Attitudes and perceptions of HIV-infected pregnant women towards the use of antiretroviral therapy in the Niger Delta region of Nigeria

Dr. Puremeluan Baldwin Major

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Attitudes and perceptions of HIV-infected pregnant women
towards the use of antiretroviral therapy in the
Niger Delta region of Nigeria

A thesis submitted to the University of Bedfordshire
In fulfilment of the requirements for the
degree of Doctor of Philosophy

Institute for Health Research
University of Bedfordshire

By
Puremeluan Baldwin Major

February 2019
Declaration

I, Puremeluan Baldwin Major declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

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2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;

3. Where I have cited the published work of others, this is always clearly attributed;

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5. I have acknowledged all main sources of help;

6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;

7. Either none of this work has been published before submission, or parts of this work have been published as indicated on page vi.

Name of Student: Puremeluan Baldwin Major

Signature:

Date: 20 February 2018
Abstract

Background

Despite several initiatives, the number of HIV-infected pregnant women receiving antiretroviral therapy (ART) to prevent mother-to-child transmission (MTCT) of HIV in Nigeria remains low. In 2016, only 32% of HIV-infected pregnant women received ART to prevent MTCT of HIV. Evidence suggests that attitudes and perceptions of pregnant women with HIV influence their use of ART. However, limited evidence exists about HIV-infected pregnant women’s attitudes and perceptions towards ART in Nigeria.

Aim

This study aims to improve the understanding of the attitudes and perceptions of HIV-infected pregnant women towards the use of antiretroviral therapy for the prevention of mother-to-child transmission of HIV in the Niger Delta region of Nigeria.

Method

The study utilises an exploratory sequential mixed methods design, consisting of qualitative and quantitative phases. In the first phase, 24 HIV-infected antenatal attendees were purposively selected. Semi-structured in-depth interviews were conducted for all 24 participants. Interviews explored pregnant women’s attitudes and perceptions towards the use of ART for PMTCT. All the interviews were recorded, transcribed and analysed using a thematic approach. In the second phase, a sample size of 264 was statistically determined. Simple random sampling was used to select the 264 participants who attended antenatal clinics during the period the study was conducted. A survey questionnaire was administered, 260 participants responded to the questionnaire. The survey examined how pregnant women’s attitudes and perceptions influence their use of antiretroviral therapy, as well as the influence of socio-demographic factors on their attitudes towards ART. Statistical analysis was done using SPSS.
Results

Findings indicated that participants were overall positive about using ART. In the first phase, participants’ positive attitudes were associated with partner support, optimism and perceived benefits of ART, which motivated their use of ART. Participants recognised that taking ART would lead to delivering babies free from HIV and improved prognosis, as well as living a healthy life. However, their views indicated underlying concerns about the daily regimen of taking ART and the side effects. In the second phase, statistical analysis indicated that perceived barriers such as simply forgot, too busy with work/house chores and lack of food were significantly associated with defaulting ART. The fear of having an HIV-infected child (perceived severity), being given the kind of care women wanted and partner support were significantly associated with adhering to ART. Educational level and members of household had significant influence on attitude towards ART. Attitude had a significantly positive correlation with partner support, adherence to ART, years with HIV and duration of ART initiation.

Conclusion

The result of this study could inform Nigerian health policies and interventions required to prevent MTCT of HIV. A key recommendation is to provide education on how women can cope with side effects and the daily regimen of taking antiretroviral therapy during pregnancy, as well as awareness on the importance of husbands reminding and encouraging their wives to take their medication. Providing training for healthcare providers on good patient-provider relationships can help to improve uptake of ART.
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<td>AIDS</td>
<td>Acquired Immunodeficiency Syndrome</td>
</tr>
<tr>
<td>ANC</td>
<td>Antenatal Care/Clinic</td>
</tr>
<tr>
<td>ARRM</td>
<td>AIDS Risk Reduction Model</td>
</tr>
<tr>
<td>ART</td>
<td>Antiretroviral Therapy</td>
</tr>
<tr>
<td>ARVs</td>
<td>Antiretroviral Drugs</td>
</tr>
<tr>
<td>AZT</td>
<td>Azidothymidine (Zidovudine)</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>ECDC</td>
<td>European Centres for Disease Control and Prevention</td>
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<tr>
<td>FDA</td>
<td>(US) Food and Drug Administration</td>
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<tr>
<td>GP</td>
<td>Global Plan for PMTCT</td>
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<tr>
<td>HAAT</td>
<td>Highly Active Antiretroviral Therapy</td>
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<tr>
<td>HBM</td>
<td>Health Belief Model</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<tr>
<td>MM</td>
<td>Mixed Methods</td>
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<tr>
<td>MTCT</td>
<td>Mother to Child Transmission</td>
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<tr>
<td>NACA</td>
<td>National Agency for the Control of AIDS</td>
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<tr>
<td>NFMH</td>
<td>Nigerian Federal Ministry of Health</td>
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<tr>
<td>NNRTI</td>
<td>Non-nucleoside Reverse Transcriptase Inhibitor</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>NRTI</td>
<td>Nucleoside Reverse Transcriptase Inhibitor</td>
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<td>NVP</td>
<td>Nevirapine</td>
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<td>PI</td>
<td>Protease Inhibitor</td>
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<td>PMTCT</td>
<td>Prevention of MTCT</td>
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<td>SCT</td>
<td>Social Cognitive Theory</td>
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<td>SSA</td>
<td>Sub-Saharan Africa</td>
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<td>TPB</td>
<td>Theory of Planned Behaviour</td>
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<td>TRA</td>
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<td>TTM</td>
<td>Trans Theoretical Model</td>
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<tr>
<td>UNAIDS</td>
<td>Joint United Nations Programme on AIDS</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Chapter 1: Introduction

1.1 HIV in women

Women constitute about half of those living with human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) globally, with young women and girls accounting for a relatively high number of new infections (Joint United Nations Programme on AIDS (UNAIDS), 2015). The HIV/AIDS epidemic is gendered and the UNAIDS estimated that approximately 18.8 million out of about 37 million people with HIV are women (UNAIDS, 2018a). In 2017, about 7000 women were infected with HIV every week (UNAIDS, 2018b). The disease has been established as a leading cause of death among women of reproductive age (UNAIDS, 2012). Women appear to be at higher risk of HIV infection than men (Adebayo et al., 2013; Auvert et al., 2001), due to the structure of the female reproductive tract (Abdool-Karim, Sibeko and Baxter, 2010; Ramjee and Daniels, 2013). It has been argued that the growing feminization of the HIV epidemic may also be due to interrelated socio-cultural and economic factors that make women more psychologically and socially vulnerable (Boateng, Kwapong and Agyei-Baffour, 2013). Gender-based violence and gender inequalities, coupled with policies and systems that do not address women’s needs, may also play a major role in preventing young women from protecting themselves against HIV and accessing treatment (UNAIDS, 2018a; UNAIDS, 2014). More so, the impact of the epidemic on women is exacerbated by societal responsibilities such as caring for orphans and people with HIV (UNAIDS, 2014).

However, in regions such as Oceania, and Central, Eastern and Western Europe, HIV prevalence is relatively low among women (UNAIDS, 2012). The low HIV prevalence among women in these regions is attributed to the wide availability of antiretroviral therapy (ART) and other HIV prevention services; most pregnant women are routinely tested for HIV and if positive are recommended to commence treatment with ART immediately and counselled to modify behaviours (European Centre for Disease Prevention and Control (ECDC), 2013). However,
in regions such as Sub-Saharan Africa (SSA), HIV prevalence is notably higher in women (UNAIDS, 2012). Women in SSA constitute 60% of all those infected with HIV, and 75% among 15–24 year olds (United Nations Children’s Fund (UNICEF), 2018). The UNAIDS (2018a) stated that women in SSA are twice more likely to contract HIV than males. Duffy (2005) and Ramjee and Daniels (2013) argued that women’s higher HIV prevalence in SSA may be due to the patriarchal culture in this region. Here, women’s desires and needs (including health needs) are not considered important, and so women are not allowed to seek medical care without the husband’s approval or make sexual decisions (e.g. condom use) or express their sexual feelings (Ramjee and Daniels, 2013). Although there are reports suggesting that the prevalence of HIV in women is stabilising or declining in some parts of SSA such as Southern Africa, however, cohort studies and clinical trials claim that the stabilising prevalence reveals high incidence rates of HIV in women (Karim et al., 2011; Rehle et al., 2010). Risk factors for the high rates of HIV incidence in women in this region are: being below 25 years, unmarried, and sexually transmitted infections (Wand and Ramjee, 2012; Wand, Whitaker and Ramjee, 2011).

Nigeria accounts for 10% of the HIV/AIDS burden worldwide (UNAIDS, 2018c). Since the first case of AIDS was reported in 1986, the country has experienced a continuous spread of HIV in all its six geopolitical zones: North East, North West, North Central, South East, South South and South West. (National Agency for the Control of AIDS (NACA), 2014). Amusa (2013) stated that the virus succeeded in spreading across all the geographic areas of the country because of misconception about the disease and high level of stigmatization/discrimination which prevented people from having HIV tests, revealing their status and receiving treatment. Nigeria bears the second highest incidence of new HIV infections among women globally, with 110,000 women aged 15-49 years becoming infected (NACA, 2014). In 2018, HIV prevalence in Nigeria was about 1.5% (UNAIDS, 2018c), with about 1.6 million women becoming infected, compared with 1.3 million infections for men (UNAIDS, 2018c). In addition, studies investigating prevalence have also indicated that the HIV/AIDS epidemic in Nigeria affects
more women than men (Emeka-Nwabunnia, Ibeh and Ogbulie, 2014). Stephen, Jakonda and Alexander (2015) argued that some cultural practices highly respected by Nigerian society, such as child marriage, levirate marriage and polygamy, enhance HIV spread and as such are detrimental to the wellbeing of women. It is worth noting that as more women become infected, there is also an increase in paediatric HIV through mother-to-child-transmission (MTCT) (Olugbenga-Bello et al., 2013).

1.2 Mother-to-child-transmission
Mother-to-child-transmission (MTCT) of HIV is a major challenge of the HIV/AIDS epidemic, accounting for 90% of all paediatric HIV worldwide (UNAIDS, 2017). However, without intervention, HIV-positive mothers have a 35% chance of transmitting HIV to their children via breastfeeding, pregnancy and delivery (Ahmad, 2005; Lehman and Farquhar, 2007). In Nigeria, of an estimated 85,450 HIV-infected women giving birth annually (about 4.6% of all pregnancies), about 56,681 births will be HIV positive (NACA, 2011; Oladokun, Ige and Kikelomo, 2013). MTCT accounts for about 10% of new HIV infections annually in Nigeria (NACA, 2014). High incidence of MTCT in Nigeria is suggested to be due to higher prevalence of HIV among women, higher heterosexual transmission rates, and a prolonged breastfeeding culture; coupled with poor access and utilisation of prevention of MTCT (PMTCT) services (Nigerian Federal Ministry of Health (NFMH), 2010). However, timely initiation of antiretroviral therapy (ART) during pregnancy coupled with monitoring and with or without breastfeeding can significantly reduce the risk of MTCT (Chama, Gashau and Oguche, 2007; Shaffer, 2001; WHO, 2006).

1.3 HIV in children
Children contribute about 1.8 million HIV infections worldwide (UNAIDS, 2018b). In 2016, approximately 120,000 children died as a result of AIDS-related illness, and 180,000 children were newly infected worldwide (UNAIDS, 2018b). Of these HIV-infected children, 91% live in SSA (UNAIDS, 2018a). In SSA paediatric HIV is a major contributor to child mortality, with about one-third of infected infants dying within their first year of life (Hampanda, 2012).
In Nigeria, a total of 200,000 children aged zero to 14 years were living with HIV/AIDS in 2016; the majority (90%) being through MTCT (UNAIDS, 2018c). It was estimated that approximately 37,000 new infections occurred through MTCT in 2016 among Nigerian children (UNAIDS, 2018c). As a result, PMTCT is a top public health priority in Nigeria (Chukwuemeka et al., 2014; UNAIDS, 2013). While the global prevalence of paediatric HIV is declining, the number of infections and deaths from HIV among Nigerian children is increasing (Ogunbosi et al., 2011; UNAIDS, 2013; UNAIDS, 2010). Since 2009, there has been a decrease in new infections of 67%, 50% and 50% in Malawi, Ghana and Ethiopia, respectively. However, incidence of new infections in Nigerian children has only declined by 19% (UNAIDS, 2014).

1.3.1 Consequences of HIV in children

The consequences of paediatric HIV are well documented (Desmond, 2009; Punpanich, Gorbach and Detels, 2012; Sherr, 2008). Paediatric HIV infection presents a range of complex challenges that not only affect the infected child, but also affect healthcare providers and family members (Punpanich, Gorbach and Detels, 2012). Current literature suggests that HIV-infected children are at risk of neuropsychological and neurological impairments (Ravindran, Mrudula and Priya, 2014). HIV attacks tissue cells and weaken the immune system thereby, affecting the central nervous system (CNS) (Singh, Kaur and Arora, 2011). The status of the immune system is measured by the level of CD4 lymphocytes in the blood. The severity of neuropsychological and neurological challenges increases with children at the final stages of HIV/AIDS or with low CD4 lymphocytes (Singh, Kaur and Arora, 2011). Cognitive and neurological deficiencies have been reported in up to 82% of children with HIV as compared to 36% of HIV-seroreverters (Tahan et al., 2006). Cognitive deficiencies in children with HIV have been reported in the area of learning difficulties (Scopazzini, 2011). Children with HIV also experience language impairment and ventricular enlargement (van Arnhem et al., 2013). The most common developmental impairments happen during their first three birthdays, although there may be lower development than the norm during the remaining years of life (Franklin et al., 2005).
Following the initiation of maternal and childhood ART, there has been an enhanced wellbeing and survival status for paediatric HIV patients (Judd et al., 2007), as well as reduced neurodevelopmental problems and acute encephalopathy (Patel et al., 2008). However, a significant number of HIV-infected children undergoing ART continue to experience chronic and long-term neurodevelopmental weaknesses (Garvie et al., 2014). Although, the clinical benefits of ART and its effectiveness in reducing cerebrospinal fluid viral load is undisputed (Price and Spudich, 2008), the effectiveness of ART on neurodevelopmental and cognitive abilities remains unclear (Sherr, Mueller and Varrall, 2009; Weber et al., 2017). Punpanich, Gorbach and Detels (2012) argued that when dealing with serious chronic conditions like HIV in children, it goes beyond treatment to coping with stressors. Ji et al. (2007) opined that the stress and physical burden of caring for HIV-infected children can worsen psychological conditions of caregivers.

With about 90% of paediatric HIV occurring through MTCT, the most significant response to overcome paediatric HIV and its associated complex challenges remains the use of ART for PMTCT (NACA, 2015).

1.4 Rationale

Nigeria accounts for 32% of the burden of MTCT globally (NACA, 2015). Although, there was a slight decline of about 19% of paediatric new infection after 2009 (UNIADS, 2014), much work is still required. In the developed world, MTCT is controlled through a combination of formula feeding, caesarean section (C-section) and ART (ECDC, 2013). However, this approach is often unaffordable and unsafe in developing countries such as Nigeria, due to cost, lack of clean water, poor sanitation and fear of stigmatization associated with not breastfeeding (Atashili et al., 2008; Little et al., 2007). Therefore, ART is generally used alone (Atashili et al., 2008). However, ART is grossly underutilised among Nigerian HIV-infected pregnant women (NFMH, 2014), with only 32% of Nigerian HIV-infected pregnant women receiving ART for PMTCT (UNAIDS, 2018c).
To achieve the United Nations’ targets of eliminating MTCT, this gap in access to and usage of ART among pregnant women in Nigeria must be addressed. The low rates of ART among pregnant women in Nigeria contributed to an estimated 41,000 new infections in 2015, making Nigeria the global leader of new paediatric HIV infections occurring through MTCT (UNAIDS, 2016a). Without urgent action in Nigeria, UNAIDS suggests that the global target of eliminating new HIV infections among children is unlikely to be reached (UNAIDS, 2016a). The Nigerian government has renewed its commitment for PMTCT in order to achieve the United Nations targets of eliminating MTCT (WHO, 2014). For example, PMTCT and ART services in Nigeria are now distributed to secondary and primary health facilities so as to bring the services closer to women in communities (NACA, 2014). Agboghoroma, Sagay and Ikechebelu (2013) argue that the distribution of these ART and PMTCT services to rural areas has been slow due to shortage of human resources, and this may have impeded access to ART for PMTCT.

Researchers in Nigeria have also attributed the low access and uptake of ART for PMTCT to factors such as discrimination and stigma (Anígilájé, Ageda and Nweke, 2016; Iwelunmor et al., 2014). However, access and use of ART for PMTCT has been shown to be influenced by attitudes and perceptions. For example, beliefs that ART could harm the baby in South Africa (Stinson and Myer, 2012), and doubts about ART being effective to prevent MTCT in Malawi, (Levy, 2009) hindered HIV-infected pregnant women from using ART. In a recent study conducted in Indonesia (Lumbantoruan et al., 2018), women who had doubts about ART treatment efficacy were non adherent or stopped taking ART, and non-adherence or absence of ART is associated with non-viral suppression which increases MTCT risk (Mugwaneza et al., 2018). On the other hand, the perception that ART is good and effective motivated women to adhere to ART (Lumbantoruan et al., 2018). Similarly, in Swaziland, ART initiation among HIV-infected pregnant women was threefold higher for those who hold positive beliefs regarding ART benefits. ART initiation and adherence are necessary to achieve viral suppression which in turn, reduces the risk of MTCT (Mugwaneza et al., 2018).
Given that studies have established the significant influence exerted by attitudes and perceptions on access and uptake of ART, it is important to understand pregnant women’s attitudes and perceptions about ART in Nigeria to improve its access and uptake.

Studies on PMTCT research in Nigeria have focused generally on perception of PMTCT (Dinwoke and Okafor, 2013; Mezie-Okoye and Tobin-West, 2010; Moses et al., 2009; Olugbenga-Bello et al., 2013; Owoaje, Omidokun and Ige, 2012). These studies focused mainly on knowledge and perception of MTCT, HIV testing and counselling, ART was only mentioned as a method of PMTCT, and was not further researched. It is therefore important for studies to focus on ART for PMTCT since clinical trials and observational studies have established its significance in PMTCT (Gray et al., 2005; Palombi et al., 2007; Taha et al., 2003). Furthermore, these studies were conducted in the South-Western zone of Nigeria (Olugbenga-Bello et al., 2013; Owoaje, Omidokun and Ige, 2012), North-East zone (Moses et al., 2009) and South-East zone (Dinwoke and Okafor, 2013). The only PMTCT study in the South-South zone where the Niger Delta is located focused on perception of HIV testing and counselling for PMTCT (Mezie-Okoye and Tobin-West, 2010). There is a lack of studies focussing on attitudes and perception of ART for PMTCT in Nigeria.

In addition, these studies are all quantitative, mixed methods (MM) studies combining qualitative and quantitative approaches in PMTCT research are lacking in Nigeria. According to Cronholm and Hjalmarsson (2011), in MM research, the strengths of the two approaches are preserved and the weaknesses reduced, thereby providing a more relevant and trustworthy evidence. Against this background, a MM approach has been adopted to investigate the attitudes and perceptions of pregnant women towards the use of ART for PMTCT of HIV in the Niger Delta region of Nigeria. It is anticipated that the findings will be relevant and trustworthy, and may then contribute to decision making in the health sector to increase the use of ART among pregnant women, and ultimately reduce MTCT in Nigeria.
1.5 Aim

The aim of this research is to improve the understanding of the attitudes and perceptions of pregnant women towards the use of ART for the prevention of MTCT of HIV in the Niger Delta region of Nigeria, as well as to identify socio-demographic factors that influence these attitudes.

1.6 Research question

The study’s research questions are:

What are the attitudes and perceptions of HIV-infected pregnant women towards the use of ART for PMTCT?

What are the socio-demographic factors that influence HIV-infected pregnant women’s attitudes towards ART for PMTCT?

1.7 Objectives

The objectives of this study were achieved through qualitative and quantitative methods.

Phase 1: Qualitative approach

1. To explore the attitudes of HIV-infected pregnant women towards the use of ART for PMTCT.

2. To explore the perceptions of HIV-infected pregnant women about the use of ART for PMTCT.

The first and second objectives were achieved by conducting semi-structured interviews with 24 participants. Analysis of the interview data was done using a thematic approach with NVivo 11.

Phase 2: Quantitative approach
To examine how attitudes and perceptions of HIV-infected pregnant women influence their use of ART for PMTCT.

4. To identify socio-demographic factors that influence attitudes of HIV-infected pregnant women towards ART for PMTCT.

To achieve the third and fourth objectives, a questionnaire was designed from the interview data analysis, and was administered in a cross sectional survey. Analysis was done statistically with SPSS.

1.8 Methodology and methods

The study followed the exploratory sequential design of MM, which allowed for in-depth qualitative exploration of the phenomenon in the first phase, followed by a quantitative study in the second phase. The choice of MM was informed by the pragmatic approach taken in this research. As advocated by Johnson and Onwuegbuzie (2004), pragmatism is the best philosophical companion for MM. For the qualitative phase, a semi-structured in-depth interview was used to provide in depth understanding of HIV-infected pregnant women’s attitudes and perceptions towards ART. Qualitative data was analysed with NVivo 11 using thematic analysis. The quantitative study adopts a questionnaire survey; the data were analysed statistically with SPSS version 22. Results of both analyses were integrated and interpreted.

1.9 Scope of the study

The study only included HIV-infected pregnant women receiving antenatal care (ANC) in tertiary hospitals located in two states of the Niger Delta region. Pilot studies were conducted before commencing each of the phases to test the data collection instruments. The study was restricted to the Niger Delta region of Nigeria. HIV infection among women and children in this region is much higher than the national prevalence in Nigeria, as a result of young women engaging in transactional sex with wealthy oil company workers for sustenance (Obioma et al., 2017; Udoh et al., 2009).
1.10 Outline of the thesis

The present thesis comprises of nine chapters:

**Chapter One:** This chapter presents an overview of the study. It contains the background knowledge of HIV among women, children and MTCT of HIV. It also considers the aim, objectives and research question, as well as the rationale for conducting the research. This is followed by an overview of the methodology and methods used in answering the research question. Finally, it presents an outline of the thesis chapters.

**Chapter two:** This chapter provides a review of the literature in regards to the use of ART for prevention of MTCT. The chapter begins with a review of MTCT and PMTCT, followed by ART. Next, it reviews studies on attitude and perception of ART. The next section introduces the conceptual frameworks (health belief model and theory of planned behaviour) of the study.

**Chapter three:** This chapter describes the philosophical approach of the study, the choice of mixed methods and the study design. It provides a detailed description of the study’s area and sites, as well as the study population. Finally, it discusses measures to minimise bias.

**Chapter four:** This chapter describes the methods utilised for phase one of the study. It considers the purposive sampling strategy and sample size. It presents the choice of the semi-structured interviews and the development of an interview guide used for the data collection. The chapter also describes the pilot study and lessons learned from it. Finally, it considers ethical issues.

**Chapter five:** This chapter reports the findings from the qualitative study. It describes HIV-infected pregnant women’s attitudes and perceptions towards the use of ART for PMTCT. It presents eight main themes and their sub-themes.

**Chapter six:** This chapter describes the methods utilised for the second phase. It explains the rationale for simple random sampling and the development of a survey questionnaire. It explains the survey pilot study and lessons learned from it. It describes the statistical tests.
used for data analysis. Finally, it presents the validity and reliability of the questionnaire and ethical issues of the second phase.

