.

4.3.1.2.5 Respondents’ employment status

The respondents were asked their employment status (see figure 4.5).

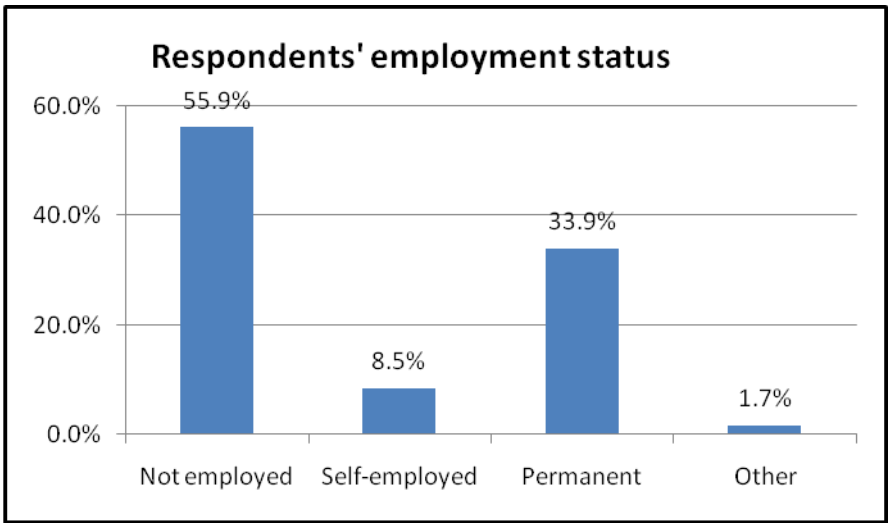

Figure 4.5 Respondents’ employment status (N=60)

Of the respondents, 55.9% (n=34) were not employed; 8.5% (n=5) were self-employed, 33.9% (n=20) were permanently employed, while 1.7% (n=1) indicated “Other” and stated student.

Majority of respondents in this study were not employed. This implies that 58% (35 out of 60) of the respondents might have encountered financial difficulties if they needed transport to the clinic. Being employed provides resources which help a woman to be financially independent and thus able to meet some of her obligations in terms of transportation to attend follow-up visits at the clinic (Nnamdi-Okagbue 2009:84). The employment status in this study does not differ much with that of Gondar Town health institutions, Northwest Ethiopia, where it was found that 57.9% of the mothers were

unemployed; 35.4% were employed, and 6.7% were self-employed (Muluye et al 2012:3). In Shargie et al (2011:4) study in Addis Ababa, Ethiopia, 66.9%of the mothers were unemployed, 23.7% were self-employed, and 9.3% were employed.

- **Association between the respondents' employment status and the clinic attended**

Table 4.2 Association between respondents' employment status and clinic attended (N=60)

Employment status	Clinic A		Clinic B	
	N	%	N	%
Not employed	11	33.3	23	67.6
Self-employed	3	60.0	2	40.0
Permanent	15	75.0	5	25.0
Other	1	100.0	0	0.0

The Chi-square was used to analyse the significance of the relationship between the respondents' employment status and the clinic attended. The Chi-square is a non-parametric statistic which is used to analyse data where no assumptions are made regarding the normal distribution of the target population and the variables are measured on nominal and ordinal scale (Brink 2006:183). Table 4.2 indicates that 75.0% (n=15) of the respondents who were permanently employed were from clinic A and 25.0% (n=5) were from clinic B, while 67.6% (n=23) of the unemployed were from clinic B and 33.3% (n=11) were from clinic A. There was a significant association between the respondents' employment status and the clinic attended. There were more unemployed respondents at clinic B and more permanently employed respondents at clinic A (Chi-square value χ^2=9.853, *df*=5, *p*-value 0.0199).

Clinic B is situated in one of the largest townships in Tshwane and next to an informal settlement, while clinic A is in the city centre. Informal settlements consist of shacks built with wood and corrugated iron that do not comply with legal building regulations (Tshikotsi 2009:1).

4.3.1.2.6 Family income per month

The respondents were asked to indicate the family income per month (see figure 4.6).

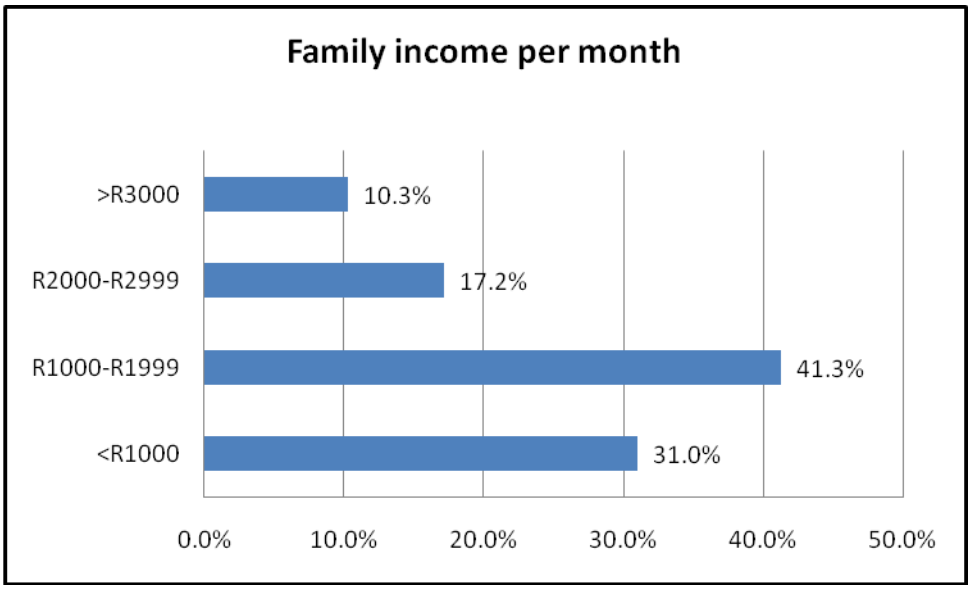

Figure 4.6 Respondents' family income per month (n=29)

Of the respondents, only 29 answered this question. Figure 4.6 indicates that of these, 31.0% (n=9) had a family income of less than R1,000 per month; 41.3% (n=12) had an income of between R1,000 and R1,999 per month; 17.2% (n=5) had an income of between R2,000 and R2,999 per month, and 10.3% (n=3) had a family income of above R3,000.

Of the respondents who answered this question, 69.0% (n=20) had a family income of more than R1,000 per month. In a high HIV-prevalence rural district of KwaZulu-Natal, Ghuman et al (2009:75) found that only 28.0% of the respondents had an income of more than R1,000 per month.

4.3.1.2.7 Unemployed respondents' source of financial support

The respondents who were unemployed were asked to indicate their source of financial support (see figure 4.7).

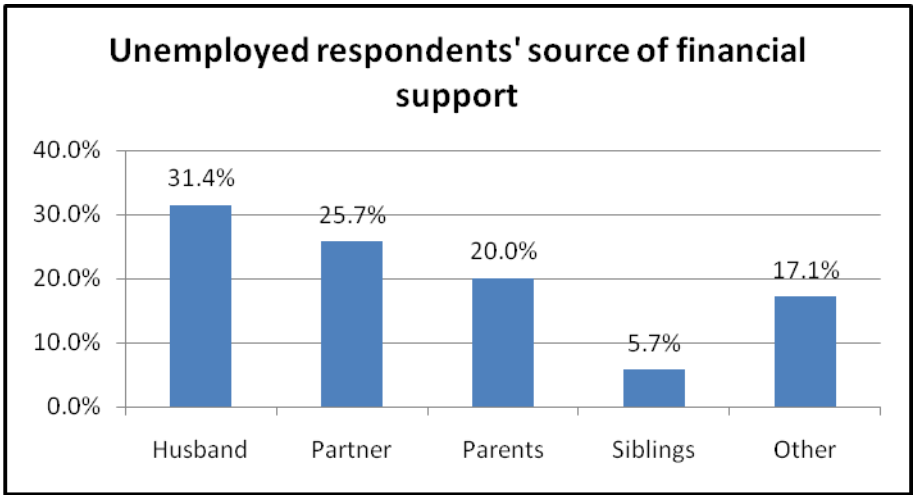

Figure 4.7 Unemployed respondents' source of financial support (n=35)

Of the 57.6% (n=35) respondents that were unemployed with one student included. Figure 4.7 indicates that of these respondents, 31.4% (n=11) received financial support from their husbands; 25.7% (n=9) from their partners; 20.0% (n=7) from their parents; 5.7% (n=2) from their siblings, and 17.1% (n=6) received financial support from other sources (social grant).

Most of the unemployed respondents (57.1%; n=20) were thus financially supported by their husbands or partners. In Tanzania, Kirsten et al (2011:6) found that many women were still dependant on their husbands for money and transport to go to the clinic.

4.3.1.3 Section 2: Respondents' ART status and parity

This section examined the respondents' ARV treatment, number of pregnancies and number of living children.

4.3.1.3.1 Number of times respondents were pregnant

The respondents were asked to indicate how many times they had been pregnant (see figure 4.8).

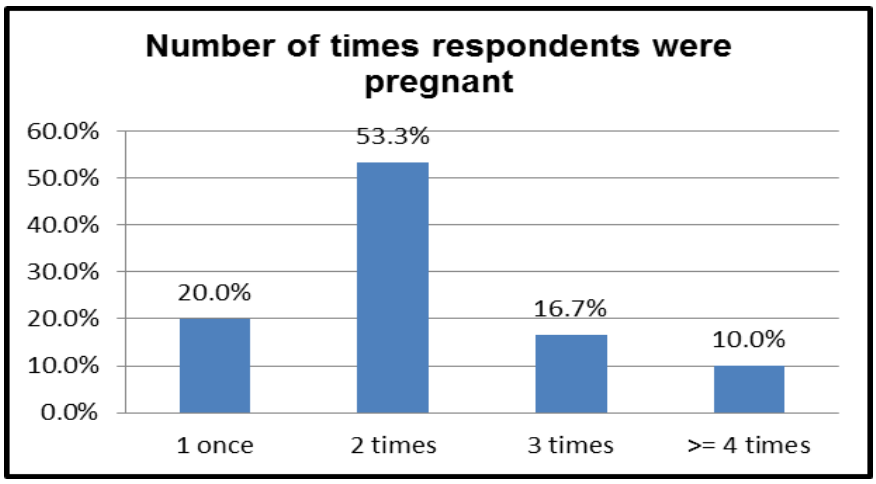

Figure 4.8 Number of times respondents were pregnant (N=60)

Figure 4.8 indicates that of the respondents, 20.0% (n=12) fell pregnant once, 53.3% (n=32) fell pregnant 2 times; 16.7% (n=10) fell pregnant 3 times, and 10.0% (n=6) fell pregnant 4 or more times. The mean fertility rate was 2.03, which is lower than the South African total fertility rate, which is 2.35 (Statistics South Africa 2011:6).

4.3.1.3.2 Number of living children per respondent

Table 4.3 indicates the number of living children per respondent.

Table 4.3 Number of living children per respondent (N=60)

Number of living children	Number of respondents	Percentage
>=4 children	3	5.0
3 children	9	15.0
2 children	34	56.7
1 child	14	23.3

Table 4.3 indicates that of the respondents, 5.0% (n=3) had 4 or more living children; 15.0% (n=9) had 3 living children, 56.7% (n=34) had 2 living children; and 23.3% (n=14) had 1 living child. Most of the respondents (76.7%; n=46) had 2 or more children.

Comparing the figures from tables 4.3 and figure 4.8 indicates the following:

- 6 respondents had been pregnant 4 or more times, but only 3 respondents had 4 or more children

- 10 respondents had been pregnant 3 times, but only 9 respondents had 3 children
- 32 respondents had been pregnant 2 times, but 34 respondents had 2 children
- 12 respondents had been pregnant once, but 14 had 1 child

These differences might indicate that some women had lost some children. However, this was not asked directly and the course of death was not asked. The respondents' parity status in this study was lower than in Addis Ababa, Ethiopia where Shargie et al (2011:4) found that 68.6% of the mothers had 3 or more children alive and only 31.4% had 1 or 2 children alive.

4.3.1.3.3 Respondents on ART

This sub-section indicates whether the respondents were on ART or not (see figure 4.9).

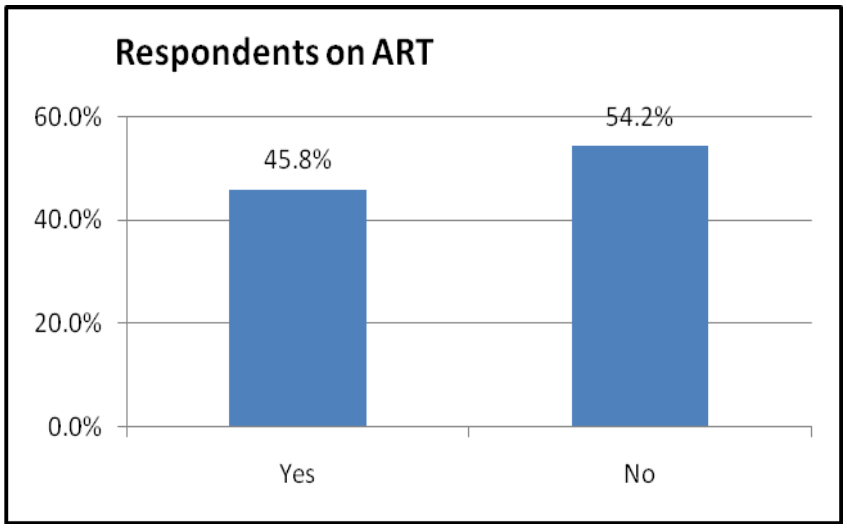

Figure 4.9 Respondents on ART (n=59)

From figure 4.9 it is clear that of the respondents, 45.8% (n=27) were on ART and 54.2% (n=32) were not.

In their study in Addis Ababa, Ethiopia, Shargie et al (2011:4) reported that 89.0% of the mothers were on ART. This study found not much difference between the number of respondents who were on lifelong ART and those who were not. The respondents not on lifelong ART had only received PMTCT prophylactic treatment consisting of Zidovudine (AZT) from 14 weeks of pregnancy, single dose of NVP, Tenofovir (TDF),

Imitracitabine (FTC) and 3 hourly AZT during labour. According to the DOH (2010:17), mothers with a CD4 count of more than 350cells/mm^3 and WHO clinical stage 1 and 2 should only receive prophylactic treatment. They are not eligible for lifelong ART.

4.3.1.3.4 Respondents' duration on ART

The respondents' duration on ART was examined (see figure 4.10).

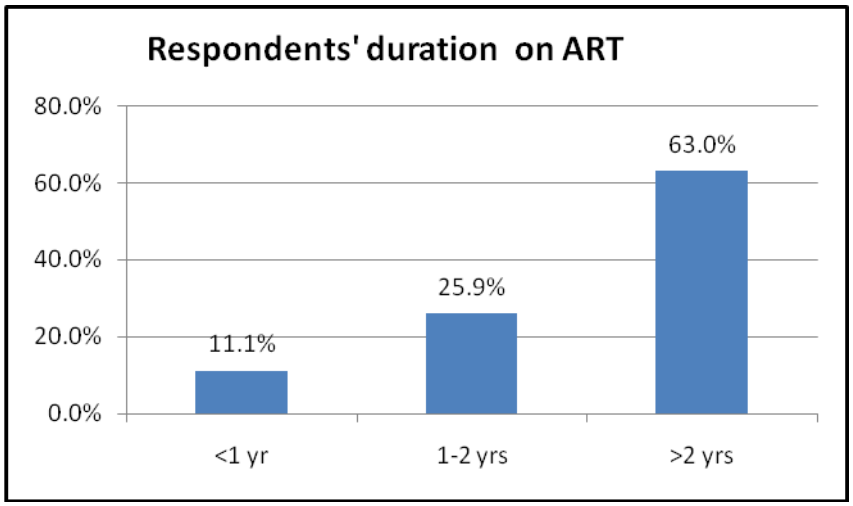

Figure 4.10 Respondents' duration on ART (n=27)

Figure 4.10 indicates that of the respondents, 11.1% (n=3) were on ART for less than a year; 25.9% (n=7) were on ART 1-2 years, and 63.0% (n=17) were on ART for more than 2 years. The majority of the respondents (63%; n=17) were on lifelong ART before they became pregnant with their current children, while 11.1% only started with lifelong ART after the birth of their children.

Women who become pregnant while on lifelong ART continue with the treatment for the rest of their lives as long as there are no contraindications, while those not on lifelong ART are reassessed at postnatal follow-up visits and put on lifelong ART if the CD4 count is less than 350 cells/mm^3 (DOH 2010:18-20).

4.3.1.4 Section 3: Social stigma

This section explored the respondents' perceptions and experiences of social stigma due to their HIV status, including disclosure of HIV status, perception of influence of HIV status on relationships with others, and feelings of victimisation.

4.3.1.4.1 Respondents' disclosure of their HIV status

The respondents were asked to indicate whether they had disclosed their HIV status (see figure 4.11).

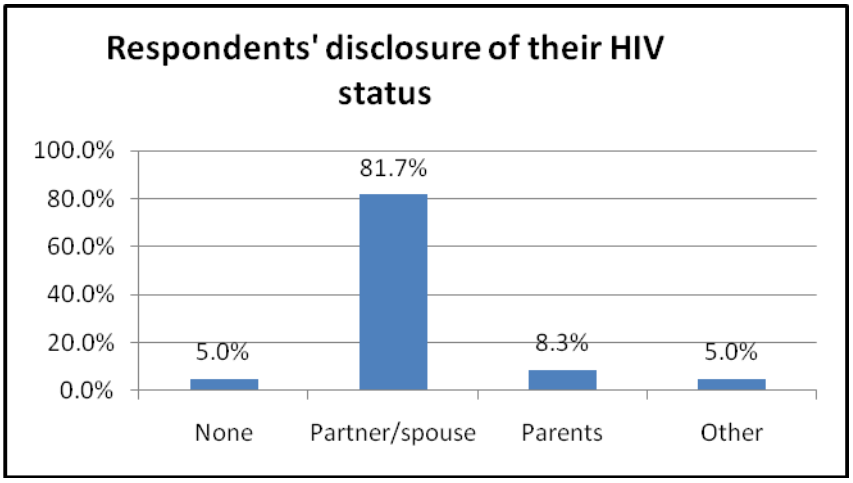

Figure 4.11 Respondents' disclosure of their HIV status (N=60)

From figure 4.11 it is evident that of the respondents, 81.7% (n=49) had disclosed their status to their spouses/partners; 8.3% (n=5) had disclosed their status to their parents; 5.0% (n=3) had disclosed their status to others (siblings and friends), and 5.0% (n=3) had not disclosed their status to anyone. The majority of the respondents (81.7%; n=49) had disclosed their HIV status to their spouses/partners, and 13.3% (n=8) had disclosed their status to their parents, siblings and friends.

In this study, 5.0% (n=3) of the respondents gave being treated badly and labelled as an HIV-positive person by others as the main reason for non-disclosure. One respondent indicated that she was afraid that her partner would leave her if he knew that she was HIV positive. It is evident that some people still fear the stigma associated with HIV. HIV infection is widely stigmatised because of its association with behaviours considered socially unacceptable by many people, and people living with the virus are frequently subject to discrimination and human rights abuses (UNAIDS 2010:124).

The level of disclosure in this study was higher than in Visser et al's (2008:1140) study in South Africa where only 59.0% of respondents had disclosed their status, and lower than Muluye et al's (2012:4) study in Northwest Ethiopia where 87.0% of respondents

had disclosed their status to their husbands, while 65.0% had disclosed their status to other family members.

4.3.1.4.2 Influence of HIV status on relationship with partner/spouse, parents, friends and the community

This sub-section examined the respondents' perception of the influence of their HIV status on their relationships with partner/spouse, parents, friends and the community (see table 4.4).

Table 4.4 Influence of HIV status on respondents' relationship with partner/spouse, parents, friends and the community (N=60)

Influence of HIV status on relationships	Yes	% Yes	No	% No	N/A	% N/A	Unsure	% Unsure
Influence of HIV status on relationship with partner/spouse	6	10.0	48	80.0	2	3.3	4	6.7
Influence of HIV status on relationship with parents	3	5.0	19	31.7	2	3.3	36	60.0
Influence of HIV status on relationship with friends	5	8.3	8	13.3	1	1.7	46	76.6
Influence of HIV status on relationship with the community	6	10.0	4	6.7	1	1.7	49	81.7

- *Influence of HIV status on relationship with partner/spouse*

Table 4.4 indicates that of the respondents, 80.0% (n=48) indicated that their HIV status would not influence their relationship with their partners/spouses; 10.0% (n=6) indicated that being HIV positive would influence their relationship with their partners/spouses; 6.7% (n=4) were unsure, and 3.3% (n=2) indicated that this question was not applicable to them. The majority of the respondents (80%; n=48) were certain that their relationships with their partners/spouses were not influenced by their HIV status and indicated that their partners/spouses were very supportive. This was an important finding since it is apparent that the most important person in the respondents' (mothers') life was the partner/spouse accepting their HIV-positive status.

Although disclosing sensitive information like HIV status has potential risks, such as abandonment, physical violence, or feelings of shame, worry, fear, or rejection, there are also several important advantages to disclosure. Disclosure may enable HIV-positive individuals to gain access to appropriate treatment, motivate them to change risky behaviour patterns, and encourage their sexual partners to seek information and testing. Moreover, disclosure may increase opportunities to receive social support, which may help individuals cope and recover from physical illness (Wong, Van Rooyen, Modiba, Richter, Gray, McIntyre, Schetter and Coates 2009:215). Sagay et al (2010) found that 86.9% of partners/spouses in Northern Nigeria were supportive of the mothers after disclosure.

- *Influence of HIV status on relationship with parents*

Table 4.4 indicates that of the respondents, 60.0% (n=36) were not sure whether their HIV status would influence their relationship with their parents, 5.0% (n=3) indicated that being HIV positive would influence their relationship with their parents; 31.7% (n=19) indicated that it would not, and 3.3% (n=2) indicated "not applicable". Of the 5.0% (n=3) who indicated "yes", one respondent indicated that her mother still thought that HIV only infected people who had sexual intercourse with many partners.

The findings indicate that some respondents feared that their HIV status would have a negative effect on their relationship with their parents. This fear is also supported in a West and South African study where 16.1% did not disclose their status to their parents out of fear of emotional abuse and discrimination, while 22.2% protected their parents from emotional stress which might affect their health. In contrast, however, Visser et al (2008:1140) found that 52.5% of respondents had disclosed because they had experienced a supportive and trusting relationship with their parents.

- *Influence of HIV status on relationship with friends*

Of the respondents, 76.6% (n=46) were not sure if being HIV positive would influence their relationship with their friends; 8.3% (n=5) indicated that it would; 13.3% (n=8) indicated that it would not, and 1.7% (n=1) indicated that this question was not applicable to them.

It is evident that the majority of the respondents were uncertain on how their HIV status will affect their relationships with their friends. This finding depicts/reflects uncertainties regarding strength of relationships and the level trust among friends. In their study, Visser et al (2008:1141) reported that 57.1% of respondents received emotional support from friends after disclosing their status.

- *Influence of HIV status on relationship with the community*

Of the respondents, 10.0% (n=6) indicated that being HIV positive would influence their relationship with the community; 6.7% (n=4) indicated that it would not; 81.7% (n=49) were unsure, and 1.7% (n=1) indicated that this question was not applicable to her. Of the respondents, 10.0% (n=6) of those who perceived that their HIV status would influence their relationship with community, and 81.7% (n=49) of those who were unsure, indicated that there were still people in the community who said bad things about HIV-positive people.

This concurs with Visser et al's (2008:1141) finding that reasons for non-disclosure to the community included a lack of a trusting relationship, and fear of emotional abuse, discrimination and abandonment.

4.3.1.4.3 Feelings of victimisation due to HIV status

The respondents were asked to indicate whether they felt victimised because of their HIV status (see figure 4.12).