**Chapter seven:** This chapter represents the analysis of the quantitative phase. The chapter displays the descriptive statistics as percentages in tables and figures. Inferential statistics are also presented in tables and figures.

**Chapter eight:** This chapter interprets the findings of both the qualitative and quantitative phases. It discusses the findings separately in different sections and later integrates both findings. It compares the findings with the current body of literature on ART and PMTCT. Finally, it considers the limitations and the contribution of the study to knowledge.

**Chapter nine:** This chapter presents the concluding part of the thesis. It gives a brief summary of the thesis. It describes the implications of the study in terms of methodological, practical and theoretical. It provides recommendations for policy, practice and future research. Finally, it provides a brief reflection of the PhD journey and the conclusion for the whole study.

**1.11 Chapter summary**

This chapter has provided a general background of HIV/AIDS in women, children and MTCT. A detailed rationale for the study was also given, as well as the aim and objectives of this research. The chapter has established the following key points:

- Women account for about half of all those living with HIV/AIDS worldwide. Women in SSA are twice more likely to contract HIV than males.
- Paediatric HIV is mainly transmitted through MTCT.
- Nigeria bears the highest burden (32%) of MTCT worldwide.
- Paediatric HIV presents a range of complex challenges such as cognitive and neurological deficiencies.
- ART is universally accepted and used for effective prevention of MTCT and treatment of HIV/AIDS.
ART for prevention of MTCT is underutilised among pregnant women in Nigeria.

Attitudes and perceptions exert a significant influence on access and uptake of ART among HIV-infected pregnant women.

There is a lack of studies focussing on attitudes and perception of ART for PMTCT in Nigeria.

The aim of this research was to improve the understanding of the attitudes and perceptions of pregnant women towards the use of ART for the prevention of MTCT of HIV in the Niger Delta region of Nigeria, as well as to identify socio-demographic factors that influence these attitudes.

Both qualitative and quantitative methods were used to achieve the study’s aim.

Finally, the chapter presented an outline of the thesis.

The next chapter reviews relevant literatures related to the topic.
Chapter 2: Literature Review

2.1 Introduction

Literature review is described as an interpretation of documents (published and/or unpublished) that involves assessing, synthesising, analysing, and summarising the documents (Onwuengbuzie et al., 2010). Boote and Beile (2005) acknowledged that a literature review sums up to a recapitulation of identified information. It is argued that reviewing the literature is the most significant step in the process of conducting a research (Combs, Bustamante and Onwuegbuzie, 2010). A thorough literature review forms the foundation and motivation for a useful research (Onwuegbuzie, Leech and Collins, 2012).

In this chapter, the literature was reviewed with focus on MTCT, PMTCT and ART. First, it reviews literatures around HIV in pregnancy and MTCT. It discusses the timing, routes, mechanism, and factors affecting MTCT. Second, it examines PMTCT, providing a brief historical trend of the global PMTCT, current global PMTCT strategy, the PMTCT programme in Nigeria and the antenatal management of HIV. Third, it considers ART, its safety and toxicity and as an important component of PMTCT. Fourth, it explains briefly the two key concepts (attitude and perception) in the study and also explores studies on attitudes and perceptions to ART for PMTCT. Lastly, it considers the theoretical framework for this study.

The objective of this review is to gain a deeper understanding of the research topic and the current literature, as well as to appraise the existing evidence to set the context for the current study. According to Boote and Beile (2005), literature review helps to increase the researcher’s understanding of the broad context of the research topic. Maggio, Sewell and Artin (2016) acknowledged that, understanding of the existing evidence is vital for all stages of the research. In addition, the literature review helped the researcher to select appropriate theories and methods for the current study by using the information gathered from the literature review (Dellinger and Leech, 2007).
2.2 Search strategy and criteria

PubMed and Global Health databases were used to conduct searches for relevant literatures related to attitudes and perceptions towards ART and PMTCT. In addition, Google search engine was used to search for relevant documents, as well as the reference list of relevant papers. Searches were conducted using key words with Boolean operators: [Attitudes OR Perspectives OR Perceptions OR Views OR Opinions] AND ['Antiretroviral therapy' OR ART OR HAART OR ‘Highly active antiretroviral therapy’ OR ‘Antiviral drugs’] AND ['Prevention of mother to child transmission’ OR PMTCT OR MTCT OR ‘Mother to child transmission’] AND ['Human Immunodeficiency Virus' OR HIV OR ‘Acquired Immune Deficiency Syndrome’ OR AIDS OR HIV/AIDS] AND [Pregnancy OR Women OR Mothers] AND ['Sub Saharan Africa' OR SSA OR Africa OR Nigeria OR 'Low and Middle Income countries' OR 'Developing countries'].

English language publications up until 2019 that described MTCT, PMTCT, attitudes and perceptions towards ART were reviewed. No restriction was placed on the type of methodology used in the publications since the aim of the literature review was to summarise evidence from a range of publications to identify knowledge gaps.

2.3 HIV and pregnancy

In pregnancy, women’s immune capacity is suppressed whether they are HIV-infected or not, with reduced cell-mediated immunity (Mor and Cardenas, 2010). Due to these normal changes in the body of a pregnant woman, there is a concern that pregnancy might speed-up HIV progression (Calvert and Ronmans, 2015), which increases the MTCT risk (Birlie et al., 2016). However, evidence supporting that HIV progression is faster in pregnancy is uncertain, it remains a debated topic by researchers, and a reason for investigations (Calvert and Ronmans, 2015; Wall et al., 2017). Several studies have reported that pregnancy does not have any effect on HIV progression (Ahdieh, 2001; Bessinger et al., 1998; Wall et al., 2017), instead some studies have demonstrated that pregnancy reduces HIV progression (Tai et al., 2007). However, other studies have reported that during pregnancy, women’s CD4 count reduces faster (Calvert and Ronmans, 2015; Heffron et al., 2014; Mayanja et al., 2012).
Although the reduced CD4 count usually experienced in pregnancy by HIV-positive women is not sustained after pregnancy (Heffron et al., 2014), decreased maternal CD4 count is known to cause negative outcomes during birth such as low-birth weight, which increases MTCT risk (Van der Merwe et al., 2011).

In developed countries, HIV infection has minor effects on complications or outcomes of pregnancy due to access to better healthcare (Hardy and Cu-Uvin, 2015). However, in low-resource settings; HIV in pregnancy is a well-known pregnancy complication, requiring referral to tertiary hospitals for better management (Mayer, Anderson and Cu-Uvin, 2009). Researchers have suggested that the risk of obstetric complications and adverse perinatal outcomes may be increased in HIV-infected women (Calvert and Ronmans, 2013; Reitter et al., 2014). Although the supporting evidence was established in a few research work conducted with small samples (Berer, 1999; McIntyre, 2003), there are different ways by which HIV may influence obstetric complications and adverse outcomes. First, the overall poor health and compromised immune capacity of women with HIV may cause them to be more susceptible to intrauterine infections (chorioamnionitis), and this may increase MTCT risk by causing membrane rupture, low-birth weight and preterm birth (King, Ellington and Kourtis, 2013; Zaba et al., 2013) and puerperal sepsis (Graham and Hussein, 2003; Moran and Moodley, 2012; van Dillen et al., 2010). Other infections such as genital-tract infection, STIs, urinary-tract infections and bacterial pneumonia have been identified to be more common in HIV-infected women (King, Ellington and Kourtis, 2013). Ectopic pregnancy is more common among HIV-infected women, possibly due to concurrent STDs (Mbu et al., 2008).

Second, researchers have suggested that the risk of haemorrhage in HIV-infected pregnant women may be increased with HIV-related thrombocytopenia (Montgomery, 2003). However, a recent study by Sebitloane (2016) reported that HIV was not associated with thrombocytopenia during pregnancy. In addition, poor healthcare access is generally associated with obstetric complications (Worku, Yalew and Afework, 2013), but this may be worsened in HIV-infected women due to HIV-related stigma (Valencia-Garcia et al., 2017).
Furthermore, HIV is believed to contribute to maternal death, and HIV-infected women may be more vulnerable to post-surgery complications (McIntyre, 2003). It is believed that the risk of maternal death is increased eight times in HIV-infected pregnant women (Calvert and Ronsmans, 2013). In SSA, about 25% of deaths among pregnant women are ascribed to HIV (Zaba et al., 2013). However, it is hard to ascertain the influence of HIV on pregnancy complications and adverse outcomes since other factors such as drug use and ART may also contribute (Szyld et al., 2006).

2.3.1 Timing of MTCT

MTCT can occur during pregnancy (in utero), delivery or breast-feeding (Kourtis et al., 2006; WHO, 2015). Due to infant viral detection during the initial forty-eight hours of life, it is generally acknowledged that the majority (about 50%) of MTCT happen around the time of delivery (Cavarelli and Scarlatti, 2011). Henin et al. (1993) suggested that the detection of HIV in peripheral blood of infants around 48 hours of delivery is an indication of intrauterine transmission. Dunn et al. (2000) argues that a negative test result at delivery does not indicate the absence of in utero transmission as HIV may be unidentifiable in the plasma of infants for more than seven days of life. Several earlier studies supported the possibility of intrauterine transmission: HIV was detected in placental tissues (Lewis et al., 1990) and foetal tissues collected during the early stages of pregnancy (Backe et al., 1992). Indeed, the decision of whether MTCT happen intrauterine versus intrapartum is based on the detection of infant HIV within 48 hours after delivery and after seven days of birth, respectively (Kourtis and Bulterys, 2010).

Authors synthesising results from several PMTCT studies utilising ART at different stages of pregnancy and C-section performed before the start of labour have argued that about one-half of MTCT happen during the late stages of pregnancy, possibly few days before birth when the placenta starts separating from the uterine wall (Kourtis et al., 2001). Only about 4% of MTCT seem to happen during the first trimester (Lehman and Farquhar, 2007), and about 20% occur around 36 weeks of pregnancy (Kourtis et al., 2001). Determining the timing of MTCT from
breast milk may be difficult due to the closeness of infant exposure to both intrapartum and breastfeeding (Cavarelli and Scarlatti, 2011). It is suggested that about 5-6% of MTCT occur during the early period of breastfeeding after six to eight weeks of delivery (Moodley et al., 2003), while 23-42% occur during the remaining period of breastfeeding (John-Stewart et al., 2004). However, it is worthy of note that despite the knowledge about MTCT and its timing, the mechanism of HIV transmission from mother to child is still unclear (Kwiek et al., 2008). The following sub-section discusses the routes and mechanism of MTCT.

2.3.2 Routes and mechanism of MTCT

MTCT can happen when a foetus swallows infected amniotic fluid in utero, vaginal secretions and blood at delivery and breastmilk, as well as through the placenta (Cavarelli and Scarlatti, 2011). Whereas it has been suggested that intrauterine infection happens when infected amniotic fluids passes through the mucosal surfaces in the foetal gut (Cavarelli and Scarlatti, 2011), some studies have reported that the amniotic fluids of HIV-positive women were HIV-free (Mohlala et al., 2005). This suggests that intrauterine transmission primarily occurs when HIV travel through the placenta (Cavarelli and Scarlatti, 2011). Given that only a small number of intrauterine transmissions occur, it is likely that during pregnancy, the placenta plays an important role in acting as a barricade to HIV (Robbins and Bakardjiev, 2012). Although it has been demonstrated that HIV is present in the placenta of both women who transmit and those who do not transmit HIV to their infants, the crossing of cell-free virus through the placenta is restricted (Robbins and Bakardjiev, 2012). Thus, in utero transmission may rely on disruption of the placenta or through transfusion of infected blood from mother to the foetus as a result of tears in the placenta (Kourtis and Bulterys, 2010). Tears in the placenta can happen at any time during pregnancy; however, it is believed to occur mainly at the start of labour when intensified contractions of the uterus causes membranes to rupture, leading to transfusions of maternal infected blood (Lobato et al., 2010).
Despite the benefits of breast milk in providing infants’ nutritional needs and protection against pathogens (Van de Perre et al., 2012), it remains a major oral route of MTCT. Ingestion of infected maternal cervico-vaginal secretions and blood also provide oral route for MTCT. Although the precise pathway for infant oral transmission remains unclear, researchers have identified that intestinal and tonsillar mucosa may act as an entry point to oral HIV transmission (John-Stewart et al., 2004; Wood et al., 2013). In adults, HIV transmission rarely occur orally, and the binding of HIV to epithelium in the tonsil exhibits restricted progression to HIV infection (Heron and Elahi, 2017). It is believed that the presence of anti-HIV factors in the oral cavity such as defensins, salivary-secretory-leukocyte-protease inhibitor, lysozyme and thrombospondin protect against oral HIV transmission. However, Kutty (2012) argues that the extent to which these anti-HIV factors function maturely in infants’ oral cavity is questionable.

During pregnancy, birth and breastfeeding, infected maternal fluids are in contact with the mucosal barriers of tonsils and the gut, giving adequate time for MTCT to take place (Wood et al., 2013). However, MTCT does not take place in most cases, and the restrictive epithelial layer overlying these mucosal surfaces play a part in protecting the infants (Bunders et al., 2012). Thus, for MTCT to occur, vulnerable cells under or within the epithelial layer must be infected with maternal HIV, and then transported to underlying layers where the virus is disseminated to blood and lymphatic vessels (Milligan and Overbaugh, 2014). In spite of the protection provided by the epithelial layers, studies have demonstrated that MTCT still occurs when mucosal surfaces are exposed to HIV (Abel et al., 2006; Bunders et al., 2012). Recent evidence suggests that the gut epithelia of foetus and infants contain a large amount of target cells, which are susceptible to HIV, indicating that MTCT can take place if these surfaces encounter HIV-infected fluids (Bunders et al., 2012). Alternatively, HIV may enter this epithelium through transcytosis (transcellular passage of materials) or tears in the mucosal layer (Milligan and Overbaugh, 2014; Shen et al., 2015). In addition, mammary cells are principle cells in breast milk acting as a barrier between the interstitium and the milk (Kutty, 2012), however, in mastitis this protective role becomes ineffective, permitting passive flow of infected
cells and HIV virions into the milk (Wood *et al*., 2013). Swallowed infected milk may pass easily through the stomach of neonates to their intestines due to the absence of acid secretions in their stomach (Van de Perre *et al*., 2012).

Several studies have shown that limiting exposure of infants to HIV-infected mother’s fluids such as breast milk, blood and cervicovaginal secretions reduces MTCT risk. For example, reduction has been achieved in cases where C-section is performed before labour begins and membrane ruptures, to avoid infant exposure to HIV-infected blood and cervicovaginal secretions in the genital tract (Kennedy *et al*., 2017; Sebitloane, 2013). Similarly, formula feeding given to infants in place of breastfeeding lowered MTCT risk by approximately 50% (Nduati *et al*., 2000). However, infants who are formula-fed face higher risk of respiratory-tract infections (Bachrach, Schwarz and Bachrach, 2003), diarrhoea and gastroenteritis (Chien and Howie, 2001) and infant mortality (Chen and Rogan, 2004). Schwartz *et al*. (2016) argued that preventing MTCT is not the only target of PMTCT programmes, and that reducing the causes of child mortality is crucial for a successful PMTCT intervention. The WHO endorses HIV-exposed infants to be breastfed while the mother and infant are placed on ART due to the protective function of breastmilk against pneumonia, diarrhoea and malnutrition (WHO, 2015).

### 2.3.3 Factors affecting MTCT

Various factors are known to affect MTCT, which are grouped into viral, maternal, obstetric and infant-related factors.

**Viral factors**

Pregnant women with higher viral loads are at MTCT risk; as the viral load increases, MTCT risk also increases (Ahir *et al*., 2013; Tubiana *et al*., 2010). In Gonfa and Gebre-Selassie’ (2014) study, assessing time of MTCT, MTCT rate increased by 27 times among women with ≥24,665 copies/ml viral loads at delivery. Viral load in the maternal genital tract is an important factor of intrapartum MTCT risk (King, Ellington and Kourtis, 2013). Due to reports from studies, that chlorhexidine inactivates HIV in cell culture (Harbison and Hammer, 1989; Montefiori
al., 1990), it was suggested that vaginal cleansing during labour with chlorhexidine be used as a method to reduce viral load or inactivate HIV in birth canals to achieve reduction in MTCT (Gaillard et al., 2001 Wilson et al., 2004). However, studies evaluating the effectiveness of disinfecting women’s genital tract with chlorhexidine did not report any benefit of reducing MTCT (Gaillard et al., 2001). Treatment with ART has been shown to significantly reduce viral load in women’s genital secretions (Graham et al., 2007). Additionally, breast-milk viral load also increases MTCT risk.

**Maternal factors**

Maternal factors affecting MTCT include immune status, nutrition and negative behaviours of pregnant mothers. Maternal health generally plays an important role in MTCT. A low level of maternal immune status is reflected by a decreased CD4 count, which increases MTCT risk (Ngwende et al. (2013). According to Ahir et al. (2013), women with low CD4, which may be a marker for high viral load, are more likely to transmit HIV to their infants. In Ngwende et al. (2013) study, mothers with less than 200 cells/μL CD4 count were more likely to infect their infants with HIV during pregnancy and breastfeeding [OR = 6.6 (95% CI 2.6-17)]. Additionally, in an advanced stage of HIV, MTCT risk increases. Studies documented that an advanced stage of HIV in infected mothers is a major predictor of MTCT. In Birlie et al.’s (2016) study, MTCT risk was reported to be 5.8 times higher among mothers with advanced AIDS compared to mothers at earlier stages.

Argemi et al. (2012) argued that advance AIDS stage is linked with poor nutritional status, which in turn is linked with increased MTCT risk and negative health-outcomes. Nutritional elements such as vitamin-A levels in pregnant women have been correlated with risk of MTCT. Many previous studies during the 1990s have demonstrated that deficiency of vitamin-A may increase MTCT risk (Greensberg, 1997; Semba et al., 1994). In Greensberg’s (1997) study of 133 USA women infected with HIV, it was reported that deficiency of vitamin-A was significantly associated with MTCT in a regression analysis. Similarly, Semba et al.’s (1994) study of 338
Malawian HIV-infected women, deficiency of vitamin-A was significantly correlated with MTCT. The mechanism by which vitamin A impacts on MTCT is uncertain, however, earlier studies have opined that vitamin-A may influence the tissue integrity in the placenta, mammary glands and vaginal mucosa (Greensberg, 1997). Thus, it was concluded that vitamin-A deficiency influences MTCT, and subsequent clinical trials were conducted to assess the benefit of vitamin-A supplementation on MTCT (Coutsoudis et al., 1999; Fawzi et al., 2002; Humphrey et al., 2006; Kumwenda et al., 2002). These studies did not find any benefit of vitamin-A with regards to reducing MTCT risk, however, they reported improved preterm delivery and birth weight with vitamin-A supplementation. Although, vitamin-A is not recommended for MTCT intervention due to conclusions made by a Cochrane review (Wiysonge et al., 2011) that there is little or no effect of vitamin-A supplementation on MTCT risk, WHO suggested that pregnant women should be encouraged to eat a balanced diet to obtain adequate nutrition (WHO, 2011).

Further, negative behaviours of pregnant mothers such as drug abuse and smoking during pregnancy can affect MTCT. While lifetime drug use has not been reported to have impact on MTCT, drug abuse in pregnancy has a significant impact on the risk of MTCT (Ellington, King and Kourtis, 2011). Authors have ascertained that drug abuse among pregnant mothers increases MTCT risk through various pathways (Purohit, Rapaka and Shurtleff, 2010). For example, drug-abuse exposure increases viral load and induces preterm birth, which in turn affects MTCT (Purohit, Rapaka and Shurtleff, 2010). In several studies, being exposed to tobacco (Ashford et al., 2010; Jaddoe et al., 2008; Luo et al., 2012; Mannan et al., 2012; Rozi et al., 2016) and cocaine (Cressman et al., 2014; Gouin et al., 2011; Walton-Moss et al., 2009) among pregnant women is associated with preterm birth. Studies conducted in Europe have established that preterm birth increases MTCT risk (Warszawski et al., 2008). In addition, drug abuse was found in several studies to increase viral load and speed-up progression to AIDS (Baum et al., 2009; Cook et al., 2008), and reduce women’s adherence to ART (Marquez et al., 2009).
Risky sexual activity among HIV-infected pregnant women might also increase MTCT risk. In Bultery's et al.'s (1997) study, MTCT risk was reported to be higher among women engaging in high rate of vaginal intercourse during pregnancy. MTCT is more likely to occur among pregnant women with several sexual partners (Bultery et al., 1997). Furthermore, maternal infections during pregnancy are associated with MTCT risk. Infection during pregnancy with cervicitis, herpes simplex virus (HSV-2), candida albicans and bacterial vaginosis are connected with increased MTCT risk (Bollen et al., 2008; Gumbo et al., 2010; Sivarajah et al., 2017). Gumbo et al. (2010) examined factors affecting MTCT among 479 Zimbabwean women. This study found that HIV-infected women with candida, bacterial vaginosis and trichomonas were more likely to infect their infants with HIV (Gumbo et al., 2010). HSV-2 coinfections cause genital ulcers and mediates genital shedding, thus, increasing MTCT risk (Sivarajah et al., 2017). Increased MTCT risk among women infected with HSV-2 were reported in Thailand (Bollen et al., 2008). In this Thailand study, intrapartum MTCT risk tripled with HSV-2 genital shedding (Bollen et al., 2008). Chorioamnionitis, an inflammation of the placental membrane is primarily caused by bacterial infection ascending from the cervix and vagina (King, Ellington and Kourtis, 2013). Chorioamnionitis may interfere with the placental barrier integrity, permitting flow of maternal HIV-infected lymphocytes into the amniotic fluid. Also, chorioamnionitis mediates early membrane rupture, premature labour and prematurity; these conditions are all MTCT risk factors (Kourtis and Bultery, 2010; Gray and McIntyre, 2007).

**Obstetric factors**

Obstetric factors are key elements in MTCT, since the majority of MTCT happen during labour and birth, following infant’s exposure to maternal infected blood and vaginal secretions (Bongertz, 2001). Studies have demonstrated that mothers who undergo vaginal delivery have
increased risk of transmitting HIV to their infants. In a retrospective Brazilian study to determine factors related with MTCT, vagina delivery was found to have twofold higher MTCT risk compared to C-section (da Cruz Gouveia, da Silva and de Albuquerque, 2012). Thus, elective C-section is recommended before the start of labour and membrane rupture to reduce MTCT risk (Read and Newell, 2005). It is believed that C-section prevents trans-placental movement of infected maternal blood and exposure of the foetus to infected blood or secretions in the genital tract. In addition, premature labour and labour induction were associated with MTCT risk in a randomised trial of 1437 pregnant women in Thailand (Jourdain et al., 2007).

**Infant-related factors**

While exclusive breastfeeding is essential for the child’s survival, especially in the early period of life, it remains a major determinant of MTCT, raising dilemmas for health professionals regarding the ethics of promoting breastfeeding in HIV-infected mothers (Coovadia et al., 2007; John-Stewart, 2004). The risk of postnatal transmission was evaluated in a meta-analysis and estimated as 8.9/child-100-years of breast-feeding (Breastfeeding and HIV International Transmission Study Group, 2004). However, the duration of breastmilk exposure may increase MTCT risk. A study by Becquet et al. (2009) conducted in South Africa and Côte d’Ivoire revealed that MTCT risk was 3.9% and 8.7% among infants breastfed below six months and longer than six months respectively. This study suggests that MTCT risk increased by 1% for each month added after six months of breastfeeding (Becquet et al., 2009). Similarly, in Ngwende et al.’s (2013) study, children who received breastfeeding for less than six months were less likely to be infected.

Several studies have correlated infant gender with MTCT. In Gonfa and Gebre-Selassie’s (2014) study, MTCT risk was 4.94% and 1.23% for female infants and male infants, respectively. Similarly, in a Ugandan study to assess if infant gender plays a role in MTCT, female infants had an MTCT risk of 20.8% compared to 12.4% risk for male infants.
(Brahmbhatt et al., 2009). This Ugandan study further stated that female infants had more risk of being delivered with low-birth weight, which increases MTCT risk (Brahmbhatt et al., 2009).

2.4 Prevention of mother-to-child transmission (PMTCT) of HIV

2.4.1 PMTCT trends

Since the first recorded AIDS cases in children through MTCT in the 1980s, (Centers for Disease Control and Prevention (CDC), 1982; Cowan et al., 1984; McIntyre and Gray, 2009), there has been remarkable progress in PMTCT leading to reduced infections in children – a major advancement in HIV prevention (McIntyre and Gray, 2009). Initially, no specific intervention was available for PMTCT apart from avoiding pregnancy. CDC issued guidelines in 1985 for paediatric HIV, recommending that counselling and testing be offered to pregnant women. During counselling, HIV-infected women were advised to retard pregnancy (CDC, 1985). This is evident in Thackway et al.’s (1997) review of 294 women’s medical records in Australia, which reported that HIV-infected women had a lower birth rate, about one-half of that of the Australian population in general. Pregnancy termination in this study was higher among the HIV-infected women compared to the population in general. However, it is now well established that decisions about having children are complex and the mother’s HIV status is just one factor among many others affecting reproductive decisions (Biseck et al., 2015; Zihlmann and de Alvarenga, 2015).

In 1987, Zidovudine was officially approved by the US Food and Drug Administration for use in adults, and subsequently put forward as a preventive strategy for MTCT. Nevirapine was also recommended for PMTCT by the US Public Health Service Task Force (Guay et al., 1999; Public Health Service Task Force, 2003). Continued research into PMTCT suggested that C-section reduces MTCT (European Collaborative Study, 2015). However, C-section is well known to be connected with a significant risk of morbidity among women without HIV (Sebitiloane, 2012). Reed (2000) argues that data regarding the risk of maternal morbidity associated with C-section among HIV-infected women is sparse. Thus, it is suggested that the
role of C-section in PMTCT should be evaluated in light of both benefits and risks, and that HIV-infected women should be well informed about decisions regarding options for PMTCT including C-section (Read, 2000). Sebitloane (2012) argues that because of the current strong evidence of the effectiveness of ART for PMTCT, the option of C-section for PMTCT has been rendered less attractive. Initially, other modes of MTCT such as breastfeeding were not officially recognised. However, Zeiger et al. (1985) reported in 1985 that breastfeeding was another route for MTCT. Later on, formula feeding was made available and WHO recommended stopping breastfeeding in order to minimise postnatal transmission (WHO, 2015). John-Stewart (2004) acknowledged that formula feeding provides the only way to completely prevent postnatal transmission of HIV.

In developed regions like Europe, Brazil, Northern America and Thailand avoidance of breastfeeding with formula feeding has become a norm, leading to below 2% MTCT rate (Leroy et al., 2007; McIntyre and Gray, 2009). However, in low-resource settings like SSA, formula feeding is not accessible due to cultural beliefs, lack of clean water, poor sanitation, cost and fear of stigmatization associated with not breastfeeding (Atashili et al., 2008). The WHO (2015) argues that in regions where there is no availability of clean water, breast milk substitutes have a similar risk of infant mortality to breastfed infants. Therefore, it was recommended that where this is the case, infants should be placed on exclusive breastfeeding (WHO, 2015). Unfortunately, this recommendation has raised concerns as breastfeeding cannot prevent MTCT (Peltier et al., 2009). Thus, it was suggested that both mother and child be placed on ART during the breastfeeding period to reduce the risk of MTCT (Kilewo et al., 2008; Mofenson, 2008).

Later on, treatment in pregnancy progressed from Zidovudine (AZT) monotherapy to combination therapy, which is now the standard of care in well-resourced settings (WHO, 2016). WHO (2016) claimed that ART has caused a reduction of MTCT rate to less than 2% in developed countries. However, in some limited-resourced settings, most people do not have access to combination ART (Prendergast, Essajee and Penazzato, 2015). Following the report
from the HIVNET trial that single-dose Nevirapine (NVP) reduces about 50% of MTCT rate when given to mother and infant, WHO has endorsed it as an approach to treatment and prevention of MTCT in SSA since 2001 due to its low cost and feasibility (Guay et al., 1999; Prendergast et al., 2015). Since 2010, it was recommended by WHO to initiate ART at 14 weeks of pregnancy, however, an approach called “treat all” is now recommended, meaning women are offered treatment as soon as they are diagnosed (WHO, 2019). Through this approach, more women of childbearing age are reached with lifelong ART, which in turn has scaled up access to ART for PMTCT (WHO, 2019).

2.4.2 Current global PMTCT strategy

Over the past thirty years, PMTCT programmes have remained at the frontline of HIV treatment/care innovation with tremendous advancements (UNAIDS 2016b; Vrazo, Sullivan and Phelps, 2018). Global efforts to scale up PMTCT have constantly increased since 2001 when member states made a commitment to reduce infections among infants by 20% in 2005 and 50% by 2010 and making sure that 80% of HIV-infected pregnant women attending ANCs have access to HIV-prevention and treatment to reduce MTCT (UNAIDS, 2016b). This PMTCT programme was initially introduced as stand-alone or vertical services, separated from maternal, newborn and child health (MNCH) with separated infrastructures, and specialised healthcare providers (Tudor Car et al., 2012).

However, to improve quality of care, keep children and their mothers alive and healthy, and to increase access for children and women, PMTCT programmes were gradually integrated into MNCH (WHO, 2006). The United States Agency for International Development (USAID) (2011) argued that the integrated PMTCT and MNCH services offer an entry-point for HIV testing, reduces loss to follow-up and enhances long-term treatment for HIV-infected women. Following the advances in service delivery and effective therapies, a call to eliminate MTCT was proposed by the UNAIDS in 2009 (Adetokunboha and Oluwasanu, 2016; UNAIDS, 2016). This led to the launching of the current global plan (GP) in 2011 to eliminate MTCT (UNAIDS, 2016b). The GP had two main targets: (1) to eliminate paediatric new infections by 90% and

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(2) to reduce 50% of AIDS-related maternal deaths during pregnancy, delivery and puerperium by 2015 (UNAIDS, 2016b; WHO, 2012).

According to the UNAIDS (2016b), to reach the GP’s goal of eliminating MTCT and also keeping mothers alive, existing approaches will need to be transformed, requiring the guidance of overarching principles. Thus, four principles were introduced to guide the GP to achieve its goal. The first principle highlights the centrality of HIV-infected women in the response to eliminate MTCT (UNAIDS, 2016b). HIV-infected women are considered integral in the fight against the HIV/AIDS epidemic (Haroz, von Zinkernagel and Kiragu, 2017). The GP intensely affirms that women’s interest and that of their children must be grounded in all national plans. The GP further stated that access to HIV care and family planning must be provided for women and children based on recent guidelines and include HIV-infected women in national programme implementation to tackle obstacles in services (UNAIDS, 2016). National programmes are expected to secure the support and involvement of men to tackle gender and HIV-related discrimination that may hinder access and utilisation of services (WHO, 2012). Whereas male involvement is expected to increase access to HIV services, in most African countries it has been reported as a limitation to access and use of PMTCT services (Lumbantoruan et al., 2018; Vitalis and Hill, 2017).

The second principle highlights the importance of country ownership (UNAIDS, 2011). Countries in the GP must be responsible for leading and making their own operational plans. Piloted by ministries of health in every country, such plans should comprise of strategic planning, setting priority, monitoring performance and tracking progress in partnership with HIV-infected women, private sector, civil society and international organisations (UNAIDS, 2016). The UNAIDS (2011, p.8) suggested that the plans and policies should be in accordance “with the “Three Ones” principles for coordinated country action, which call for all partners to support: one national action framework, one national coordinating mechanism, and one monitoring and evaluation system at country level”. The third GP principle suggests that services should be integrated and linked with services for MNCH, family planning, vulnerable children and orphans
for sustainability. The UNAIDS (2011) argued that PMTCT should not be regarded as a single intervention designed only for the perinatal period; rather it should be considered as a chance for long-term continuous care involvement with other crucial services while maintaining focus for PMTCT. The GP suggested that loss to follow-up should be addressed through a strong referral system (UNAIDS, 2016b).

The fourth principle calls for specific accountability and shared responsibility (UNAIDS, 2011). WHO (2012) argued that the responsibility of achieving the GP goal of stopping MTCT must be shared amongst communities, families, national authorities, health services, and regional partners. UNAIDS (2011) suggested that these responsibilities should be transparent and specific with clear indicators to monitor progress and measure accountability. In Nigeria, the NACA is in-charge of delegating task to sectors and monitoring their progress (NACA, 2014). According to the UNAIDS (2016b), there is a huge progress worldwide since the initiation of the GP in 2011. The GP achieved a reduction of 60% paediatric new infections with approximately 1.2 million paediatric infections being averted, giving more children the opportunity to survive, grow and accomplish their dreams (Haroz, von Zinkernagel and Kiragu, 2017; UNAIDS, 2016b). Under the 2011 plan, AIDS-related mortality among women was reduced by 50% (UNAIDS, 2016b).

Building on the success achieved in 2015 from the 2011 plan, the international community further strengthened its commitment to eliminating MTCT by 2020 as part of the super-fast-track target of the UNAIDS to end AIDS (UNAIDS, 2016b). The “start free stay free AIDS free framework, also called a super-fast-tract framework” (Figure 2.1) was launched in 2016 by the UNAIDS on the premise that every child deserves to be born HIV-free (UNAIDS, 2016c, p.4). The framework embraces the political declaration made in 2016 by the United Nations’ member states to end AIDS among young women, adolescents and children by 2020 (UNAIDS, 2017). The framework comprises of three aspects: the first part is Start free, which involves preventing new paediatric infections and providing lifelong treatment/care to HIV-infected women. The target for the Start free involves reducing new infections to less than
40,000 in 2018 and 20,000 in 2020 among children, as well as reaching 95% of HIV-infected pregnant women with lifelong ART by 2018 (UNAIDS 2017). The second aspect is Stay free, which involves helping HIV-free children to remain free until adulthood by reducing new infections to less than 100,000 by 2020 among young women/adolescents. The third part, AIDS free includes providing support, treatment and care to HIV-infected adolescents and children (UNAIDS, 2016c). The framework concentrates intensively on the WHO priority countries, in which Nigeria is included (Haroz, von Zinkernagel and Kiragu, 2017). The framework aims to continue with the PMTCT progress made in SSA and to expand the geographical reach and scope of the GP (UNAIDS, 2016c).

Both the GP and the framework are built on the WHO four-prong strategies developed in 2000 (UNAIDS, 2016b). The four-prong strategies are: (1) preventing HIV infection in females of childbearing age, as well as their partners, particularly within services such as antenatal and postnatal care. (2) Preventing unwanted pregnancies in HIV-infected women within family-planning services, including counselling and contraceptives. (3) To reduce MTCT by providing HIV testing and ART services and (4) giving support and care to HIV-positive mothers, their young children and family members (NFMH, 2010). UNAIDS (2016b) stated that these strategies form the basis for the creation and implementation of national plans for PMTCT. UNAIDS (2017) argued that for these strategies to achieve PMTCT, partners at all levels must work together, as they all have their part to play. UNAIDS (2016b) opined that an effective response to HIV/AIDS hinges on community engagement and leadership. Engaging the community of HIV-infected women and local leaders fosters a favourable environment where women’s rights are protected and respected, and services are accessed without fear of stigma (UNAIDS, 2016c). The framework also expands its partnership to faith-based organisations, suggesting that strengthening partnership with religious leaders will accelerate access to treatment/care among youths, children and women (UNAIDS, 2016c).

According to the WHO (2012), the framework has ambitious targets, but achieving them is crucial in ending MTCT. UNAIDS (2016c) suggested that countries should overcome barriers
impeding scale-up of services to achieve the targets. It has been identified that user fees (cost for antenatal, birth and postnatal services) are a limitation to PMTCT success (Anígilájé, Ageda and Nweke, 2016; UNAIDS, 2016b). Due to user fees attached to these services, women from Nigeria prefer to utilise traditional birth attendants (Amutah-Onukagha et al., 2017; Ebuehi and Akintujoye, 2012), and this impedes their access to MNCH services which are entry points for PMTCT (USAID, 2011). UNAIDS (2016b) argues that removing user fees in services is a major step in achieving PMTCT success. Specifically, in Kenya, maternity fee was removed to encourage utilisation of health facilities among pregnant women, and this increased the number of women utilising skilled-birth attendants from 44% (in 2009) to 62% (in 2014) (UNAIDS, 2016b).

![Super-fast-track framework](Figure 2.1: Super-fast-track framework)

Source: UNAIDS (2016c)
2.4.3 PMTCT in Nigeria

The NFMH, supported by the WHO and UNICEF, initiated the PMTCT programme in 2002 in six tertiary health institutions spread across the country (NFMH, 2010). This response was in line with the global strategy for PMTCT that promotes the four-pronged procedure discussed in the previous section (NACA, 2014). However, by 2004, less than 1% of HIV infected women and virtually no exposed infants received ART (UNICEF, 2010). Over the years, the number of Nigerian health institutions providing PMTCT services has increased (to approximately 5,622 by 2014), with services distributed to secondary health institutions and private health institutions also becoming involved (NACA, 2014). Currently, about 7,265 Nigerian health institutions provide PMTCT services (NACA, 2015). Figure 2.1 shows the number of PMTCT sites from 2009 to 2013. The Nigerian PMTCT programme involves counselling, optional rapid HIV testing, ART prophylaxis, safe delivery practices, and infant feeding options. Women are routinely tested for HIV in Antenatal Care (ANC) to identify those who are positive and immediately enrol them for ART.

The NFMH (2014) claimed that to achieve the goal of eliminating MTCT in Nigeria, comprehensive PMTCT services should be accessible to at least 90% of HIV-positive women (NFMH, 2014). Despite the government’s effort, the number of HIV-infected women receiving ART for PMTCT from 2006 to 2013 only increased from 31,688 to 57,871 (Figure 2.2); only about 27% of the 244,000 women infected with HIV in 2013 (NFMH, 2014). Chukwuani et al. (2006) and Nkwo (2012) attributed the low coverage of ART to challenges faced by the Nigerian PMTC programme such as poor service provision, poor political commitment, low utilisation of healthcare services and poor infrastructure. Similarly, Agboghoroma, Sagay and Ikechebelu (2013) argued that even the distribution of ART and PMTCT services in Nigeria to rural areas has been slow due to the shortage of human resources. As reported by Colvin et al. (2014) and Gourlay et al. (2013) shortage of human resources impedes access and use of ART in SSA. Agboghoroma, Sagay and Ikechebelu (2013) argued that for Nigeria to be able to eliminate MTCT, these challenges must be tackled.
However, a recent study conducted in Nigeria to assess barriers to PMTCT services’ uptake among HIV-infected mothers reported patient-related factors such as falling asleep during dosing time, forgetfulness, financial constraint as challenges to uptake of PMTCT services (Anigilajé, Ageda and Nweke, 2016). In other settings, challenges to scaling up ART for PMTCT have also been studied in terms of pregnant women’s perceptions and attitudes. For example, in South Africa, Malawi and Ghana, negative perceptions and attitudes among HIV-infected pregnant women have been reported such as concerns that ART could harm the baby, doubts about ART being effective to prevent MTCT, and beliefs that HIV infection is spiritual through bewitchment and so medical intervention is not necessary (Boateng, Kwapon and Agyei-Baffour, 2013; Levy, 2009; Stinson and Myer, 2012; Stinson et al., 2010).

In Nigeria, there is limited published information regarding pregnant women’s perceptions and attitudes towards the use of ART for PMTCT. Studies have focused mainly on HIV testing for PMTCT and knowledge of MTCT (Mezie-Okoye and Tobin-West, 2010; Olugbenga-Bello et al., 2013; Owoaje, Omidokun and Ige, 2012). This study therefore, aims to close this gap in knowledge by studying pregnant women’s attitudes and perceptions towards ART for PMTCT.
Figure 2.2: Number of PMTCT sites in Nigeria

Source: NACA (2014)
Figure 2.3: Nigerian women who received ART for PMTCT from 2009-2013

Source: NACA (2014)

2.4.3.1 Antenatal management of HIV-infected pregnant women in Nigeria

The gateway to PMTCT is via HIV testing of women seeking antenatal care (ANC) (Onakewhor et al., 2013). The Nigerian PMTCT guideline recommends that HIV testing should be routinely offered to women accessing ANC, delivery and postnatal services (NFMH, 2016). Early identification of maternal HIV through ANC HIV testing ensures early initiation of treatment measures to reduce the risk of MTCT and further infection during pregnancy (Rogers et al., 2017). As an aspect of this process, pregnant women who test negative are encouraged to protect themselves against HIV (NFMH, 2016). However, women may acquire HIV infection during pregnancy and breastfeeding and may not be identified except HIV testing is repeated. Thus, repeat HIV testing is recommended during the last stage of ANC to increase utilisation of ART for PMTCT (NFMH, 2016). However, repeat testing is hardly conducted, indicating a lost opportunity for identification of women who were infected during the perinatal period for the early commencement of PMTCT (Onakewhor et al., 2013).
Up to 2010, PMTCT guideline in Nigeria recommended Option A regimen, consisting of Zidovudine (AZT) for pregnant mothers, and single dose Lamivudine (3TC), AZT and Nevirapine (NVP) at delivery and for seven days postpartum. Breastfeeding infants received daily NVP up to one week after stopping breastmilk, while formula fed infants received NVP up to six weeks of life (NFMH, 2010). However, in 2010, the PMTCT guideline was revised and Option B was adopted, recommending that pregnant women receive a mixture of at least three antiretroviral drugs (ARVs) (NFMH, 2010). ART is continued until seven days after stopping breastfeeding for mothers who do not require ART for their personal health (NFMH, 2010). In 2016, Nigeria adopted the current WHO option B+ for PMTCT which recommends that all pregnant and breastfeeding women be initiated with life-long ART regardless of CD4 count, gestational age and WHO clinical stage (UNAIDS, 2016). Women who have access to ART during ANC are allowed to deliver vaginally. However, for women not on ART with high viral load, elective C-section is considered before labour starts (NFMH, 2016). Table 2.1 shows the ART regimen currently given to pregnant and breastfeeding mothers. Table 2.2 shows ART prophylaxis for HIV-exposed infants.

Table 2.1: Current ART regimen for pregnant women in Nigeria

<table>
<thead>
<tr>
<th>First-line ART or breastfeeding women</th>
<th>Preferred first line regimens</th>
<th>Alternative first-line regimens</th>
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<tr>
<td></td>
<td>TDF + 3TC + EFV</td>
<td>AZT + 3TC + EFV</td>
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<td></td>
<td>TDF + FTC + EFV</td>
<td>AZT + 3TC + NVP</td>
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<td>TDF + 3TC + NVP</td>
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<td>TDF + FTC + NVP</td>
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According to NFMH (2016), appropriate feeding for infants is vital for their survival. Although, formula feeding has zero MTCT risk, it carries a risk of infant mortality and morbidity. Evidence suggests that exclusive breastfeeding is highly beneficial to both mother and child (Coovadia et al., 2007; Iliff et al., 2005; Kuhn et al., 2007). A cohort intervention study assessing survival and transmission risk associated with breastfeeding in an antenatal clinic in South Africa (2,722 attendees, both HIV infected and uninfected), found that exclusive breastfeeding reduced transmission (Coovadia et al., 2007). In this study, 83% of infants born to HIV infected mothers were breastfed exclusively from birth. These infants were significantly less likely to be infected with HIV than those with mixed feeding ($p = 0.018$). Cumulative three-month mortality was 6.1% in exclusively breastfed infants compared to 15.1% in non-breastfed ($p = 0.051$). Due to the benefits of exclusive breastfeeding, it is recommended in the presence of maternal ART for six months, and then complementary food can be introduced (NFMH, 2016).

### 2.5 Antiretroviral therapy

Antiretroviral therapy (ART) refers to “the treatment of HIV infection using a combination of antiretroviral drugs (ARVs)” (NFMH, 2016, p.34). The increased ART availability has led to a reduction of morbidity due to opportunistic infections and improved survival among infected persons (WHO, 2015). ART achieves a sustained suppression of the virus, leading to a reduction in MTCT (Musoke, 2004). The following sub-section discusses ART as a component of PMTCT.
2.5.1 ART as an important component of PMTCT

The administration of ART in pregnancy, at delivery and to the new born for the first six weeks of life is highly effective in reducing the risk of MTCT, a critical component of PMTCT (NFMH, 2016). Prior to the availability of ART, the risk of MTCT was high even in the developed world (around 15-20% in Europe) and life expectancy was poor (van Benthem et al., 2000). Consequently, HIV-infected women did not consider parenthood and pregnancy termination rates increased along with a decrease in live births (Duong et al., 1999; van Benthem et al., 2000). However, the availability of ART has caused a reduction in both the risk of MTCT and mortality and morbidity among HIV-infected pregnant women (NFMH, 2016). The 1994 randomised trial conducted by French and American researchers showed that AZT given to pregnant women could reduce MTCT risk (Connor et al., 1994). This study determined the effectiveness of AZT in preventing MTCT among 477 HIV positive pregnant women. These women received AZT until delivery and their infants were treated for six weeks. There was a 67% (95%CI) reduction in risk of MTCT (Connor et al., 1994). This marked the first significant breakthrough in efforts to prevent MTCT of HIV (WHO, 2015).

As a result of the efficacy of using ART for PMTCT, the WHO recommended that lifelong ART be given to pregnant women, irrespective of their CD4 cell count (WHO, 2015). Observational studies in resource-limited settings have shown the efficacy of ART during pregnancy in preventing in utero and postnatal HIV transmission. In the Drug Resource Enhancement against AIDS and Malnutrition cohort study (Palombi et al., 2007), HIV-infected pregnant women from Tanzania, Mozambique, and Malawi were recruited from 25 weeks of gestation; regardless of their CD4 count. HIV-infected pregnant women received a triple ARV regimen and optional infant formula for six months, from 2004 to 2006. Among 1,150 live infants, the rate of HIV transmission at one month was 1.2 (breastfeeding) and 0.8 (formula) and at six months was 0.8 (breastfeeding) and 1.8 (formula) (Palombi et al., 2007). Similarly, a recent clinical trial (Kisumu Breastfeeding Study) conducted in Kenya reported reduced risk of MTCT when women received three-drug regimen from 34-36 weeks of pregnancy until six months.
postpartum. MTCT rates at birth was 2.5%, at six weeks (4.2%), at six months (5.0%), at twelve months (5.7%), and at 24 months (7.0%) among 487 live-births (Thomas et al., 2011).