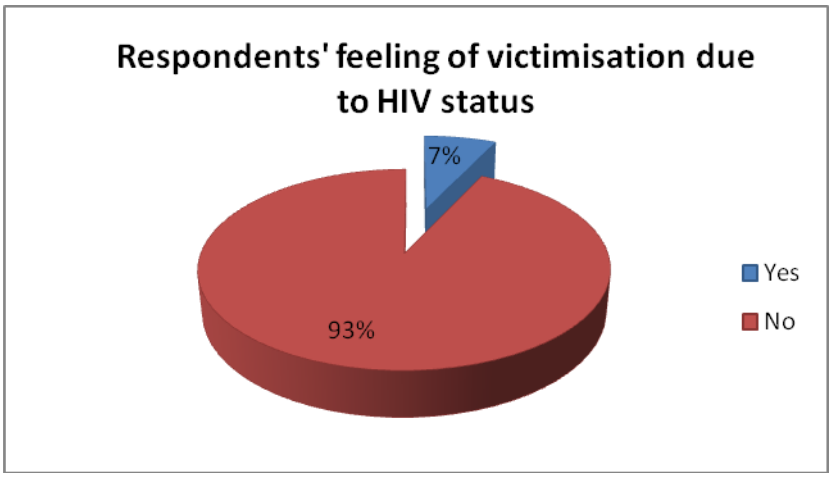

Figure 4.12 Respondents' feelings of victimisation due to HIV status (n=57)

Figure 4.12 indicates that of the respondents, 93.0% (n=53) did not experience any victimisation while 7.0% (n=4) felt victimised because of their HIV status. Of the respondents who experienced victimisation, 3.5% (n=2) were victimised by their partners. Their partners blamed them, treated them badly and eventually left them. One respondent (1.7%; n=1) indicated that she was victimised by her mother, who called her a mistress, while another (1.7%; n=1) indicated that she was victimised by a nurse at the clinic. The respondent indicated that the nurse told her not to come to the clinic and make her HIV status other people's problem.

It is evident that some health care workers have negative attitudes towards patients. This may affect patients' desire to come back for future services. In India, Rahangdale et al (2010:838) found that some mothers on PMTCT experienced abusive behaviour, moral judgement and refusal of treatment from health care staff.

Despite the support received by some respondents earlier in the study, it is evident that some respondents still experiences some form of victimization from their spouses/partners. In a study in Sub-Saharan Africa, Nassali et al (2009:1129) found that 14.0% of respondents experienced violence, divorce and withdrawal of social support following their disclosure to their husbands. In Nkangala District, Mpumalanga Province, Peltzer et al (2011:58) reported that 43.0% of the pregnant women on the PMTCT programme were abused by their partners after disclosing their HIV status to them.

4.3.1.5 Section 4: Children's HIV test results

This section investigated the children's HIV test results, including at 6 weeks; 6 weeks post-cessation of breastfeeding, and 18 months.

4.3.1.5.1 Children tested for HIV at 6 weeks and results

Figure 4.13 depicts the children's HIV tests at 6 weeks of age.

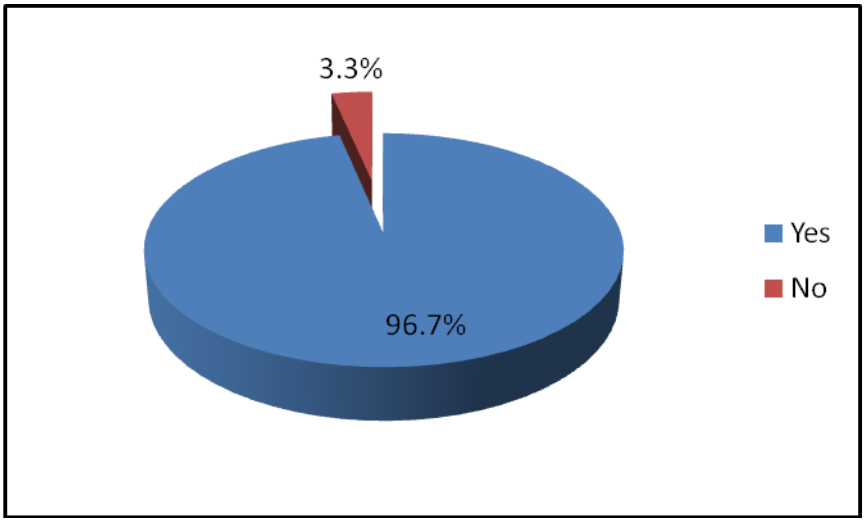

Figure 4.13 Children tested for HIV at 6 weeks of age (n=60)

Figure 4.13 indicates that of the children, 96.7% (n=58) were tested for HIV at 6 weeks, while 3.3% (n=2) were not tested.

The DOH (2010:27) recommends that all HIV-exposed children should be tested for HIV at 6 weeks of age. In this study, only 3.3% of mothers did not fulfil the requirement of the DOH. Early infant diagnosis is required to identify HIV-infected children early prior to the development of clinical diseases in order to provide them with the life-saving treatment including ART (Chiduo, Mmbando, Theilgaard, Bygbjerg, Gerstoft, Lemnge & Katzenstein 2013:2).

In this study the uptake of PCR at 6 weeks is higher than the uptake reported in Nkangala district and in Ethopia. In Nkangala District, Mpumalanga, 29.0% of respondents did not take their children back for the HIV test at six weeks (Peltzer et al 2011:31). In Addis Ababa, Ethiopia, 53.0% of respondents did so (Mirkuzie et al 2011:5).

All the children (96.7%; n=58) tested for HIV at 6 weeks of age tested negative. The HIV transmission rate was 0.0%. In this study the outcome of PMTCT at six was good. Peltzer et al (2011:31) found a 0.8% transmission rate at 6 weeks in Nkangala District, Mpumalanga. In a randomised clinical trial in Botswana, the transmission rate at one month of age was 1.2% (Shapiro et al 2009:415).

4.3.1.5.2 Children tested for HIV at 6 weeks post-cessation of breastfeeding and results

Figure 4.14 depicts the children's HIV tests at 6 weeks post-cessation of breastfeeding.

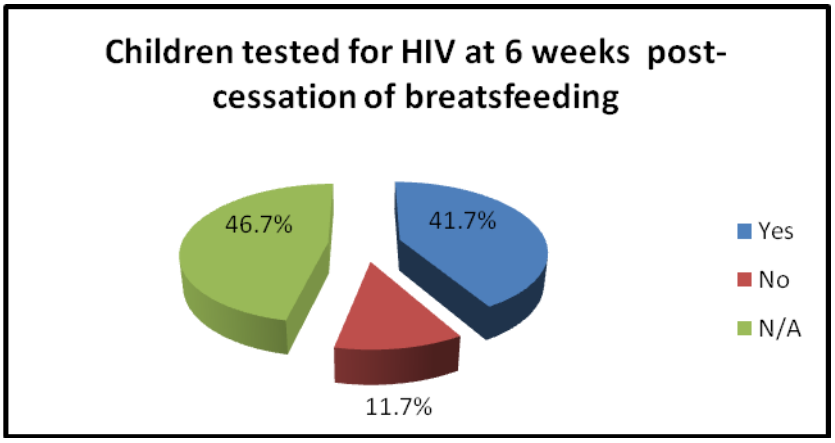

Figure 4.14 Children tested for HIV at 6 weeks post-cessation of breastfeeding (N=60)

Figure 4.14 indicates that of the respondents, 41.7% (n=25) indicated that their children were tested for HIV 6 weeks after they stopped breastfeeding; 11.0% (n=7) indicated that their children were not tested because they did not know that their children had to be tested, while 46.7% (n=28) indicated that the testing was not applicable to them because they did not breastfeed their children from birth.

All the children tested for HIV at 6 weeks post-cessation of breastfeeding tested HIV negative. These findings contradict those of Becquet et al's (2009:4) study where breastfeeding was associated with HIV transmission. The transmission rate for children breastfed below 6 months was 3.9% increasing to 8.7% for those breastfed for 6 months or more. The fact that 11.0% (n=7) of the children were not tested because the mothers did not know, is of great concern as it contradicts the DOH's (2010:6) recommendation that all breastfed children should be tested for HIV 6 weeks post-cessation of breastfeeding.

4.3.1.5.3 Children tested for HIV at 18 months and the results

The respondents were asked to indicate whether their children were tested for HIV at 18 months. Figure 4.15 illustrates the number of children tested.

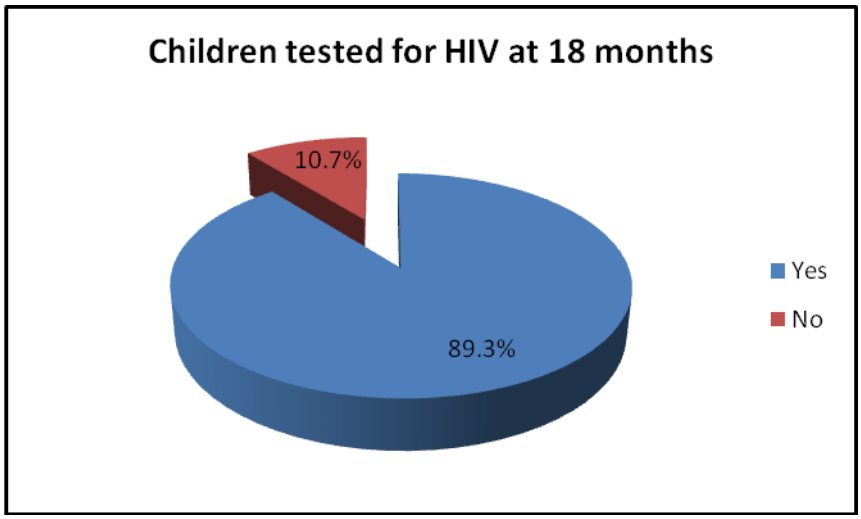

Figure 4.15 Children tested for HIV at 18 months of age (n=56)

Of the children, (89.3%; n=50) were tested for HIV at 18 months of age, while 10.7% (n=6) were not. The respondents whose children were not tested indicated that they did not know that their children had to be tested for HIV at 18 months. The uptake of HIV test at 18 months was high compared to 4.9% (13 out of 265) found in KwaZulu-Natal, South Africa (Chetty, Knight, Giddy, Crankshaw, Butler & Newell 2012:3:5). The DOH (2010:6) recommends and expects all HIV-exposed children not on ART to be tested for HIV at 18 months regardless of the feeding method.

The results were negative for all the babies who were tested therefore the HIV transmission rate in this group was 0.0%. A child is classified as HIV uninfected if the antibody test at or after 18 months was negative (Chetty et al 2012:3) .The transmission rate was low compared to 1.27% found in Malawi and 6.1% found in South Africa (Taha et al 2007:12; Becquet et al 2009:4).

4.3.1.6 Section 5: Provision and adherence to PMTCT prophylactic treatment

This section discusses the provision of PMTCT prophylactic treatment by the clinic and hospital staff and adherence to the treatment.

4.3.1.6.1 Provision of NVP within 72 hours after birth

Figure 4.16 indicates the provision of NVP to the children within 72 hours after birth.

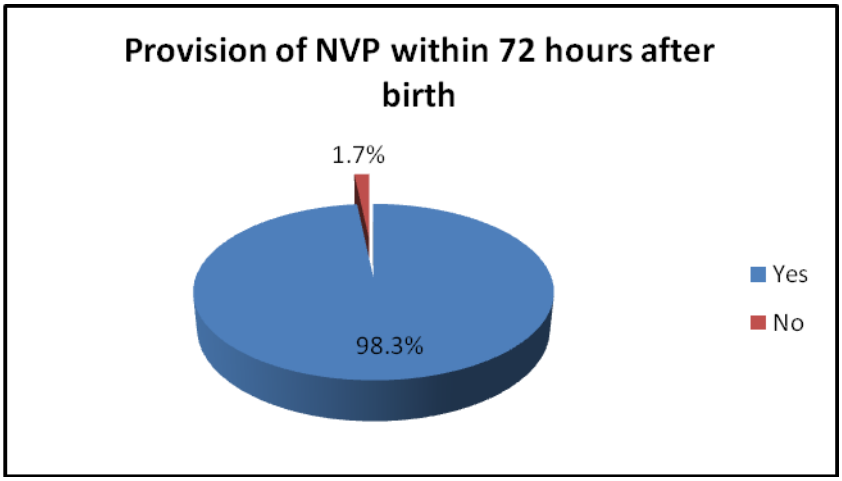

Figure 4.16 Provision of NVP within 72 hours after birth (N=60)

From figure 4.16, it is clear that most of the HIV-exposed children did receive NVP within 72 hours after birth. Of the children, 98.3% (n=59) were given NVP within 72 hours after birth while only 1.7% (n=1) was not. It was not indicated why the child did not get the treatment. In this study, the uptake of NVP within 72 hours of birth was found to be 98.3%.

In studies in Ethiopia and Nigeria, the uptake was found to be 91.0% and 61.8%, respectively (Shargie et al 2011:4; Anoje et al 2012:3). According to the DOH (2010:4), all children born to HIV-positive mothers should receive antiretroviral prophylactic treatment immediately at birth.

4.3.1.6.2 Provision of NVP by the hospital/clinic after delivery to give to the child at home

This sub-section examined the provision of NVP to the mother by the hospital/clinic after delivery to give to the child at home (see figure 4.17).

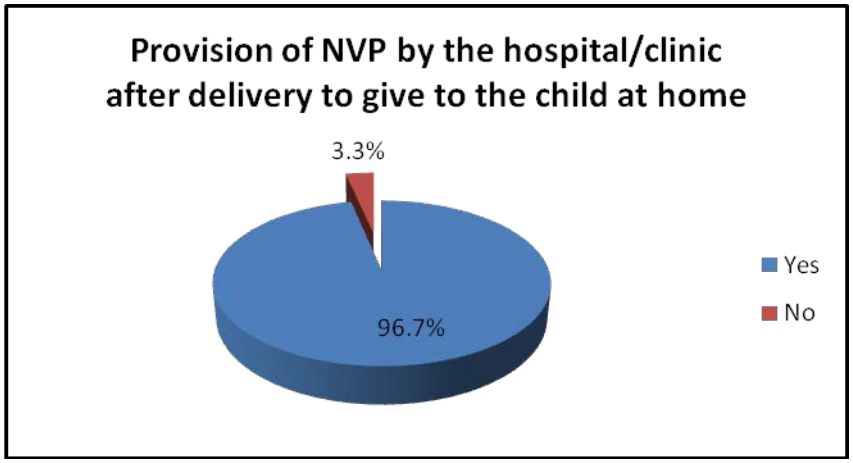

Figure 4.17 Provision of NVP after delivery to give to the child at home (N=60)

Of the respondents, 96.7% (n=58) were provided with NVP by the nurse/doctor to administer to their children at home after discharge, while 3.3% (n=2) were not. No reason was indicated. According to the DOH (2010:4), all children born to HIV-positive mothers should receive NVP for a minimum duration of six weeks, regardless of the feeding practice. Doherty et al (2009:7) found lack of training of the clinical staff and poor implementation of clinical guidelines among the causes of low uptake of NVP treatment.

4.3.1.6.3 Frequency of administering NVP at home

This sub-section discusses the frequency of administering the NVP to the child at home (see table 4.5).

Table 4.5 Frequency of administering NVP at home (n=58)

Frequency of administering NVP at home	Number (%)
Once a day	58 (96.7%)
Every second day	0
Not regularly	0
None	0

All the respondents (96.7%; n=58) who were provided with NVP to take home administered the medication to their children once a day. The nurses gave the correct information about the frequency of administering NVP and the mothers understood

clearly. According to the DOH (2010:22), all HIV-exposed children should take NVP daily for a minimum of six weeks, irrespective of the mother being on ART or not.

4.3.1.6.4 Provision of NVP at follow-up visits

This sub-section discusses the provision of NVP to the mother at follow-up visits to give to the child at home (see figure 4.18).

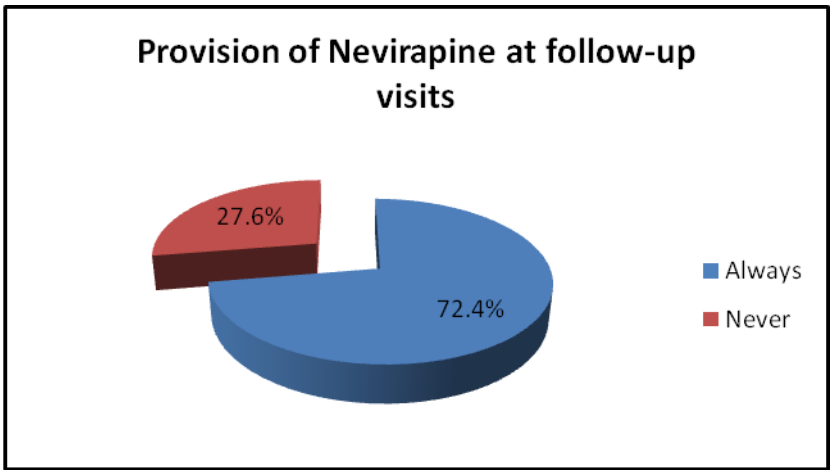

Figure 4.18 Provision of NVP at follow-up visits (n=58)

Figure 4.18 shows that 72.4% (n=42) of the children were provided with NVP at the clinic during their follow-up visits, while 27.6% (n=16) were not. No reason was indicated for those who were not provided with NVP during their follow-up visits.

According to the DOH (2010:6), children who are breastfed and whose mothers are not on ART should receive NVP until one week after they stop breastfeeding. Failure to provide medication to patients due to a shortage of stock contributes to non-adherence to medication. Unavailability of NVP and poor ownership of the PMTCT service by nurses contributes to non-adherence to treatment (Doherty et al 2009).

- **Association between unemployed respondents' source of financial support and provision of NVP at follow-up visits**

Table 4.6 Association between respondents' source of financial support and the provision of NVP at follow-up visits (n=34)

Unemployed respondents' source of financial support	Provision of NVP at follow-up visits			
	Always		Never	
	n	%	N	%
Husband	11	32.4	0	0.0
Partner	7	20.6	2	5.9
Parents	2	5.9	4	11.8
Siblings	2	5.9	0	0.0
Other	4	11.8	2	5.9

All the respondents (32.4%; n=11) who were supported financially by their husbands and those (5.9%; n=2) supported by their siblings were always provided with NVP at their follow-up visits. Of the respondents, 5.9% (n=2) of those supported financially by their partner; 11.8% (n=4) of those supported by parents, and 5.9% (n=2) of those supported by others, were never provided with NVP at their follow-up visits.

The study found an association between the unemployed respondents' source of financial support and provision of NVP at follow-up visits. Unemployed respondents who were supported by their husbands were more likely to be provided with NVP on follow-up visits (Chi-square value χ^2=10.534, *df*=4, *p*-value=0.323). Such strong support often emanates from stronger family ties that result from marital relationships or staying with the partner. In Zimbabwe, adherence to mother and infant Nevirapine treatment was associated with disclosure to the spouse or partner while non-adherent was associated with mother staying with in-laws (Kuonza et al 2010:4).

4.3.1.6.5 Children still on NVP treatment at the age 18-24 months

This sub-section covers the children still on NVP at 18 to 24 months (see figure 4.19).

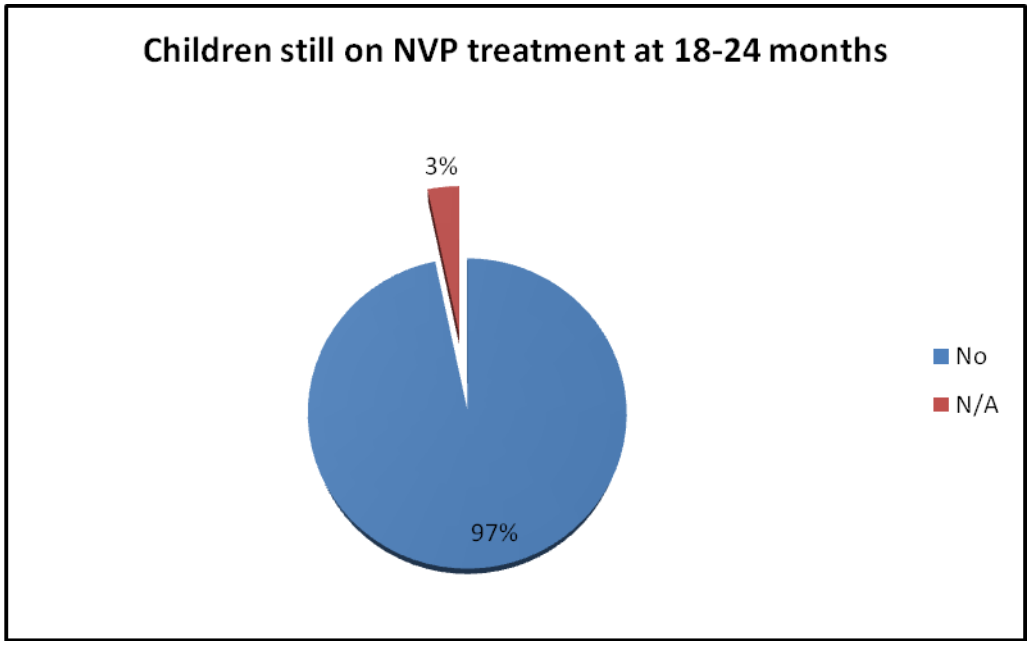

Figure 4.19 Children still on NVP treatment at 18-24 months (N=60)

The majority (97%; n=57) of the respondents reported that their children were no longer on the NVP treatment, while the question was not applicable to 3.0% (n=2) of the respondents because they never administered NVP at home. All children were no longer on NVP at 18-24 months. At 18 months there was only one child that was still breastfed and the mother was on ART. NVP is only given for 6 weeks if the mother is on ART (DOH 2010:5).

4.3.1.6.6 Age at which NVP treatment was stopped

Figure 4.20 depicts the age at which NVP treatment was stopped.

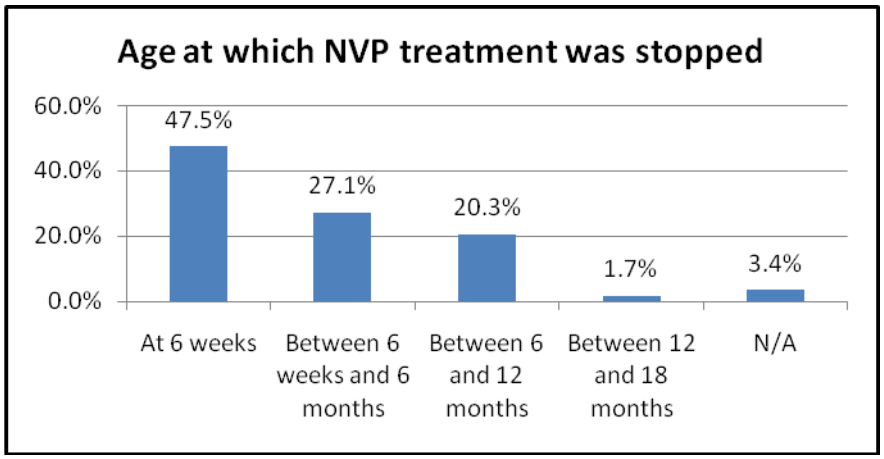

Figure 4.20 Age at which NVP treatment was stopped (n=59)

Figure 4.20 indicates that of the respondents, 47.4% (n=28) terminated the NVP treatment when their children were 6 weeks old; 27.1% (n=16) terminated the treatment when their children were between 6 weeks and 6 months old; 20.3% (n=12) terminated it between 6 and 12 months; 1.7% (n=1) terminated it between 12 and 18 months, while 3.4% (n=2) indicated that the question was not applicable to them. At 18 months all the children were no longer on treatment. According to the DOH (2010:6-7), HIV-exposed children whose mothers are on ART and not breastfeeding should terminate NVP treatment at 6 weeks, while those whose mothers are not on ART and breastfeeding should terminate NVP at one week post-cessation of breastfeeding.

Of the respondents, 47.5% (n=28) stopped administering NVP treatment at 6 weeks of age as compared to 43.1% (n=25) who were never breastfed. No statistical association was found between the duration of breastfeeding and duration of NVP intake; even though the two could be expected to be the same if the guidelines were implemented correctly.

4.3.1.6.7 Reason for stopping the NVP treatment

Of the respondents,31.6%(n=18) indicated that the nurse at the clinic told them to stop giving the treatment to their children at 6 weeks because the respondents were taking ART while 68.4% (n=39) indicated that they stopped because they were no longer breastfeeding and their children tested HIV negative. It appears like nurses implemented the guidelines correctly with regard to termination of NVP treatment. According to DOH (2010:5), children whose mothers are on ART and those who were not breastfed should stop NVP treatment at 6 weeks of age. Children who were breastfed and mothers not on ART should stop NVP treatment only if they test HIV negative at 6 weeks after cessation of breastfeeding.

4.3.1.6.8 Age at which the child was started on CTX treatment

Figure 4.21 indicates the age at which the child was started on CTX treatment.

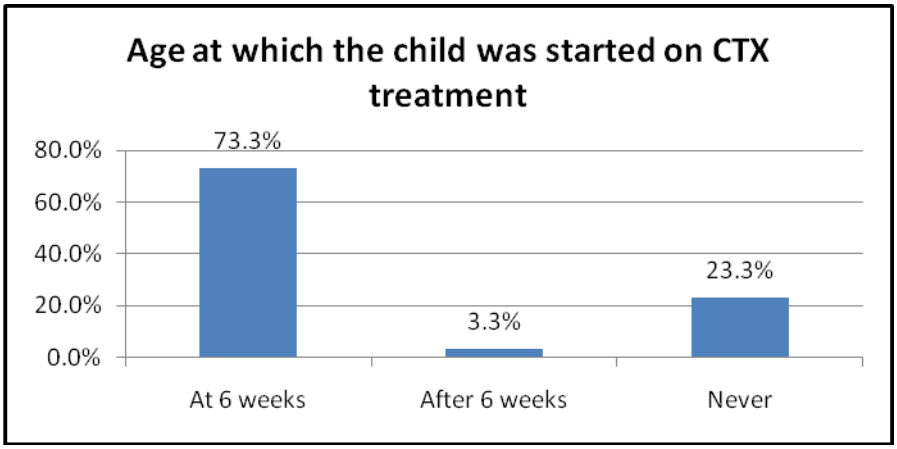

Figure 4.21 Age at which the child was started on CTX treatment (N=60)

Figure 4.21 shows that 73.3% (n=44) of the children were started on CTX treatment at 6 weeks after birth; 3.3% (n=2) were started after 6 weeks, while 23.3% (n=14) were never on treatment. No reason was given for those that were never started on treatment and those that were started later than 6 weeks of age.

The uptake of CTX treatment was high compared to 33% found in KwaZulu-Natal, South Africa (Moodley, Reddy, Mahungo & Masha 2013:2). This shows non-compliance with the guidelines. According to the DOH (2010:27), all HIV-exposed children should be started on CTX treatment at 6 weeks of age regardless of their feeding method. Inadequacies previously found in the health care system included guidelines not being followed and health care facilities not adequately equipped (HSRC et al 2010:27; Doherty et al 2009:7).

- **Association between unemployed respondents' source of financial support and administration of CTX treatment**

Table 4.7 Association between unemployed respondents' source of financial support and administration of CTX treatment (N=35)

Source of financial support for the unemployed respondents	Age at which CTX treatment was started					
	At 6 weeks		After 6 weeks		Never	
	n	%	n	%	N	%
Husband	10	90.9	0	0.0	1	9.1
Partner	6	66.7	0	0.0	3	33.3
Parents	4	57.1	0	0.0	3	42.9
Siblings	1	50.0	1	50.0	0	0.0
Other	3	50.0	0	0.0	3	50.0

Of the unemployed respondents, 90.9% (n=10) of those supported financially by their husbands and 66.7% (n=6) of those supported by their partners started CTX treatment at 6 weeks; 57.1% (n=4) of those supported by their parents, 50.0% (n=1) of those supported by their siblings, and 50.0% (n=3) of those supported by others started treatment at 6 weeks.

An association was found between the unemployed respondents' source of financial support and the administration of CTX treatment. At Chi-square value χ^2=21.409, *df*=8, *p*-value=0.0061, it appeared that the unemployed respondents who were financially supported by husbands and partners started their children on CTX treatment at 6 weeks compared to those financially supported by their parents, siblings or others. In contrast, In Ethiopia it was found that initiation and adherence to CTX treatment was associated with the mother receiving care at the same facility and child received NVP prophylaxis treatment at birth (Shargie et al 2011:3).

4.3.1.6.9 Frequency of administering CTX at home

Figure 4.22 presents the frequency of administering CTX treatment at home.

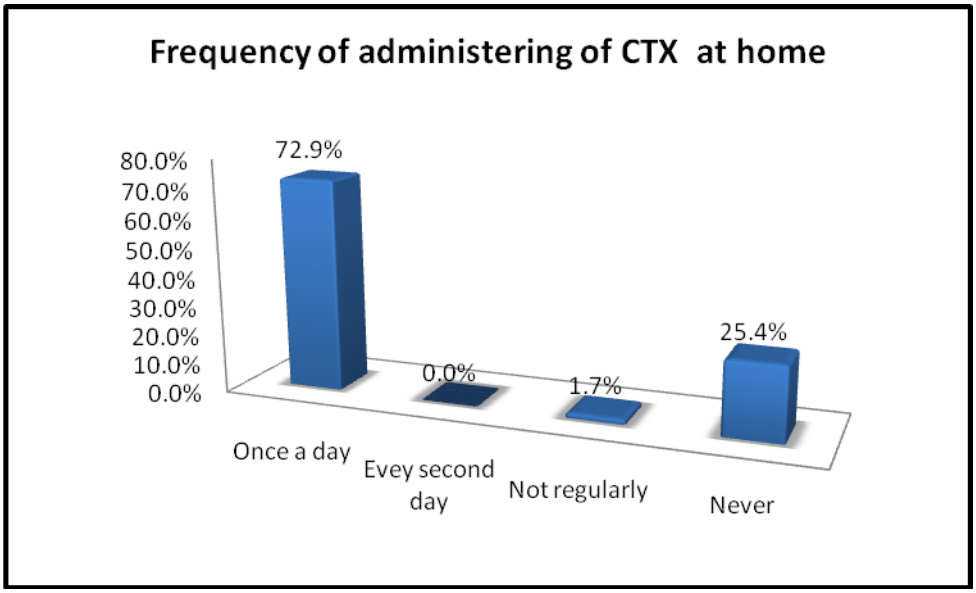

Figure 4.22 Frequency of administering CTX at home (n=59)

From figure 4.22 it is evident that of the respondents, 72.9% (n=43) administered CTX to their children once a day; 1.7% (n=1) did not administer it on a daily basis, while 25.4% (n=15) never administered it at all.

In a study in South Africa, Moodley et al (2013:2) found that mothers administered CTX differently, including three times daily, twice daily, and not on weekends. The findings indicate non-compliance to PMTCT guidelines. The frequency of administering CTX for HIV-exposed children is once daily (WHO & UNICEF 2009:28).

4.3.1.6.10 Provision of CTX at follow-up clinic visits

This sub-section investigated the provision of CTX treatment at follow-up visits.

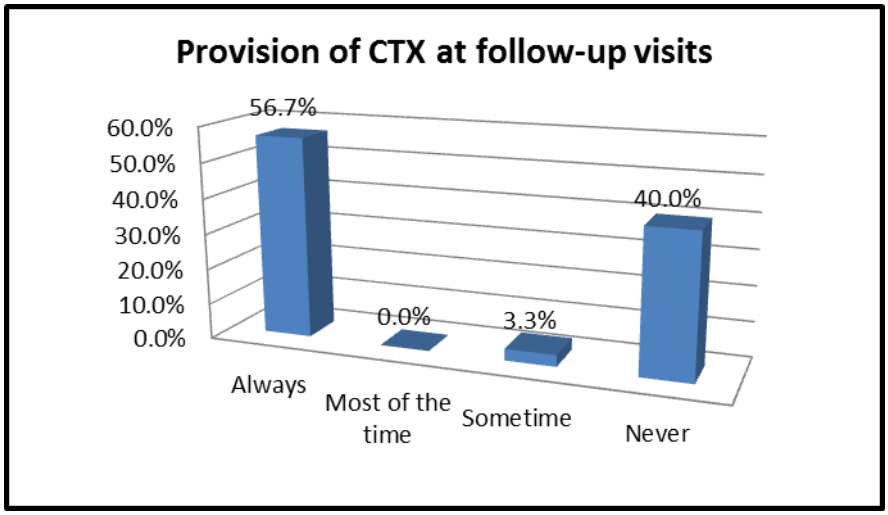

Figure 4.23 Provision of CTX at follow-up clinic visits (N=60)

Figure 4.23 indicates that of the respondents, 56.7% (n=34) always received the CTX treatment on their follow-up clinic visits, 3.3% (n=2) only received it sometimes, while 40% (n=24) never received it at all during all their follow-up visits. No reason was indicated for not receiving it always.

The proportion of children who always received CTX at follow-up visits was low compared to 93.7% of those who were reported to been started on CTX in KwaZulu-Natal, South Africa (Moodley et al 2013:2).

- **Association between the respondents' age and provision of CTX to take home at follow-up visits**

Table 4.8 Association between the respondents' age and the provision of CTX to take home at follow-up visits (N=60)

Respondents' age	Provision of CTX to take home at follow-up visits					
	Always		Sometimes		Never	
	N	%	N	%	N	%
18-20 years	0	0.0	1	50.0	1	50.0
21-25 years	6	66.7	0	0.0	3	33.3
26-30 years	11	55.0	1	5.0	8	40.0
31-35 years	14	70.0	0	0.0	6	30.0
> 36 years	3	33.3	0	0.0	6	66.7

Table 4.8 indicates that of the respondents, 66.7% (n=6) aged 21-25; 55.0% (n=11) aged 26-30; 70% (n=14) aged 31-35, and 33.3% (n=3) aged above 36 always received

CTX at their follow-up visits, while 50.0% (n=1) aged 18-20 sometimes received CTX to take home at follow-up visits.

Respondents between 21 and 35 years old appeared to receive CTX to take home more regularly at follow-up visits at clinics (Chi-square value χ^2=19.544, df=8 p-value=0.012). This could be due to the fact that majority of respondents (82%) in this study were aged between 21 and 35 years, while all respondents had some form of secondary education. Mothers with secondary education have been found to be adherent to CTX treatment than those who cannot read or write (Shargie et al 2011:3).

4.3.1.6.11 Children still on CTX at 18 to 24 months

This sub-section examined whether the children were still on CTX treatment at 18-24 months.

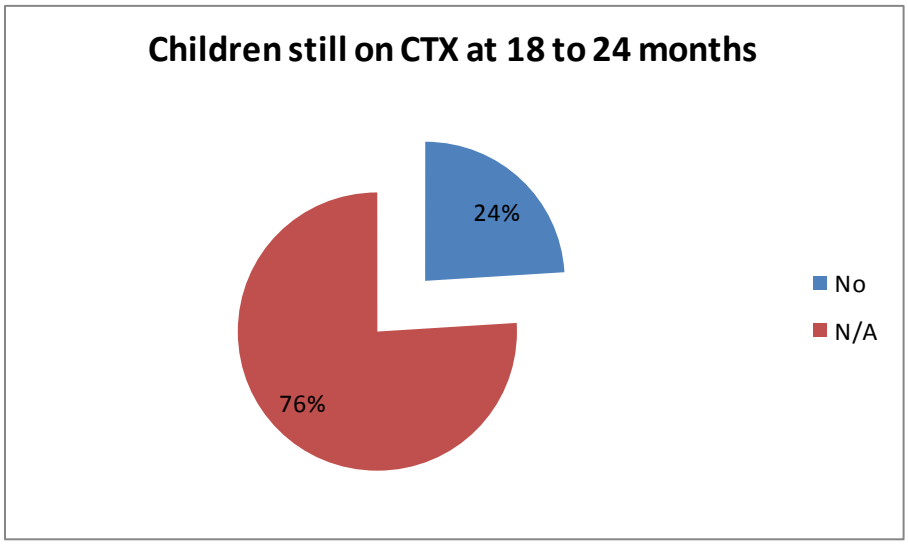

Figure 4.24 Children still on CTX at 18 to 24 months (n=59)

Of the respondents, 76.0% (n=45) indicated that their children were no longer on CTX treatment, while 24.0% (n=14) were never on CTX. All the children were no longer on CTX treatment although one child was still breastfed.

This indicated shortcomings in the implementation of the guidelines. According to the DOH (2010:5), CTX treatment should only be stopped when the child is no longer breastfed and has tested HIV negative post-cessation of breastfeeding.

4.3.1.6.12 Age *at which the CTX treatment was terminated*

Table 4.9 presents the age at which CTX treatment was terminated.

Table 4.9 Age at which the CTX treatment was terminated (N=60)

At what age was the CTX treatment terminated?	N	%
Between 6 weeks and 6 months	29	48.3
Between 6 and 12 months	16	26.7
Between 12 and 18 months	1	1.7
N/A	14	23.3

According to table 4.9, 48.3% (n=29) of the respondents terminated the treatment when their children were between 6 weeks and 6 months old; 26.7% (n=16) did so at between 6 and 12 months; 1.7% (n=1) did so when the child was 12 to 18 months old, while 23.3% (n=14) never started the treatment.

All HIV-exposed children should be started on CTX treatment at 6 weeks regardless of the feeding practice. Treatment can only be terminated when the children have tested HIV negative and are no longer breastfed (DOH 2010:5).

4.3.1.6.13 Reason for stopping the CTX treatment

Of the respondents, 76.6% (n=46) indicated that they stopped the treatment because their children were no longer breastfeeding and were HIV negative, while 23.3% (n=14) did not answer this question. In a study in South Africa, Moodley et al (2013:2) found that availability of children's HIV status was associated with continuing or discontinuing of CTX treatment after 6 months of age or after cessation of breastfeeding. HIV-exposed children may stop CTX treatment only if they are allergic to it or have tested HIV negative and are no longer breastfeeding (WHO & UNICEF 2009:6).

4.3.1.7 Section 6: Child feeding practices

This section examined the respondents' child feeding practices, including feeding advice received from the clinic nurse, feeding practices from birth to 6 months, difficulties experienced with the selected feeding option, availability of money to buy

formula milk, duration of breastfeeding, and introduction of water and other foods to the child.

4.3.1.7.1 Respondents received advice from the clinic nurse about feeding options

Figure 4.25 indicates whether the respondents received advice from the clinic nurse about feeding options.

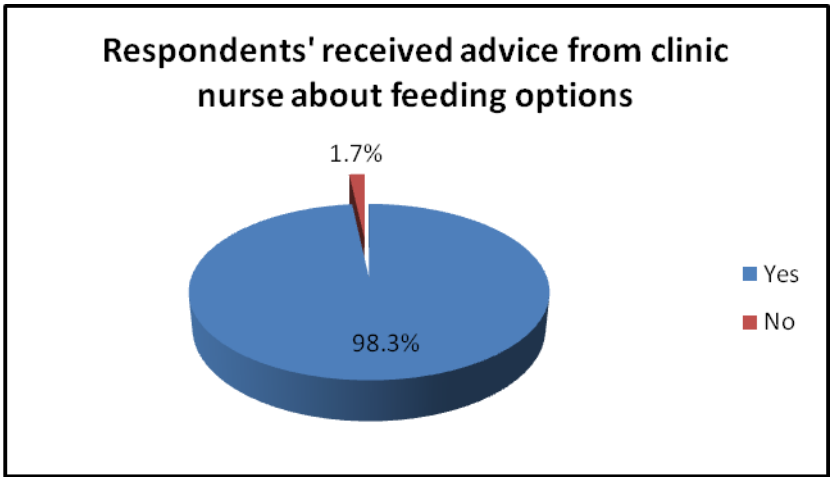

Figure 4.25 Respondents received advice from the clinic nurse about feeding options (n=58)

Of the respondents, 98.3%; (n=57) indicated that they did receive feeding advice from the clinic sister; while 1.7% (n=1) did not receive advice.

In Addis Ababa, Ethiopia, Shargie et al (2011) found 58.4% of respondents received feeding advice from nurses. These findings were low as compared 100% found in South East Nigeria, where all participants reported to have received counselling on infant feeding and adherence during health education given at every antenatal care visits (Lawani, Onyebuchi, Iyoke, Onoh & Nkwo 2014:378). According to the DOH (2010:24), counselling on infant feeding should start after the first HIV post-test counselling session in pregnancy and continue at every antenatal visit. Infant feeding support should be provided at postnatal visits.

4.3.1.7.2 Respondents' child feeding practice from birth to 6 weeks

Figure 4.26 depicts the respondents' child feeding practice from birth to 6 weeks.

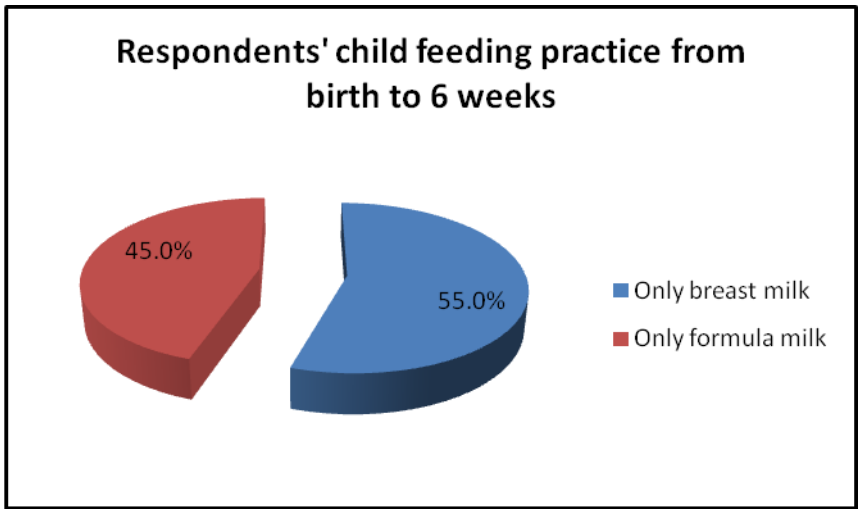

Figure 4.26 Respondents' child feeding practice from birth to 6 weeks (N=60)

Of the respondents, 55.0% (n=33) indicated that their children were exclusively breastfed from birth to 6 weeks, and 45.0% (n=27) fed their children formula milk exclusively. There was not much difference between the percentage of respondents who exclusively breastfed their children and those who exclusively formula fed their children.

In a study on factors affecting HIV-infected mothers' ability to adhere to antenatal intended infant feeding choice in Tshwane, Matjie et al (2009:21) found that only 7.4% of HIV-exposed children were exclusively breastfed, 69.0% were exclusively formula fed, and 23.6% were mixed fed at 6 weeks. According to DOH (2008:48), the recommended feeding options for HIV exposed children either exclusive breastfeeding or exclusive formula feeding.

- **Association between respondents' feeding practice from birth to 6 weeks and the clinic involved**

Table 4.10 Association between respondents' feeding practice from birth to 6 weeks and the clinic involved (N=60)

Clinic involved	Feeding practice			
	Only breast milk		Only formula milk	
	n	%	N	%
Clinic A	11	33.3	19	70.4
Clinic B	22	66.6	8	29.6

From table 4.10 it is evident that of the respondents, 66.6% (n=22) in clinic B exclusively breastfed their children from birth to 6 weeks compared to 33.3% (n=11) in clinic A; while 70.4% (n=19) in clinic A exclusively formula fed their children compared to 29.6% (n=8) in clinic B.

Respondents visiting clinic B were more likely to breastfeed, whereas respondents visiting clinic A were more likely to provide their infants with formula milk (Chi-square value χ^2=8.148, *df*=1, *p*-value=0.0043). On a 2x2 contingency table, an odds-ratio was calculated: mothers attending clinic B were 4.75 times more likely to breastfeed in the period from birth to 6 weeks. Majority of respondents in clinic B were unemployed as compared to clinic A. Unemployment can contribute to the mother's inability to meet the AFASS criteria, particularly the affordability and sustainability of formula feeding (DOH 2008:48). In south east Ethiopia, Setegn, Belachew, Gerbaba, Deribe, Deribew & Biadgilign (2012:5) found that 73% of unemployed mothers were exclusively breastfeeding as compared to 33% of the employed mothers.

- **Association between unemployed respondents' source of financial support and feeding practice from birth to 6 weeks**

Table 4.11 Association between unemployed respondents' source of financial support and feeding practice from birth to 6 weeks (n=35)

Unemployed respondents' source of financial support	Feeding practice			
	Only breast milk		Only formula milk	
	N	%	N	%
Husband	9	42.86	2	14.29
Partner	6	28.57	3	21.43
Parents	1	4.76	6	42.86
Siblings	2	9.52	0	0.00
Other	3	14.29	3	21.43

Table 4.11 indicates that of the respondents, 42.86% (n=9) receiving financial support from husband exclusively breastfed their children at 6 weeks of age compared to 28.57% (n=6), 4.76% (n=1), 9.52% (n=2) and 14.29% (n=3) who received financial support from partners, parents, siblings and others, respectively.

Unemployed respondents receiving financial support from husbands/partners appeared more likely to only breastfeed from birth to 6 weeks (at Chi-square value χ^2=10.027, *df*=4, *p*-value=0.040). The practice may be due to the fact that Clinic B is in a township and most mothers are unemployed as compared to clinic A which is in the city centre and more mothers are employed. The findings were consistent with those of the study done in Goba district, South East Ethiopia, where 73% of unemployed mothers were reported to be exclusively breastfeeding as compared to 33% of the employed mothers (Setegn et al 2012:5).

4.3.1.7.3 Respondents' child feeding practice from 6 weeks to 6 months

Figure 4.27 depicts the respondents' child feeding practice from 6 weeks to 6 months.

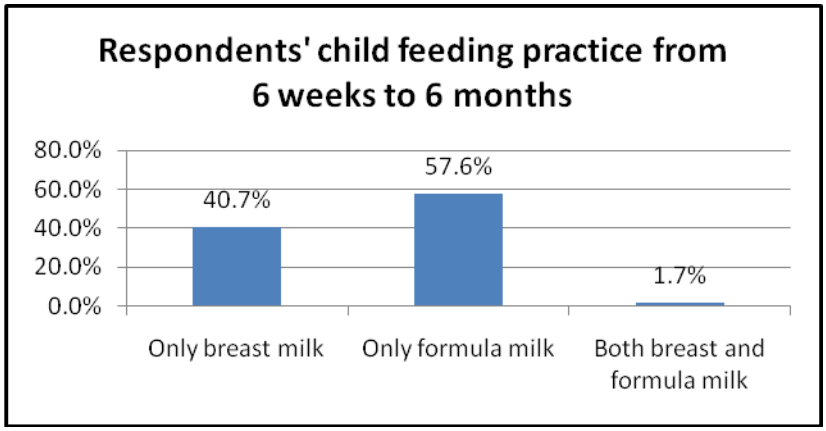

Figure 4.27 Respondents' child feeding practice from 6 weeks to 6 months (n=59)

Figure 4.27 indicates that of the respondents, 40.7% (n=24) indicated that their children were still on exclusive breastfeeding at 6 months; 57.6% (n=34) were on exclusive formula feeding, while 1.7% (n=1) was on both formula and breastfeeding.

At 6 months more of the respondents' children were on formula milk than on breast milk compared to at 6 weeks. About 27.0% (9 out of 33) of respondents who were exclusively breastfeeding at 6 weeks, were giving formula at 6 months and only 1.7% (n=1) was mixed feeding.

In 2010, the HSRC et al (2010:xix) found that only 25.7% of children in South Africa were exclusively breastfed; 25.5% were exclusively formula fed, and 51.3% were mixed fed at 6 months. In their study in Southern Ghana, Laar and Govender (2011:133) found 60.0% children exclusively breastfed, 40.0% mixed fed, and none exclusively formula fed. According to the DOH (2010:24), all mothers who decide to breastfeed should exclusively breastfeed for at least 6 months and introduce complementary food after 6 months. Mixed feeding before 6 months is discouraged. Mixed feeding in the first 6 months has been found to predispose children to malnutrition, diarrhoea, and pneumonia and have been identified as one of the numerous causes of the setbacks in efforts to achieve HIV-free survival for children (Lawani et al 2014:378).

- **Association between number of times the respondents were pregnant and feeding practice from 6 weeks to 6 months**

Table 4.12 Association between number of times the respondents were pregnant and feeding practice from 6 weeks to 6 months (N=60)

Number of times the respondents were pregnant	Feeding practices from 6 weeks to 6 months					
	Only breast milk		Only formula milk		Both	
	n	%	n	%	N	%
>=4 times	2	33.3	3	50.0	1	16.7
3 times	6	60.0	4	40.0	0	0.0
2 times	9	29.0	23	71	0	0.0
Once	7	58.3	5	41.7	0	0.0

Table 4.12 reflects that 50.0% (n=3) of the respondents who became pregnant 4 or more times were more likely to exclusively formula feed their children by 6 months of age compared to 40.0% (n=4), 71.0% (n=23) and 41.7% (n=5) who became pregnant 3 times, 2 times, and once, respectively.