However, maternal ART can be absent due to the identification of HIV late in pregnancy or even after delivery. This is common in SSA, where most pregnant women present at hospitals for delivery, with unknown HIV status (Ndidi and Oseremen, 2010). In such cases, ARVs are still effective in preventing MTCT when administered to the infant. A randomised trial was conducted in South Africa to determine the efficacy of infant AZT or NVP (Gray et al., 2005). The study offered HIV testing and counselling to women who delivered within 24 hours without knowing their HIV status. Women who tested positive were recruited to the trial and either single dose NVP or AZT was administered to 1,051 infants within 24 hours of delivery. Overall the probability of MTCT at six weeks was 12.8% and at twelve weeks 16.3% (95%CI) (Gray et al., 2005). While mono-therapy given to infants is effective in PMTCT, ART is more effective. A randomised trial, conducted in Malawi, compared single-dose NVP with a combination of NVP and AZT (Taha et al., 2003). NVP (once daily) and AZT (twice daily) were given to 1,119 infants immediately after delivery. At six to eight weeks, the rate of MTCT was 15.3% for NVP plus AZT and 20.9% for NVP alone (Taha et al., 2003).

However, infant ART prophylaxis is more efficacious when combined with maternal ART. A prospective study conducted in Nigeria among 726 mother-infant pairs showed that, for mothers and infants who received ART prophylaxis, MTCT was low, about 2.8% (Ikechebelu et al., 2011). But poor maternal adherence to ART can lead to the development of drug resistance in the mother, leading to increased risk of transmission of HIV and drug-resistant virus to the infant (Delaugerre et al., 2009; Newell and Bunders, 2013). A cohort study conducted in France among HIV infected infants born between 1999 and 2004, detected drug resistance in 20% of the infants (Delaugerre et al., 2009). Therefore, there is a need for continued adherence after initiation of ART, evaluation, and counselling to enhance effective PMTCT care (Bailey et al., 2014).
2.5.2 Safety and toxicity of ART in pregnancy

The effectiveness of ART in preventing MTCT of HIV is undisputed (Fowler et al., 2016; Palombi et al., 2007). However, there are concerns regarding the possibility of adverse consequences resulting from exposure to ART in utero (Zash et al., 2017). The debate regarding ART as a contributing factor of adverse outcome in pregnancy continues (Areechokchai et al., 2009; Weinberg et al., 2011). For example, in Kourtis et al.'s (2007) review of 14 studies, it was concluded that the risk of premature birth was not increased by taking ART during pregnancy. Similarly, a cohort study to determine if taking ART during pregnancy increases the risk of preterm birth and low-birth weight found that, there was no increased risk of preterm birth and low-birth weight among women on ART compared to those on mono/dual therapy (Szyld et al., 2006). However, a study conducted in the UK and Ireland reported a higher rate of prematurity among women who received ART than women who received mono/dual therapy (Townsend et al., 2007). A Tanzanian study also reported higher rates of low-birth weight and preterm birth among women receiving ART compared to women on monotherapy (Li et al., 2016).

While mild toxic effects of ART occur commonly, more serious toxic effects may negatively impact quality of life (Montessori et al., 2004; Santos and Fuertes, 2007). These side effects vary both between drugs and between patients. The nucleoside reverse transcriptase inhibitors (NRTIs), the cornerstone of HIV treatment since the development of AZT in 1986, can cause mild to severe toxic effects (Montessori et al., 2004). NRTIs can cause toxicity to mitochondria (which is associated with pancreatitis, neuropathy, cardiomyopathy, and lipoatrophy), lactic acidosis (associated with fatigue, vomiting, nausea, and abdominal pain), and shortness of breath and weight loss (Hawkins, 2010; Montessori et al., 2004; Reust, 2011). A number of pregnant women have died as a result of lactic acidosis; resulting in the US Food and Drug Administration (FDA) issuing a warning in 2001 contraindicating the use of Didanosine and Stavudine in pregnancy (Coll et al., 2002). Mitochondria toxicity has been reported among HIV-negative children exposed to NRTIs both foetally and postnatally (Blanche et al., 1999). Further
studies confirmed that the level of mitochondrial DNA is less than normal in HIV-negative children exposed to ART in utero (Masyeni et al., 2018; Poirier et al., 2003; Walker and Poirier, 2007; Walker, Setzer and Venhoff, 2002). However, findings from Aldrovandi et al.’s (2009) study suggested that maternal viral load might contribute to mitochondria toxicity.

Non-nucleoside reverse transcriptase inhibitors (NNRTIs) can cause liver toxicity, neuropsychiatric symptoms, lipid abnormalities, and rash. NVP, a commonly used NNRTI, is associated with liver failure and hepatotoxicity in adults, especially in women with a CD4 count of over 250 cells/μL and this risk increases in pregnancy (Reust, 2011). Pregnant women are more vulnerable to the adverse effects of NVP, possibly owing to a hypersensitivity reaction mediated by the immune system (Bera and Mia, 2012). Therefore, the use of NVP is contraindicated for pregnant women with CD4 counts over 250 cells/μL (Bera and Mia, 2012).

ART in pregnancy is associated with complications, including hypertension, gestational diabetes, premature delivery and low-birth weight (Kowalska et al., 2003; Newell and Bunders, 2013; Thorne and Newell, 2005). Heidari et al. (2011) argued that since ART has only been used for approximately 10-15 years, there is a lack of data on the effects of long-term exposure to ART in utero. They further argued that childhood studies are not enough to provide conclusive answers on the effects of ART in this area, thus, follow-up studies into adulthood may be necessary (Heidari et al., 2011). However, the possibility of adverse effect on the foetus from exposure to a drug during pregnancy may not only be due to the drug itself, but may depend on the pregnancy age at exposure, the dose, interaction of the drug with other agents and the duration of exposure (Alemu et al., 2015).

Generally, ART has been shown to be safe with the benefits for PMTCT outweighing any potential side effects (Fowler et al., 2016). The recommended ART containing Efavirenz (EFV) is commonly used for PMTCT in resource-limited countries (NFMH, 2016). EFV is associated with specific side effects such as vivid dreams and dizziness. However, these side effects are believed to be temporary and to improve as women continue to adhere to ART, but they may interrupt early adherence to ART (Phillips et al., 2016). However, in pregnancy, early
adherence is necessary for speedy viral suppression, decreased MTCT risk and enhanced maternal health outcomes (Phillips et al., 2016).

2.5.3 Adherence to ART

Adherence is defined “as the extent to which patients take medications as prescribed by their healthcare providers” (Osterberg and Blaschke, 2005, p.487). ART adherence is required to achieve a sustained HIV suppression, improve immune function, prevent drug resistance, and enhance overall health (NFMH, 2016). During pregnancy, ART adherence virtually eliminates MTCT, with the risk reduced to below 2% (WHO, 2015). However, authors have identified that ART adherence is a key concern for pregnant women (Oginni et al., 2018). Nachega et al. (2012) opined that pregnant and breastfeeding mothers face challenges with adhering to their ART medication. Nachega et al. (2012) argued that the morning sickness (nausea, vomiting) experienced by most pregnant women might contribute to their nonadherent behaviours. Other authors have reported side effects (Mohammed et al., 2004), forgetfulness (Adeniyi et al., 2018; Ekama et al., 2012), too busy (Hansana et al., 2013), feeling healthy (Igwegbe, Ugboaja and Nwajiaku, 2010) and treatment cost (Boeteng, Awunyor-Vitor and Seidu Jasaw, 2012). However, pregnancy may be a motivation to increase adherence due to the desire to prevent MTCT (Boateng, Kwapong and Agyei-Baffour, 2013).

Studies have utilised different approaches to measure adherence such as patient self-report (stirratt et al., 2015), pharmacy refill metrics, provider-reports (Denison et al., 2015), and pill counts (Wu et al., 2014). According to Wu et al. (2014), each approach has its own weaknesses and strengths, and there is no agreed standard for measuring ART adherence. However, the most commonly used approach in research and clinical care for ART adherence is patient self-reports (Simoni et al, 2006). Self-reports involves asking participants to indicate how many times they have missed their doses over a specific period of time (Stirratt et al., 2015). The validity of self-reports has been questioned due to its proneness to recall bias and social desirability. However, self-reports are simple, low-cost and are regarded as the most practical approach for ART adherence in resource-limited settings (Phillips et al., 2017). The
present study used the self-report to determine the number of times women defaulted in taking their ART medication within the month prior to the start of the study.

2.6 Attitudes and perceptions

Attitude is defined as “a mental and neural state of readiness, organised through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related” (Allport, 1935, p.810). In simpler terms, attitude refers to a mindset or a propensity to act in a certain way (Ajzen, 2005). Attitude is often termed a hypothetical construct representing a person’s dislikes and likes for any behaviour (Susanty, Miradipta and Jie, 2013). Alliport (1935) and Kreitner and Kinicki (2004) described attitude as a distinctive concept that provokes a behaviour that is unfavourable or favourable, avertive or acquisitive, negative or affirmative towards all its related objects. Thus, attitudes are classified as positive and negative (Di Martino and Zan, 2003). Generally, attitudes are reduced into components, namely: cognitive (beliefs or thoughts), affective (feelings) and behavioural (actions). Cognitive is characterised by beliefs formed about persons, objects or events. Affective is characterised by feelings and emotional expressions towards objects, events or individuals that are either negative or positive. Behavioural is shown by the propensity to behave towards events or people in a certain way (Mishra, 2006). Bohner and Wanke (2002) argued that these three attitude components are not necessarily independent and do not represent three separable factors. Bohner and Wanke (2002) claimed that attitude may be composed entirely of affective or cognitive components, and all three components may not always be present. In this study, attitude is defined as the tendency to respond either favourably or unfavourably towards ART for PMTCT (Ajzen, 2005).

According to Pickens (2005), perception refers to an organised process whereby people interpret situations from previous experiences into what is meaningful to them. In other words, individuals may give different interpretations to the same thing after looking at it together (Robbins, Odendaal and Roodt, 2001). Robbins, Odendaal and Roodt (2001) argues that these interpretations are influenced by the perceiver's personality, the object being perceived
and the context where the object is being perceived. In this study, perception refers to the way pregnant women understand, interpret and regard facts about using ART for PMTCT. Without a good understanding of ART, HIV-infected pregnant women could regard it as a problem.

2.6.1 Attitudes and perceptions towards ART

Various studies investigating reasons for HIV patients using and adhering to ART have recognised the significance of HIV patients’ attitudes and perceptions towards ART. HIV patients have reported different views and beliefs about ART. For example, patients have reported fears about strict adherence, concerns about side effects, beliefs that no reason to start ART without symptoms, ART disrupts daily life, concerns about body organ damage and fear of ART causing abortion and big babies (Catt, Stygall and Catalan, 1995; Chen et al., 2009; Cooper et al., 2002; Enwereji and Enwereji, 2010; Ezzy et al., 1998; Horne et al., 2007; Iwelunmor et al., 2014). In addition, doubts about ART efficacy have been reported in other studies (Gebo, Keruly and Moore, 2003; Spire et al., 2002).

Research during the era prior to combination therapy reported mainly negative attitudes and perceptions held by HIV-positive women (Nannis et al., 1993). In studies conducted by Siegel and Gorey (1997) and Siegel et al. (2001) to examine factors associated with AZT use, AZT was viewed by HIV-infected women as highly toxic with little or no benefit and causing death. However, since the beginning of ART, it is generally believed that HIV-infected women have more positive views about ART due to increased positive experiences of using ART (Schrimshaw, Siegel and Lekas, 2005). In recent years, research has recognised that HIV-infected women experience both benefits and problems while using ART (Horne et al., 2004; Powell-Cope et al., 2003). For example, Richter, Sowell and Pluto (2002) in a study among HIV-positive African American women suggest that participants had both positive and negative attitudes towards ART. Those who had positive attitudes view ART as a symbol of survival and hope. Thus, they felt taking ART is a way to have control over HIV.
On the other hand, women who expressed negative attitudes in the study were concerned about the efficacy of ART in preventing MTCT and the possibility of long-term side effects and complications for the baby (Richter, Sowell and Pluto, 2002). Similarly, in a study of HIV-infected women’s attitudes to ART (Schrimshaw, Siegel and Lekas, 2005), some women viewed ART as beneficial in terms of improving their health and reducing the viral load, while others were concerned about taking the drugs daily. A qualitative study conducted in Nepal to explore factors related to ART also revealed mixed feelings about ART (Wasti et al., 2012). While some of the participants believed that without ART their symptoms will worsen, others questioned ART efficacy, they believed taking ART is a waste of time since people infected with HIV will die eventually from the illness (Wasti et al., 2012).

In Nigeria, studies on attitudes and perceptions towards ART have mainly used samples from adults infected with HIV (including women) (Afolabi et al., 2010; Kasumu and Balogun, 2014; Olowookere, Fatiregun and Adewole, 2012). These studies are cross-sectional surveys that used interviewer-administered questionnaires to assess knowledge and attitudes towards ART among HIV patients. Findings from these studies suggest that while some of the respondents view ART as a treatment that improves quality of life, prolong life and assists in carrying out family obligations, others feel it is a waste of time taking the drugs since there is no cure for HIV. Some respondents in these studies view ART as a treatment with side effects that can lead to organ damage and financial difficulties. Studies in Nigeria focusing on only HIV-infected pregnant women’s attitudes and perceptions towards ART for PMTCT are scant. ART is an important component of PMTCT, as opined by the WHO that the primary intervention for PMTCT is ART (WHO, 2015). With ART, MTCT rates can be less than 5% (WHO, 2015). Therefore, it is important for research in Nigeria to focus on HIV-infected pregnant women’s attitudes and perceptions towards ART for PMTCT.
2.6.2 Influence of attitudes and perceptions towards ART on ART initiation and adherence

Research has established that there is a strong relationship between the use of ART and attitudes and perceptions towards ART (Horne et al., 2007; Schrimshaw, Siegel and Lekas, 2005). Evidence suggests that people are more likely to utilise ART when they hold favourable perceptions and attitudes towards ART than those with negative perceptions and attitudes (Govender et al., 2011; McDonald, Bartos and Rosenthal, 2001). In addition, Ezzy et al. (1998) argued that people’s attitudes towards ART apply a greater influence on the people’s choices to start ART than ill-health and clinical markers of HIV progression. Ezzy et al. (1998) added that attitudes towards ART are fundamental to HIV-patients’ decision to use ART, such that treatment can rapidly cease if confidence in ART changes. Similarly, Govender et al. (2011) reported that peoples’ negative attitudes are the main reasons for HIV-patients declining ART.

For example, in Horne et al.’s (2007) study, it was found that perceived low personal need for ART influenced people’s choices to decline ART. In Wasti et al. (2012) study, the view that taking ART was a waste of time since HIV was incurable was a barrier to ART adherence. Also, concerns about possible side-effects significantly determined the poor utilisation of ART (Cooper et al., 2002; Grant et al., 2008).

Furthermore, pregnant women’s decisions to use ART for PMTCT have also been found to be determined by attitudes and perceptions. A qualitative study of barriers to ART during pregnancy among 28 women and 21 service providers highlighted that women who had concerns that ART could harm the baby were afraid of taking ART (Stinson and Myer, 2012). In Kenya, about 11% of women disbelieve the efficacy of ART, and this restricted their readiness to receive HIV treatment/care (Otieno et al., 2010). However, positive beliefs about the benefits of ART promote access and adherence to ART (Chen et al., 2009). In a Ghanaian study, pregnant women’s beliefs that ART will reduce the virus in their system and prevent transmission to their babies motivated their use of ART (Boateng, Kwapong, and Agyei-Baffour (2013).
From the findings above, it can be concluded that ART use for PMTCT is strongly influenced by attitudes and perceptions towards ART. However, research has recognised that individual attitudes towards ART can be influenced by different factors such as the success of past treatment, community beliefs, personal experience and exposure to HIV counselling and testing (Cooper et al., 2002; Grant et al., 2008). Attitudes towards ART can also be influenced by socio-demographic factors such as marital status (Afolabi et al., 2010), place of residence (Tymejczyk et al., 2016) and educational level (Afolabi et al., 2010; Tymejczyk et al., 2016).

2.6.3 Interventions to improve negative attitudes and perceptions towards ART

Adherence is arguably the most crucial element in ensuring the success of HIV treatment/care, however, negative attitudes towards ART such as skipping or stopping to take ART is often reported among HIV-infected persons (Nachega et al. (2012). To promote positive attitudes towards ART, several interventions such as social support, education and incentives have been shown to be effective in promoting attitudes towards ART.

In India, educational intervention has been shown to improve HIV-infected people’s attitudes towards ART (Rajesh et al. 2013). Rajesh et al.’s (2013) study evaluated the effectiveness of an educational intervention on ART adherence behaviours. Participants were randomly assigned to intervention and standard groups. The intervention group consisted of participants who received education about adverse drug reactions and the benefits of ART adherence(Rajesh et al. 2013). The standard group had participants who received the regular standard care. Participants attitudes towards ART in the intervention group improved after receiving education, 98.3% in the intervention group viewed ART as lifesaving compared to 75.8 % in the standard care, 79.2% in the intervention group believed ART should not be stopped or skipped compared to 40.8% in the standard care (Rajesh et al. 2013). Another Indian study also reported a positive impact of education on attitudes and knowledge (Mini et al., 2010). Similarly, in Thailand, an educational programme was used to improve attitudes and knowledge about ART (Fongkaew et al., 2017). Participants who missed their medications prior to the programme due to fear of being stigmatised were no longer afraid after the
programme, they were more confident in ART efficacy, motivated to stay on ART and looked for ways to overcome adherence barriers (Fongkaew et al., 2017).

In China, home-based interventions were used to successfully improve negative attitudes towards ART (Williams et al., 2014). The intervention involved trained peer and nurse educators visiting participants. It was found that the participants’ attitudes improved and most of the participants achieved about 90% adherence (Williams et al., 2014). Two intervention studies conducted in Kenya (Aluisio et al., 2011) and Malawi (Kalembo et al., 2013) applied social support to improve attitudes towards ART. These studies assessed the association between partner support and PMTCT. Interventions in these studies involved husbands/partners accompanying their pregnant wives to ANC and receiving HIV prevention counselling. These studies reported that partner support improved pregnant women’s attitudes towards ART and reduced MTCT risk (Aluisio et al., 2011; Kalembo et al., 2013).

2.6.4 Systematic reviews on attitudes and perception towards ART uptake

Reviews focusing on attitudes and perceptions towards ART are scant, however, some reviews have looked at reasons why HIV-infected persons refuse to initiate or adhere to ART. A systematic review of 20 qualitative studies investigated the reasons why people in low-resource settings refuse ART initiation (Ahmed et al., 2018). The review demonstrated that HIV-infected patients had a perception that initiating ART would constantly remind them of their status, and cause them shame and distress. Others perceived that initiating ART would increase the chances of disclosing their status which can lead to stigmatisation (Ahmed et al., 2018). The review also highlighted that participants in their reviewed studies believed that initiating ART would cause restrictions on their way of life, such as routinely going for appointments, taking ART lifelong, modifying lifestyle such as disclosing to family members, abstaining from smoking, alcohol and unprotected sex. Others feared that ART could make them feel worse due to its side-effects (Ahmed et al., 2018). The review concluded that for interventions focused on increasing ART access and adherence to be effective, there is need to better understand what influences HIV-infected people’s decision to access and initiate ART.
Ahmed et al. (2018) further explained that while interventions have been able to minimise supply-side barriers such as side effects and pill burden, many HIV-infected patients still refuse to initiate and adhere to ART (Ahmed et al., 2018). Thus, Ahmed et al. (2018) suggested that understanding patients’ perception is critical to increase ART uptake.

One systematic review of 51 papers, assessed ART adherence among HIV-infected pregnant women in SSA (Omonaiye et al., 2018). The review demonstrated that ART side effects influenced its use during pregnancy (Omonaiye et al., 2018). This review also highlighted that due to HIV-related stigma and fear of disclosure, women were not motivated to commit themselves to lifelong ART (Omonaiye et al., 2018). However, women who had the desire to safeguard their children from HIV were motivated to continue having good ART adherence (Omonaiye et al., 2018). Another systematic review assessed barriers to ART adherence (Shubber et al., 2016). The study reviewed 125 studies reporting on ART adherence among adults and children. The study found that secrecy/stigma, concerns about ART and distance to clinic were barriers to ART adherence (Shubber et al., 2016).

### 2.7 Effect of socio-demographic factors on ART for PMTCT

Different socio-demographic factors have been investigated in relation to ART adherence for PMTCT, however, studies have reported mixed findings. While some studies have found significant associations between ART and socio-demographic variables, others have reported no associations. In SSA, education and maternal age have been mostly investigated in relation to ART adherence among women on the PMTCT programme. Most of these studies (both observational and RCTs) investigating maternal age and ART adherence have found no association (Buseri and Okonkwo, 2014; Ekama et al., 2012; Hampanda, 2016; Kirsten et al., 2011; Mirkuzie et al., 2011; Okawa et al., 2015; Schnack et al., 2016; Yotebieng et al., 2016). However, some observational studies conducted in SSA have reported significant associations between ART adherence and maternal age (Haas et al., 2016; Parisotto et al., 2011). Similarly, in Nigeria, while some studies found no association between ART and maternal age (Ekama et al., 2012; Joseph et al., 2018), others have reported significant associations (Igwegbe,
Ugboaja and Nwajiaku, 2010). It is worthy of note that the studies showing significant associations between ART adherence for PMTCT and maternal age have reported inconsistent findings. For example, Haas et al.’s (2016) Malawian study established that younger women (between 15 and 29 years) were less likely to comply with their ART medication during pregnancy, compared with women in their older age groups. However, Igwegbe, Ugboaja and Nwajiaku (2010) Nigerian study demonstrated that older pregnant women (40 years and above) were less likely to comply with their ART medication, compared with younger pregnant women.

Studies have demonstrated that ART adherence for PMTCT is also associated with women’s educational level. Studies in SSA have reported that women with low educational level, particularly those with primary education or those not completing secondary are more likely to be non-adherent to ART for PMTCT, compared with those at the tertiary level (Adeniyi et al., 2018; El-Khatib et al., 2011; Kuonza et al., 2010). However, a Ugandan study assessing ART adherence and uptake during pregnancy found that mothers with tertiary education were less likely to achieve optimal adherence (Schnack et al., 2016). In Nigeria, a recent study by Omonaiye et al. (2019) assessing determinants of ART adherence among HIV-infected pregnant women found a significant association between ART and educational level. This Nigerian study highlighted a 70% increase in ART adherence for PMTCT for every increase in the level of educational status (Omonaiye et al., 2019). In another Nigerian study, primary education was associated with non-adherence to ART for PMTCT (Igwegbe, Ugboaja and Nwajiaku, 2010). In addition, partner’s educational level was found to be associated with maternal ART adherence (Igwegbe, Ugboaja and Nwajiaku, 2010). However, in another Nigerian study, educational level was not associated with ART adherence for PMTCT (Joseph et al., 2018).

In addition to education and maternal age, some studies have investigated other socio-demographic factors in relation to ART adherence for PMTCT such as marital status, occupation, and place of residence. In a South African study investigating factors related to
ART adherence with HIV-infected pregnant women, it was reported that the rates of ART adherence was highest among married participants (Adeniyi et al., 2018). Similarly, in a Tanzanian study, the rates of ART adherence for PMTCT were 1.68 times higher among the married women (Zacharius et al., 2019). However, in a similar study conducted in Nigeria, marital status was not associated with ART adherence for PMTCT (Joseph et al., 2018). Omonaiye et al.’s (2019) study to assess ART adherence-related factors among HIV-infected pregnant women demonstrated that place of residence was associated with ART adherence for PMTCT. The study highlighted that Nigerian pregnant women dwelling in rural areas had two times higher rates of ART adherence compared to those dwelling in urban areas (Omonaiye et al., 2019). Similarly, in a Tanzanian study assessing ART adherence for PMTCT, it was reported that women dwelling in rural areas had 4.86 times higher likelihood of adhering to ART compared to those in urban areas (Zacharius et al., 2019).