Respondents who had experienced 2 pregnancies were more inclined to provide infants formula milk during the period 6 weeks to 6 months (Chi-square value χ^2=13.871, *df*=6, *p*-value=0.0311). In contrast, it the south east of Ethiopia, it found that 77.7% of mothers who were pregnant 2 to 4 times were more likely to exclusively breastfeed as compared to 49% of those who were pregnant once (Setegn et al 2012:4).

- **Association between respondents' number of children alive and feeding practice from 6 weeks to 6 months**

Table 4.13 Association between respondents' number of children alive and feeding practice from 6 weeks to 6 months (N=60)

Respondents' number of children alive	Feeding practice from 6 weeks to 6 months					
	Only breast milk		Only formula milk		Both	
	N	%	n	%	N	%
>=4 children	0	0.0	2	66.7	1	33.3
3 children	6	66.7	3	33.3	0	0.0
2 children	12	36.4	22	63.6	0	0.0
1 child	6	42.9	8	57.1	0	0.0

Table 4.13 indicates that of the respondents, 66.7% (n=2) with 4 or more living children were exclusively formula feeding their children between 6 weeks and 6 months, compared to 33.3% (n=3) with 3 living children, 63.6% (n=22) with 2 living children, and 57.1% (n=8) with 1 living child. Of the respondents with 4 or more children, 33.3% (n=1) mixed fed the children.

The respondents with 2 children appeared more likely to provide formula milk during 6 weeks to 6 months, while those with 4 children or more were more likely to mix feed (Chi-square value χ^2=22.72, *df*=6, *p*-value=0.0009). In contrast, Laar & Govender (2011:131) in their study on factors influencing the choice of infant feeding of HIV positive mothers found that all (100%) mothers breastfed their children. Sixty two percent practiced exclusive breastfeeding from birth to 6 months regardless of their parity. No one gave formula feeding (Laar & Govender 2022:131).

4.3.1.7.4 Respondents' difficulty experienced with the chosen feeding option

Figure 4.28 depicts the respondents' difficulty experienced with the chosen feeding option.

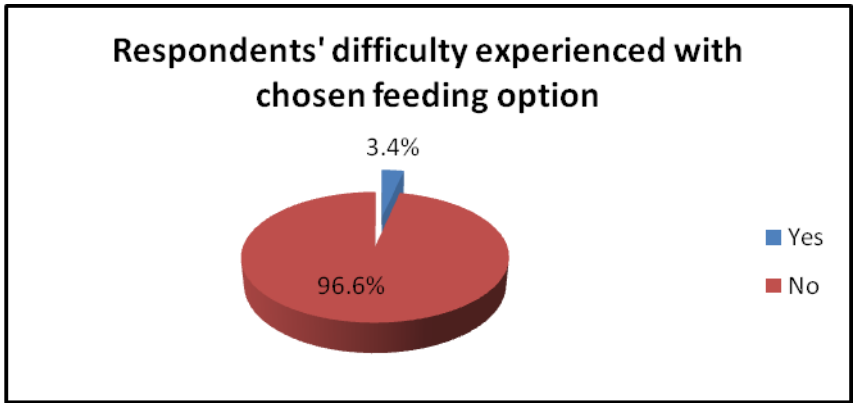

Figure 4.28 Respondents' difficulty experienced with chosen feeding option (n=59)

Figure 4.28 indicates that of the respondents, 96.6% (n=57) had no difficulty with the chosen feeding option, while 3.4% (n=2) had difficulties with the feeding method. They indicated that they did not breastfeed and were initially provided with milk from the clinic, but this was later stopped. They were left stranded because they could not afford to buy enough milk for their children.

In Northwest Ethiopia, Muluye et al (2012:4) found that 32.1% of respondents indicated that the unavailability of milk supply from the health care services affected their feeding option. In Khayelitsha, South Africa, Zunza et al (2011:277) found that 9.4% of respondents reported infant feeding difficulties, disapproval of feeding option by the family members and infant not passing stool regularly as difficulties experienced with their feeding choice. Maru et al (2010:1121), in a study done in Nigeria, found that most common difficulties experienced by formula feeding women were: having to prepare formula in the middle of the night, having insufficient resources for preparing the formula, maintaining sanitation of utensils and experiencing fatigue.

4.3.1.7.5 Respondents' availability of money to buy formula milk

The respondents were asked about the availability of money to buy formula milk (see figure 4.29).

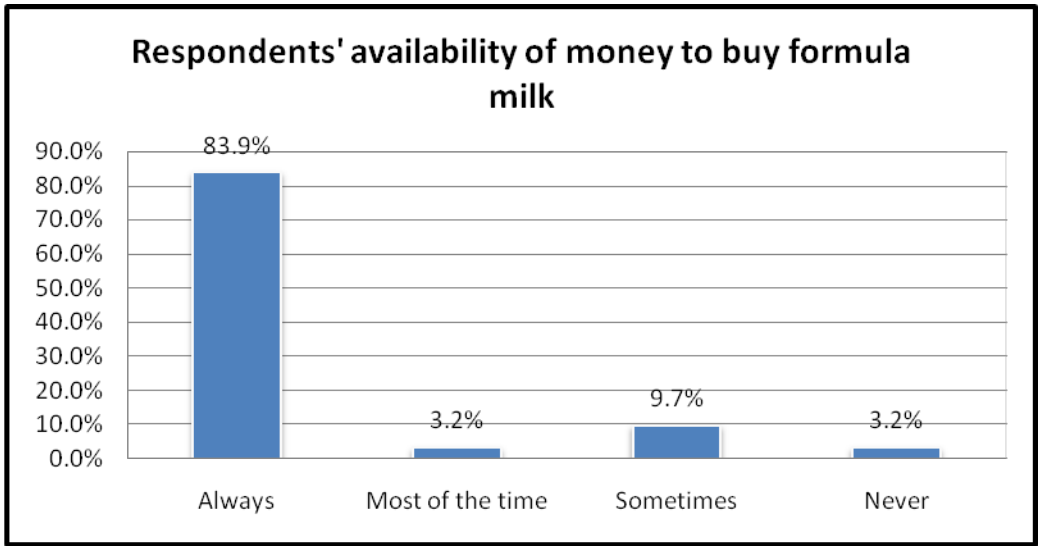

Figure 4.29 Respondents' availability of money to buy formula milk (n=31)

This question was only answered by 31 of the respondents. Figure 4.29 indicates that 83.9% (n=26) always had money to buy formula; 3.2% (n=1) had money most of the time; 9.7% (n=3) had money sometimes, and 3.2% (n=1) never had money to buy formula milk. Those who did not always have money to buy formula indicated that they gave their children "rooibos" (red bush) tea or soft porridge when the milk was finished.

In Ghana, Laar and Govender (2011:133) found that 100% of the women who opted for exclusive replacement feeding never practiced it. Unaffordability to buy the buy formula milk was reported as the main reason for supplementing with some local foods.

4.3.1.7.6 Respondents' children who were still breastfed at 18 to 24 months

Figure 4.30 indicates the respondents' children who were still breastfed at 18-24 months.

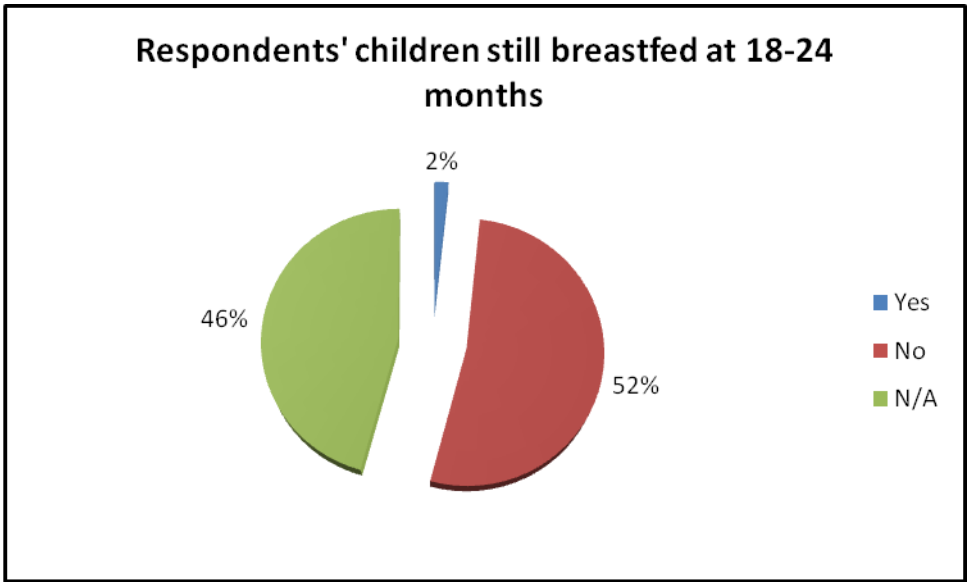

Figure 4.30 Respondents' children still breastfed at 18 to 24 months (n=59)

Of the respondents, 1.7% (n=1) still breastfed at 18 months; 52% (n=31) had stopped breastfeeding, while 46% (n=27) never breastfed their children. According to the DOH (2010:24), HIV-exposed children can be breastfed for 12 months, while HIV-positive children can be breasted for 24 months and longer (DOH 2010:25).

In this study, only 1 (2%) respondent was still breastfeeding at 18 to 24 Months. These findings were low as compared to 11% (n=87) found in Tanzania (Petraro, Duggan, Msamanga, Peterson, Spiegelmam & Fawzi 2011:5).

4.3.1.7.7 Respondents' duration of breastfeeding

The respondents were asked to indicate how long they breastfed their children (see figure 4.31).

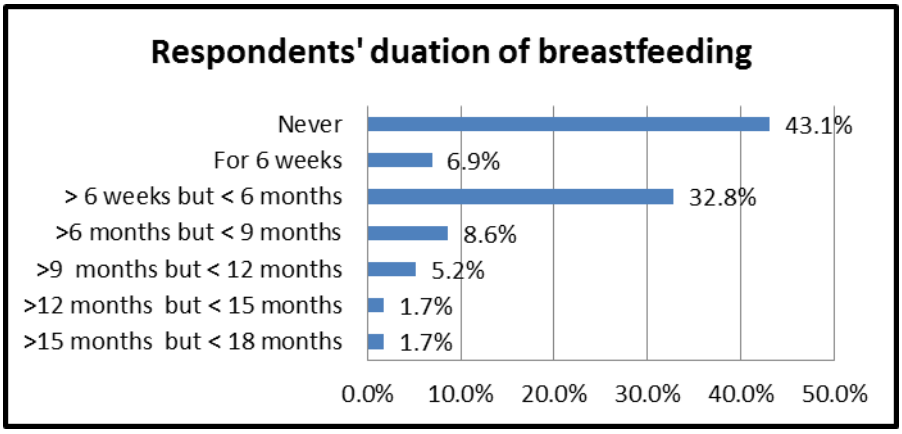

Figure 4.31 Respondents' duration of breastfeeding (n=58)

Of the respondents,43.1% (n=25) indicated that they never breastfed their children; 6.9% (n=4) only breastfed for about 6 weeks; 32.8% (n=19) breastfed for more than 6 weeks but less than 6 months; 8.6% (n=5) breastfed for more than 6 months but less than 9 months; 5.2% (n=3) breastfed for more than 9 months but less than 12 months; 1.7 (n=1) breastfed for more than 12 months but less than 15 months, and 1.7% (n=1) breastfed for about 18 months. It appears that most of the respondents (53.5%; n=31) who breastfed their children only breastfed for less than 12 months.

In this study the duration of breastfeeding was high as compared to Zambia and low as compared to Tanzania. In Zambia, Kuhn et al (2007:3) reported that 83.5% of respondents were still breastfeeding their children at 4 months. In Tanzania 3% of respondents stopped breastfeeding before 9 months, 2% stopped before 12 months, 23% stopped before 18 months, 61% stopped before 24 months, while 11% was breastfed at 24 months (Petraro et al 2011: 5). However, Becquet et al (2009:4) and Taha et al (2007:196) found that breastfeeding beyond 6 months increased the risk of HIV transmission.

4.3.1.7.8 Age at which respondents gave children water to drink

Figure 4.32 indicates the age at which the respondents gave their children water to drink.

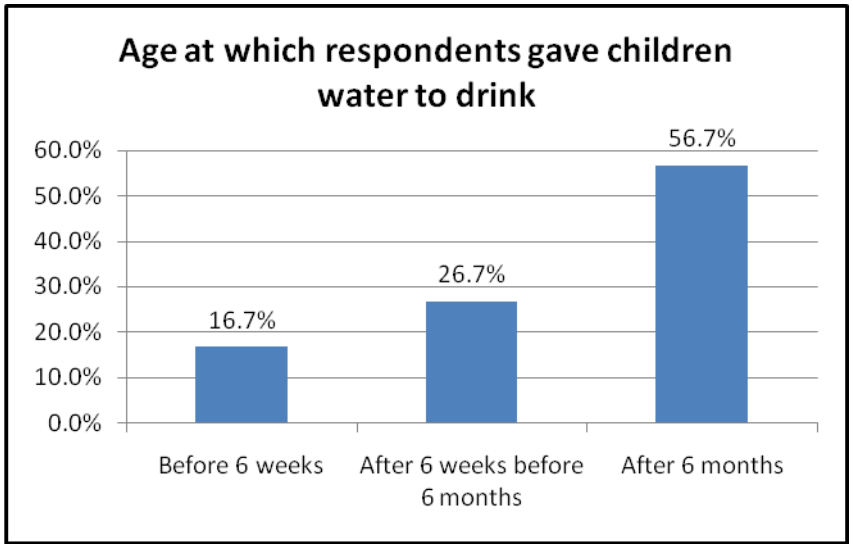

Figure 4.32 Age at which respondents gave children water to drink (N=60)

Figure 4.32 indicates that of the respondents, 56.7% (n=34) started giving their children water to drink after 6 months; 26.7% (n=16) started before 6 months, and 16.7% (n=10) started before 6 weeks. Of the respondents, 43.3% (n=26) did not practice either exclusive breastfeeding or exclusive formula feeding before 6 months.

In a high HIV-prevalence rural district of KwaZulu-Natal, Ghuman et al (2009:76) found that 52.0% of the children were given water by 8 weeks of age. In Kilimanjaro Region, Northern Tanzania, some mothers gave their children water before 6 months despite advice they received from the clinic (Falnes et al 2011:8). The DOH (2008:50) recommends exclusive breastfeeding or exclusive formula feeding in the first 6 months.

4.3.1.7.9 Age at which respondents gave children other food (solids) besides milk

The respondents were asked to indicate the age at which they gave the children other food besides milk (see figure 4.33).

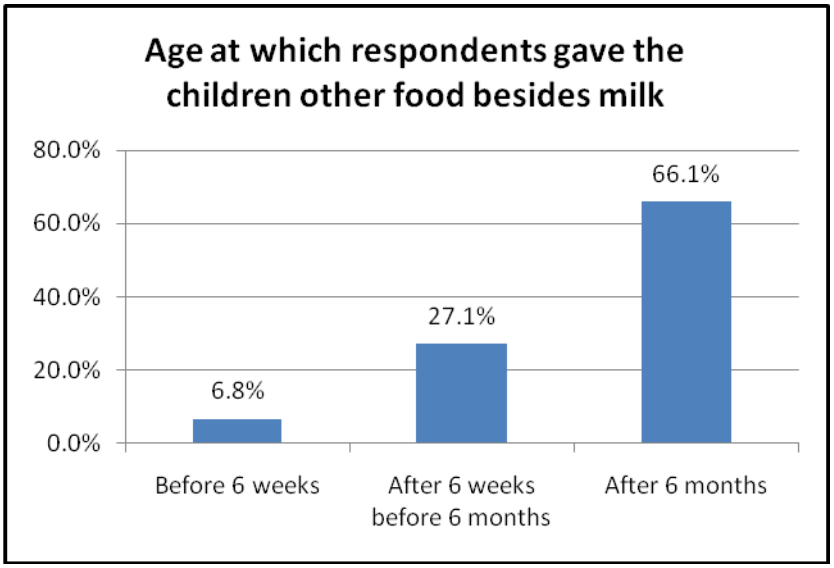

Figure 4.33 Age at which respondents gave the children other food besides milk (n=59)

Of the respondents, 6.8% (n=4) started giving their children other foods besides milk before 6 weeks; 27.1% (n=16) started before 6 months, and 66.6% (n=39) gave their children other food after 6 months. Of the respondents, 33.9% (n=20) introduced solids before 6 months.

This was lower than Goga et al (2012:5) and Ghuman et al (2009:76) findings that solids were introduced by 12 weeks of age because respondents thought that their children's crying indicated that the milk alone was not sufficient to satisfy them. In some communities, even though breastfeeding is considered important for the child, it is not believed to be enough to satisfy babies. As soon as they start crying, they are given porridge regardless of their age (CADRE & UNICEF 2010:33).

4.3.1.8 Section 7: Respondents' breast conditions (only applicable to respondents who were breastfeeding)

The respondents were asked about their breast condition while breastfeeding, including the child's age at the time of the breast condition, the manner at which the child was fed during the breast condition, and the management of the condition.

4.3.1.8.1 Breast problems while breastfeeding

Figure 4.34 indicates how many respondents experienced breast problems while breastfeeding.

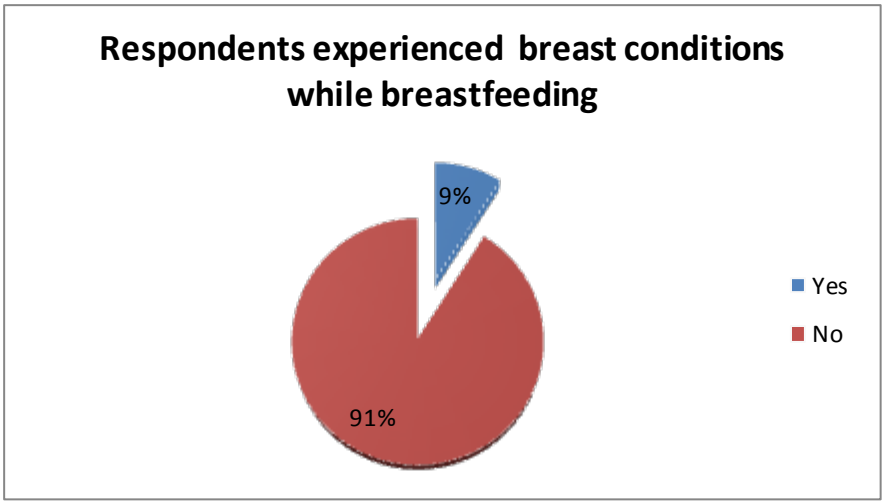

Figure 4.34 Respondents experienced breast conditions while breastfeeding (n=33)

Only 33 respondents answered this question. Of these respondents, 91.0% (n=30) did not experience any breast problems while breastfeeding their children, and 9.0% (n=3) experienced problems. In Zambia, Semrau (2009:72) found a 14.0% incidence of clinical mastitis.

4.3.1.8.2 Respondents' breast conditions experienced

The respondents were asked about the type of breast condition experienced (see table 4.14). Only 3 respondents indicated that they had experienced breast conditions while breastfeeding. Of these, only 2 provided details.

Table 4.14 Respondents' breast conditions experienced (n=2)

Breast condition experienced	N	%
Cracked nipples	0	0
Sores on the nipples	0	0
Engorged/full, painful breast	2	6
Lumps on the breast	0	0
Abscess on the breast	0	0
N/A	0	0

Of the 3 (9.0%) respondents who reported having experienced breast problems, only 2 (6.0%) reported engorged/full, painful breasts. They indicated that the engorgement was experienced between 6 weeks and 6 months of breastfeeding. One respondent reported that she breastfed from the unaffected breast and the other continued feeding from both breasts until the condition was resolved.

In Zimbabwe, 29.1%, 18.4% and 12.7% of respondents experienced subclinical-mastitis at 6 weeks, 3 months and 6 months, respectively (Lunney et al 2010:766). In Zambia, 2.9%, 1.5% and 1.4% reported to have experienced pain, engorgement and sore/swollen nipples respectively in the first 6 months of breastfeeding (Semrau, Kuhn, Brooks, Sinkala, Kankasa, Thea & Aldrovandi 2011:344.e5).

No association was found between breast conditions/problems and vertical transmission of HIV in this study. However, research has found an association between subclinical mastitis and vertical transmission of HIV. Subclinical mastitis was found to increase the viral load in the breast, while transferring the HIV from the blood to the breast milk which increased the risk of child exposure to HIV through breastfeeding (Lunney 2007:14; Lunney et al 2010:766).

4.3.1.9 Section 8: Child thrush

The respondents were asked whether the children developed mouth thrush/sores and, if so, at what age.

4.3.1.9.1 Respondents' children developed mouth thrush/sores

Figure 4.35 indicates whether the respondents' children developed mouth thrush/sores.

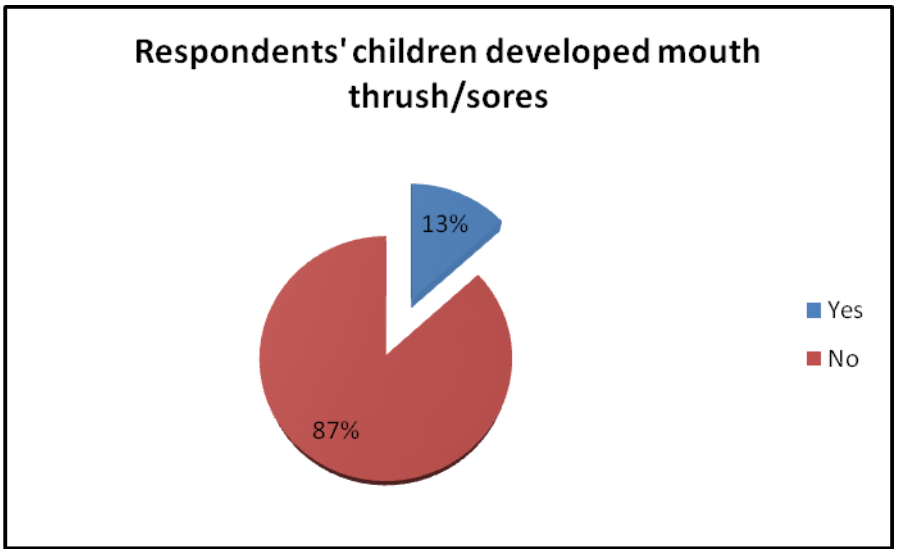

Figure 4.35 Respondents' children developed mouth thrush/sores (N=60)

Of the respondents, 86.7% (n=52) indicated that their children did not develop mouth thrush/sores while 13.3%; (n=8) indicated that they did.

The incidence of mouth thrush in this study was lower than in Nairobi where 12.0% of HIV-exposed children developed mouth thrush (Embree et al 2000:2538). Oral thrush during breastfeeding is among the risk factors for postnatal mother-to-child transmission of HIV-1. The infection of the oral mucosa with Candida interrupts the mucosal barrier to transmission thereby leading to breakages in the mucosa allowing access of HIV into the system (Embree et al 2000:2539; Adeyi, Kanki, Odutolu & Idoko 2006:350; ICAP 2007:5).

4.3.1.9.2 Age at which respondents' children developed oral thrush/sores

In this sub-section, information about the age at which the children developing any mouth thrush/sores is indicated.

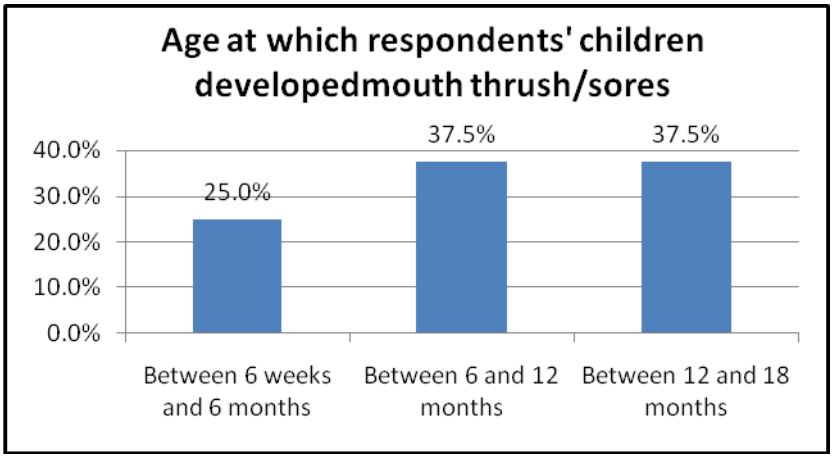

Figure 4.36 Age at which respondents' children developed mouth thrush/sores (n=8)

Eight respondents answered this question. Of these respondents, 25.0% (n=2) indicated that their children developed mouth thrush/sores between 6 weeks and 6 months; 37.5% (n=3) indicated between 6 and 12 months, and 37.5% (n=3) indicated between 12 and 18 months.

Embree et al (2000:2538) found that all HIV-exposed children (100%; 49) developed mouth thrush before the age of 6 months compared to 25.0% in this study.

- **Association between development of mouth thrush/sores and administration of CTX**

Table 4.15 Association between development of mouth thrush/sores and administration of CTX (N=59)

Frequency of administering CTX to the child at home	Development of mouth sores/thrush			
	Yes		No	
	n	%	N	%
Once a day	4	9.3	39	90.7
Never	4	25.0	12	75.0

Only 9.3% (n=4) out of 43 children who received CTX treatment daily experienced mouth thrush/sores compared to 25.0% (n=4) out of 16 that had never received CTX. There was an association between children who were administered CTX daily and the occurrence of mouth sores/oral thrush. It appears that infants who were treated daily

with CTX were less prone to experience mouth sores/thrush (Chi-square value χ^2=7.571, *df*=2, *p*-value=0.0227).

CTX is recommended for HIV-exposed children because they are at greater risk of developing illness. It prevents the development of opportunistic and common childhood infections (WHO & UNICEF 2009:3).

4.3.2 Findings from the clinical records of 18 to 24 month-old children on the PMTCT programme

4.3.2.1 Clinic representation in survey

Table 4.16 indicates the clinic representation.

Table 4.16 Children's records according to clinic (N=152)

Clinic	Number (n)	Percentage (%)
A	72	47.4
B	80	52.6
Total	**152**	**100.0**

A total of 152 records were reviewed and data collection forms were completed. Of the records, 72 were from the city centre clinic and 80 were from the township clinic. All the records were for children aged 18 to 24 months on the PMTCT programme.

4.3.2.2 Section 1: Demographic information

In this section socio-demographic information of the children was presented, including age and gender.

4.3.2.2.1 Children's age

In this sub-section, the ages of the children is indicated.

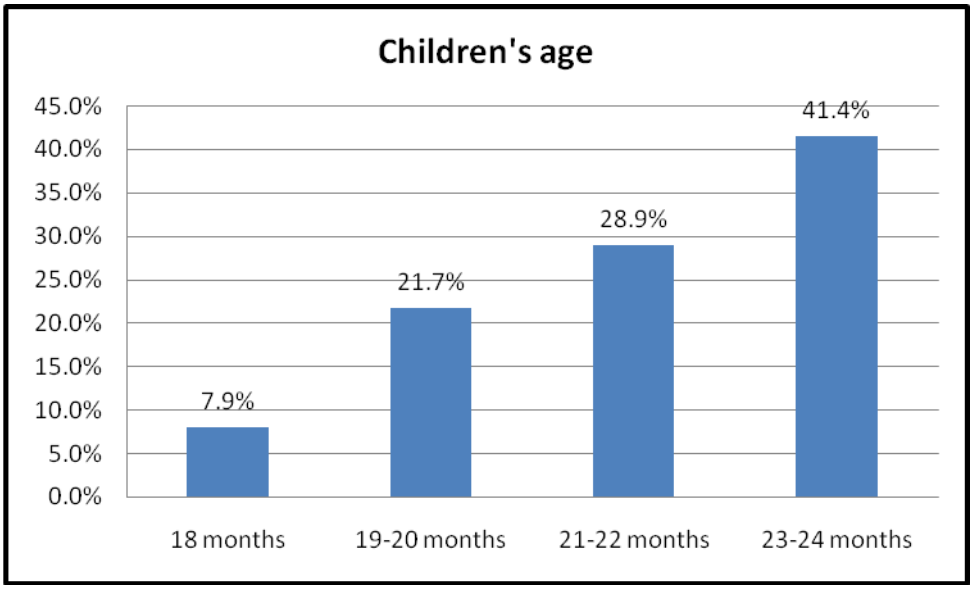

Figure 4.37 Children's age (N=152)

According to figure 4.37, 7.9% (n=12) of the children were 18 months old; 31.7% (n=33) were 19-20 months old; 28.9% (n=44) were 21-22 months old, and 41.4% (n=63) were aged 23-24 months. The mean age of the children was 22 months. In Moodley et al (2013:2) study, the mean age for the HIV exposed children was 9 months, with ages ranging from 6 to 9 months, 10 to 12 months and 13 to 18 months accounting 61%, 24% & 15% respectively.

4.3.2.2.2 Children's gender

Figure 4.38 reflects the children's gender.

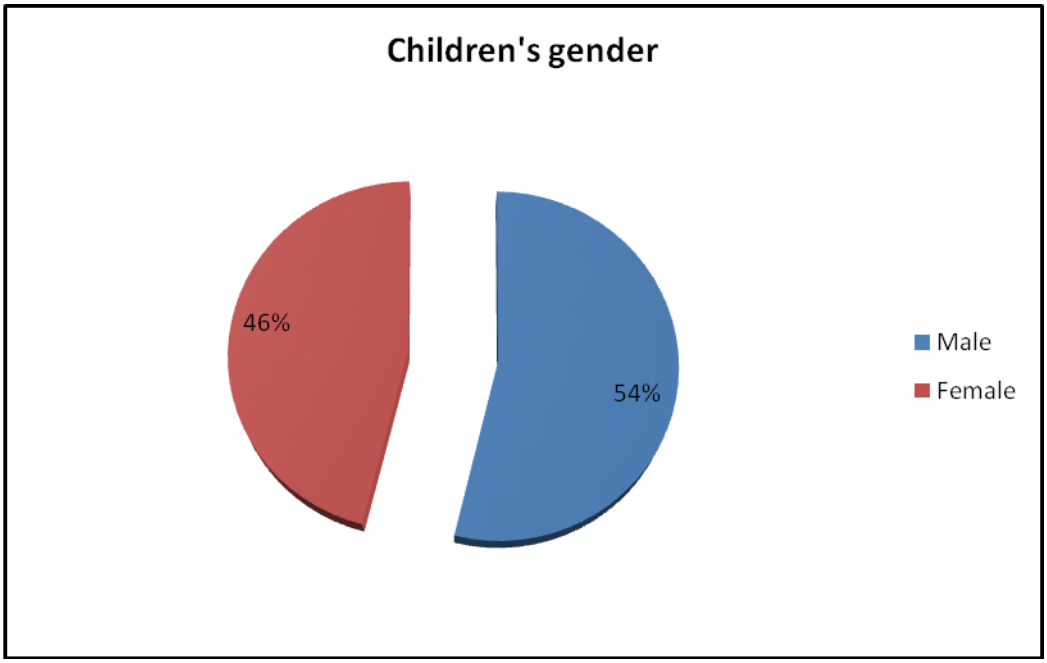

Figure 4.38 Children's gender (N=152)

Of the children, 53.9% (n=82) were male and 46.1% (n=70) were female. In Shargie et al (2011:4) study, 55.1% were male and 44.9% were female.

4.3.2.3 Section 2: Provision of PMTCT prophylactic treatment

This section examined place of birth and provision of PMTCT prophylactic treatment by clinic and hospital staff.

4.3.2.3.1 Place of birth and NVP treatment within 72 hours after birth

This sub-section indicates place of birth and provision of NVP to the child within 72 hours after birth.

According to the records, all the children (100.0%; N=152) were born in a health care facility and all were provided with NVP treatment within 72 hours of birth. There were no home deliveries.

These findings are in contrast with the HSRC et al (2010:xix) finding that home deliveries in South Africa account for 5.0% of all deliveries. All children in this study were provided with PMTCT prophylactic treatment at birth or within 72 hours after birth,

compared to 9.3% in Addis Ababa, Ethiopia who was not provided with the treatment (Shargie et al 2011:4).

4.3.2.3.2 Provision of NVP to take home at all follow-up visits

This sub-section investigated the provision of NVP to take home at follow-up visits.

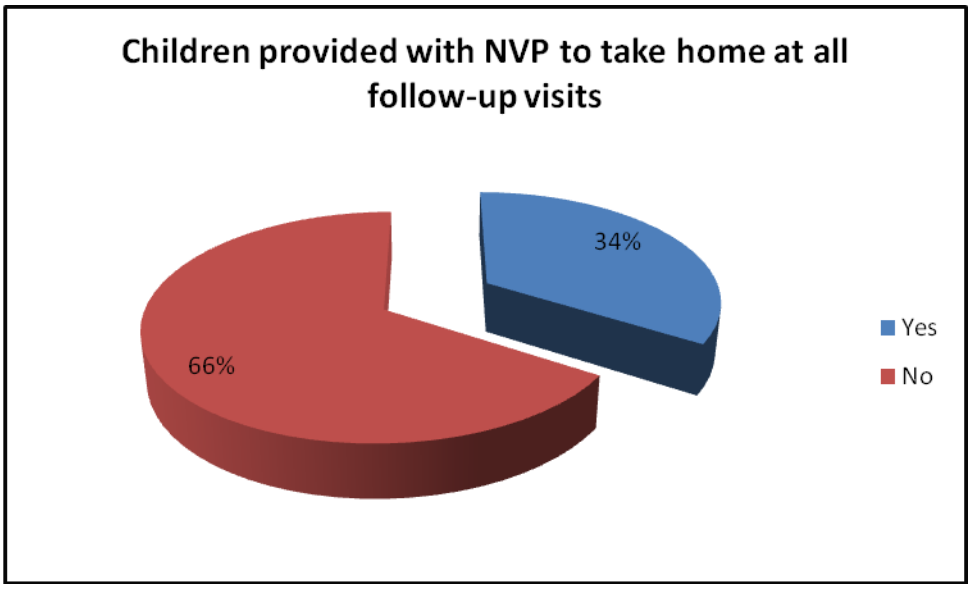

Figure 4.39 Children provided with NVP to take home at all follow-up visits (n=150)

The clinic records reflected that of the children, 66.0% (n=99) were not provided with NVP at follow-up visits and 34.0% (n=51) were provided with NVP at all visits for the duration of breastfeeding (see figure 4.39). Of the children who were not provided with NVP at follow-up visits, 18.1% (n=18) were breastfed beyond 6 months and stopped before they reached 15 months.

These findings contradict the PMTCT guidelines (DOH 2010:6) that breastfed children should receive NVP treatment from birth till one week post-cessation of breastfeeding.

4.3.2.3.3 Children still on NVP treatment at 18-24 months

The records reflected that of the children, 99.0% (n=150) were no longer on NVP treatment at 18-24 months and 1.3% (n=2) were referred to the next level of treatment (Hospital) because they were HIV positive. Therefore the records did not indicate whether they were still on treatment or not. Of the 2 children, one was breastfed for 6

months and the other was breastfed for 12 months. All the children were no longer breastfeeding at 18 months.

According to the DOH (2010:6), NVP treatment should be given for the duration of breastfeeding and continue for only one week after cessation of breastfeeding.

4.3.2.3.4 Age at which NVP treatment was stopped

Figure 4.40 reflects the age at which NVP treatment was stopped.

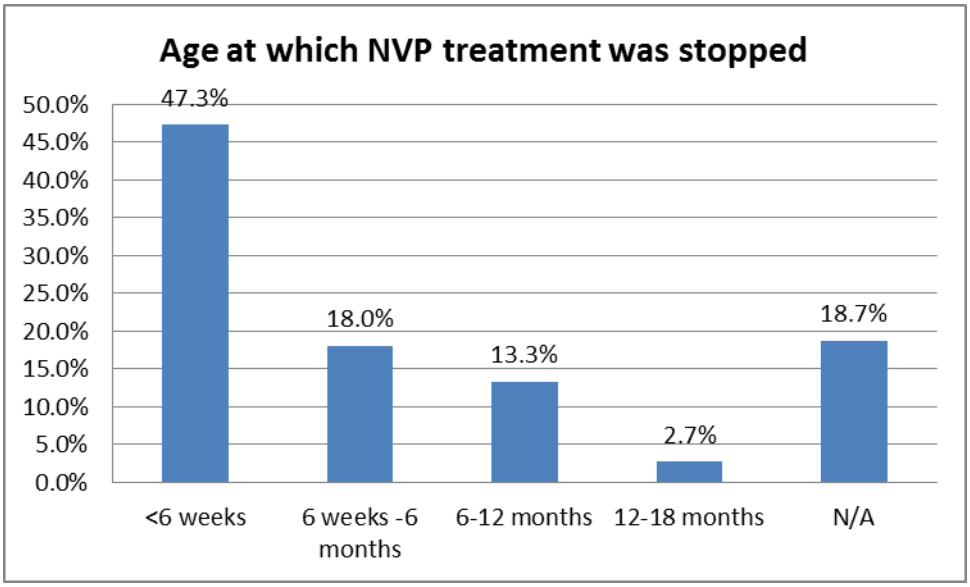

Figure 4.40 Age at which NVP treatment was stopped (n=150)

Figure 4.40 indicates that of the children, 47.3% (n=71) stopped NVP at 6 weeks; 18.0% (n=27) stopped between 6 weeks and 6 months; 13.3% (n=20) stopped between 6 and 12 months; 2.7% (n=4) stopped between 12 and 18 months, while 18.7% (n=28) never received NVP to take home. It was only given at the hospital within 72 hours after birth.

These findings contradict the recommendation from the PMTCT guidelines. All children born to HIV-positive mothers should receive NVP treatment for the minimum duration of 6 weeks despite the feeding practice or the mothers ART status (DOH 2010:5).

- **Association between age which NVP treatment was stopped and clinic involved**

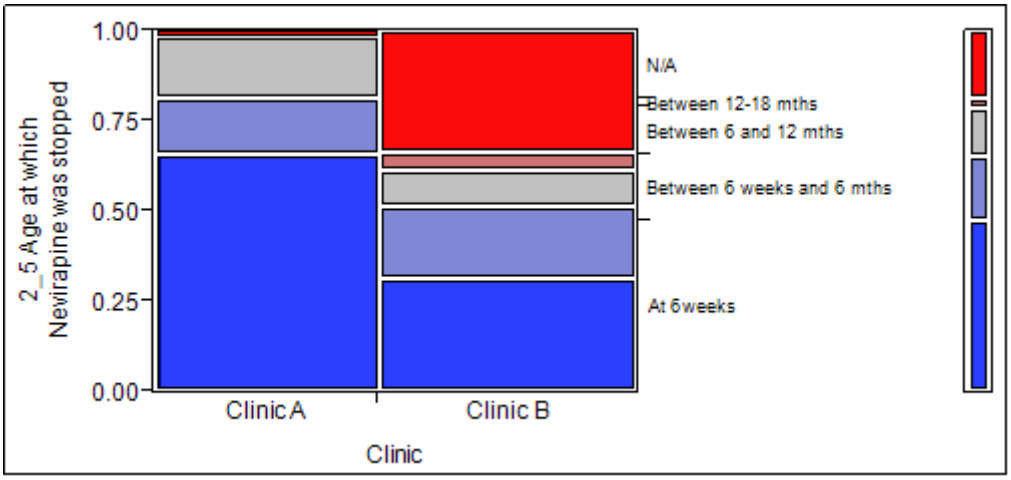

Figure 4.41 Association between age at which NVP treatment was stopped and clinic involved (n=150)

A significant association was found in the ages of children at which NVP treatment was stopped for the 2 clinics. Clinic A stopped treatment of NVP at an earlier age than clinic B. Of the children, 65.0% at clinic A had treatment stopped at 6 weeks whereas only 35.0% of those at clinic B stopped the treatment at 6 weeks (Chi-square value χ^2=35.571, N=150, *df*=4, *p*-value=<0.0001).

It has been found earlier in this study that more respondents in clinic B were breastfeeding their children as compared to clinic A. The Nevirapine treatment can only be stopped one week after cessation of breastfeeding. It is expected from respondents in clinic B to stopped Nevirapine later because of their feeding practice (DOH 2010:6).

4.3.2.3.5 Age at which children were started on CTX treatment

Table 4.17 presents the age at which children were started on CTX treatment.

Table 4.17 Age at which children were started on CTX treatment (N=152)

Started on CTX treatment at 6 weeks	N	%
Yes	150	98.6
No	2	1.3
Total	**152**	**100.0**

Table 4.17 indicates that of the children, 98.6% (n=150) were started on CTX treatment at 6 weeks and 1.3% (n=2) children were never started on treatment.

This finding (98.6%) was higher than Moodley et al (2013:2) 67.0%. According to DOH (2010:5), all HIV-exposed children should be started on CTX treatment at 6 weeks, irrespective of the feeding practice or the mother's ART status.

4.3.2.3.6 Provision of CTX treatment to take home at all follow-up visits

Figure 4.42 presents the number of children provided with CTX treatment to take home at follow-up visits.

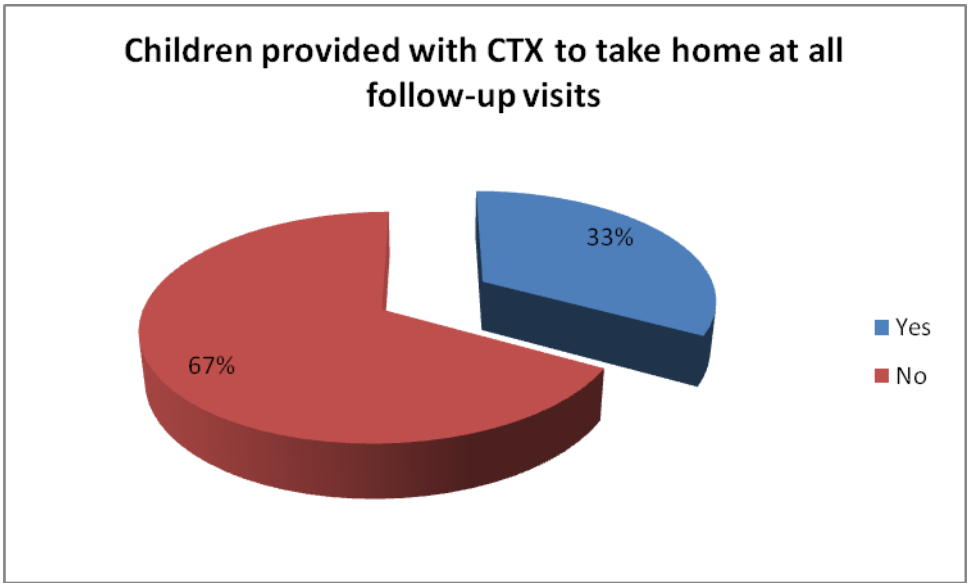

Figure 4.42 Children provided with CTX to take home at all follow-up visits (N=152)

Figure 4.42 indicates that of the children, 33.0% (n=50) were provided with CTX treatment to take home at follow-up visits, while 67.0% (n=102) were not. Of the children (67.0%; n=102) who were not provided with CTX at their follow-up visits, 12.7% (n=13) were breastfed beyond 6 weeks of age.

According to the DOH (2010:6), all HIV-exposed children should be provided with CTX treatment until breastfeeding is stopped and they have tested HIV negative.

- **Association between children provided with CTX treatment at follow-up visit and clinic involved**

Table 4.18 Association between children provided with CTX treatment at follow-up visit and clinic involved (N=152)

Clinic involved	Provision of CTX at follow-up visit			
	Yes		No	
	N	%	N	%
Clinic A	17	24	55	76
Clinic B	33	41	47	59

In this study, a significant association was found between the 2 clinics and the provision of CTX treatment to take home at follow-up visits. A Chi-square test showed that of the children, 24.0% (n=17) at clinic A and 41.0% (n=33) at clinic B were provided with CTX treatment to take home at follow-up visits (Chi-square value χ^2=5.087, N=152, *df*=4, *p*-value=0.0241).

On the contrary, In Ethiopia, adherence to CTX treatment was greater in children whose mothers had primary or secondary education;42.4% and 41% respectively, compared to 6% among children whose mother were unable to read and write (Shargie et al 2011:3).

4.3.2.3.7 Children still on CTX treatment at 18-24 months

This sub-section investigated children still on CTX treatment at 18-24 months.

Of the children, 98.6% (n=150) were no longer on CTX treatment at 18-24 months and 1.3% (n=2) were referred to the hospital because they were HIV positive. There was no record of whether they were still on treatment or not. One was referred at 12 months and the other at 18 months.

CTX treatment can be taken until there is no risk for HIV infection and the child tests HIV negative (WHO & UNICEF 2009:27). There was no risk for HIV transmission through breast milk for the remaining 98.6% because they were no longer breastfeeding.

4.3.2.3.8 Age at which CTX was stopped

Figure 4.43 depicts the age at which CTX treatment was stopped.

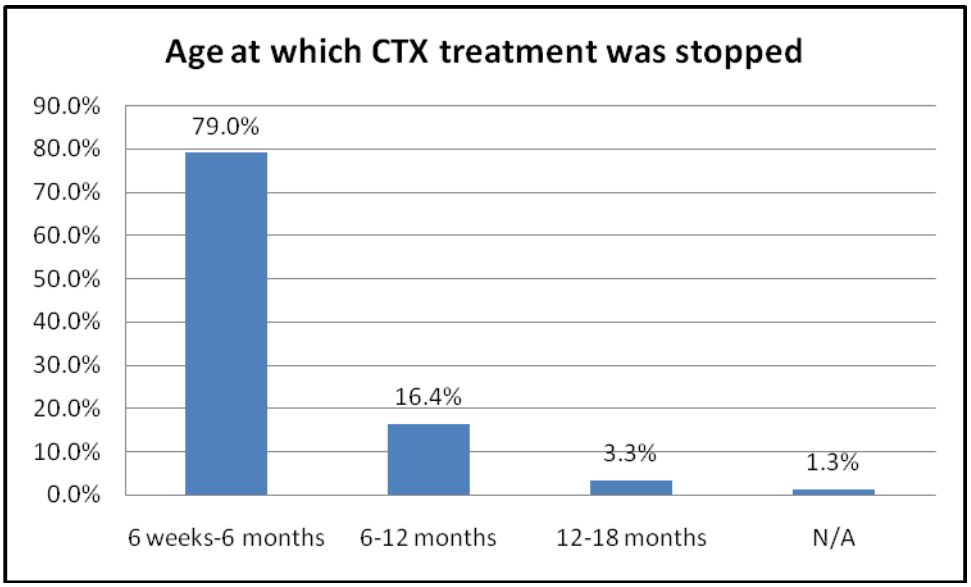

Figure 4.43 Age at which CTX treatment was stopped (N=152)

Figure 4.43 shows that of the children, 79.0% (n=120) stopped the CTX treatment between 6 weeks and 6 months; 16.4% (n=25) stopped between 6-12 months; 3.3% (n=5) stopped between 12-18 months, and 1.3% (n=2) were never put on the treatment. At 18-24 months, all the children (99%; n=150) who were started on the treatment were no longer on treatment.

In this study, only 1.3% of the children never started on CTX compared to Moodley et al (2013: 2) finding of 33.0% who were not treated. Not knowing HIV status of the child

was identified as a primary reason for continuing CTX treatment after 6 months of age or after cessation of breastfeeding, especially in areas where PCR test is unavailable or limited (Moodley et al 2013:2).

4.3.2.4 Section 3: Treatment of mouth thrush/sores

This section investigated children treated for mouth thrush/sores and the age at which the mouth thrush/sores were treated.

4.3.2.3.1 Children treated for mouth thrush/sores

Figure 4.44 indicates the number of children treated for mouth thrush/sores.