2.8 Theoretical framework

A theory, according to Lunenburg (2011), is an organised interconnected concepts, prepositions and definitions that systematically predict and explain a phenomenon. Abd-El Khalick and Akerson (2007) argue that since research is theory-driven, it is important for researchers to utilise a theoretical framework as an anchor for their research studies. Grant and Osanloo (2014) acknowledged that theoretical framework forms the basis from which knowledge for the research study is developed. They went further to state that a theoretical framework serves as a base for the study’s methods, analysis and the literature review (Grant and Osanloo, 2014). Hence, the selection of a suitable theory for this study was necessary for effective research. The selection of suitable theories and/or models for any research study is based on the research objectives, research questions and the research problem (Sussman and Sussman, 2001). However, given the available large number of behavioural theories, Traube, Holloway and Smith (2011) emphasised the importance for HIV researchers to carefully assess the limitations and strength of existing theories/models related to their research topic before selecting a theoretical model on which to base their research. The
following sub-sections provide a brief discussion of the prominent theories/models applied in HIV prevention including their strengths and limitations, as well as the selection of two theoretical models for this study.

### 2.8.1 Prominent models and theories in HIV prevention

The transmission of HIV is greatly influenced by factors related to behaviour; thus, behavioural change interventions are important for HIV prevention (Abraham et al., 1998). As a result, behavioural change theories and/or models have been used to provide the basis for HIV prevention worldwide (Abraham et al., 1998). Health behavioural models focus mainly on psychosocial factors that influence behaviours such as, beliefs, attitudes, knowledge, personality traits and intentions. These factors are identified to have proximal influence on individuals’ behaviours, and thus very important in health promotion (Groenewold, Bruijn and Bilsborrow, 2006). Studies on HIV/AIDS have established that social cognition theories and/or models are the most valuable and efficient tools in predicting HIV-preventive behaviours and guiding psychological changes that can lead to a change of behaviour towards HIV prevention (Abraham et al., 1998).

The most commonly used cognition models in HIV prevention are: social learning/cognitive theory, AIDS Risk Reduction Model (ARRM), trans-theoretical model (TTM), theory of planned behaviour (TPB), theory of reasoned action (TRA) and the health belief model (HBM) (Hampanda, 2012; Michielsen et al., 2012). In recent reviews on HIV prevention (including PMTCT), it was identified that HBM, TPB and TTM were the most commonly used theories (Hampanda, 2012; Latifi et al., 2017). In other reviews on HIV prevention, the commonest theories/models identified were SCT (Harrison et al., 2010; Michielsen et al., 2012) and ARRM (Bonell and Imrie, 2001). Even though each model is based on its own assumptions, they all predict that changes in behaviour occur by altering risk perceptions, social relationships, attitudes, intentions, self-efficacy beliefs and outcome expectations (King, 1999). The following sub-sections present a review of these cognition models and the selection of two theoretical models for the present study.
2.8.1.1 Social Cognitive Theory

Developed in the 1960s by Albert Bandura, the model was initially known as the social learning theory, however, in 1986, the model was expanded into the social cognitive theory (SCT) (Bandura, 1991). The model describes behaviour in a reciprocal and dynamic fashion, in which a new behaviour is produced through an interaction of the environment (physical, social), individual factors (attitudes, beliefs) and the behaviour (Riley et al., 2016). The major concepts of the SCT are self-efficacy, self-regulatory capability, observational learning, emotional coping and outcome expectations (Portugal, 2018; Riley et al., 2016). The central tenet is that behaviour is learned, proposing that, for a person to act in a certain situation, they need to be knowledgeable about the action to be taken (Adefolalu, 2018). Thus, it is believed that the SCT is relevant in counselling sessions with individuals suffering from chronic illnesses such as HIV/AIDS (Adefolalu, 2018). The SCT has been mostly applied to help HIV patients learn about the disease and the possible line of action to follow in making choices regarding the disease and treatment. Despite the application of SCT in controlling HIV, it is arguably more effective in addressing sexual risk behaviours and condom use (Kanekar and Sharma, 2009; Snead et al., 2016).

The SCT has been criticised to be loosely designed with a broad range of focus, making it hard to apply the theory in its totality (Munro et al., 2007). Thus, SCT is mainly utilised in parts, raising questions about its applicability (Enwereji and Eke, 2016). Further limitation is that, the SCT is centred entirely on the interplay of three major factors (environment, individual and behaviour). However, it is not specified how each of them plays into real behaviour, and if any of the factors influence more than the other (Traube, Holloway, and Smith, 2011). Considering these limitations, it can be concluded that SCT is not suitable for the present study.

2.8.1.2 AIDS Risk Reduction Model

The AIDS Risk Reduction Model (ARRM) was developed in 1990 to predict and explain individuals’ efforts to change behaviour (Catania, Kegeles and Coates, 1990). The model comprises of three stages, incorporating elements from prior models (HBM, interpersonal
process, emotional influences and efficacy theory) (Wilkerson et al., 2011). The model postulates that individuals must recognise and consider their sexual behaviours as risky, and be able to make commitments to minimise risky activities. The model posits that for individuals to achieve success in changing their behaviours, they may be required to make efforts to acquire solutions through social support, self-help and professional assistants (Catania, Kegeles and Coates, 1990). ARRM has been used in recent years to predict risk behaviours among groups at-risk, including HIV-infected individuals (Crepaz and Marks, 2002) and injecting-drug users (Cox et al., 2008; Spielberg et al., 2001). The ARRM is criticised for not providing sufficient explanation on why individuals would tag their behaviours as risky (Wilkerson et al., 2011). The ARRM seems to be more suitable and relevant in HIV prevention relating to risk assessment and risk reduction (Wilkerson et al., 2011). Thus, it is not suitable for the present study.

### 2.8.1.3 Trans-theoretical model

The model was first described in 1984 by Prochaska and DiClemente after they observed that individuals vary regarding their readiness to stop smoking and that, they move through certain stages of readiness while going through the path to change behaviour (Pekmezi, Barbera and Marcus, 2010; Prochaska and Velicer, 1997). The model proposes that individuals change their behaviours through a process of five stages. The first stage, pre-contemplation includes individuals who do not desire to change their behaviour, and may be uninformed about the problem associated with their behaviour (Cabral et al., 2004). This is followed by the contemplation stage, where individuals start recognising the consequences of their behaviour, and begin to show the desire to change (Prochaska and Velicer, 1997). Next is the preparation stage, where individuals have strategies in place to change their behaviour in the nearest future. The action stage involves individuals who have made modifications but require learning on how to continue in their dedication to change. The last stage (maintenance) involves individuals making effort not to relapse. The TTM suggest that certain processes mediate the movement through the stages (Cabral et al., 2004). While the stages describe when individuals
change, the processes explain how individuals make these changes (Pekmezi, Barbera and Marcus, 2010). Ten processes of change have been identified and grouped into two main categories: behavioural and cognitive processes. Specifically, cognitive processes facilitate progression through pre-contemplation to contemplation stages. Progressing through later stages of the model involves more of the behavioural processes (Cabral et al., 2004).

Critics of TTM have argued that the constructs are not specifically defined (Vilela et al., 2009). It has been suggested that TTM oversimplifies the complex process of changing behaviour by creating arbitrary lines to separate the stages without any set criteria to determine an individual’s stage of change (Vilela et al., 2009; Littell and Girvin, 2002). Bandura (1997) argues that humans function in a multifaceted way, and as such, cannot fit into distinct stages. He further argued that stage thinking may restrict the extent of change-promoting interventions (Bandura, 1997). In addition, the TTM ignores social context and demographic variables through which change occurs (Boston University School of Public Health, 2018).

2.8.1.4 Health Belief Model

The health belief model (HBM) posits that individual perceptions and beliefs determine health behaviour (Hayden, 2013). HBM is one of the most widely used and well-researched models in health behaviour, health promotion and health education (Champion and Skinner, 2008; Hayden, 2013). In HIV prevention, HBM has been used extensively to change risky behaviours and increase uptake of preventive services (Oyekale and Oyekale, 2010; van Wyk and Basson, 1994). The HBM was developed in the 1950s at the US Public Health Service by social psychologist researchers, to predict and explain why a tuberculosis screening programme was not very successful (Janz and Becker, 1984; Rosenstock, 1974; Rosenstock, Strecher and Becker, 1988). Later on, the HBM was expanded to include the study of people’s behaviours in response to illnesses, uptake of medical regimens and response to symptoms (Glanz, Rimer and Viswanath, 2008). The HBM initially consisted of four constructs when it was first developed, namely: perceived susceptibility, severity, benefits and barriers, later on, self-efficacy and cues to action were added (Figure 2.3).
The HBM stipulates that people take health-related actions based on these constructs. Individuals who perceive themselves at risk of a condition (perceived susceptibility) will take health-related actions to reduce the risk of developing that disease (Janz and Becker, 1984). For example, if HIV-infected pregnant women perceive that they are at risk of transmitting HIV to their foetus or infants, then they will take recommended action (using ART) to reduce MTCT risk. The HBM also suggests that if individuals perceive that a particular disease is a serious health condition (perceived severity), they are more likely to take health-related action to prevent it (Hayden, 2013). This perception is often based on personal beliefs, medical knowledge or past experiences (Hayden, 2013). However, individual perception of risk and severity may not be the sole trigger for taking a health-related action and the perceived benefits of taking that action play a part. Similarly, people may perceive the benefits associated with taking an action but may be limited by personal evaluation of the obstacles involved (perceived barriers). Therefore, HBM predicts that, for an individual to take a recommended action, the perceived benefits must outweigh the barriers to that action (Glanz, Rimer and Viswanath, 2008).

Rosenstock (1966) noted that perceptions or beliefs of susceptibility, severity, benefits, and barriers provide the force to act and the path of action. However, for the decision-making process to be triggered, Rosenstock (1966) argued that some stimulus or cue was necessary (cue to action) (Figure 2.4). Cues or triggers may include advice from others, mass media campaigns, illness of a family member and pain. Individual behaviours may also change, depending on confidence in one’s ability to take an action (self-efficacy) (Figure 2.4). The HBM constructs are further discussed later in this chapter.
2.8.1.5 Theories of planned behaviour and reasoned action

The theory of planned behaviour (TPB), developed by Ajzen is a successor to the theory of reasoned action (TRA) which was formulated by Fishbein and Ajzen in the 1960s (Ajzen, 2012). Both TPB and TRA are cognition models used to predict and understand behaviour. Both TPB and TRA suggest that behaviour is the outcome of an individual’s deliberate decision to function in a specific way (Ajzen, 2012). While TRA is related only to voluntary behaviour under an individual’s control, TPB regards non-volitional behaviours (Omer and Haidar, 2010).

Ajzen (1991) argues that the development of the TPB was necessary due to the weakness in the original model (TRA) in explaining people’s behaviours that have insufficient volitional control. Perceived behavioural control, a component of TPB was added to account for non-volitional behaviour, which was not covered in TRA (Ajzen, 1991). The central factor in both theories is the people’s intention to carry out certain behaviours (Ajzen, 1991). Intentions are believed to capture people’s motivational factors influencing their behaviours (Ajzen, 2012).

Ajzen (1991) opined that intentions represent how hard individuals are prepared to try and the amount of effort they plan to exert to carry out the behaviour.

Source: Glanz, Rimer and Viswanath (2008)
TPB posits that people’s motivations or intentions to perform behaviour (e.g. using ART) are guided by three constructs: attitudes, perceived behavioural control (PBC) and subjective norm (SN) (Figure 2.5). The constructs of TPB are discussed later in this chapter. The efficacy of the TPB was studied by Armitage and Conner (2001); they reviewed 185 studies and established that TPB accounted for the variance of intentions (39%) and behaviours (27%). The study also established that subjective norm was weak in terms of predicting intentions. In comparing the predictive power of both theories, studies have established that the additional construct increased TPB predictive power than TRA (Hausenblas, Carron and Mack, 1997; Sheeran and Taylor, 1999). Sheeran and Taylor (1999) conducted a meta-analysis comparing the predictive power of TPB and TRA with regards to condom use and found that, both TRA and TPB variables had moderate to strong associations, SN and attitude were stronger predictors than PBC, however, the addition of perceived behavioural control to TPB increased its predictive power over TRA.
2.8.2 Rationale for choosing HBM and TPB

Although, the dominant theories in HIV prevention over the last two decades have been HBM, TTM, SCT, ARRM and TPB/TRA, reviews have identified that the most prevalent theories in uptake and adherence of medications like ART are those such as SCT, HBM, TRA and TPB (Holmes, Hughes and Morrison, 2014). Due to the complex organisation of the SCT, which makes it hard to operationalize (Munro et al., 2007), studies have mostly utilised only two constructs of SCT: outcome expectation and self-efficacy. Hence, SCT was not utilised in the present study. Rather, constructs from HBM and TPB were used to understand HIV-infected pregnant women’s attitudes and perceptions towards ART in relation to PMTCT. The utility of HBM and TPB in predicting behaviour has been well established, with their variables having significant predictive power across various health behaviours (Armitage and Conner, 2001). A discussion of their application and predictive power is given in the following sub-sections.

2.8.2.1 Application and predictive power of HBM

The usefulness of the HBM in explaining and predicting behaviour over the last decades has been well established (Carpenter, 2010; Zimmerman and Vernberg, 1994), with successful application in designing health-related interventions (Peng, 2009), preventive health behaviour and relationship between health behaviour and health beliefs in different populations and fields (Bakker et al., 1997; Champion and Skinner, 2008). For instance, HBM has been successfully applied to increase screening rates for various cancers such as the pap-test for cervical cancer, mammography, and breast self-examination (Hay et al., 2003; Simon and Das, 1984; Umeh and Rogan-Gibson, 2001). The HBM was also used to predict dietary-calcium intake and weight-bearing exercise in osteoporosis prevention (Wallace, 2002). Hochbaum (1958) used...
the HBM in TB screening (chest X-ray) and found that beliefs about the benefits of screening and susceptibility to infection were strongly associated with uptake of chest X-ray. The HBM has also been used to predict preventive dental behaviour (Chen and Land 1986).

In Petosa and Jackson’s (1991) study, HBM was used to predict intentions of students (seventh, ninth and eleventh grades) to adopt safe sexual behaviour. The study found HBM constructs to be effective in explaining and predicting adolescents’ safer sex intentions with 43% variance, although the study reported that HBM was not useful in explaining the eleventh grade safer sex intentions. Similarly, Oyekale and Oyekale (2010) also applied the HBM for promotion of HIV prevention behaviours among Nigerian youths. Meta-analyses have been conducted to analyse the predictive power of the HBM constructs in predicting different health behaviours (Carpenter, 2010; Zimmerman and Vernberg, 1994). In Carpenter’s (2010) review, 18 studies were analysed and it was concluded that perceived benefits and barriers were the strongest predictors, while severity was a weak predictor. Susceptibility was reported to predict preventive behaviour more than treatment behaviour. A possible explanation is that, an already diagnosed individual with a condition, may not have varying perceptions about susceptibility since they are already susceptible (Carpenter, 2010).

2.8.2.2 Application and predictive power of TPB

TPB has been successfully applied in various social science fields to study health-related behaviours and intentions (Ajzen and Fishbein, 2004). For example: exercise behaviour and intentions (Downs and Hausenblas, 2005; Hagger, Chatzisarantis and Biddle, 2002), breast self-examination, condom use (Asare, 2015; Sheeran and Taylor, 1999), alcohol use (Cooke et al., 2016), and smoking cessation (Topa and Moriano, 2010). A meta-analysis examined the application of TPB and TRA in relation to exercise behaviour (Hausenblas, Carron and Mack, 1997). The authors’ findings support the validity of TPB: they reported that the effect sizes between: attitude and exercise, attitude and intention, PBC and exercise, PBC and intention, and intention and exercise were large. However, a moderate effect size was found between subjective norm and intention, and zero effect was between subjective norm and exercise.
(Hausenblas, Carron and Mack, 1997). Cooke et al.’s (2016) meta-analysis investigated the utilisation of the TPB to predict alcohol use and reported strong predictive power of TPB, with attitudes and subjective norm being the strongest predictors of alcohol use intentions compared to PBC. Intention was found to be the strongest predictor of alcohol use (actual behaviour) (Cooke et al., 2016). In Riebl et al.’s (2015) meta-analysis investigating the application of TPB in nutrition-related behaviour, it was reported that attitude was the strongest in predicting intention, while intention was strongest in predicting actual behaviour.

More recently the TPB has been used extensively in HIV prevention and treatment. McKinney et al. (2015) used TPB to predict intentions to adhere to ART among Malawian women and found that all the constructs were significant in predicting Malawian women’s intentions to adhere to ART. Similarly, Vissman et al.’s (2011) study utilised the TPB to explore influences on ART adherence among Latino immigrants in southeastern USA, and found that TPB constructs were important in influencing ART adherence behaviour. The TPB constructs were found to be strong predictors of condom use intentions accounting for 64% variance, while behavioural intention and perceived behavioural control were predictors of the actual behaviour (condom use) with variances of 15% and 35% respectively (Asare, 2015).

2.8.3 HBM constructs

Perceived threat

Within the HBM, perceived threat of a disease is recognised as an important starting point in complying with recommended actions that will reduce the threat (Rosenstock et al., 1974). Perceived threat is based on two perceptions: perceived susceptibility and severity (Champion, 1999). Perceived susceptibility, which is the first construct of the HBM, refers to a person’s beliefs about the level of their risk of having a health problem (Frewen, Schomer and Dunne, 1994). Perceived susceptibility is known to predict certain health-related behaviours, for instance, HIV-infected women ought to believe that their unborn children are at risk of HIV infection for them to utilise and adhere to ART for PMTCT (Glanz, Rimer and Viswanath, 2008).
Likewise, women who feel their unborn children are not susceptible will not utilise and adhere to ART for PMTCT. Where there is low risk perception, individuals display unhealthy behaviours, which results in developing the condition or even death (Hayden, 2013). On the account of non-utilisation of ART for PMTCT due to low perceived risk, it results in paediatric HIV through MTCT. Moreover, studies have demonstrated that individuals may not pay attention to perceived risk (Hounton, Carabin and Henderson, 2005). Thus, women may perceive their unborn children as susceptible and yet, may not utilise ART for PMTCT. This is a limitation of the HBM, where perceived susceptibility does not always lead to adopting the recommended behaviour (Hounton, Carabin and Henderson, 2005; Norman and Brain, 2005). Limitations of the HBM are discussed in subsequent sections in this chapter.

Perceived severity refers to feelings about the level of concern relating to the severity of contracting a disease and the consequences related to the disease. It denotes people’s subjective beliefs of the degree of harm that can result from acquiring a disease due to certain behaviours (Orji, Vassileva and Mandryk, 2012). For example, HIV-infected pregnant women are more likely to take ART (recommended action) during pregnancy and breastfeeding to prevent MTCT if they perceive that the potential negative outcome resulting from having an HIV-positive child pose severe consequences (such as death, financial burden, discomfort and pain). In a qualitative study exploring perceptions about PMTCT services and HIV among Sudanese women, it was reported that women indicated that the consequences of HIV in a child will be death early in life, disabilities and stigma that will prevent the child from living a normal life (Elsheikh, Crutzen and Borne, 2015).

Whether these two concepts (susceptibility and severity) are perceived differently by individuals when considering threat is unclear, and even in the HBM the relationship between the two concepts is not well explained (Rosenstock, Strecher and Becker, 1988). According to Weinstein (1982), perception of susceptibility to and severity of a condition are subjective. While some individuals will perceive a given illness as life threatening and may take recommended preventive measures, others may perceive themselves immune to it, and may
not take preventive measures; a phenomenon Weinstein referred to as unrealistic optimism (Weinstein, 1982).

**Perceived benefits**

This refers to individual beliefs in the effectiveness of available actions recommended to reduce the threat of a disease. Even though acceptance of feelings of susceptibility and seriousness to a health problem (perceived threat) is a crucial step leading to behaviour, taking a recommended action will depend on the belief that the available action is effective in reducing that threat. Thus, people are not expected to accept or take recommended actions even when they exhibit optimal level of susceptibility and severity unless they perceive those actions as effective or beneficial (Rosenstock et al., 1974). Individuals must believe that the recommended behaviour will provide great benefits with the propensity to prevent the negative outcome (Orji, Vassileva and Mandryk, 2012). For example, women must be convinced that taking ART will benefit them and is able to prevent MTCT for them to use ART for PMTCT. Schrimshaw, Siegel and Lekas (2005) explored women’s attitudes towards ART and reported that women believed that ART will improve their health and prevent MTCT. However, recent studies have established that perceived efficacy of ART is associated with risky sexual behaviours (de Walque, Kazianga and Over, 2012; Smith et al., 2011). On the other hand, women who do not believe that ART has great benefits and the tendency to prevent MTCT are unlikely to utilise ART for PMTCT. Studies have confirmed that perceived lack of benefits is associated with failure to utilise PMTCT services (Workagegn, Kiros and Abebe, 2015).

**Perceived barriers**

This refers to individuals’ beliefs about the obstacles on the way to taking the available action. According to Janz and Becker (1984), perceived barrier is the most important construct in terms of determining health behaviour. Individuals weigh the efficacy of the available action against perceptions of the obstacles (e.g. expensive, side effects). Previous studies have reported that women who perceive that ART side effects make them depressed, feel sick, have
nausea and insomnia displayed risky behaviours such as non-adherence to ART (Ammassari et al., 2001; Chen, Chen and Kalichman, 2017; Mohammed et al., 2004).

**Cues to action**

Hochbaum (1958) argues that the readiness to take a recommended action can only be instigated by cues or triggers. Cues to action can either be external (e.g. reminders from care providers, family members, mass media, advice) or internal (e.g., symptoms) (Janz and Becker, 1984). Women would take ART if they are reminded or advised by their healthcare providers or family members. Roux et al. (2011) investigated ART adherence and found that reminders such as watch, clock alarm and mobile phones were influential triggers for participants.

**Self-efficacy**

Bandura (1997) defined self-efficacy as the extent of a person's belief in their ability to successfully take the available recommended action. In a study by Workagegn, Kiros and Abebe (2015) to assess predictors of HIV testing for PMTCT, women who had high perceived self-efficacy were more likely to use PMTCT services.

**2.8.4 Strengths and Limitations of HBM**

A major strength of HBM as highlighted by Conner (2010) is that it utilises simplified constructs that allows for easy application, implementation and testing. Another important strength is that the HBM has made available an important theoretical framework for examining cognitive determinants of varied behaviours (Jones, Smith and Llewellyn, 2014). Orji, Vassileva and Mandryk, (2012) argue that the HBM has directed the attention of healthcare professionals and researchers on variables which are fundamental to health behaviour. Thus, the HBM has established a foundation for various behavioural interventions (Jones, Smith and Llewellyn, 2014). However, critics of the HBM argue that its determinants are inadequate in predicting behaviour (Norman and Brain, 2005). In reaction to this weakness, the HBM has been
extended by researchers to increase its ability to predict behaviour. For instance, Rosenstock added self-efficacy and cues to action (Rosenstock, Strecher and Becker, 1988) to the original constructs. Reece (2003) also added HIV-related stigma in a study about factors affecting drop-out among HIV-positive mental health patients. Orji, Vassileva and Mandryk (2012) further explained that the model did not explain the relationship between the beliefs and how they combine to influence behaviour. However, Orji, Vassileva and Mandryk (2012) argue that this limitation can likewise be seen as a strength since absence of strict regulations of combining constructs may present flexibility, making HBM applicable and adaptable to various population groups and health behaviour.