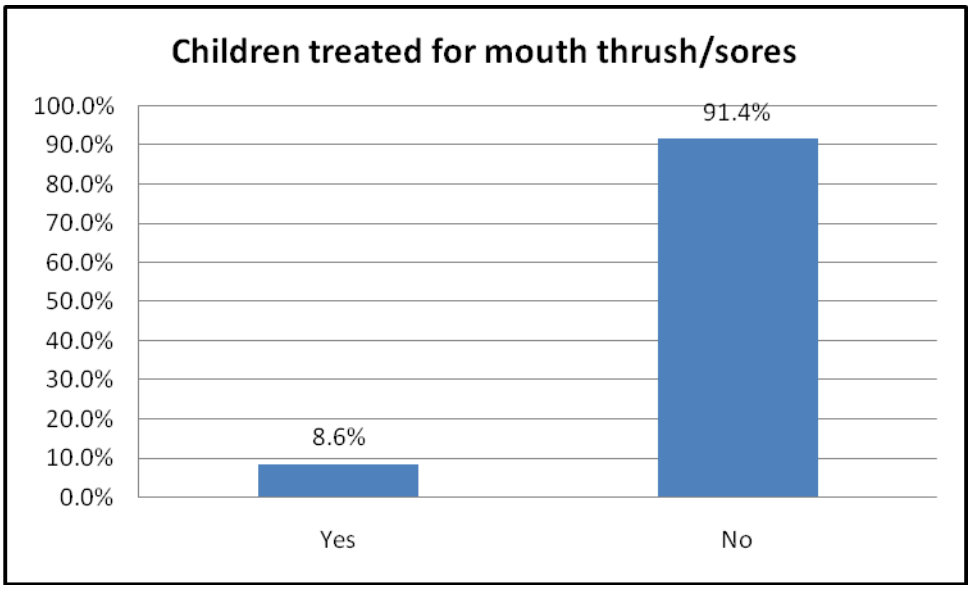

Figure 4.44 Children treated for mouth thrush/sores (n=151)

Figure 4.44 indicates that of the children, 91.4% (n=138) were never treated for mouth thrush/sores and 8.6% (n=13) were treated for mouth thrush/sores.

In a study in India, Irene and Arun (2010:223) found 15.7% of HIV-exposed children were treated for mouth thrush.

4.3.2.3.2 Age at which the children were treated for mouth thrush/sores

Figure 4.45 indicates the age at which the children were treated for mouth thrush/sores.

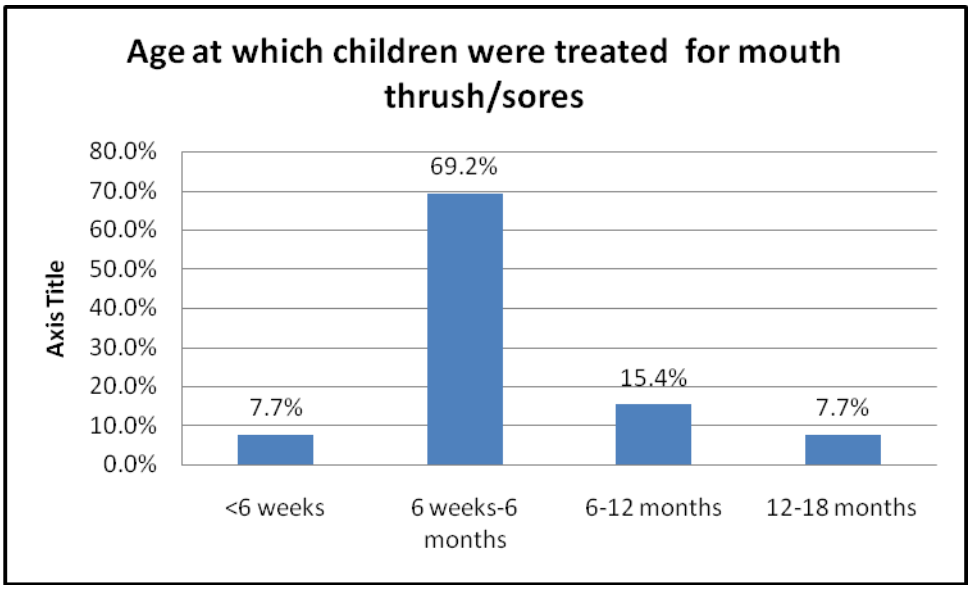

Figure 4.45 Age at which children were treated for mouth thrush/sores (n=13)

According to figure 4.45, of the 13 children treated for mouth thrush/sores, 7.7% (n=1) were treated before 6 weeks; 69.2% (n=9) were treated between 6 weeks and 6 months; 15.4% (n=2) were treated between 6 and 12 months, while 7.7% (n=1) were treated between 12 and 18 months. In India, all HIV-exposed children with mouth thrush were treated before they were 6 weeks old (Irene & Arun 2010:223).

4.3.2.5 Section 4: Duration of breastfeeding

In this section, information about children's duration of breastfeeding was required.

4.3.2.5.1 Age at which breastfeeding was stopped

In this sub-section, information about the age at which breastfeeding was stopped is indicated.

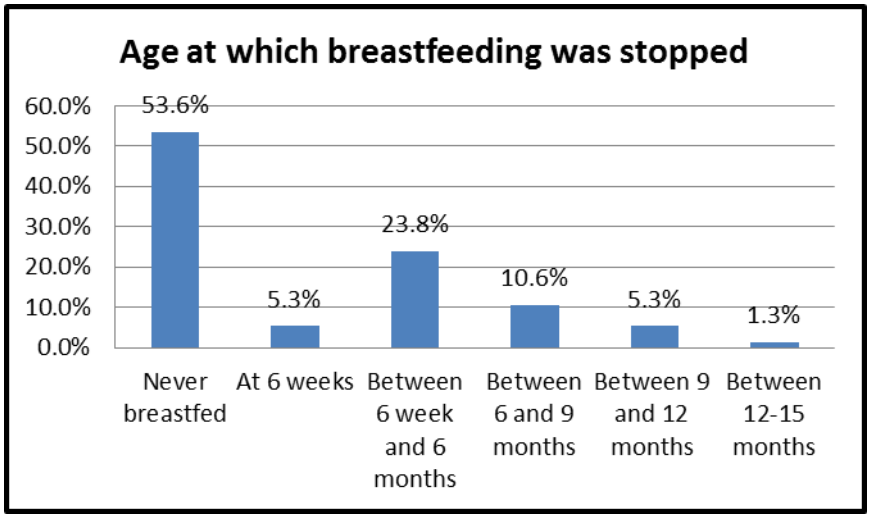

Figure 4.46 Age at which breastfeeding was stopped (n=151)

Figure 4.46 shows that of the children, 53.6% (n=81) were never breastfed; 5.3% (n=8) stopped breastfeeding at 6 weeks; 23.8% (n=36) stopped between 6 weeks and 6 months; 10.6% (n=16) stopped between 6 and 9 months; 5.3% (n=8) stopped between 9 and 12 months, while 1.3% (n=2) stopped between 12 and 15 months.

The duration of breastfeeding in this study was shorter than in Tanzania where 97.0% of children were breastfed at 6 weeks, 90.0% at 3 months, 17.0% at 6 months, 8.0% at 12 months, and 3.0% at 18 months (Kilewo, Karlsson, Ngarina, Massawe, Lyamuya, Swai, Lipyoga, Mhalu & Biberfeld 2009:410).

- **Association between duration of breastfeeding and receiving NVP at follow-up visits**

Table 4.19 Association between duration of breastfeeding and receiving NVP at follow-up visits (n=149)

Duration of breastfeeding	Receive NVP to take home at follow-up visits			
	Yes		No	
	N	%	n	%
Never	4	5.0	76	95.0
6 weeks	2	28.6	5	71.4
6 weeks-6 months	23	63.9	13	36.1
6-9 months	14	87.5	2	12.5
9-12 months	6	75.0	2	25.0
12-15 months	1	50.0	1	50.0

Table 4.19 reveals that the majority of the children (95%; n=76) who were never breastfed did not receive NVP to take home at their follow-up clinic visits (Chi-square value χ^2=71.480, *df*=5, *p*-value <.0001). It is expected for formula fed children not to receive the NVP treatment at follow-up visits as compared to breastfed children. Children that are formula fed from birth only receive NVP treatment for a maximum duration of 6 week (DOH 2010:5).

- **Association between children who were never breastfed and stopping NVP treatment at 6 weeks**

Table 4.20 Association between children who were never breastfed and stopping NVP treatment at 6 weeks (n=149)

Duration of breastfeeding	Age at which NVP was stopped									
	6 weeks		6 weeks-6 months		6-12 months		12-18 months		N/A	
	N	%	N	%	n	%	n	%	n	%
Never	56	70.0	4	5.0	0	0.0	0	0.0	20	25.0
6 weeks	3	37.5	3	37.5	0	0.0	0	0.0	2	25.0
6 weeks-6 months	10	28.6	18	51.4	3	8.6	0	0.0	4	11.4
6-9 months	0	0.0	1	6.3	14	87.5	0	0.0	1	6.3
9-12 months	2	25.0	1	12.5	2	25.0	3	37.5	0	0.0
12-15 months	0	0.0	0	0.0	0	0.0	1	50.0	1	50.0

Table 4.20 indicates that 70.0% (n=56) of the children who were not breastfed stopped NVP at six weeks, and the mothers of the children who were not breasted either stopped NVP at 6 weeks or did not administer NVP at all (Chi-square value χ^2=199.332, *df*=20, *p*-value<.0001). Not administering NVP treatment at all to HIV exposed children poses a major concern with regard to compliance of PMTCT guidelines. Children on PMTCT should receive NVP treatment for a maximum duration of 6 weeks for formula fed children and extended for breastfeeding children until a week after stopping breastfeeding (DOH 2010:5-6).

- **Association between duration of breastfeeding and receiving CTX treatment to take home at follow-up visits**

Table 4.21 Association between duration of breastfeeding and receiving CTX treatment to take home at follow-up visits (n=150)

Duration of breastfeeding	Receiving CTX to take home			
	Yes		No	
	N	%	N	%
Never	4	4.9	77	95.1
6 weeks	2	25.0	6	75.0
6 weeks-6 months	24	68.6	11	31.4
6-9 months	11	68.8	5	31.3
9-12 months	6	75.0	2	25.0
12-15 months	2	100.0	0	0.0

A Chi-square test revealed an association between the duration of breastfeeding and receiving CTX to take home at follow-up visits. Most of the mothers of children who were not breastfed did not appear to receive CTX to take home at follow-up visits (Chi-square value χ^2=69.153, *df*=5, *p*-value<.0001). Of the children that were never breasted, 95.1% (n=77) did not receive CTX treatment to take home at follow-up visits.

These results concur with Moodley et al's (2013: 2) finding in South Africa of 78.7%of breastfed children having received CTX compared to 63.4% who were not breastfed.

4.3.2.6 Section 5: Follow-up visits

This section investigated the frequency of follow-up visits in the first 6 weeks, from 6 weeks to 12 months, and from 12 to 24 months.

4.3.2.6.1 Frequency of follow-up visits in the first 6 weeks of life

Figure 4.47 indicates the frequency of follow-up visits in the first 6 weeks of life.

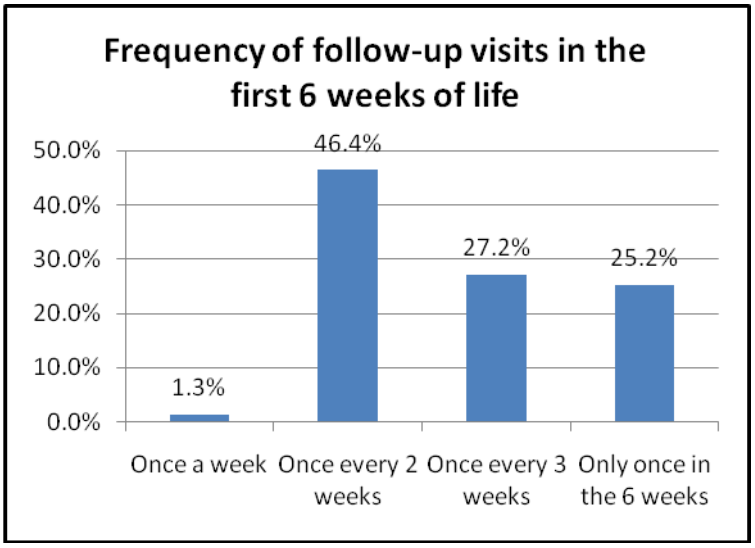

Figure 4.47 Frequency of follow-up visits in the first 6 weeks of life (n=151)

Figure 4.47 indicates that of the children, 1.3% (n=2) were brought to the clinic once a week in the first 6 weeks of life; 46.4% (n=70) were brought once every two weeks; 27.2% (n=41) were brought once every three weeks, while 25.2% (n=38) were only brought to the clinic once in the 6 weeks. Only 1.3% (n=2) complied with the PMTCT requirements. According to the DOH (2010:27), all children on the PMTCT programme should visit the clinic weekly in the first month of life.

- **Association between frequency of follow-up visits in the first 6 weeks and the clinic involved**

A significant association was found in the frequency of follow-up visits within the first 6 weeks of birth and the clinic involved: 85.9% (n=62) of patients in clinic A visited the clinic at least once in 2 weeks, whereas 86.3% (n=69) in clinic B visited the clinic 3 weekly and longer (Chi-square value χ^2=78.854, N=151, *df*=3, *p*-value=<0.0001). Mothers in clinic A visited the clinic most frequently that mother from clinic B. These could be due to the employment status of the respondents. There were more mothers employed in clinic A as compared to clinic B. In ability to pay transport fares from home to the clinic contributes to non-adherence to follow-up visits (Mekonnen 2009:44).

- **Association between frequency of follow-up visits in the first 6 weeks and child receiving NVP to take home at follow-up visit**

A Chi-square test of association was performed upon frequency of follow-up visits within 6 weeks of birth and receiving NVP to take home. Patients who attended follow-up visits only once in 6 weeks, were less likely to receive NVP to take home (Chi-square value χ^2=12.798, N=149, *df*=3, *p*-value=0.0051). All HIV exposed children should be followed up weekly in the first month of life. During the follow-up visit, NVP medication is dispensed and infant feeding support is offered (DOH 2008:57).

4.3.2.6.2 Frequency of follow-up visits from 6 weeks to 12 months

Figure 4.48 indicates the frequency of follow-up visits from 6 weeks to 12 months.

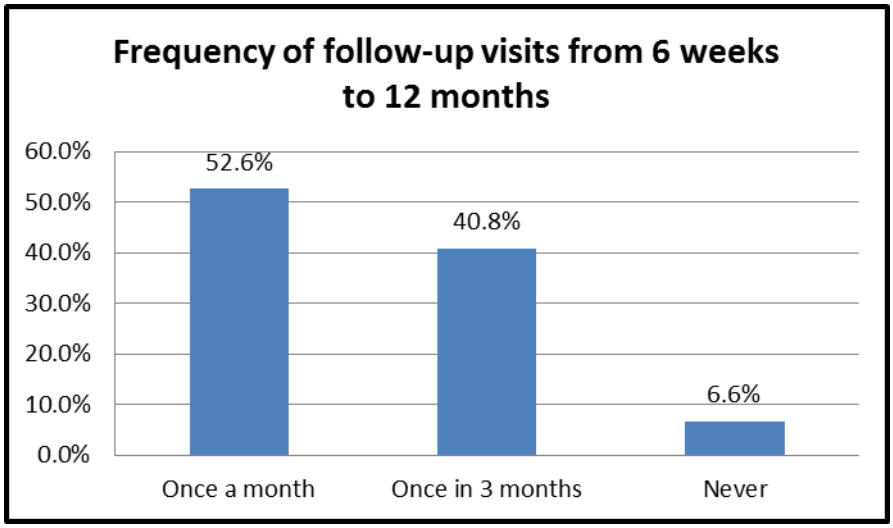

Figure 4.48 Frequency of follow-up visits from 6 weeks to 12 months (N=152)

Figure 4.48 indicates that of the children, 52.6% (n=80) were brought to the clinic once a month between 6 weeks and 12 months; 40.8% (n=62) were brought once every 3 months, while 6.6% (n=10) were last seen at 6 weeks of age. Only 52.6% (n=80) of the children complied with the programme requirements. Children on the PMTCT programme should visit the clinic monthly in the first 12 months (DOH 2010:27).

- **Association between frequency of follow-up visits from 6 weeks to 12 months and the clinic involved**

A Chi-square test of association was performed on frequency of follow-up visits with children between 6 weeks to 12 months and clinic visited. Patients who attended clinic A attended follow-up visits more regularly: 63.8% (n=46) attended monthly; 33.3% (n=24) attended 3 monthly, and 2.8% (n=2) never attended. In clinic B, 42.5% (n=34) patients attended follow-up visits monthly; 47.5% (n=38) attended 3 monthly, and 10.0% (n=8) never attended (Chi-square value χ^2=8.1632, N=152, *df*=2, *p*-value=0.0169).

There was more loss to follow-up cases in clinic B (10%) as compared to clinic A (2.8%). The fact that more respondents from clinic B were unemployed could be a contributing factor to loss to follow-up children. According to Cook et al (2011:e107), independent maternal income through formal employment increased adherence to follow-up and decreases lost to follow-up cases. In KwaZulu-Natal, 40.4% of children on PMTCT were lost to follow-up by 28 weeks of age (Chetty et al 2012:5).

- **Association between frequency of follow-up visits from 6 weeks to 12 months and child receiving CTX to take home at follow-up visit**

A Chi-square test of association was performed on frequency of follow-up visits with infants between 6 weeks and 12 months and receiving CTX to take home. Children who attended follow-up visits at least once a month were more likely to receive CTX to take home than those who attended less frequently (Chi-square value χ^2=12.665, N=151, *df*=2, *p*-value=0.0018).

Poor adherence to follow-up visits contributes to treatment interruption. In Ethiopia, 31% of HIV exposed children's CTX treatment was interrupted due to loss to follow-up (Shargie et al 2011:4).

4.3.2.6.3 Frequency of follow-up visits from 12 to 24 months

Figure 4.49 indicates the frequency of follow-up visits from 12 to 24 months.

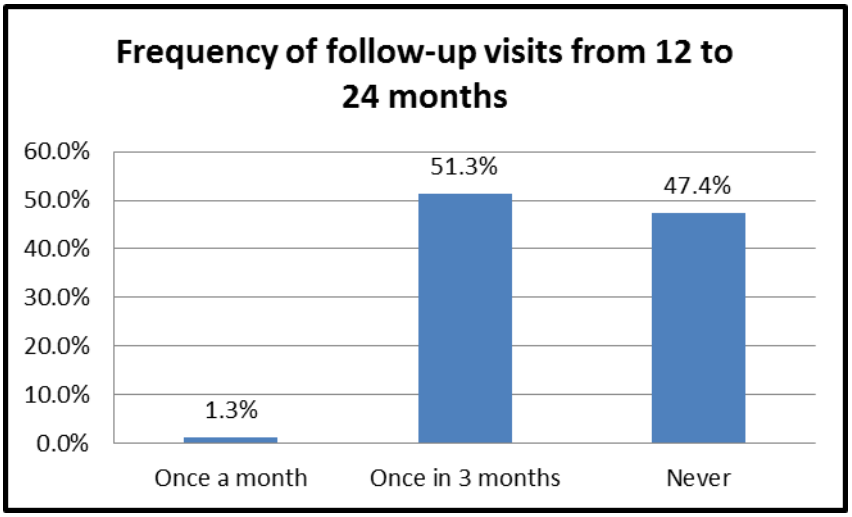

Figure 4.49 Frequency of follow-up visits between 12 and 24 months (N=152)

Figure 4.49 indicates that of the children, (1.3%; n=2) were brought to the clinic once a month from 12-24 months; 51.3% (n=78) were brought once every 3 months, while 47.4% (n=72) were last seen before 12 months of age.

The findings reveal that 47.4% (n=72) were lost to follow-up, which is higher than Shargie et al's (2011:4) 31.0%. According to the DOH (2010:27), children between the age of 12 and 24 months on the PMTCT programme should follow-up at the clinic 3-monthly unless the child is ill, then they should follow-up more often.

- **Association between frequency of follow-up visits from 12 to 24 months and child receiving CTX to take home at follow-up visits**

A Chi-square test of association was performed on frequency of follow-up visits with children between 12 and 24 months and receiving CTX at follow-up visits. Children who attended follow-up visits at least once a month were more likely to receive CTX to take home than those who attended less frequently (Chi-square value χ^2=12.665, N=151, *df*=2, *p*-value=<0.0018).

Exposure to HIV through breastfeeding necessitate the need to continue taking the CTX treatment until breastfeeding is stopped and the child has tested HIV negative. Ensuring good adherence is an on-going process that needs continuous interaction between the

nurse and the mother. Children on CTX treatment need to follow-up on a monthly basis to ensure constant supply of medication (WHO & UNICEF 2009:6).

4.3.2.6.4 Attendance of follow-up visits as arranged with the nurse at the clinic

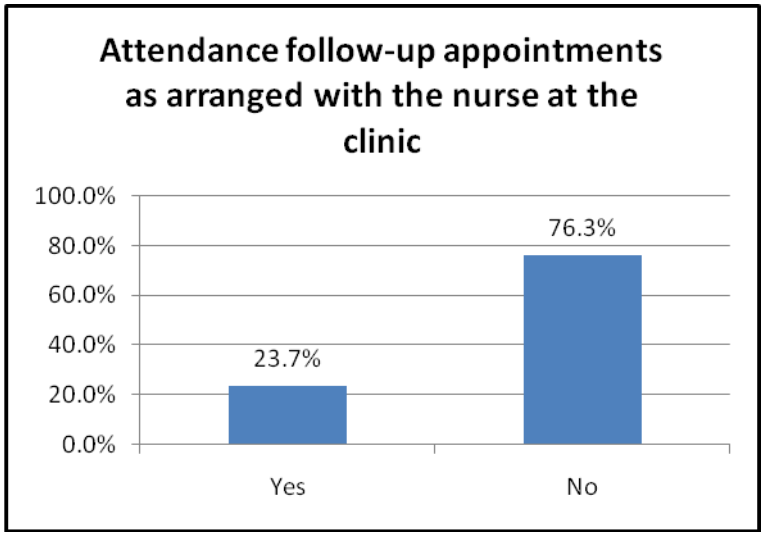

Figure 4.50 Attendance of follow-up visits as arranged with the nurse at the clinic (N=152)

Figure 4.50 reveals that the majority of the children (76.3%; n=116) did not attend follow-up visits as arranged with the clinic nurse. Only 23.7% (n=36) attended their follow-up appointments as arranged with the nurse at the clinic. Shargie et al (2011:4) point out that when the PCR test at 6 weeks is negative mothers often decide that it is not necessary to continue, especially if the child was never breastfed.

- **Association between clinic attendance as arranged with clinic sister and age at which NVP treatment was stopped**

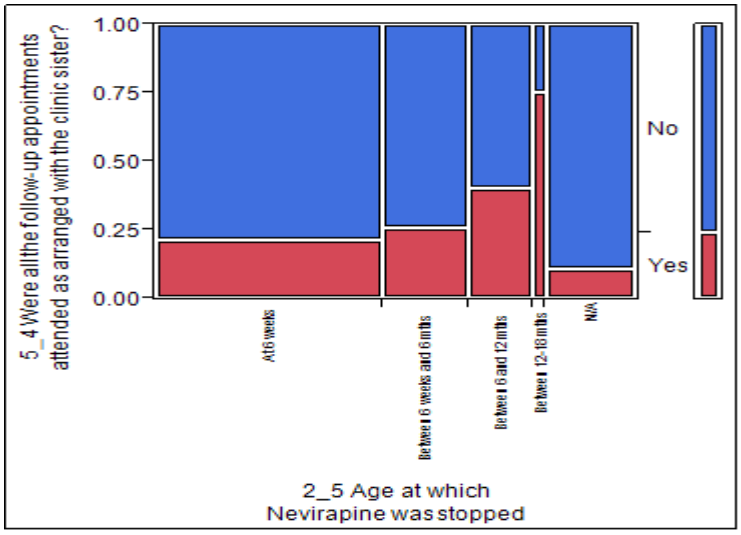

Figure 4.51 Association between clinic attendance as arranged with the clinic nurse and age at which NVP treatment was stopped (N=152)

A Chi-square test of association was performed between attendance as arranged with clinic sister and age at which treatment with NVP was stopped. Children who attended follow-up visits significantly more regularly as arranged with clinic sister stopped NVP treatment when they were between 12 and 18 months old (Chi-square value χ^2=11.597, N=152, *df*=4, *p*-value=0.0206).

In this study all respondents had secondary education and were presumably in a better educational level to make informed decisions about the care of their children. In Ethiopia, Shargie et al (2011:3) found that adherence to follow-up visits and adherence to medication was more in children whose mothers had primary and secondary education.

4.3.2.7 Section 6: Children's HIV test results

This section investigated the children's HIV test results, including at 6 weeks; 6 weeks post-cessation of breastfeeding, and 18 months.

4.3.2.7.1 Uptake of PCR test around 6 weeks

Table 4.22 presents the children's uptake of PCR tests at 6 weeks.

Table 4.22 Uptake of PCR test around 6 weeks (N=152)

HIV Test	Tested		Not Tested		Total
	n	%	n	%	
HIV PCR test around 6 weeks	151	99.3	1	0.7	152

Of the children, 99.3% (n=151) were tested for HIV test at 6 weeks, and 0.7% (n=1) was not tested. This uptake of HIV PCR test at 6 weeks was higher than Mirkuzie et al (2011:5) 52.0% and Mirkuzie, Hinderaker and Mørkve (2010:5) 10.6%. According to the DOH (2010:27), all HIV-exposed children should be tested for HIV at 6 weeks.

4.3.2.7.2 Uptake of PCR test 6 weeks post-cessation of breastfeeding

Table 4.23 indicates the children's uptake of PCR tests at 6 weeks post-cessation of breastfeeding.

Table 4.23 Uptake of PCR test 6 weeks post-cessation of breastfeeding (N=152)

HIV Test	Tested		Not Tested		Total
	n	%	n	%	
PCR test around 6 weeks post- cessation of breastfeeding	37	24.3	115	75.7	152

Of the children, 24.3% (n=37) were tested for HIV test at 6 weeks after breastfeeding was stopped, while 75.7% (n=115) were not tested. According to the DOH (2010:6), all breastfed HIV-exposed children should be tested for HIV 6 weeks post-cessation of breastfeeding.

4.3.2.7.3 Uptake of HIV rapid test at 18 months

Table 4.24 indicates the children's uptake of HIV rapid tests at 18 months.

Table 4.24 Uptake of HIV rapid test at 18 months (N=152)

HIV test	Tested		Not tested		Total
	n	%	n	%	
HIV rapid test at 18 months	57	37.5	95	62.5	152

Table 4.24 shows that of the children, 62.5% (n=95) were not tested for HIV at 18 months and 37.5% (n=57) were tested. The uptake of HIV test at 18 months was very low. According to the DOH (2010:27), all HIV-exposed children should be tested for HIV at 18 months, irrespective of negative results at 6 weeks or at 6 weeks post-cessation of breastfeeding.

4.3.2.7.4 HIV transmission rate at 6 weeks, 6 weeks post-cessation of breastfeeding, and at 18 months

Table 4.25 indicates the HIV transmission rate at 6 weeks, 6 weeks post-cessation of breastfeeding, and at 18 months.

Table 4.25 HIV transmission rate at 6 weeks, 6 weeks post-cessation of breastfeeding, and at 18 months

HIV Test	Positive		Negative		Total tested	
	n	%	n	%	n	%
PCR test around 6 weeks	2	1.3%	149	98.6%	151	100%
PCR test around 6 weeks post-cessation of breastfeeding	3	8.1%	34	91.9%	37	100%
HIV rapid test at 18 months	1	1.8%	56	98.2%	57	100%

Table 4.25 indicates that the HIV transmission rate was 1.3% at 6 weeks; 8.1%at 6 weeks post-cessation of breastfeeding, and 1.8% at 18 months. The HIV transmission rate included only those children who tested for HIV at specific ages. The transmission rate at 6 weeks post-cessation in this study was high. This may be due to the low uptake of the test.

The transmission rate around 6 weeks was lower than the 4.8% found by Anoje et al (2012:4) in Nigeria and the 4.1% found by Kilewo et al (2009:411) in Tanzania. The

transmission rate at 18 months was nearly the same as Kilewo et al's (2009:411) 1.9%. The transmission rate at 6 weeks and 18 months was lower than the DOH's (2012:12) target of less than 2% and 5% for mother-to-child transmission rate at 6 weeks and 18 months, respectively, by 2016.

4.4 CONCLUSION

This chapter discussed the data analysis and interpretation and results with reference to the literature review.

Chapter 5 presents the conclusions and limitations of the study and makes recommendations for practice and further research.

CHAPTER 5

FINDINGS, RECOMMENDATIONS AND LIMITATIONS

5.1 INTRODUCTION

Chapter 4 discussed the data analysis and interpretation of results with reference to the literature review. This chapter concludes the study, summarises the findings, briefly discusses the limitations, and makes recommendations for practice and further research.

The purpose of the study was to identify factors associated with the HIV transmission rate in 18 to 24 month-old children enrolled in the PMTCT programme at two selected City of Tshwane clinics. In order to achieve the purpose, the objectives were to

- determine the HIV transmission rate among 18 to 24 month-old children on the PMTCT programme at City of Tshwane clinics
- identify factors associated with the HIV transmission rate in these children
- determine the relationship between the identified factors and the HIV transmission rate among these children

Accordingly, the study wished to answer the following research question:

What are the factors associated with the HIV transmission rate in 18 to 24 month-old children enrolled in the PMTCT programme at City of Tshwane clinics?

A quantitative, descriptive retrospective correlational design was used. The accessible population was the mothers of the children aged 18 to 24 months attending PMTCT at City of Tshwane clinics and the clinical records of children on PMTCT aged 18 to 24 months. The sample consisted of 60 respondents (30 from clinic A and 30 from clinic B) and 152 clinical records (72 from clinic A and 80 from clinic B). Structured questionnaires and data-collection forms were used to collect data from the respondents and clinical records, respectively.

This chapter summarises the findings, briefly discusses the limitations of the study, and makes recommendations for improving the outcome of the PMTCT programme and further research.

5.2 FINDINGS

The findings are presented in two phases, namely the questionnaires (respondents) and the data-collection forms (children's clinic records).

5.2.1 Questionnaires

The findings are discussed according to the questionnaire sections.

5.2.1.1 Respondents' socio-demographic information

The majority of respondents [66.7% (n=40)] were aged between 26 and 35. Age of the respondents was not found to be associated with HIV transmission rate in 18 to 24 months children on PMTCT. Lack of significant association between maternal age and HIV transmission rate was reported in Malawi (Taha et al 2007:12), however in Rwanda, Ruton et al (2012 6) found the highest transmission rate (6.8%) among children born to young mothers (15 to 24 years) and the lowest (1.5%) among children born to mothers aged 35 to 39 years. The findings in this study implies that the age of the mother does not predispose the child to HIV transmission

All the respondents (100%; N=60) had at least a primary school education. In this study, all the respondents who were given NVP and CTX administered them daily as instructed by the nurse. The findings in this study imply that women with some form of secondary education are most likely to adhere to prescribed medication.

The majority of respondents (68.3%; n=41) lived with their partner or spouse, while 55.9% (n=34) were unemployed, and 1.7% (n=1) was a student. Of the unemployed respondents, 57.1% (n=20) were financially supported by their husband or partner.

There were more unemployed respondents (66.7%) at clinic B which is in a township next to an informal settlement and more permanently employed respondents (75.0%) at

clinic A which is in the city centre. Of the respondents 31% (n=9) had a family income of less than R1,000.00 per month, and 10.3% (n=3) had an income of over R3,000.00 per month. No association was found between respondents' employment status and the HIV transmission rate.

5.2.1.2 Respondents' ART status and parity

The majority of respondents, 76.7% (n=46) had more than one child, and had previously been exposed to postnatal care and the practice of bringing their children to the clinic for child health services. These respondents were likely to adhere to PMTCT follow-ups and other services. In this study parity status was not associated with HIV transmission rate. In contrast, Taha et al (2007:12) found an association between new mothers (primiparity) and HIV transmission rate in children above 6 months old.

The respondents' parity status was associated with the feeding practices. Respondents (71%; n=23) who became pregnant twice in their lifetime were more likely to exclusively formula feed their children from 6 weeks to 6 months. The decision to formula feed among these respondents might have resulted from their previous exposure to the PMTCT programme and their knowledge that HIV can be transmitted through breastfeeding.

There was no significant difference between mothers on ART (45.8% [n=27]) and those not on ART (54.2% [n=32]). Not all the respondents on PMTCT were eligible for life-long ART, some received PMTCT prophylactic treatment only during pregnancy and labour (DOH 2010:17). Majority of respondents on ART (63% [n=17]) started the therapy before they became pregnant with the current children, while 11.1% (n=3) only started with therapy after the birth of their children. ART lowers the viral load, which in turn reduces the risk of transmission. Children born to mothers who started ART before or during pregnancy are less likely to be infected compared to those whose mothers were not on ART during pregnancy (Ruton et al 2012:6).

No association was found between respondents being ART and the transmission rate. The findings in this study imply that PMTCT prophylactic treatment is as effective as lifelong ART in reducing the transmission rate because no difference was found

between children whose mothers were on PMTCT prophylactic treatment and those who were on lifelong ART.

5.2.1.3 Respondents' social stigma

Of the respondents, 81.7% (n=49) had disclosed their HIV status to their spouses/partners, and 13.3% (n=11) had disclosed to their parents, siblings and friends. Consistent with the findings of this study, high proportion of mothers in Ethiopia (80%) and South Africa (87.6%) had disclosed their status to spouses/partners (Muluye et al 2012:4; Visser et al 2008:1140). Almost all the respondents (80%; n=48) who had disclosed their status to their spouses/partners were certain that their HIV status did not influence their relationships with them. The findings in this study imply that disclosure to the spouse/partner will probably result in social and financial support from the spouse/partner, which is very important, given the negative stigma surrounding the disease.

Of the respondents, 60.0% (n=36) were not sure whether their HIV status would influence their relationships with their parents, 76.6% (n=46) with their friends, and 81.7% (n=49) with the community. In contrast, in South Africa 52.5% and of women disclosed their status to their parents and 82.9% to their friends because they experienced their relationship as supportive and trusting (Visser et al 2008:1140). The findings in this study indicate that most of the respondents did not trust their parents, friends and the community members. They were not open about their HIV status possibly because of the fear of resultant stigma from the community.

In this study, respondents' victimised due to HIV status were only 7% (n=4) as compared to 14% and 43% reported in Uganda and South Africa respectively (Nassali et al 2009:1129; Peltzer et al 2011:58). These findings indicate the need for the allocation of more resources and effort into community education about HIV, and offering support to assist women in making decisions about disclosure.

5.2.1.4 Children's HIV test results

The majority of the children, 96.7% (n=58) were tested for HIV at 6 weeks and all of them tested HIV negative; 41.7% (n=25) were tested for HIV 6 weeks after they stopped breastfeeding and all of them tested HIV negative, while 57.7% (n=35) were not tested. Of those who were not tested, 11.0% (n=7) were once breastfed in their lives. Of the children, 89.3% (n=50) were tested for HIV at 18 to 24 months and all of them tested HIV negative. In South Africa, Chetty et al (2012:5) reported 2.7% transmission rate at 6 weeks of age and 0% transmission rate at 18 months of age. The reason for children not being tested for HIV was that the mothers were not informed of the need for the test. This indicates that some nurses did not follow the PMTCT guidelines. There were some inconsistencies in the information given to mothers and the implementation of the programme. Despite the inconsistencies, the programme seemed to be working because all children who tested for HIV were negative.

5.2.1.5 Provision and adherence to PMTCT prophylactic treatment

The majority of children (98.3% [n=59]) were given NVP within 72 hours after birth. In contrast, Mirkuzie et al (2010:4) and Kuonza et al (2010:3) reported low level of NVP adherence within the first 72 hour in Addis Ababa (31%) and in Zimbabwe (73.1%) respectively. Of the children, 3.3% (n=2) were not provided with NVP to administer at home after discharge. All the respondents (96.7%; n=58) who were provided with NVP to take home had administered the medication to their children once a day. Although NVP adherence within 72 hour of birth was high in this study, it is clear that there were some inconsistencies in the implementation of the PMTCT guidelines by nurses. Some children were given NVP treatment according to the recommendations on the guidelines, while some were not. It is expected of all mothers to receive NVP on discharge to give to their children at home. All HIV-exposed child should be on NVP treatment for a minimum duration of six weeks, regardless of the mothers' ART status and feeding practice (DOH 2010:20).

Of the children, 72.4% (n=42) were provided with NVP at the clinic during their follow-up visits. All the children (100%; n=60) were no longer on NVP treatment at 18 to 24 months. Of the respondents, 31.6% (n=18) stopped administering NVP treatment to their children because they (mothers) were taking ART; while 68.4% (n=39) stopped

because their children were HIV negative and were no longer breastfed. In this instance, nurses did follow the guidelines. NVP can only be stopped when the child has tested HIV negative and is no longer breastfed, or at 6 weeks when the child is not breastfed or the mother is on ART (DOH 2010:5).

The majority of children (73.3%; n=44) were put on CTX treatment at 6 weeks, and 3.3% (n=2) after 6 weeks, while 23.3% (n=14) were never on treatment. In South Africa, Moodly et al (2013:2) found that 33% of HIV exposed children aged 6 months and older were never initiated on CTX treatment. Of the respondents who received CTX, 72.9% (n=43) administered it daily, but only 56.7% (n=34) of them received it at their follow-up visits. These findings indicate poor compliance with the guidelines.

All the children were no longer on CTX at 18 to 24 months. Of the respondents, 48.3% (n=29) stopped the treatment before 6 months and 26.7% (n=16) before 12 months. Treatment was stopped because the children tested HIV negative and were no longer breastfeeding. This reaffirms the finding from the study done in South Africa which showed that the duration of CTX treatment was longer in breastfed children as compared to formula fed children (Moodle et al 2013:3). The finding in this study indicates that the nurses did correctly follow the PMTCT guidelines regarding the termination of CTX treatment. HIV-exposed children should stop CTX treatment only if they are allergic to it or they tested HIV negative and are no longer breastfeeding (WHO & UNICEF 2009:6).

There was an association between the unemployed respondents receiving financial support from husbands and the provision of prophylactic treatment. Unemployed respondents who were financially supported by their husbands were more likely to be provided with NVP on follow-up visits; and they started their children on CTX at six weeks compared to those that are financial supported by their parents, sibling or others. The findings in this study imply that disclosure to the spouse/partner contribute positively to adherence to medication.

The respondents' age was also associated with receiving CTX at follow-up visits. Respondents aged between 21 and 35 received CTX regularly at their follow-up visits. This is inconsistent with the study done in Ethiopia where age of the mother was not

associated with adherence to CTX treatment. No association was found between adherence to prophylactic treatment (NVP and CTX) and HIV transmission rate.

5.2.1.6 Child feeding practices

The majority of respondents, 98.3% (n=57) received feeding advice from the clinic sister. Inconsistence with the findings in this study, a lower proportion (91%) of mothers had received infant feeding counselling in South Africa (Zunza et al 2011:277). In this study no significance difference was found between respondents practised exclusive breastfeeding (55%; n=33) and respondents practised exclusive formula feeding (45.0%; n=27) from birth to 6 weeks. In contrast, high level of exclusive breastfeeding was reported in Ethiopia (71.3%) and in South Africa (97%) (Sategn 2012:5; Ghuman 2009:77). Lack of significance difference between exclusive breastfeeding and exclusive formula feeding in this study may reflect the mother's level of knowledge regarding the benefits and the risk of different feeding practices.

The respondents supported by their husbands and the clinics were associated with the feeding practice. Respondents utilising clinic B were more likely to breastfeed than those utilising clinic A. Respondents receiving financial support from their husbands/partners were more likely to exclusively breastfeed from birth to 6 weeks. The difference in feeding practices from the two clinics may be due to the fact that more respondents at clinic A were employed therefore they could afford to buy formula compared to respondents at clinic B. Ghuman et al (2009:75) also found that mothers who were economical better off tended to formula feed their children more often than those of poorer socio-economic status.

At 6 months more of the children (57.6%; n=34) were on formula feeding than breastfeeding (40.7%; n=24) compared to at 6 weeks. Of the respondents who exclusive breastfed at 6 weeks, 27.0% (9 out of 33) were giving formula at 6 months and only 1.7% (n=1) reported mixed feeding. The change in the feeding pattern as the children grow was also reported in Setegn et al (2012:4), where children in the age group of less than 2 months were found to be 2.7 times more likely to be breastfeed exclusively as compared to those aged 4 to 5 months.

The respondents with 2 children (63.6%; n=22) were more likely to formula feed from 6 weeks to 6 months. Almost all the respondents (53.5%; n=31) who decided to breastfeed did so for less than a year. Only one child was still breastfed at 18 months. Most HIV-positive mothers stop breastfeeding earlier or do not breastfeed at all compared to HIV-negative mothers (Sadoh, Sadoh, Adeniran & Abhulimhen-Iyoha 2008:465). The duration of breastfeeding was regarded as a determinant for postnatal HIV transmission. Each additional month of breastfeeding beyond six months was associated with 1% risk of HIV transmission (Becquet et al 2009:4). The finding in this study implies that mothers breastfed their children for a shorter duration possible as a measure to reduce the chances of HIV transmission to their children.

Of the respondents who formula fed their children, 16.1% (n=5) did not always have money to buy the formula. They then gave their children “rooibos” tea or soft porridge when the milk was finished. This practice is consistent with findings from others studies which showed that mothers gives children other local food like tea when the formula milk is finished. The tin of formula milk was reported to be small and expensive (Laar & Govender 2011:133; Lawani et al 2014:379). This indicates that some mothers practised replacement feeding although they did not meet the AFASS criteria.

Of the respondents who gave their children water before 6 months, 16.7% (n=10) started before 6 weeks and 26.7% (n=16) started after 6 weeks but before 6 months. Of the respondents who also gave their children other food besides milk before 6 months, 6.8% (n=4) started before 6 weeks and 27.1% (n=16) started after 6 weeks but before 6 months. The practice of introducing water and solids prior 6 months was also reported in South Africa where 73% of children were fed solids and 53% received water at 14 weeks (Ghuman et al 2009:76). These respondents did not practise exclusive breastfeeding or exclusive formula feeding before 6 months. Despite the nurses’ feeding advice, some respondents still practiced mixed feeding. It is evident from these findings that mothers face a difficult decision about how to feed their children which may be complicated by the lack of support from the family members, the influence of family members on culturally and socially acceptable feeding methods and the employment status of the mother (Anoje et al 2012:6).

In this study no association was found between the feeding practice and the HIV transmission rate. In contrast, Becquet et al (2009:4) found that children exposed to

solids during the first two months of life were 2.9 times more likely to be infected postnatally than children never exposed to solids during the same period.

5.2.1.7 Respondents' breast conditions (only applicable to respondents who were breastfeeding)

Of the respondents, 91% (n=30) did not experience any breast conditions or mastitis, and 9.0% (n=3) did. Engorged/full painful breast was the only condition experienced by 6.0% (n=2). In this study breast conditions or clinical mastitis was not associated with HIV transmission rate. Taha et al (2007:12) and Lunney et al (2010:767) reported an association between clinical mastitis and HIV transmission in Malawi and Zimbabwe respectively.

5.2.1.8 Child thrush

Of the 43 children who were given CTX treatment daily, only 9.3% (n=4) experienced mouth thrush/sores compared to 25.0% (n=4) of the 16 who never received CTX. There was an association between the development of mouth sores/thrush and the administration of CTX. Children who were given CTX daily were less prone to develop mouth sores/thrush. The effects of CTX in the prevention of opportunistic infections, in this case mouth sores/thrush was evident from the fact that only a few of the children who received CTX developed mouth sores/thrush (WHO & UNICEF 2009:3).

Although some studies have identified children oral thrush as the risk factor for HIV transmission through breastfeeding (Embree et al 2000:2539; Nandini & Deepak 2010:83). In this study child thrush was not associated with HIV transmission rate.

5.2.2 Findings from the children's clinic records

5.2.2.1 Children's demographic Information

Of the children's records, 7.9% (n=12) were aged 18 months; 31.7% (n=33) were 19-20 months; 28.9% (n=44) were 21-22 months, and 41.4% (n=63) were 23-24 months. The mean age of the children was 22 months. Of the children, 53.9% (n=82) records were males , while 46.1% (n=70) were females. There were no significant difference in HIV

transmission between the different age groups and gender. No association was found between children's gender and HIV transmission. Lack of association between children's gender was also reported in Malawi (Taha et al 2007:12)

5.2.2.2 Provision of PMTCT prophylactic treatment

Level of NVP treatment adherence within 72 hours of birth was high in this study. All the children (100.0%; N=152) received NVP treatment within 72 hours of birth and were all born in a health care facility. In contrast, Lettow et al (2011:3) reported 66% adherence of NVP treatment within 72 hours in Malawi. In support of this study's findings, Kuonza et al (2010:5) reported an association between place of birth and adherence to NVP treatment within 72 hours of birth where non-adherence was associated with home deliveries. The findings in this study imply that giving birth in a health care setting increases the chances of the child receiving NVP treatment.

Most of the children (66%; n=99) were not issued with NVP treatment at their follow-up visits. Of the 99 children who were not issued with NVP, 18.1% (n=18) were breastfed beyond 6 months. Of the children, 99.0% (n=150) were no longer on NVP treatment at 18 to 24 months. This indicates poor adherence to the PMTCT guidelines, because some children did not receive NVP at their follow-up visits while they were still breastfed. All HIV-exposed children who were breastfed should be on NVP treatment until one week after they stopped breastfeeding (DOH 2010:6).

Of the children, 98.6% (n=150) were started on CTX treatment, while 67.0% (n=102) only received CTX at 6 weeks and never received it again at their follow-up visits. Of the children who did not receive CTX at their follow-up visits (67.0%; n=102), 12.7% (n=13) were breastfed beyond 6 weeks. The findings indicate non-compliance to PMTCT guidelines because not all children were started on CTX treatment, while others did not receive treatment for the duration of breastfeeding. All children on PMTCT programme should receive CTX treatment until breastfeeding is stopped and are HIV negative (DOH 2010:5).

Of the children, 98.6% (n=150) were no longer on CTX treatment at 18 to 24 months, and 79.0% (n=120) stopped the treatment before 6 months. In South Africa, continuing or discontinuing of CTX treatment after 6 months was associated with the availability of

the children's HIV test results. A larger proportion of children with unknown HIV status were continuing with CTX treatment regardless of their age (Moodley et al 2013:2). This implies that when the child is tested HIV negative and is no longer breastfed, the CTX treatment will be discontinued; where else if the status is unknown the treatment will be continued regardless of the feeding practice and the age. In this study no association was found between the adherence to prophylactic treatment (NVP and CTX) and the HIV transmission rate.

5.2.2.3 Occurrences of mouth thrush/sores

The study found less incidence of mouth thrush (8.6%; n=13) as compared to 39% reported in Rollins, Meda, Becquet, Coutsoudis, Humphrey, Jeffrey, Kanshana, Kuhn, Leroy, Mbori-Ngacha, McIntyre & Newell (2004:193). In this study the development of mouth /sores was not associated with the feeding practice and HIV transmission rate.

5.2.2.4 Duration of breastfeeding

The duration of breastfeeding in this study was short, 5.3% (n=8) of the children stopped breastfeeding at 6 weeks; 23.8% (n=36) stopped before 6 months; 10.6% (n=16) stopped before 9 months; 5.3% (n=8) stopped before 12 months; 1.3% (n=2) stopped before 15 months; while 53.6% (n=81) were never breastfed. In Tanzania 97%, 95%, 72% and 11% of HIV exposed children were still breastfed at 9, 12, 18 and 24 months respectively (Petraro et al 2011:5). Many of the children stopped breastfeeding prior to the recommended period. According to the DOH (2010:24), HIV positive mothers may breastfeed their children for the first 12 months of life. In this study no association was found between the duration of breastfeeding and HIV transmission rate.

An association between the feeding practice and the administration of prophylactic treatment was found. The mothers of the children who were not breasted either stopped NVP at 6 weeks or did not administer NVP at all. The majority of the children (95.0%; n=76) who were never breastfed did not receive NVP to take home at their follow-up clinic visits. Of the mothers of the children who were not breastfed, 95.1% (n=77) did not receive CTX to take home at follow-up visits. The findings in this study imply that

children who are not breastfed will receive NVP treatment for the first 6 weeks, while they only get CTX once at 6 weeks.

5.2.2.5 Follow-up visits

Of the children, only 1.3 (n=2), complied with the PMTCT follow-up requirement by bringing their children to the clinic once a week in the first month of life. Of the children, 52.6% (n=80) between 6 weeks and 12 months old were brought to the clinic once a month, while 6.6% (n=10) only came at 6 weeks and never returned for other follow-up visits. Children were not brought for follow-up visits as required. HIV- exposed children are expected to follow-up at the clinic weekly in the first month of life and monthly from 1 month to 12 months (DOH 2010:27).

Even though the children were not brought for follow-up as required, all of them (100%; n=152) came to the clinic at least once from 6 weeks of age as compared to 38%, 76% and 86% in Uganda, South Africa and Kenya respectively (Nassali et al (2009:1127; Peltzer et al 2011:19; Mirkuzie et al 2011:6). In this study bringing the children to the clinic at 6 weeks of age gave an opportunity for conducting PCR HIV test on all of them.