2.8.5 TPB constructs

The TPB suggests that attitudes constitute individuals’ assessment of a behaviour, which is determined by beliefs regarding the consequences of performing the behaviour, and the negative or positive assessment of these consequences (Pawlak et al., 2008; Richardson, McCabe and Priebe, 2012). For example, if HIV-infected pregnant women hold the belief that using ART will prevent MTCT, and these women place a high value on preventing MTCT, the TPB would recommend that pregnant women’s attitude towards using ART would be favourable, which in turn would determine their intentions to use ART. Subjective Norm refers to perceived social pressure, which is determined by normative beliefs concerning expectations of important people in our lives. The TPB suggests that an individual’s intention to perform a particular behaviour may be subject to the individuals’ perception that important people in their lives think they should perform the behaviour (Ajzen, 2012). Perceived behavioural control (PBC) is defined as individuals’ perception of their ability to carry out a particular task or behaviour, which is influenced by internal or situational factors that can be facilitators or inhibitors (Pawlak et al., 2008).

Although the TPB has been widely used for three decades to guide research related to health behaviour, it is subject to critique (Barber, 2011). The TPB has been criticised as ignoring
unconscious behavioural influences, focusing exclusively on rational reasoning, and for ignoring emotional determinants (Conner et al., 2013; Sheeran, Gollwitzer and Bargh, 2013).

2.9 Chapter summary

This chapter has reviewed the literature in relation to MTCT, PMTCT and ART, and provided an understanding of the research problem. A number of theories/models commonly used in HIV prevention research were also reviewed. The chapter has established the following key points:

- MTCT occur mainly through tears in the placenta, swallowing of infected maternal cervico-vaginal secretions and during breastfeeding.
- Different factors increases the risk of MTCT, including the mother’s viral load, advanced AIDS stage, prolonged breastfeeding and negative behaviours of mothers such as drug abuse, increased sexual activity and non utilisation of ART during pregnancy.
- The global PMTCT strategies and policies guided the formulation and implementation of the Nigerian PMTCT policies.
- The WHO 4-prong approach is used as the basis for the implementation of strategies for the Nigerian PMTCT programme.
- ART is a key component of the PMTCT programme. ART during pregnancy virtually eliminates MTCT, with the risk reduced to below 2%.
- Attitudes and perception towards ART influence ART use. Pregnant women are more likely to use ART for PMTCT when they hold favourable attitudes and perceptions towards ART than those who hold negative attitudes and perceptions.
- There is limited evidence on HIV-infected pregnant women’s attitudes and perceptions towards ART for PMTCT in the Nigerian context.
- The HBM and TPB are the theoretical models for this study. They have been applied in various health-related fields and are useful in predicting behaviour. The HBM and TPB have received significant support from empirical evidence.
The next chapter presents the methodology of this study.

Chapter 3: METHODOLOGY

3.1 Introduction

This chapter describes how the research work has been carried out to accomplish the objectives of the study. It gives a discussion of the research design, and the methodological elements, including population, sample, recruitment, study setting, data collection tools, and the analytical approach, as well as the justification for their choice (Austin and Sutton, 2014). Although, there are different approaches (quantitative, qualitative or mixed method) for investigating research problems, they, have their own limitations and strengths. Creswell (2009) suggested that the choice of any approach for investigating research problems should depend on the type of information required to answer the research question. To be able to provide the required information that will comprehensively answer the research question, the study adopts a mixed method (MM) approach. The chapter begins with an overview of the adopted research model (research onion), followed by research philosophy, and the selection of a paradigm for the study. Next, it provides information about the different approaches to research, and the selection of a MM approach. This is followed by the selection of an exploratory sequential design for the study. The chapter also describes the study setting, selection of study sites and the study population. Finally, it considers integration of data and measures to minimise bias.

3.2 Research Onion Model

The research onion model (ROM) (Figure 3.1), created by Saunders and colleagues, outlines the different stages that researchers can follow when undertaking research (Saunders, Lewis and Thornhill, 2016). The model is used to describe the methodology of a research study, with
layers providing illustrations of the components of the research (Zefeiti and Mohamad, 2015). According to the ROM, the entire process of conducting a research can be equated to an onion consisting of many layers (Saunders, Lewis and Thornhill, 2007). The outer layers consist of the research philosophy and the research approach, while the inner layers consist of the research strategies, methods of data collection and analysis (Saunders, Lewis and Thornhill, 2016). Saunders, Lewis and Thornhill (2007) noted that, unlike an onion’s external layers which are normally disposed of as unnecessary, a clear consideration of these components is critical for developing a suitable research design that can be well described and justified. According to Sahay (2016), the understanding and decisions about the external layers of the ROM provides the researcher with the boundaries and context from which techniques for data collection and analysis (inner layer) are chosen. Researchers have argued that the primary aspect of any research is not the research methods (inner layers) but the philosophical underpinnings (outer layer) of that research (Guba and Lincoln, 1994). Similar to an onion, it is suggested that researchers peel from the external to the inner layer of the ROM to reach the centre where data collection techniques lie (Sanders, Lewis and Thornhill, 2016). The model was applied to the present study by peeling away each layer to reach the inner layer of the onion (Figure 3.1). The components of the ROM are explained in detail in the next sub-sections.
Figure 3.1: Research process for this study

Source: Adapted from Saunders, Lewis and Thornhill (2016)
3.2.1 Research philosophy

This is the first layer of the ROM. It comprises of assumptions regarding the way researchers view the world (Saunders, Lewis and Thornhill, 2012). These philosophical views or beliefs about the world underpin all scientific investigations (Blackstone, 2012; Creswell, 2014; Mertens, 2014; Scotland, 2012). Creswell (2014) argued that these individual views of the world and the nature of research are formed based on past research experiences, inclinations of mentors/advisors and discipline orientations. Creswell (2014) noted that these factors influence the beliefs held by researchers and often lead to adoption of either a MM, quantitative or qualitative approach. Similarly, Jackson (2013) suggested that it is crucial to consider philosophical underpinnings when carrying out research, as this helps to explain approaches taken and shape the research design. These philosophical beliefs are often referred to as worldviews (Creswell, 2014) or paradigms (Kuhn, 1962; Mertens, 2014). Paradigms (worldviews) can be defined as a basic set of beliefs or views that direct and guide researchers’ thinking and actions (Creswell, 2014; Guba and Lincoln, 1994; Mertens, 2014). Creswell (2014) and Guba and Lincoln (1994) noted that paradigms represent worldviews which define the “nature of the world” and the place of the individuals in it. Bryman (2006) claimed that paradigms influence the choice of the research area to be studied, the way research should be carried out, and how to interpret results in a specific discipline. Scotland (2012) highlighted four main components of paradigms: ontology, epistemology, methodology and methods. Ontology is “concerned with the nature of reality and existence” (Easterby-Smith, Thorpe and Jackson, 2012, p.17). On the other hand, epistemology originated from the Greek term ‘episteme’, which means knowledge and is concerned with the forms and nature of knowledge (Kraus, 2005; Scotland, 2012). Epistemology is concerned with how to create, acquire and communicate knowledge (Scotland, 2012).
Scotland (2012) claimed that all paradigms are based on their own ontological and epistemological assumptions. Thus, different paradigms have differing assumptions of reality and knowledge, which underpin the research approach. These assumptions embedded in paradigms are indicated in the chosen methodology and methods (Guba and Lincoln, 1994; Scotland, 2012). Methods refer to the techniques, tools and procedures employed in carrying out a study in order to answer a research question (Clough and Nutbrown, 2012; Crotty, 1998; Saunders, Lewis and Thornhill, 2007). However, methodology extends beyond the techniques and procedures used in the collection and analysis of data. It includes the plan of action or strategy underpinning these procedures and techniques (Kothari, 2004; Scotland, 2012). Methodology provides the justification for employing a specific research recipe (Clough and Nutbrown, 2012). Numerous paradigms have been identified; however, the two widely discussed ones are the quantitative paradigm (positivism) and the qualitative paradigm (interpretivism) (Cherryholmes, 1992; Creswell, 2014; Graff, 2012; Mertens, 2014). Cohen, Manion and Morrison (2007), Scotland (2012) and Tuli (2010) noted that whether researchers are aware of it or not, the choice of methods is influenced by the chosen methodology, methodology is influenced by the theoretical perspective (e.g. positivism or interpretivism), and the theoretical perspective is influenced by the epistemological (e.g. objectivism or subjectivism) and ontological (e.g. realism or relativism) assumptions.

### 3.2.1.1 Positivism

Positivism has been used in social sciences for various decades. It was mainly dominant during the 1930s and 1960s (Gray, 2013). The positivist ontological assumption is that of realism. Realism is defined as a perspective that entities or objects exist independently of the knower or observer (Scotland, 2012). It is believed that one reality exists independently, and this reality can be known or discovered. The positivist epistemological assumption is that of objectivism. The knower and the object (participants) are independent, not influenced by each other. The object can be studied without being influenced by the knower (Aliyu et al., 2014; Corbetta, 2003; Crotty, 1998; Krauss, 2005; Mertens, 2014). The positivist methodology explains
relationships whereby causes that influence outcomes are identified. Generally, a deductive approach is adopted. The positivist aims to formulate laws, thereby, yielding generalisations and predictions (Creswell, 2009). Thus, methods often include the use of closed-ended questionnaires, standardised tests, descriptive analysis and inferential statistics (de Vaus, 2014). Critics argue that the positivist paradigm defines life as measurable rather than individual experiences; it ignores values, moral choices, individuality and freedom (Cohen, Manion and Morrison, 2007). Findings of positivism are criticised to be trivial, so that it is of little consequence to the people they are intended for (e.g. social workers, teachers) (Cohen, Manion and Morrison, 2007). This criticism gave birth to the anti-positivist paradigm.

3.2.1.2 Interpretivism
Interpretivism is the main anti-positivist paradigm; it focuses on social life-world interpretations that are historically and culturally derived (Crotty, 1998). In terms of ontology, interpretivists argue that there is no single reality; rather, reality is individually constructed (Guba and Lincoln, 1989). Therefore, realities are as many as individuals. Epistemologically, interpretivists argue the position of subjectivism, which emphasises the link between the participants and the researcher (Schwandt, 2000; Smith, 1983; Tuli, 2010). The interpretivist methodology is about understanding individuals’ perspectives about a phenomenon. The researcher gains knowledge through induction by approaching it without predetermined theories (Corbetta, 2003). Methods include focus groups, open-ended interviews, open-ended observations, and open-ended questionnaires (Scotland, 2012).

3.2.1.3 The paradigm debate
The paradigm debate was characterised as a war between quantitative and qualitative approaches (Amare, 2004; Denzin and Giardina, 2017). It was argued that mixing both approaches was untenable as the two methods are incompatible (Cherryholmes, 1992; Creswell and Plano Clark, 2011; Graff, 2012). Advocates of both approaches engaged in a debate from which purists emerged on both sides, in what is called the ‘paradigm wars’ (Amare, 2004; Johnson and Onwuegbuzie, 2004; Morgan, 2007). Both quantitative and qualitative
purists advocate their own paradigms and believe that the two approaches are incompatible and should not be combined (Graff, 2012; Johnson and Onwuegbuzie, 2004; Tuli, 2010). However, Bryman (1988) challenged the debate and suggested that there is a clear relationship between the two methods. Notwithstanding this, Onwuegbuzie and Johnson (2006) pointed out that the aim of mixing qualitative and quantitative approaches is not to substitute any of them; MM research aims to combine multiple approaches to utilise their strengths and minimise their flaws.

However, alternative approaches were devised to accommodate both qualitative and quantitative research (Creswell and Plano Clark 2007). Suggestions were made for researchers to use multiple paradigms in MM (Greene and Caracelli, 1997). Howe (1988) proposed the pragmatist paradigm as a single philosophical basis for MM research to replace the incompatibility debate between quantitative and qualitative methods. Pragmatism has not eliminated the debate about research philosophy, but it has offered a middle ground between philosophy and methodology (Johnson and Onwuegbuzie, 2004). Saunders et al. (2007) argued that no one philosophy should be seen as superior, as different situations require different approaches. Guba (1990) also argued that such debate is irrelevant as each paradigm has its own merits.

3.2.1.4 Pragmatic paradigm

Pragmatism is the paradigm that provides the philosophical framework underlying this MM research (Tashakkori and Teddlie, 2010). This paradigm was derived in the 19th and 20th centuries from the writings of Teddlie, Creswell, Williams, Cherryholmes and Rorty (Creswell and Plano Clark, 2011; Johnson and Onwuegbuzie, 2004). This philosophy bridges the gap between free will inquiry and the singular empirical scientific approach (Tashakkori and Teddlie, 2003). Pragmatism is seen to offer practical and logical alternatives; it rejects the forced-choice dichotomy between interpretivism and positivism, and also abandons the metaphysical concepts of “reality” and “truth” (Tashakkori and Teddlie, 2003). Pragmatists argue that quantitative and qualitative methods are compatible, and can be used in a single
study, thus allowing deductive and inductive reasoning to be used (Howe, 1988). This philosophy allows researchers to choose freely among techniques, procedures and methods that meet the purpose of their research (Creswell, 2014). According to pragmatism, the world is not viewed as an absolute entity; rather, it focuses on the research questions, and what works, using workable approaches to solve the research problem (Feilzer, 2010; Rossman and Wilson, 1985). Creswell (2014) argued that pragmatism opens the door for MM researchers to different assumptions and worldviews, as well as multiple methods of collecting and analysing data.

Considering the strengths of this paradigm as discussed above and its strong association with MM (Johnson and Onwuegbuzie, 2004), it was chosen as the researcher’s worldview. By adopting the qualitative paradigm (interpretivism), this study would be restricted to only qualitative methods, which can only answer objectives 1 and 2, and would provide incomplete answers to the problem. In addition, adopting only the quantitative paradigm (positivism) would limit the study to only quantitative methods, which would answer only objectives 3 and 4 and this would provide incomplete answers to the research problem as the study requires both approaches to completely answer the research questions. This study, therefore, adopts the pragmatic paradigm to allow the researcher to combine freely methods and techniques of both quantitative and qualitative approaches in order to answer the research question and provide an in-depth understanding of the problem under study (Creswell, 2009). As supported by Saunders, Lewis and Thornhill (2007) that researchers should adopt a philosophy depending on the research questions they are seeking to answer.

3.2.2 Research approach

This is the second layer of the ROM. Generally, in scientific research, there are two main approaches or methods of reasoning: inductive and deductive approaches (Creswell, 2014). The deductive approach involves developing hypotheses from prior theories and subjecting them to rigorous testing (Saunders Lewis and Thornhill, 2012). The researcher then carries out empirical observation to test these hypotheses (Wilson, 2010). Deduction is characterised
by a search in explaining causal associations among variables, and is associated with positivism and quantitative research. In the inductive approach, the researcher starts with a research question and data collection, which leads to generating hypothesis and theory (Saunders Lewis and Thornhill, 2012). Induction is associated with interpretivism and qualitative research.

However, there are no set norms for the approach to be followed; they primarily depend on the nature of the research and its objectives. There are studies which involve mixing of deductive and inductive approaches in order to make the research more comprehensive, and are widely known as mixed approach (Saunders, Lewis and Thornhill, 2016). Jackson (2013) argued that the decision about the most appropriate approach for any study should be informed by the researcher’s philosophical assumption. Based on the pragmatic approach taken in the present study, an MM approach, combing both deductive and inductive approaches was adopted (Creswell, 2014; Tashakkori and Teddlie, 2003).

3.2.3 Methodological choice: mixed methods

Mixed Methods (MM) is a type of research that combines both deductive (quantitative) and inductive (qualitative) approaches in a single study for the purpose of in-depth understanding (Howe, 1988; Johnson and Onwuegbuzie, 2004; Rocco et al., 2003). MM utilises multiple methods of data collection (e.g. in-depth interviews, intervention trials, questionnaires), analysis, and integration of findings to draw inferences (Campbell and Fiske, 1959; Creswell, 2014; Creswell and Plano Clark, 2011; Teddlie and Tashakkori, 2009). MM combines these methods intentionally to draw on their strengths (Graff, 2013; Johnson, Onwuegbuzie and Turner, 2007). Researchers have used different terms for this approach: multi method, combined, hybrid, integrated and mixed methodology (Creswell and Plano Clark 2007; Driscoll et al., 2007). However, recent writers frequently use the term mixed methods (Bryman, 2006; Creswell, 2014; Tashakkori and Teddlie, 2003). MM has emerged as a new methodology in the 1980s and 1990s, based on individual research from diverse fields such as management, evaluation, sociology, education and health sciences, following quantitative and qualitative
research (Gorard and Taylor, 2004; Johnson and Onwuegbuzie, 2004; Tashakkori and Teddlie, 2010; Teddlie and Tashakkori, 2009).

In recent years, MM has developed rapidly, promoted by writers such as Jennifer Greene, John Creswell, Charles Teddlie, David Morgan, Abbas Tashakkori, Anthony Onwuegbuzie and Burke Johnson (Johnson, Onwuegbuzie and Turner, 2007). MM has been incorporated into numerous research studies published in diverse fields in the human and social sciences, including HIV/AIDS prevention (Janz et al., 1996; Penman-Aguilar et al., 2014). There is a growing interest in conducting MM due to the value it adds to the study (O’Cathain, Murphy and Nicholl, 2007; Tariq and Woodman, 2013). The value of MM is evident in the integration of findings from both qualitative and quantitative methods. However, there are challenges the researcher faces when conducting MM study (creswell, 2014). MM researchers require additional time, resources and expertise owing to the necessity to gather and analyse both qualitative and quantitative data, as well as knowledge of both methods Creswell and Plano-Clark 2011; McKim, 2017). Thus, McKim (2017) suggests that before conducting MM, it is important to understand if combining methods will add extra value to the study than using a single method.

Creswell and Plano Clark (2011) identified four basic types of MM designs namely: exploratory sequential, explanatory sequential, convergent parallel and embedded designs. Exploratory sequential design comprises of two phases: collection and analysis of qualitative data in the first phase and the first phase findings are used to collect and analyse quantitative data in the second phase (Creswell, 2014). Explanatory sequential design also comprises of two phases. It involves collection and analysis of quantitative data in the first phase. The finding from the first phase informs the second phase, which involves the collection and analysis of qualitative data (Creswell, 2014). Convergent design involves collecting both quantitative and qualitative data concurrently. In convergent design, both methods are conducted independent of each other. Each of the data is analysed separately, and both results are merged and compared to draw overall conclusion (Creswell, 2014; Creswell and Plano Clark, 2007). Embedded design
involves the collection of both qualitative and quantitative data either concurrently or sequentially (Creswell and Plano Clark, 2011). One phase is prioritised over the other, and is relevant in addressing the main research question. The other phase is embedded into the research and provides support for addressing secondary research questions (Creswell, 2014; Creswell and Plano Clark, 2017). The next sub section explains the MM design adopted for this study.

### 3.2.3.1 Mixed methods design for this study

For this study, an exploratory sequential design was adopted, aiming to develop an in-depth understanding of the attitudes and perceptions of HIV-infected pregnant women towards ART use for PMTCT. The design involves collection of both qualitative and quantitative data sequentially in two phases (Creswell, 2003). The first phase involves collection and analysis of qualitative data to explore the phenomenon. Building from the findings of the first phase, a quantitative instrument is developed. The instrument is used to collect and analyse the quantitative data in the second phase (Creswell, 2014; Creswell and Plano Clark, 2011; Saunders, Lewis and Thornhill, 2016). In an exploratory sequential study, priority is given to the qualitative phase due to the requirement for an in-depth exploration of the phenomenon, allowing generalisation of the findings with a larger quantitative sample in the second phase (Creswell and Plano Clark, 2011).

In the present study, the first phase was conducted using semi-structured interviews and analysis using a thematic approach. Building from the results of the interviews, a survey questionnaire was developed and used to collect quantitative data for the second phase. Data from both phases were integrated during interpretation (Creswell and Plano Clark, 2011; Terrell, 2012). Integration (mixing) of the data is discussed later in this chapter. Methods of data collection and analysis are discussed in subsequent chapters. A key strength of this design is that, it is straightforward to describe and report despite the considerable time and resources needed to implement it. Another important strength of this design is that, the work is acceptable to audiences who are either quantitative or qualitative biased (Creswell and
Plano Clark, 2011). Figure 3.2 shows the exploratory sequential design and the sequential phases undertaken in this research.
Figure 3.2: Exploratory sequential design

Source: (Adapted from Creswell and Plano Clark, 2011)
**3.2.3.2 Justification for choosing mixed methods**

To be able to answer the research question for this study MM was chosen. While a qualitative approach can answer the first two objectives of the study, the third and fourth objectives can only be addressed quantitatively. According to Creswell (2014), combining quantitative and qualitative methods provides a more comprehensive answers to research questions than utilising these methods alone (Creswell, 2014). MM was therefore considered more appropriate for this research as it provided an understanding of the attitudes and perceptions of HIV-infected pregnant women towards the use of ART for PMTCT and the factors influencing these attitudes in the Niger Delta region of Nigeria. MM was also chosen because it draws on the strengths of both quantitative and qualitative methods and minimises their limitations (Creswell and Plano Clark, 2011).

Creswell and Plano Clark (2011) noted that quantitative study of many individuals diminishes individual understanding. In contrast, when few individuals are studied qualitatively, the result cannot be generalised to many. Hence, a combination of both methods help to reduce inherent weaknesses and preserve the strengths of the two approaches (Creswell, 2014; Cronholm and Hjalmarssson, 2011; Johnson and Turner, 2003). Another reason for choosing MM is the value it adds to a study in terms of integrating findings, thus, enhancing the validity of the findings (Hurmeinta-Peltomaki and Nummela, 2006). Researchers argue that MM studies gain a wider and deeper understanding of the research area being studied (McKim, 2017).

Creswell (2014) argues that paradigm’s assumptions guide and direct researchers’ decisions about methodological choices. Based on the study’s pragmatic assumptions, mixed methods was chosen, as acknowledged by researchers that mixed methods is the best approach for pragmatism (Creswell and Plano Clark, 2011; Onwuegbuzie and Johnson, 2006; Teddlie and Tashakkori, 2009).
3.2.4 Research strategies and procedures

Creswell and Plano Clark (2011) suggested that when designing a MM, MM researchers should incorporate the strategies and procedures of both the qualitative and quantitative strands of the study. Different methods are used in qualitative research such as interviews and focus groups (Morris, 2015). Interviews and focus groups are regarded in social sciences as cost effective and flexible techniques, allowing in-depth exploration of perceptions, attitudes and experiences (Sofaer, 2002; Young et al., 2018). This study utilised semi-structured in-depth interviews to collect data for the first phase. Interviews were utilised because of their ability at generating effective and broad range of information (Guest et al., 2015; Morris, 2015).

In addition, Saunders, Lewis and Thornhill (2016) noted that there are different strategies linked to quantitative research including experiment and survey. However, survey is more commonly used in social science research due to the ability to provide a huge sum of data based on real-life observations in a short period of time (de Vaus, 2014; Kelley et al., 2003; Rea and Parker, 2014). According to Kelley et al. (2003), survey is more likely than other strategies to gather data using a representative sample, which can be generalised to the population due to the wide range of coverage. This study utilised survey for the second phase of data collection. While other data collection methods such as observation and structured interviews can be used in surveys, questionnaires are extensively utilised (de Vaus, 2014). This study utilised questionnaires to collect survey data during the second phase of this study. Detailed information about the second phase (survey) data collection procedures are given in chapter six.

3.2.5 Time horizon

Saunders, Lewis and Thornhill (2016) opined that researchers should consider the time horizon of their research at the point of research design. Saunders, Lewis and Thornhill (2016) identified two main types of time horizons in research: longitudinal and cross-sectional. In a cross-sectional research, a specific phenomenon is examined at a particular point in time, while a longitudinal research is known for its ability to study development and changes of a
phenomenon (Carlson and Morrison, 2009). This research is a cross-sectional study since the aim was not to examine changes and development over a time frame.