The Frequency of follow-up visits from 6 weeks to 12 months was associated with receiving CTX to take home. Children who attended follow-up visits at least once a month were more likely to receive CTX to take home than those who attended less frequently. The frequency of follow-up visits from 12 to 24 months was associated with receiving CTX to take home. Children who attended follow-up visits at least once a month between 12 and 24 months were more likely to receive CTX to take home. The findings in this study imply that bringing the child to the clinic at least once a month increases the chances of receiving CTX treatment which increases the adherence to the treatment.

The majority of the children (76.3%; n=116) did not comply with the follow-up visit appointments as arranged with the clinic nurse. Attendance of follow-up visits was associated with the age at which the NVP was stopped. The children who attended follow-up visits as arranged with clinic sister, stopped NVP treatment between 12 and 18 months. Of the children, 47.0% (n=72) were lost to follow-up before 24 months. Shargie et al (2011:4) found that when children test HIV negative at 6 weeks, mothers

decide that is no longer necessary for them to come for follow-up visits and the children are then loss to follow-up. The mothers did not comply with the PMTCT follow-up requirements. The findings in this study imply that bringing the children to the clinic according to the arrangement with the nurse could result in extended period of NVP treatment and increasing adherence to treatment. In this study no association was found between attending follow-up visits as arranged with the nurse and the HIV transmission rate.

5.2.2.6 Children's HIV test results

The majority of the children (99.3%; n=151) were tested for HIV at 6 weeks. Of the children, 24.3% (n=37) were tested for HIV at 6 weeks post-cessation of breastfeeding. At 18 to 24 months, only 37.5% (n=57) were tested, while 62.5%; (n=95) were not tested. The HIV transmission rate was 1.3% at 6 weeks; 8.1% at 6 weeks post-cessation of breastfeeding, and 1.8% at 18 to 24 months. The transmission rate at 6 weeks post-cessation of breastfeeding seemed high possibly because of the low uptake of the test. In Botswana the HIV transmission rate was 2.9% at 1 to 3 months and 0.5% at 7 to 24 months. Testing children for HIV at 6 weeks seemed to be acceptable, while testing at 6 weeks post-cessation of breastfeeding and at 18 to 24 months appeared to be a problem. Mothers who never breastfed their children often consider the 6 weeks test as final because their children are not exposed to their breast milk. No factors were found to be associated with the HIV transmission rate at 18 to 24 months.

5.3 CONCLUSIONS

Even though there were no factors associated with the HIV transmission rate at 18 to months old children on PMTCT, there were certainly discrepancies in the implementation of the programme by the nurses. The most prominent discrepancies were not issuing prophylactic treatment (NVP & CTX) as indicated in the guidelines and failure to test the children for HIV at 6 weeks post cessation of breastfeeding and at 18 to 24 months. Loss to follow-up was highly prominent from 12 months of age and this shows lack of knowledge from the respondents regarding the exit level for PMTCT. Despite the fact that all respondents received feeding counselling, the practice of mixed feeding and formula feeding even though the AFASS criteria was not met was evident in this study.

There was strong positive association between respondents who were supported by their spouses/partners and receiving treatment, while compliance to follow-up visits was associated with receiving treatment. This emanates from the high disclosure level of status to the spouse/partner and the level of trusting relationship which resulted in respondents receiving support from their spouses/partners. Victimisation of respondents by the nurse was found to be unethical and unprofessional. Negative attitudes from nurses may results in poor utilisation of the services.

5.4 RECOMMENDATIONS

Based on the findings of the study, the researcher makes the following recommendations for clinic management and clinic nurses, to improve the PMTCT service and thereby perhaps lead to a reduction of vertical transmission of HIV, and for further research.

5.4.1 Clinic management

To improve nurses' commitment to their work and tackle the inconsistencies in the implementation of the programme, clinic management should:

- Ensure that all nurses providing PMTCT services in the clinic are trained in Basic HIV and PMTCT programme so that they can manage the children better thus increase the effectiveness of the programme.
- Conduct in-service training and workshops for nurses working on PMTCT sites to provide them with current updates on the PMTCT guidelines and standardizing the provision of the PMTCT service so that all children can be managed in the same manner.
- Conduct in-service training and workshops on moral and ethical conduct for nurses working in the clinics. Employee wellness department should be engaged in motivating nurses and help them to find a meaning in their job as this may reduce their work related stress and improve performance.
- To have a system in place to secure follow-up of children and tracing those that are loss to follow-up. This could be achieved through utilisation of the community health workers that are employed through the Ward Bases Out-reach teams.

5.4.2 Clinic nurses

In order to improve nursing practice, clinic nurses should:

- Attend Basic HIV and PMTCT training and follow guidelines at all times.
- Give health education to mothers and counsel them individually at all clinic visits about the importance of exclusive breastfeeding and exclusive formula feeding in the first six months of the children's life. During the health education, the dangers of mixed feeding should be strongly emphasised.
- Conduct further health education on HIV and PMTCT to all people utilising the clinics and the community at large as a measure to reduce the level of stigma and in turn increasing adherence to medication and compliance to follow-up visits.
- Correctly assess mothers on the AFASS criteria, to prevent mothers from formula feeding even if they cannot afford to buy the milk at all times.
- Emphasise the importance of testing the children for HIV to all mothers, especially at 6 weeks post-cessation of breastfeeding and at 18 months. As this is the only measure utilised to assess the effectiveness of the programme by the department.

5.4.3 Further research

Further research should be conducted on the following:

- A case-control study of HIV-positive and HIV-negative children to identify factors associated with the HIV transmission rate in all children that were on PMTCT programme.
- An investigation into the reasons for the low up take of HIV test at 6 weeks post-cessation of breastfeeding and at 18 months.
- Determine HIV-positive mothers' perceptions and experiences of exclusive breastfeeding and exclusive formula feeding.

- Health care service providers' perceptions and experience of factors associated with the HIV transmission rate in 18 to 24 month-old children on the PMTCT programme.
- An investigation into the reason for loss to follow-up of children on PMTCT

5.5 LIMITATIONS OF THE STUDY

The study was only conducted in two clinics of the City of Tshwane and the population was limited to mothers of children on the PMTCT programme aged 18 to 24 months coming to the clinic for PMTCT follow-up, IMCI and immunisations, and the records of all children on the PMTCT programme aged 18 to 24 months. Consequently the results cannot be generalised to children who did not utilise the two.

The respondents were restricted to 60 mothers bringing their children to the clinic due to the confidentiality on the HIV status of the mother. Only mothers of HIV-negative children were accessible. Mothers of HIV-positive children were not accessible, because most HIV-positive children attend their follow-ups at the hospital. In addition, only mothers who could read and write English were included in the study. To overcome this, the researcher also reviewed a large sample of records of children on PMTCT as measure to gather more and accurate information on transmission rate at 18 to 24 months and the factors that could be associated with it.

The researcher found scant literature available on the HIV transmission rate at 18 to 24 months and the extended period of NVP treatment. Most studies had transmission rates below 12 months and only focussed on NVP treatment within 72 hour of birth. This limited the researcher ability to compare own findings with that of others. To overcome this, the researcher used the PMTCT guidelines from the department of health as a reference point.

The use of structured self-administered questionnaires for data collection limited data analysis to only the questions answered. Moreover, self-report bias cannot be excluded because self-administered questionnaires were used. This could affect the reliability of the study findings. The research tried to prevent the self-report bias by explaining to the respondents the importance of giving the correct information and also indicating that the

information they are giving will not be linked to their identity or even affect their health care in any way.

The results of the study can, therefore, not be generalised to other settings.

5.6 CONCLUDING REMARKS

Even though no factors were associated with the HIV transmission rate in 18 to 24 month-old children, the reduction of vertical HIV transmission depends on effective administration and implementation of the PMTCT programme by all stake holders. All health care workers should comply with the PMTCT guidelines while providing service to ensure that all patients get the correct treatment. Health education and counselling is essential to help patients and communities understand HIV and the PMTCT programme. This should, in time, reduce the stigma and help facilitate and foster adherence to medication and other health information.

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ANNEXURE 1

UNISA university of south africa

UNIVERSITY OF SOUTH AFRICA
Health Studies Higher Degrees Committee
College of Human Sciences
ETHICAL CLEARANCE CERTIFICATE

HSHDC/14/2012

Date of meeting: 22 February 2012 Student No: 4690-254-6

Project Title: Factors associated with the HIV transmission rate in 18 months old children on Prevention of Mother-to-Child Transmission programme at the City of Tshwane clinic.

Researcher: Sophy Mogatlogedi Moloko

Degree: Masters in Public Health Code: DIS4986

Supervisor: Dr DGJ da Serra
Qualification: D Cur
Joint Supervisor: -

DECISION OF COMMITTEE

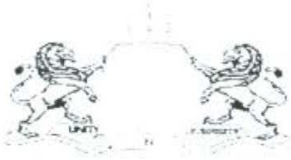
Approved [√] **Conditionally Approved** [ ]

Prof E Potgieter
CHAIRPERSON: HEALTH STUDIES HIGHER DEGREES COMMITTEE

pp **Dr MM Moleki**
ACTING ACADEMIC CHAIRPERSON: DEPARTMENT OF HEALTH STUDIES

PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRES

ANNEXURE 2



health and social development
Department: Health and Social Development
GAUTENG PROVINCE

TSHWANE RESEARCH COMMITTEE

CLEARANCE CERTIFICATE

Meeting: 20TH JUNE 2012

PROJECT NUMBER: 2012/ 20

Title: Factors associated with the HIV transmission rate in 18 months old children on prevention of mother to mother -to- child transmission Programme at the city of TSHWANE clinic.

Researcher: Mrs. S. Moloko
Supervisor: Dr D. G.J. da Serra
Department:

DECISION OF THE COMMITTEE

Approved

NB: THIS OFFICE REQUESTED A FULL REPORT ON THE OUTCOME OF THE RESEARCH DONE

Date: 20TH JUNE 2012

.....
Dr. K.E Letebele-Hartell
Chairperson Tshwane Research Committee
Tshwane District

.....
Mrs. M Morewane
Director: District Health Services Support
Tshwane District

NOTE: Resubmission of the protocol by researcher(s) is required if there is departure from the protocol procedures as approved by the committee.

ANNEXURE 3

RESPONDANT'S INFORMATION SHEET

Dear Madam/Sir

RE: FACTORS ASSOCIATED WITH THE HIV TRANSMISSION RATE IN 18 TO 24 MONTH-OLD CHILDREN ON PREVENTION OF MOTHER-TO-CHILD TRANSMISSION PROGRAMME AT THE CITY OF TSHWANE CLINIC

The above mentioned research is done as part of a Masters in Public Health at the University of South Africa (UNISA). I would like to invite you to take part in the research. Your participation in this study is of vital importance.

Permission to conduct this study has been obtained from the Department of Health Studies Research and Ethics Committee, University of South Africa (UNISA) and Research Committee of Tshwane Health and Social Development Department.

All information provided will be treated in the strictest confidence and your name will not be reflected anywhere. Please complete the questionnaire as accurately as possible. You can only complete the questionnaire if you are able to read or write in English. I am aware that some questions may touch your privacy. If you feel uncomfortable with any question, you do not have to answer it. You also have the right to withdraw from the study at any stage. All questions asked will not affect your care at the clinic.

For further information about this study, you can ask me now or any time. My telephone number is given below.

Thank you

Sophy Moloko

082 442 5326

ANNEXURE 4

Respondents research identification number ☐

CONSENT FORM FOR RESEARCH STUDY

RE: FACTORS ASSOCIATED WITH THE HIV TRANSMISSION RATE IN 18 TO 24 MONTH-OLD CHILDREN ON PREVENTION OF MOTHER-TO-CHILD TRANSMISSION PROGRAMME AT THE CITY OF TSHWANE CLINIC

Please initial in the Box

1. I confirm that I have read and understand the information Sheet for the above study and have had the opportunity to consider the information, ask questions, and had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care being affected. ☐

3. I agree to take part in the above study ☐

_____	_____	_____
Name of Patient	Date	Signature
_____	_____	_____
Researcher	Date	Signature

ANNEXURE 5

Clinic record number _____

QUESTIONNARE FOR PATIENT'S MOTHERS

Please tick in the box next to the appropriate answer and write reasons where requested

Section 1
Socio-demographic Information

1. How old are you in years?	14-19	
	20-25	
	26-30	
	31-35	
	36 and above	

2. What is your marital status?	Single	
	Married	
	Divorced/Separated	
	Widowed	

3. Who do you live with?	Alone	
	Your partner or spouse	
	Your parents	
	Your friend	
	Your partner and in-laws	
	With other, specify	

4. What is your educational level?	None	
	Primary	
	Grade 1-4	
	Grade 5-7	
	Secondary	
	Grade 8-10	
	Grade 11-12	
	Tertiary	

5. What is your employment status?	Not employed	
	Self employed	
	Permanent Employment	
	Other	
If other, specify_____		

6. What is your family income per month? _____

7. If not employed, who is supporting you financially?	Your husband	
	Your partner	
	Your parent	
	Your in-laws	
	Your siblings	
	Other	
If Other, specify_____		

Section 2
Mothers' ART Status and parity

1. How many times have you been pregnant?	4 and more	
	3 times	
	2 times	
	Once	

2. How many children do you have?	4 and more	
	3 children	
	2 children	
	1 child	

3. Are you currently on Antiretroviral Therapy/Treatment?	Yes		No	
If yes, for how long have you been on the treatment?	Less than 1 Year			
	More than 1 Year			
	More than 2 Years			

Section 3
Social Stigma

1. Who did you tell about your HIV status?	None	
	Your partner or spouse	
	Your parents	
	Your friends	
	Other	
If other, specify_____		
If answer is none, give reason_____		
_____		

2. Do you think being HIV positive will affect your relationship with your partner/spouse	Yes		No		N/A		Unsure	

Give reason _____
_____

3. Do you think being HIV positive will affect your relationship with your parents?	Yes		No		N/A		Unsure	
Give reason _____								
_____								

4. Do you think being HIV positive will affect your relationship with your friends	Yes		No		N/A		Unsure	
Give reason _____								
_____								

5. Do you think being HIV positive will affect your relationship with other people in your community?	Yes		No		N/A		Unsure	
Give reason _____								
_____								

6. Have you felt victimised because of your HIV status?	YES		No	
If yes, by whom?	Your partner or spouse			
	Your parents			
	Your friends			
	Nurses or doctors			
	Other, specify _____			
If yes, how were you victimised? _____				
_____				

Section 4
HIV Test results of the child

1. Was your child tested for HIV at 6 weeks?	Yes		No	
If yes, what was the result?	Positive		Negative	
If no, give reason_____				
_____				

2. Was your child tested for HIV at 6 week after you stopped breastfeeding?	Yes		No		N/A	
If yes, what was the result?	Positive		Negative			
If no, give reason_____						
_____						

3. Was your child tested for HIV at 18 months or today?	Yes		No	

If yes, what was the result?	Positive		Negative	
If no, give reason_____				

Section 5
Provision and adherence to PMTCT prophylactic treatment

1. Was your child given Nevirapine within first 72 hours of birth?	Yes		No	
If no, give reason _____				
_____				

2.Did the nurse or doctor at the clinic or hospital where you delivered give you Nevirapine to give to the child at home?	Yes		No	
If no, give reason _____				
_____				

3. If yes, how often did you give Nevirapine to your child?	Once a day	
	Every second day	
	Not regularly	
	None	
4. If not once a day, give reason _____		
_____		

5. Did you receive Nevirapine from the clinic at your follow-up visits while still breastfeeding?	Always	
	Most of the time	
	Some times	
	Never	
If not always, give reason _____		
_____		

6. Is your child currently still on Nevirapine treatment?	Yes		No		N/A	

7. If no, at what age did you stop the Nevirapine treatment to the child?	At 6 weeks	
	Between 6weeks and 6months	
	Between 6 and 12 months	
	Between 12 and 18 months	
	N/A	

8. Why did you stop the Nevirapine treatment, give reason _____
_____

9. At what age was the child started on Cotrimoxazole (Bactrim) treatment?	At six weeks	
	After six weeks	

	Never	
If after six weeks or never, give reason _____		
_____		

10. How often did you give the Cotrimoxazole (Bactrim) to the child at home?	Once a day	
	Every second day	
	Not regularly	
	Never	
If not once a day, give reason _____		
_____		

11. Did you receive Cotrimoxazole (Bactrim) from the clinic at your follow up visits	Always	
	Most of the time	
	Some times	
	Never	
If not always, give reason_____		
_____		

12. Is your child currently still on Cotrimoxazole (Bactrim) treatment?	Yes		No		N/A	

13. If no, at what age did you stop the Cotrimoxazole (Bactrim) treatment to the child?	Between 6 weeks and 6 months	
	Between 6 and 12 months	
	Between 12 and 18 months	
	N/A	

14. Why did you stop Cotrimoxazole (Bactrim) treatment, give reason_____
_____

Section 6
Child feeding practices

1. Did the sister at the clinic advise you about the feeding options?	Yes		No	

2. On what feeding was your child from birth to 6 weeks?	Only breast milk	
	Only formula milk	
	Both breast and formula milk	
	Other	
If other, specify_____		

3. On what feeding was your child from 6 weeks to 6 months?	Only breast milk	
	Only formula milk	
	both breast and formula milk	
	Other	
If other, specify_____		

4. Did you experience any difficulties with the feeding option you	Yes		No	

chose for your child?				
If yes, give reason_____				
_____				

5. If only formula milk was given, did you have money to buy it?	Always	
	Most of the time	
	Sometimes	
	Never	
If not always, what did you give the child when the formula milk was finished? _____		
_____		

6. Are you currently still breastfeeding your child?	Yes		No		N/A	

7. For how long did you breastfeed your child?	Never	
	For about 6 weeks	
	More than 6 weeks but less than 6 months	
	More than 6 months but less than 9 months	
	More than 9 months but less than 12 months	
	More than 12 months by less than15 months	
	More than 15 months but less than18 months	

8. At what age did you start giving your child water to drink?	At birth	
	Before 6 weeks	
	After 6 week before 6 months	
	After 6 months	

9. At what age did you start giving your child other food	At birth	
except milk?	Before 6 weeks	
	After 6 week before 6 months	
	After 6 months	

Section 7
Mother's breast Conditions

Only applicable to mothers who breastfed their children

1. Have you experienced any breast problems while breastfeeding?	Yes		No	

2. If yes, which breast problems/conditions did you experience (more than one option can be selected)	Cracked nipples	
	Sores on the nipples	
	Engorged/full painful breast	
	Lumps on the breast	
	Abscess on the breast	
	Never	

3. When did the breast problems/conditions occur (more than one option can be selected)?	In the first 6 weeks	
	Between 6 weeks and 6 months	
	Between 6 and 12 months	
	Between 12 and 18 months	

4. How did you breastfeed the child during the breast problems?	Fed only from unaffected breast	

	Fed from both breasts	
	Expressed from affected breast and fed with a cup	
	Stopped breastfeeding	

5. How was the breast condition managed? _____
_____

Section 8
Child thrush

1. Has your child ever had thrush or sores in the mouth?	Yes		No	

2. If yes, how old was the child (more than one option can be selected)	Below 6 weeks of age	
	Between 6 weeks and 6 months	
	Between 6 and 12 months	
	Between 12 and 18 months	

THANK YOU FOR TAKING PART IN THE STUDY.

ANNEXURE 6

Clinic record number _____

DATA-COLLECTION FORM

Section 1
Child's demographic information

Age	18 months	
	19 - 20 months	
	21 -22 months	
	23-24 months	
Gender	Male	
	Female	

Section 2
Provision of PMTCT prophylactic treatment

1. Place of birth	Home					
	Health care facility					
2. Received Nevirapine within first 72 hours of birth?	Yes		No			
If no, give reason as indicated in the records_____						
_____						
3.Received Nevirapine to take home at all follow-up visits?	Yes		No			
If no, give reason as indicated in the records _____						
_____						
4. Is the child currently still on Nevirapine treatment?	Yes		No		N/A	
5. If no, at what age was Nevirapine stopped?	At 6 weeks					
	Between 6 weeks and 6 months					
	Between 6 and 12 months					
	Between 12 and 18 months					
	N/A					
6. At what age was the child started on Cotrimoxazole (Bactrim) treatment?	At 6 weeks					
	After 6 weeks					
	Never					
7. Received Cotrimoxazole (Bactrim) to take home at all follow-up	Yes		No		N/A	

visits/						
If no, give reason as indicated in the records _____						
_____						
8. Is the child currently still on Cotrimoxazole (Bactrim) treatment?	Yes		No		N/A	
9. If no, at what age was Cotrimoxazole (Bactrim) stopped?	Between 6 weeks and 6 months					
	Between 6 and 12 months					
	Between 12 and 18 months					
	N/A					

Section 3
Child thrush

1. Was the child treated for thrush or sores in the mouth?	Yes		No	
2. If yes, how old was the child?	Below 6 weeks of age			
	Between 6 weeks and 6 moths			
	Between 6 and 12 months			
	Between 12 and 18 months			

Section 4
Duration of breastfeeding

1. Age at which breastfeeding was stopped	Never breastfed	
	At 6 weeks	
	Between 6 weeks to 6 months	
	Between 6 to 9 months	
	Between 9 to 12 months	
	Between 12 to 15 months	
	Between 15 to 18 months	

Section 5
Follow-up visits

1. How often was the child brought to the clinic for follow-up in the first 6 weeks after birth?	Once a week	
	Once in two weeks	
	Once in three weeks	
	Only once in the six weeks	
	Never	
2. How often was the child brought to the clinic for follow-up from 6 weeks to 12 months?	Once a week	
	Once a month	
	Once in 3 months	
	Never	

3. How often was the child brought to the clinic for follow-up from 12 to 24 months?	Once a week			
	Once month			
	Once in 3 months			
	Never			
4. Were all follow-up appointments attended as arranged with the clinic sister?	Yes		No	
If no, is there any reason indicated in the records?_____				
_____				

Section 6
HIV test results

HIV test	Pos	Neg	not done
1. PCR test around 6 weeks			
2. PCR test around 6 week post cessation of breastfeeding			
3. HIV rapid test at 18 months			

ANNEXURE 7

321 President Burgers Street

Pretoria West

0183

February 2012

City of Tshwane Research Committee

FACTORS ASSOCIATED WITH THE HIV TRANSMISSION RATE IN 18 MONTH-OLD CHILDREN ON THE PREVENTION OF MOTHER-TO-CHILD TRANSMISSION PROGRAMME AT THE CITY OF TSHWANE CLINIC

The abovementioned study is to be conducted as a prerequisite to complete my MA (Public Health) degree at the University of South Africa. The study is being conducted under the supervision and mentorship of Dr DG Ja Serra.

The Prevention of Mother-to-child transmission of HIV (PMTCT) programme is offered at your clinic as one of the strategies aimed at reducing new infection to children born to HIV-infected women. The researcher's experience showed that some of the children who were negative at six weeks tested positive at 18 months. It is also reflected in the District Health Information System that the baby HIV antibody test around 18 months positive rate is high compared to the baby HIV PCR test positive rate around 6 weeks of age. There are factors that may be associated with the increased HIV transmission rate at 18 months.

The purpose of this study is to demonstrate the relation between the identified factors and the HIV transmission rate in 18 month old children on the PMTCT programme at the City of Tshwane clinics. The research target population will be children aged 18 months attending the PMTCT programme.

Permission to conduct this study is needed, and you are kindly requested to grant permission, so that the study can be conducted in your Primary Health Care (PHC) Clinic utilising patients' records and their mothers.

All information collected will be treated with the strictest confidence. Your co-operation is appreciated. I sincerely hope that the findings of this research will be useful in the PMTCT services.

Any enquiries with regard to the research may be made at

Cell : 082 442 5326

E-mail: smmoloko@gmail.com

Dr DGJ da Serra (Supervisor): 083 226 3864

Regards

_____

Sophy M Moloko

ANNEXURE 8

LETTER FROM EDITOR

Cell/Mobile: 073-782-3923

53 Glover Avenue

Doringkloof

0157 Centurion

28 November 2013

TO WHOM IT MAY CONCERN

I hereby certify that I have edited Sophy Mogatlogedi Moloko's master's dissertation, **Factors associated with the HIV transmission rate in 18 to 24 month-old children on the prevention of mother-to-child transmission programme at the City of Tshwane Clinics**, for language and content.

IM Cooper

Iauma M Cooper

192-290-4