3.3 Study setting

The study was conducted in tertiary hospitals situated in the Niger Delta region of Nigeria. Nigeria, situated in the western part of Africa, has a population of 177 million people and is the most populated country in Africa, with an estimated 244,000 women infected with HIV in 2013 (NFMH, 2014). The Niger Delta is the oil-producing region located in the South-South zone of Nigeria, bordered to the east by Cameroon and to the south by the Atlantic Ocean. It has an abundance of water, gas, crude oil, useful vegetal, wildlife and human resources. The region is ranked as the sixth largest producer and exporter of crude oil in the world (Alens, 2014; Kuku, 2012). People in the Niger Delta depend largely on farming and fishing as their main sources of livelihood (Osuagwu and Olaifa, 2018). However, many years of oil spillages from oil exploration activities have led to pollution of farmlands and rivers (Osuagwu and Olaifa, 2018). Coupled with official neglect, the region has become an epitome of poverty and hunger. Consequently, young women in this region engage in transactional sex with wealthy oil company workers for sustenance, thereby increasing their vulnerability to HIV (Udonwa et al., 2004).

The region consists of nine of the thirty-six states in the country (Figure 3.3), out of which two states have been selected for the study, namely: Akwa Ibom and Bayelsa states. These states were chosen due to high level of commercial sex, with high prevalence of HIV in the Niger Delta. In these states, higher HIV prevalence among pregnant women (7.3%) has been reported, as compared to the national HIV prevalence of 3.4% among pregnant women (Akani et al., 2006; NACA, 2014). Reports also indicated that HIV prevalence among children through MTCT in the Niger Delta region is higher (25.8%) (Alikor and Erhabor, 2006), as compared to 13.8% prevalence reported among children in the northern region of Nigeria (Obiagwu, Hassan-Hanga, and Ibrahim, 2013). This high HIV prevalence among women and children
could be attributed to the vulnerability of women to HIV as a result of higher commercial sex, leading to high prevalence of HIV among women and high MTCT (Udonwa et al., 2004).

Figure 3.3: Map of Niger Delta

Source: Kuku (2012)

3.4 Selection of study sites

The healthcare system in Nigeria is divided into primary, secondary and tertiary (Asuke et al., 2016). While the entry point is the primary healthcare, all three sectors are linked through referrals (Asuke et al., 2016). The Nigerian tertiary hospitals are owned by the Federal government. They provide very complex and diverse healthcare services and training for medical personnel (Okpani and Abimbola, 2015). HIV in pregnancy is considered a complex health issue, thus, it is only managed in tertiary hospitals in Nigeria where PMTCT services are provided (Gray and McIntyre, 2007; Mayer, Anderson and Cu-Uvin, 2009). As a result, only
tertiary hospitals were chosen for this study as they manage long-term and complicated conditions like HIV in pregnancy and also admit more patients. Thus, it was anticipated that more HIV-infected pregnant women would be present to participate in the study.

A total of three tertiary hospitals were selected for both phases of this study from the Niger Delta region of Nigeria. Out of the three, two were from Bayelsa and one from Akwa Ibom state: the Niger Delta University Teaching Hospital (NDUTH), Federal Medical Centre (FMC) Yenagoa, and the University of Uyo Teaching Hospital (UUTH).

The criteria for choosing them were:

- Providing healthcare services at the tertiary level
- Providing PMTCT services for HIV-infected pregnant women
- Providing ANC and general healthcare for HIV-infected pregnant women
- Must be located in the selected states in the Niger Delta region of Nigeria
- Must have the available services to provide support for participants during the interview sessions in case of any distress.

3.5 Study population

Understanding and defining the study population is an essential part of a research as it is the principal source of the data (Asiamah et al., 2017). Eldredge et al. (2014) opined that an initial step to take in a research involving humans should include formulating a detailed and clearly defined study population. It is believed that failure of researchers to understand the concepts of study, target and general population can influence sampling bias which could be present in many studies (Asiamah et al., 2017; Banerjee and Chaudhury, 2010; Eldredge et al., 2014). Asiamah et al. (2017) claimed that researchers are not only expected to adequately understand their study population but also to clearly and succinctly document it in their report.

According to Banerjee and Chaudhury (2010), a research population is a well-defined group of people or objects with specific characteristics of interest. The population for this study was
made up of all HIV-infected pregnant women attending ANCs in Nigeria. Bowling (2009) and Saunders, Lewis and Thornhill (2016), acknowledged that it is difficult to study a research population due to limited time and resources. Thus, the researcher must identify a target population from which the study population can be drawn (Saunders, Lewis and Thornhill, 2016). The target population is described as the subset of the research population, and is regarded as the target or focus of the research (Banerjee et al., 2007). The target population for this study was made up of all HIV-infected pregnant women attending ANCs in the Niger Delta region of Nigeria. Due to its size, limited resources, time and cost, the target population was reduced to the study population from which participants for this study were drawn. The study population also known as the accessible population, may be characterised by gender, age, geographical location and ethnic group. It is characterised by the inclusion/exclusion criteria of the study (Banerjee et al., 2007). The study population for this study was made up of HIV-infected pregnant women attending ANCs in the selected tertiary hospitals.

3.6 Eligibility criteria

The eligibility criteria also known as the inclusion/exclusion criteria help to describe individuals who should be included or removed from the study sample (Garg, 2016).

**Inclusion Criteria**

The following criteria were adopted and used for the selection of research subjects for both phases of the study:

**Nationality:** Nigerian, living in Akwa Ibom and Bayelsa states in the Niger Delta region.

**Diagnosis:** Pregnant, HIV-infected, attending ANCs in the selected hospitals.

**Age:** 18 years and above

**Consent:** Only those who gave their consent participated.
**Exclusion criteria**

Women who are not Nigerians, under 18 years, not pregnant, HIV negative, and are living outside Akwa Ibom and Bayelsa states were excluded from the study. Also, those who were critically ill and unable to sit up or stand at the time of the study were excluded.

### 3.7 Integration of data

It has been argued that having more than one data collection method in a study is not enough to classify it as MM; it is the connecting or integrating of the two data that describes MM research (Tunarosa and Glynn, 2017). Fetters, Curry and Creswell (2013) and O’Cathain, Murphy and Nicholl (2010) opined that integration is an essential aspect of MM as it adds value to the MM study. It is believed that when both data are integrated, the validity of quantitative results can be evaluated using the qualitative data (Hurmerinta-Peltomaki and Nummela, 2006; McKim, 2017). It is argued that despite the potential benefits of data integration, the degree to which MM researchers apply integration in their studies is limited (Guetterman, Fetters and Creswell, 2015; Lewin, Glenton and Oxman, 2009; Tunarosa and Glynn, 2017). Several reviews of published literatures have reported that often, researchers gather qualitative and quantitative data in a study without integrating (Bryman, 2006; O’Cathain, Murphy and Nicholl, 2008). According to Fetters, Curry and Creswell (2013), integration can take place at different levels of the study: method, design and interpretation level.

#### 3.7.1 Design level

As discussed earlier in this chapter (sub-section 3.2.3), there are four MM basic designs. According to Fetters, Curry and Creswell (2013), the intention of the sequential designs is for one phase to build upon another, while the intention of the convergent designs is for both phases to merge in order to compare them. In this study, the first point of data integration was at the design level when a sequential design was used, qualitative data was collected and analysed in the first phase, and the findings informed the second phase (Onwuegbuzie et al.,.
The researcher collected interview data to understand the attitudes and perceptions of HIV-infected pregnant women towards ART, and these findings were used to subsequently examine how attitudes and perceptions influence the way ART is used during pregnancy and to identify the individual socio-demographic factors that influence their attitudes. Key concepts identified from the interview data were subsequently measured in a face-to-face survey.

3.7.2 Method level

It was conceptualised by Creswell and Plano Clark (2011) that various approaches of integration such as merging, connecting, embedding or building occur at the method level. Merging takes place when both forms of data are analysed together and compared, connecting takes place when one of the data connects with the other via a sampling frame, while embedding takes place when there is multiple linking of both data, while building occurs when the findings of one data instrument informs the other data collection approach (Creswell and Plano Clark, 2011; Fetters, Curry and Creswell, 2013).

In the present study, integration took place at the method level through the building approach. The items included in the survey (second phase) were informed by the interview findings. For instance, phrases used by the participants during phase one semi-structured interviews informed the way words were phrased in the questionnaire. Also, important domains were identified (such as support from husbands in taking ART for PMTCT) from the interview findings and were subsequently examined in the survey.

3.7.3 Interpretation level

The data was further integrated at the interpretation level. Three approaches are used to integrate data at the interpretation level: transformation, narrative and joint display (Creswell and Tashakkori, 2007; Fetters, Curry and Creswell, 2013). In transformative approach, integration takes place in two steps: 1) one of the data is transformed into the other type; 2) the researcher then integrates the converted data with the other data not converted. Joint
display involves integration of both data via visual means to generate new insights (Creswell, 2015). Narrative approach comprises of three methods: weaving, contiguous and staged. The weaving approach involves reporting both findings on a concept-by-concept or theme-by-theme basis. Contiguous approach involves reporting both findings in different sections but in a single report. The staged approach is generally applied in a multistage MM studies (Fetters, Curry and Creswell, 2013).

Narrative approach was used to integrate the findings in the present study. Findings of both qualitative and quantitative analysis were integrated by writing them in different sections in a single report. This is a well-established method of integration in MM (Guetterman, Fetters and Creswell, 2015).

3.8 Research bias

Bias is described as any deviation from the truth. It is mainly due to flaws in the study design, data collection, analysis and interpretation leading to false conclusions (Polit and Beck, 2014; Šimundić, 2013; Smith and Noble, 2014). In research, bias takes place when systematic error is introduced into sampling or testing by favouring one outcome or answer over others (Pannucci and Wilkins, 2010). Bias can occur at any level of the research impacting on the reliability and validity of the study (Smith and Noble, 2014). Šimundić (2013) pointed out that every research has its own limitations and confounding variables, as they cannot be avoided completely. Thus, it is suggested that every researcher should be conscious of all the ways in which bias can occur and possibly undertake all the required steps to minimise it (Galdas, 2017; Smith and Noble, 2014). Galdas (2017) claimed that, identifying bias in research is essential in determining the utilisation of the research findings and making evidence-based decisions in healthcare.
3.8.1 Measures to minimise bias

To minimise selection bias, sample size was statistically determined for the quantitative study, and participants who met the study’s aim were randomly sampled (equal chance). By using purposive sampling, samples were refined constantly to meet the aim of the study, thereby minimising bias (Sica, 2006; Smith and Noble, 2014). Standardised questions were asked during the survey to minimise interviewer bias (Morris, 2015).

3.9 Chapter summary

This chapter presented the research methodology and the philosophical approach underpinning this study. The following key points were established in this chapter:

- The ROM was used to describe the methodology of this study. It consists of layers which provided illustrations of the components of this research.
- The outer layers of the ROM consist of the research philosophy and the research approach, while the inner layers consist of the research strategies, methods of data collection and analysis.
- Pragmatism was presented as the philosophical underpinning for this study.
- The study was based on a MM approach which was considered most appropriate to provide an in-depth understanding of the attitudes and perceptions of HIV-infected pregnant women by integrating both qualitative and quantitative findings in a single study.
- The study utilised an exploratory sequential design (two-phased) which starts with a qualitative phase and builds to a second quantitative phase.
- The chapter described the study setting: two states in the Niger Delta region of Nigeria – Bayelsa and Akwa Ibom.
- The study sites were three tertiary hospitals located in the selected states.
- The study population included HIV-infected pregnant women attending ANC at the study sites.
The chapter presented the different levels the data was integrated in the present study. First, integration took place when themes from the first (qualitative) phase analysis were used to develop a survey questionnaire for the second (quantitative) phase. Second, findings from both phases were integrated at the interpretation level to provide a wider understanding of HIV-infected pregnant women's attitudes and perceptions towards ART.

Different measures were used to minimise bias.

The next chapter discusses the methods of data collection and analysis for phase one.
Chapter 4: Phase One Method

4.1 Introduction

The first phase was a qualitative study. This chapter presents and explains procedures used in conducting the qualitative phase of the present study. The chapter starts by presenting the objectives of the first phase and an overview of qualitative research. It discusses the purposive sampling technique and the procedures followed to recruit participants. It then explains the data collection method: semi-structured in-depth interviews, and how the interview guide was developed. It also provides details of the pilot study which was conducted to test the feasibility of the main study and the lessons learnt from it. It then discusses the interview process and the transcription of the data. It also explains the stages of the thematic approach used for the data analysis in the present study. Finally, it presents details of how the data was verified and ethical consideration.

4.2 Phase one objectives

The objectives for this phase were:

- To explore attitudes of HIV-infected pregnant women towards the use of ART for PMTCT
- To explore perceptions of HIV-infected pregnant women towards the use of ART for PMTCT

4.3 Overview of qualitative research

Qualitative research explores and understands individual views about people or social problems (Creswell, 2014; de Vaus, 2014; Saunders, Lewis and Thornhill, 2016). Johnson, Onwuegbuzie and Turner (2007) opined that qualitative research provides detailed understanding of respondents’ views of the phenomenon, which may lead to development of effective and appropriate interventions, and in turn, lead to sustainable programmes. Qualitative research focuses on the meaning and context of human lives and experiences for
the purpose of developing theory or inductive research (Lichtman, 2013). In qualitative research, participants are studied in their natural environments. It describes social phenomena in words through interviews (in-depth interviews, focus groups) and observations (Bowling, 2009; Creswell, 2014). However, it has been argued that because findings from qualitative studies are not statistically tested, they cannot be expanded to the larger population (Atieno, 2009; de Vaus, 2014). Qualitative researchers argued that generalisation of findings are not an anticipated attribute of qualitative research (Leung, 2015). In support of this, Polit and Beck (2010) opined that in qualitative research the goal is to provide contextualised rich data of human experience. Critics argue that qualitative research cannot provide consistent and reliable data since it is characterised by personal experiences and feelings (Atkins and Wallac, 2012; Cohen, Manion and Morrison, 2011).

4.4 Participants’ recruitment

Sampling is defined as a strategy that selects a smaller group (sample) that will reflect the patterns in the wider (target) population (de Vaus, 2014, Bowling, 2014). Moule and Hek (2011) noted that sampling constitutes a crucial aspect of the research process since it is very unlikely to collect information from the whole target population. Thus, sampling helps to reduce the number of people in the population of interest to smaller numbers that can be studied (Bowling, 2014). With sampling, the required resources and time for the whole target population is reduced and detailed information is collected because of the smaller number of people used, resulting in a better quality of data (Bowling, 2014). Generally, sampling techniques are divided into two types: probability (random) sampling, commonly applied in quantitative research involves random selection of participants, while non-probability (non-random) sampling is mainly used in qualitative research (de Vaus, 2014; Saunders, Lewis and Thornhill, 2016).

Purposive sampling was used to recruit participants for this study. Purposive sampling is a type of non-random sampling that allows participants or settings (with specific characteristics) to be selected deliberately based on a particular purpose (Teddle and Yu, 2007; Bowling,
This sampling method was chosen since the required participants are people with specific characteristics (HIV-infected pregnant women). HIV-infected pregnant women were deliberately selected from ANCs of three teaching hospitals located in Bayelsa and Akwa Ibom states in the Niger Delta region of Nigeria. A key strength of purposive sampling is that the most appropriate people are selected, with unsuitable candidates eliminated from the beginning. However, with purposive sampling a large population cannot be easily reached (de Vaus, 2014; Bowling, 2009). Thus, in order to reach a larger population and allow generalisation of the findings, this study used a random sampling method for the quantitative phase.

4.4.1 Sample size

Sample size for qualitative studies is smaller than those of quantitative studies, and there are no approved standards for calculating sample sizes required for qualitative research (Brayman, 2012; Dworkin, 2012; Marshall et al., 2013; Saunders et al., 2018). Crouch and Mckenzie (2006) gave a reason for the smaller sample size: they opined that qualitative research is focused on making meaning not generalisation. Thus, studying a smaller group of participants may enable detailed examination of the characteristics addressing the problem under study (Dworkin, 2012). Kumar (2011) and Ritchie et al. (2003) claimed that there is a point of saturation (diminishing return) during data collection, when more data no longer provide more information. Kumar (2011) suggested that the maximum sample size should be determined on saturation. Theoretical saturation originated from the grounded theory, but has gained acceptance across other qualitative approaches (Glaser and Strauss 1967; Marshall et al., 2013). Although, data saturation has been considered by some researchers as an essential aspect of qualitative research (Fusch and Ness, 2015; Morse, 2015; Sparkes et al., 2011), its use as a sole criterion for assessing rigour in qualitative research has been questioned (Malterud, Siersma and Guassora, 2016; Saunders et al., 2018). Onwuegbuzie and Leech
(2007) argued that sample sizes in many qualitative studies are apparently selected in an arbitrary manner.

Furthermore, Chamaz (2006) argued that qualitative researchers often justify small samples by claiming theoretical saturation, thus, reducing the credibility of the study. Consequently, Marshall et al. (2013), suggested that qualitative researchers should justify interview samples based on suggestions from qualitative methodologists and cite samples used in similar studies. Many research methodologists have supported a numerical method for interview samples. They recommended that a minimum sample size of 20-30 should be used for interviews (Bryman, 2012; Marshall et al., 2013; Warren, 2002). In addition, similar qualitative studies conducted with HIV-infected pregnant women using in-depth interviews have used sample sizes including 23 (Ngarina et al., 2013), 24 (Buesseler et al., 2014) and 28 (Stinson and Myer, 2012). Based on the recommendation from research methodologists and the sample sizes used in previous studies, this study interviewed 24 participants. Eight participants were interviewed in each of the three study sites. Table 4.1 shows the number of participants drawn from each of the three selected tertiary hospitals.

**Table 4.1: Summary of participants’ recruitment**

<table>
<thead>
<tr>
<th>S/N</th>
<th>Name of Hospital</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University of Uyo Teaching Hospital</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Niger Delta University Teaching Hospital</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Federal Medical Centre</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td><strong>Total number of interview participants</strong></td>
<td><strong>24</strong></td>
</tr>
</tbody>
</table>
4.4.2 Recruitment process and procedures

On arrival at the study sites, the researcher presented herself to the managing directors of the hospitals to inform them of her intention to start the research that has been approved by their ethics committees. The directors introduced her to the heads of clinical services who then introduced her to the heads of departments (HODs) of obstetrics and gynaecology. In one of the hospitals, this introduction was done through a written letter (Appendix 1). The obstetrics and gynaecology HODs introduced the researcher and the study to the matrons and other nurses in the ANC clinics, requesting them to provide assistance whenever it is required. The HODs also explained to the nurses their roles in the research in terms of identifying participants. The nurses who work at the ANC clinics identified all the participants. Nurses approached HIV-infected women on their arrival to the ANC clinics informing them about the study and inviting them to participate. To ensure that participants accept to participate willingly; the nurses explained to them that, it is entirely their choice to participate or not, and there was no consequences for refusal. Those who accepted to participate at this stage were referred to the researcher for further details. The researcher introduced herself to the potential participants, gave detailed explanation about the study and provided them with information sheets. The researcher asked those who were willing to participate to sign consent forms. Details of information sheets (Appendix 2) and consent forms (Appendix 3) are provided later this chapter under the section on ethical consideration.

4.5 Data collection

Sutton and Austin (2015) stated that the two main data collection methods in qualitative studies are focus groups and interviews. This study collected data using semi-structured in-depth interviews. Kvale (1996) defined interview as a discussion between two people about a topic of shared interest with the aim of inter changing views. As noted by Kvale (2003), interviews are stronger methods in contrast to questionnaires for obtaining data that permit researchers to study individual views in greater depth. Berg (2007) added that interviews not only provide
in-depth views of participants but also allow them to express their own feelings and thoughts. Morris (2015) highlighted five different forms of interviews: unstructured, semi structured, structured, life history and narrative interviews. However, the commonly used ones in research are structured, unstructured and semi-structured interviews (Morris, 2015). Structured interviews are questionnaires administered verbally consisting of fixed or standardised questions. The interview is expected to follow the predetermined set of questions strictly, and the interviewer is not required to probe the given answers, to eliminating variations and error from the interviewer (Morris, 2015).

Questions in structured interviews are generally closed-ended, meaning predefined answers to questions are presented to the interviewee. Thus, there is little freedom for both the participant and the interviewer during such an interview (Berg, 2007). Although, this form of interview is easy and quick, the data obtained are limited in depth and detail (Hofisi, Hofisi and Mago, 2014). Due to these limitations, structured interviews were not suitable for the present study.

In unstructured interviews, the questions asked during the interview and the answers given are not predetermined, but rather based on social interactions between the interviewer and interviewee (Fontana and Frey, 2005). Consequently, each interview may develop data with different patterns and structures (Morris, 2015). Morris (2015) pointed out that the researcher is exposed to unanticipated themes, and gains a better understanding of participants’ perspectives of their social realities. However, it is time consuming (Patton, 2002). According to Patton (2002), the interviewer faces difficulties in directing and controlling unstructured interviews, and may lead to digression from the purpose of the research. In addition, data analysis can be challenging due to the varying and unpredicted responses generated (Morris, 2015). Due to these limitations, unstructured interviews were not suitable for the present study.

The next sub-section provides a discussion of the interview method used for this study.
For this study, semi structured in-depth interviews were conducted among HIV-infected pregnant women to gather qualitative data for this study, allowing the different issues related to this research area to be covered. It was a one-to-one interview where the discussion was between the interviewer and the participants on a topic of mutual interest (Morris, 2015). According to Morris (2015), this conversation is usually open, honest and relaxed. In semi-structured interviews, a topic guide consisting of open-ended questions is prepared before commencing the interviews to guide the interview process (Berg, 2007; Olsen, 2012). However, during the interview, the interviewer can adjust the arrangement of the questions or add more questions based on the interviewee’s response (Morris, 2015). According to Berg (2007), topic guides permit detailed probing while allowing the interview to be kept within the parameters mapped out by the purpose of the research.

Individualised questions explored pregnant woman’s perceptions and attitudes towards the use of ART for PMTCT (Driscoll et al., 2007; Creswell, 2003). Additional questions followed where necessary to probe for detailed answers (Creswell and Plano Clark, 2011). The interaction was free-flowing and flexible and the interviewees were allowed a great deal of leeway (Morris, 2015). The length of the interview was subject to the topics covered and the depth of the interviewees’ answers (Morris, 2015), approximately thirty minutes to one hour. Charmaz (2006) and Mason (2002) argued that many researchers use interviews without knowing why and whether other methods might be more useful. Mason (2002) suggested that semi-structured in-depth interviews are appropriate if the researcher is interested in exploring and understanding perceptions, and that the meaningful way of generating these data is to interact with participants. This study, therefore, adopted semi-structured in-depth interviews since the study’s aim is to understand perceptions and attitudes of HIV-infected pregnant women towards ART.
A key strength of semi-structured in-depth interview is that it allows respondents to speak for themselves and express their views freely by telling their own stories. Thus, the researcher is given a range of thoughts and insights into the topic (Morris, 2015; Rubin and Rubin, 2012). Participants were able to discuss freely their views and perceptions of ART use for PMTCT. Morris (2015) claimed that in-depth interviews give the interviewer access to the interviewees’ thoughts, understanding, experiences and perceptions of the research area under study. A second strength of semi-structured in-depth interviews is that interviewers are given the opportunity to follow up remarks made by the interviewee in order to get detailed answers; thereby increasing the validity of the data (Morris, 2015). In addition, the interview is not restricted to pre-planned questions. Thus, issues relevant to the research raised during the interview can be followed up. The researcher can also obtain nonverbal information by observing intonation and body language (Morris, 2015).

However, despite the detailed information that can be obtained from in-depth interviews, the veracity of this information is questioned by other researchers. Rubin and Rubin (2012) argued that the authenticity of data from in-depth interviews is difficult to check. This is an important limitation of in-depth interviews. Interviewees may choose not to present an accurate or comprehensive account of events (Morris, 2015). In addition, in-depth interviews are expensive to conduct, time-consuming and not generalisable to the population (Morris, 2015). Other methods, used in combination with in-depth interviews can overcome these limitations (Morris, 2015). The second phase of this study adopted a method for data collection (questionnaire survey) to overcome these limitations.

4.5.2 Development of topic guide

Kvale (1996) suggested that before interviews are conducted, researchers should go beyond just knowing the subject area to planning the type of questions to be asked during the interviews. Oates (2006) argued that researchers should be clear on the type of information required from each question when designing the questions. During the questions’ design,
attention was given to the type of information required to achieve the aim and objectives. Thus, open-ended questions were considered more appropriate as they provide rich information from participants own viewpoints. Therefore, an interview guide was designed. A topic guide (Appendix 4) consisting of questions and possible probes for the semi-structured in-depth interviews was developed based on the objectives and aim of this research. The designed questions were tested initially in a pilot study to make sure that the research objectives were answered. Probes were added for better understanding of participants’ responses. The topic guide consisted of questions grouped into major themes according to the research topic. The different themes explored were derived from the conceptual frameworks for this study as described in chapter two (section 2.6). Attitude is one of the major themes derived from one of the conceptual frameworks (TPB) for the study. This theme was explored to understand HIV-infected women’s attitudes towards ART. The following are few examples of how attitude was explored:

How do you feel about using ART (explore negative concerns, side effects, benefits)?

What is your opinion about ART (positive and negative)?

Another theme derived from the HBM was perception, which consisted of perception of ART and perception of MTCT. Perception of MTCT included knowledge of MTCT, perceived susceptibility and perceived severity. Knowledge of MTCT was explored to understand participants’ understanding of what MTCT is, how it is transmitted and prevented. Perceived susceptibility was explored to understand if HIV-infected pregnant women understand the chances of their unborn children having HIV. Perceived severity was also explored to know if HIV-infected pregnant women understand the severity of HIV in infants. It is believed that individuals who hold higher perceived susceptibility and severity beliefs are more likely to take health-related action (using ART) to prevent it (HIV) (Hayden, 2013). These concepts were explored using the following questions:
What do you understand by mother to child transmission (MTCT) [Mode of MTCT, sources of information, what they think about MTCT and preventive measures]?

To what extent do you think that HIV can be passed on from a mother to her child, and exactly how? What do you think are the chances of your child getting HIV?

How serious do you think the effects of HIV are for a child with HIV, and why? [Are you afraid, or concerned about the possibility of having HIV-positive child?]

All the open-ended questions with probes in the topic guide were utilised to explore these concepts in order to gain deeper understanding and insight into the research area. All the interviews conducted used the same topic guide; however, questions were asked differently depending on the participant.

4.5.2.1 Pilot study

Pilot studies are pre-planned small-scale studies used to test the feasibility of the main study such as its research protocol, including research design, strategies for recruitment and data collection (Kim, 2010). In this study, a pilot study was necessary to validate the interview instrument as Dikko (2016) argued that, before research instruments can be viewed as good measures they must pass the reliability and validity test. Taylor et al. (2006) stated that one approach used to achieve validity in research is to carry out a pilot study. The usefulness of pilot studies in both qualitative and quantitative research have been well established (Tashakkori and Teddlie, 2003; Taylor et al., 2006). Several researchers have emphasised the significance of conducting pilot studies, as they help to identify potential flaws in the research instruments (Watson, Atkinson and Rose, 2007). A major advantage of a pilot study highlighted by Kim (2010) and Van Teijlingen and Hundley (2002) is that, researchers are provided with the opportunity to make corrections and modifications before the main primary study. Other researchers believe that credibility and value are added to the whole research study when pilot studies are conducted (Van Wijk and Harrison, 2013).
**Pilot objectives**

The objectives of the pilot study were:

- To test the efficacy and feasibility of the topic guide
- To understand the arrangement of time and venue for the interview
- To identify ambiguous and unnecessary questions
- To determine whether all the questions required to explore the concepts were incorporated
- To determine whether the questions produced satisfactory responses

**Sampling and data collection**

Three participants were purposively sampled for the pilot study. These participants were selected through the nurse in charge (matron) of the ANC in one of the selected hospitals (University of Uyo Teaching Hospital). All three participants were approached by the matron who asked them if they would participate in the research and they were introduced to the researcher. Prior to the interviews, information sheets and consent forms were given to the participants and opportunity was given for questions to be asked. All three participants signed the consent forms. Interviews were conducted with all three participants. Prior to the interviews, participants were reassured of their confidentiality and that the information they would provide would be used only for the research. All participants were pregnant, HIV-infected, and attending ANC. A favourable ethics opinion to conduct the pilot study was given (as part of the main study’s approval) by the Institute for Health Research Ethics Committee, University of Bedfordshire. A number of lessons were learnt from the pilot study.

**Lessons learnt**

The pilot study offered the opportunity to rephrase and refine some of the questions. For instance, question 4: were you counselled before and after testing, was treatment included in the post-test counselling? This question was added to question three as a probe, and was
rephrased to: what were the processes you went through before and after the test? In addition, some of the probes in question three were removed, as they were thought to be repetitive. For example, was it your decision to test? And the second probe: what made you decide to go for testing?

The questions in the topic guide were not very sensitive and participants did not have issues with them. Participants were also satisfied with the time, approach and venue of the interviews. The interview was free-flowing even though there was a set of pre-planned questions to guide the interview, thus, the semi-structured approach used for the interviews was fruitful in helping participants to be relaxed in discussing their views freely.

4.5.3 Interviewing

Olsen (2012) defined interviewing as an interaction between at least two individuals. A total of 24 interviews were conducted (May-June 2016) with HIV-infected pregnant women attending ANCs. The topic guide was used during the interview to guide the discussion. The interviews were face to face between the researcher and the participants. All interviews took place in private rooms in the selected hospitals, and lasted for about thirty minutes to one hour. Prior to the interviews participants were given information sheets containing details of the purpose and nature of the research. The researcher also read and explained the content of the information sheets to participants. Potential participants were given opportunity to ask questions. They were thanked for accepting to participate in the research, and were given consent forms to sign. Participants were informed of their right to withdraw from participating in the study at any time they wish to do so. They were given assurance of their confidentiality, and requested for their approval to record the interview. The interviews explored HIV-infected pregnant women’s attitudes and perceptions towards the use of ART for PMTCT. At the end of each interview, participants were thanked for their participation.
4.5.4 Transcribing

Transcribing involves typing out or writing down what has been said in an interview. In other words, it is the transforming of verbal data into typed or written form called transcripts, which can be in the original language or translated form (Olsen, 2012). The transcription stage is seen as the starting point of data management and analysis. In the present study, the researcher transcribed all 24 interviews verbatim using Microsoft Word (Appendix 5). Even though it was time consuming, it enabled the analysis process to start at the transcription stage and to gain a deeper understanding of the data that were collected (Bailey, 2008; Stuckey, 2014).

4.6 Data analysis

Data analysis is described as a process of structuring, bringing order and meaning to the bulk of collected data. Schwandt (2014) described data analysis as an action of theorising, interpreting and making sense of the data achieved, by undertaking various processes that facilitate working between ideas and data. Qualitative data analysis is an intuitive, creative and dynamic process of inductive reasoning and theorising in order to expand understanding of the phenomenon (Wong, 2008). According to Corbin and Strauss (2015), qualitative data analysis is the thought process and concept that brings meaning to the collected data. Authors have argued that, in social research, analysis of qualitative data is one of the most arduous and least considered area (Basit, 2003; Buchanan and Jones, 2010), probably owing to the need for the huge amount of time and effort required in qualitative inquiry to familiarise oneself with the data (Buchanan and Jones, 2010). As noted by Buchanan and Jones (2010) that there is no shortcut in qualitative research.

In the present study, qualitative data was analysed using thematic approach, which aimed to provide a thorough description of the phenomenon under study (Dey, 2003). Thematic analysis is a process whereby the data is read over again to identify themes that become the
categories for analysis (Dey, 2003). Over the years, analysis of qualitative data evolved from a manual process, using coloured pens, to using Microsoft Excel and Word, and later on to computer software (Hilal and Alabri, 2013). Hilal and Alabri (2013) argued that, in most cases, this manual task is time-consuming, vague and muddled process. However, in recent years, computer software has become available to assist in qualitative data analysis (Buchanan and Jones, 2010; Hilal and Alabri, 2013; Wong, 2008). NVivo, first produced in 1999 by QSR International, is one such program (Wong, 2008). According to Buchanan and Jones (2010), NVivo provides tools for analysis, reporting, reliability and management. However, data synthesis and interpretation remain the job of the researcher (Wong, 2008). Dey (2003) suggested that data recording is the first consideration in qualitative data analysis and that, this must be done fully and accurately to prevent uneven data. In the present study, all in-depth interview data were recorded with a digital voice recorder and transcribed verbatim to text. Rough notes were taken during the interviews.

4.6.1 Thematic analysis

Braun and Clarke (2006) defined thematic analysis as a procedure used to pinpoint, analyse and report themes within qualitative data. Rice and Ezzy (1999) further described thematic analysis as a process of careful repeated reading of the data to identify themes. Thematic analysis aims to provide organisation and detailed description of the data as well as interpreting different areas of the phenomenon (Boyatzis, 1998). Themes represent meanings or patterns within the data; they capture important aspects of the data set in connection with the research question. According to Braun and Clarke (2006), themes can be identified primarily by using two approaches: deductive (top-down) approach or inductive (bottom-up) approach. A deductive approach follows a top down pattern where the researcher predetermines the structure used for the data analysis. In this approach, the researcher’s interest in the research area drives the analysis (Braun and Clarke, 2006).
Conversely, an inductive approach to thematic data analysis is not driven by the researcher’s interest in the topic area, rather, it is data driven. Coding and identification of themes is conducted without any intention of fitting them into a predetermined framework or structure (Boyatzis, 1998). As inductive approach is data-driven, derived themes are linked to the data and questions asked during the interview (Braun and Clarke, 2006). The qualitative data analysis of this study adopted the inductive approach and followed the six phases outlined by Braun and Clarke (2006). Figure 4.1 shows the different stages used in the thematic analysis.

![Diagram of the stages of thematic analysis](image)

**Figure 4.1: Stages of thematic analysis**

**Source:** Adapted from Braun and Clarke (2006)

**Familiarizing with data**

This is the stage where the researcher reads the data repeatedly to become familiar with it, and identifies interesting and important ideas about the data. Braun and Clarke (2006) advised that notes should be taken during this stage in order to generate a list of important ideas. As pointed out by Braun and Clarke (2006), the process of transcription is an excellent way of
making the researcher familiar with the data. For this study, transcripts were read repeatedly before commencing the coding process.

**Generating initial codes**

This phase began following familiarisation with the data through transcribing, repeated reading of the transcripts and identification of important ideas. All the 24 interview transcripts were imported into NVivo 10 (Appendix 6) for easy data management and analysis. In NVivo, there are two sources (internals and externals) for storing research materials. The internal source incorporated all the interview transcripts. The external source contained other relevant materials (e.g. literatures) used during data interpretation (Oliveira et al., 2016). Coding is the process of labelling ideas and grouping the huge amount of data into categories or codes. Codes are labels or tags used to assign identified topics or themes from the compiled data (Creswell and Plano Clark, 2011; Dey, 2003). Coding with NVivo was done by highlighting interesting sections of texts and naming them as nodes (Appendix 7). Nodes are containers for grouping ideas of interest or themes (Richards, 2009).

**Searching for themes**

This phase began after all the interesting ideas across the data set were coded and a list of the various codes was identified. This phase involved sorting and organising the various codes to form broader themes. During the data analysis codes were grouped into sub-themes and sub-themes into broader themes (Creswell and Plano Clark, 2011).

**Reviewing themes**

Braun and Clarke (2006) pointed out that in reviewing themes during thematic analysis, the two levels that should be considered include reviewing the data extracts that have been coded and reviewing the entire data set by checking the validity of the identified themes and whether they correctly represent the meanings in the whole data set.
previous phase were reviewed. Similar themes were merged, while some of the themes were separated into more than one theme. All the coded data extracts were reviewed by reading them for each theme to see if they formed a consistent pattern. Data extracts within themes were also reviewed to ensure that there was distinction between data extracts in the themes. The whole data set was read again during this phase to confirm that the developed themes and the data set were related. Additional data missed during the coding phase were identified as a result of the re-reading, and were coded. According to Braun and Clarke (2006), coding is a continuing process during data analysis, thus re-coding should be expected at any phase.

**Naming and defining themes**

Broad themes were further refined and defined. It involved recognising the meaning in each theme and determining the aspects each theme captured in the data (Braun and Clarke, 2006). The data extracts for each theme were read over again to check for internal consistency and to identify interesting aspects of each data extract and why it was interesting. Detailed analysis was written for each theme in relation to the entire story about the data.

**Producing report**

This phase starts when all the themes have been completely worked-out. It is the final phase of the analysis where the whole report is written up (Braun and Clarke, 2006). Details of the findings from this qualitative phase are described in the next chapter.

**4.7 Verification**

Verification is defined as a way of checking, ensuring, being certain and confirming (Morse *et al.*, 2002). Verification also refers to the methods utilised during a qualitative research process to enhance its validity and reliability. These methods are woven into every stage of the research to recognise and correct errors before they affect the analysis (Morse *et al.*, 2002). Anderson (2010) claimed that when properly conducted, qualitative research is credible, in-
depth and rigorous. Supporting this, Morse et al. (2002), argued that if researchers follow the standards of qualitative research, it is self-rectifying. Further, Morse et al (2002) argued that qualitative research is not linear but iterative with the researcher moving forward and backward between design and application to enhance congruence among construction of questions, recruitment, data collection and analysis. Qualitative data analysis involves interpretation of results; however, the process is debatably more subjective as compared to quantitative data analysis (Morse et al., 2002). Quantitative researchers believe that due to the subjective nature of qualitative data analysis, the same data may be interpreted differently by different researchers; thus, such findings cannot be representative of the social-world (Burnard et al., 2008).

The criteria for assessing quality in quantitative research are well established, as validity and reliability are generally used (Korstjens and Moser, 2018; Noble and Smith, 2015). However, in qualitative research, validity and reliability have been replaced with the concept ‘trustworthiness’ which consists of four aspects, namely: credibility, confirmability, dependability and transferability (Korstjens and Moser, 2018; Lincoln and Guba, 1985; Morse et al., 2002). Within the four aspects of trustworthiness are specific verification strategies to demonstrate rigour in qualitative study such as member checks, audit trail, respondents’ validation and peer debriefing (Morse et al., 2002). Similarly, Burnard et al. (2008) suggested two approaches of validating qualitative analysis: respondents’ validation and peer review. In the first approach (respondent validation), interview transcripts and/or analysis are returned to participants for them to read through, provide feedback and validate their response interpretations (Anderson, 2010; Burnard et al., 2008).

In the present study, response validation was used to enhance validity of the interview data. Out of 24 participants, nine willingly gave their contacts; transcripts were sent to nine of them to check if it was a correct depiction of their views, and to give feedback. Four out of nine replied with their comments, three stated that the transcripts were accurate, while one gave minor corrections. The second approach (peer review) involves exploring and reviewing of the
transcripts by at least one experienced qualitative researcher (Burnard et al., 2008). One of the supervisors for this study who is an experienced qualitative researcher reviewed and explored the interview transcripts and analysis. The researcher also audited all 24 transcripts to verify the truthfulness in the data. Each recorded interview was listened to four times to ensure consistency with the already typed transcripts. Transcripts were read and re-read before coding.

4.8 Ethical consideration

Ethics is established in the philosophical inquiry of good life. It is concerned with the dynamics of making decisions regarding what is wrong or right (Fouka and Mantzorou, 2011). In all areas of research, it is required that researchers stick to the right conduct when conducting and disseminating their research findings, due to the involvement of human participation (Kombe et al., 2014). The aim of accepting ethics into research was based on research in biomedical field, which emerged from the requirement to utilise human beings in the conduct of research (Akaranga and Maka, 2016). Human participation in research precedes the 18th century, however, the need for researchers to develop ethical attitudes towards human participants gained attention around 1946 due to the exploitation of human participants in many cases (Fouka and Mantzorou, 2011; Kour, 2014). According to Mandal, Acharya and Parija (2011), research involving human participation raises ethical issues with the possibility of risks and things going wrong. Thus, researchers must anticipate that ethical issues may arise when conducting research (Creswell, 2014). This requires that the research be conducted based on set moral standards. Research ethics has established principles that govern how research is conducted. Creswell (2014) and Morris (2015) suggested that researchers should protect the dignity of their human participants, build trust with them, guard against misconduct and promote their research integrity.
4.8.1 Research integrity

Morris (2015) claimed that every research from the outset should be undertaken with complete integrity. He further explained that researchers should endeavour not to mislead interviewees, and that the interview report should reflect as much as possible the true interview data. The integrity of this research was promoted; interview transcription was done verbatim by the researcher. The researcher understood the ethical obligation to present findings that capture the stories of the interviewees. However, as with other studies utilising in-depth interviews, the analysis involved the researcher omitting some quotes and emphasising others (Morris, 2015). Although, the omitted and included quotes mirrored the reality of what has been explored (Pitchforth et al., 2005), it was anticipated that this might upset some participants (Morris, 2015), thus, the researcher explained to participants before conducting the interviews that the interview materials will be selectively used in terms of adding direct quotes to the report.

4.8.2 Research ethics approval

A research ethics approval for this qualitative study was sought and acquired from the Institute for Health Research (IHR) Ethics Committee, University of Bedfordshire (Appendix 8). The process involved submission of a completed ethics form, research proposal, topic guide, information sheet and consent form to the ethics committee for approval. The study was also given ethics approval by the research ethics committees of the Niger Delta University Teaching Hospital, Federal Medical Centre, Yenagao and University of Uyo Teaching Hospital (Appendices 9, 10 and 11).

4.8.3 Informed consent

Informed consent is a way of protecting the rights of patients to autonomy. When an autonomous individual gives consent knowingly, intelligently and voluntarily, it is regarded as an informed decision (De Vaus, 2014). Fouka and Mantzorou (2011) opined that for
participants to make an informed decision, they must have the information about the potential risk or benefits of the research. De Vaus (2014) further suggested that participants should be made aware of every detail of the study and should be given the opportunity to decide whether to participate or not. De Vaus (2014) and Morris (2015) claimed that failure to seek participants’ consent could cause serious implications for any study. For the present study, informed consent was sought from all participants for the qualitative research. All potential participants (HIV-infected pregnant women) were given information sheets. The information sheets clearly stated the purpose, benefits and nature of the research, dissemination plans and the right of participants to withdraw at any time from the study. The study was also explained verbally and opportunity was given for questions to be asked. Only those who agree to participate were given consent forms to sign to prove their consent to provide the required information for this research.

4.8.4 Confidentiality, anonymity and privacy

Privacy is an individual’s freedom to determine the extent, time and under which circumstances private information would be withheld or shared (Fouka and Mantzorou, 2011). Invasion of privacy occurs when participants’ information are shared without their consent or knowledge (Fouka and Mantzorou, 2011). In this study, the privacy and anonymity of participants were respected. Participants were clearly informed that the interviews would be recorded with a digital voice recorder, and all the recordings would be transcribed verbatim with names omitted to ensure anonymity. Names of participants were omitted during the data analysis. The researcher clearly explained to participants how the findings would be disseminated: submission to the University of Bedfordshire and publishing in peer-reviewed journals. Confidentiality was maintained as participants freely provided only the information they wished to provide (Morris, 2015). Participants were reminded before the start of each interview of their right not to answer any question they are not comfortable doing so. All participants were also informed that they have the right to withdraw from the study without any consequences.
4.8.5 Preventing harm

No risk or harm was anticipated, however, participants were encouraged to inform the researcher of any form of discomfort or distress as a result of their participation. The Nurses in charge were always available to intervene if there arose any distress to the patients during the interviews. In addition, arrangements were made with the counselling units of the ANCs for immediate referral of any distressed participant for further support.

4.8.6 Data storage

All the recorded interview data and transcripts were stored in encrypted files in a password-protected USB stick and computer. All the printed information sheets, consent forms and transcripts were stored in a locked cabinet in a secured facility in the university.

4.9 Chapter summary

The chapter discussed the methods of data collection and analysis of the first (qualitative) phase.

- The first phase was a qualitative study exploring attitudes and perceptions of HIV-infected pregnant women towards ART for PMTCT.
- The qualitative phase utilised purposive sampling for the recruitment of 24 participants.
- Semi-structured in-depth interviews were used to collect data from the 24 selected HIV-infected pregnant women at the study sites. All the interviews were face-to-face, took place in private rooms located in the study sites.
- A topic guide, developed prior to the commencement of the interviews was pre-tested in a pilot study, and used to guide the interviews.
- Interviews were transcribed verbatim in Microsoft word and transferred into NVivo 11 for easy data analysis and management.
- Analysis was done using a thematic approach which followed Braun and Clarke’s six stages of analysis: familiarising with the data through repeated reading of the
transcripts, coding, sorting and organising the various codes to form sub themes, merging sub themes to form broader themes, reviewing the themes, and finally, reporting the findings.

- Verification was utilised at different stages of the study to enhance validity and reliability of the qualitative data. Verification methods used were response validation and peer review.

- Finally, ethical issues with regards to the qualitative study were discussed. Participation was voluntary and written informed consent was sought from all participants. Confidentiality and anonymity was maintained throughout the study.

The next chapter presents the findings from the data analysis of phase one.
Chapter 5: Phase One Findings

5.1 Introduction

This chapter presents the findings of the semi-structured in-depth interviews. It starts by describing the characteristics of the participants, followed by a discussion of each of the themes derived from the thematic analysis.

5.2 Participants’ characteristics

The total number of participants comprised of 24 HIV-infected pregnant women, eight from FMC, eight from UUTH and eight from NDUTH. Access to study sites and methods of selecting participants were provided in the previous chapter. It is important to note that all participants were selected through the matrons (nurses in charge of ANCs). Socio-demographic information such as marital status, occupation, age, residence and level of education were collected from all participants (Table 5.1). The age of participants ranged from 25 to 39 years. Most of the participants (n=22) were married, a few were single (n=2) and cohabiting (n=2). Fourteen participants had attained post-secondary level education and 10 were secondary school graduates. The majority (n=22) resided in urban areas, only a few resided in semi-urban areas (n=2). The majority (n=12) were traders, seven were civil servants and a few were unemployed (n=4) and student (n=1). In terms of their religion, all the participants were Christians.
Table 5.1: Demographic data

<table>
<thead>
<tr>
<th>Participants</th>
<th>Age</th>
<th>Marital status</th>
<th>Educational level</th>
<th>Occupation</th>
<th>Religion</th>
<th>Residence</th>
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<td>Participants</td>
<td>Age</td>
<td>Marital status</td>
<td>Educational level</td>
<td>Occupation</td>
<td>Religion</td>
<td>Residence</td>
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<td>Student</td>
<td>Christianity</td>
<td>Urban</td>
</tr>
</tbody>
</table>
5.3 Themes

The thematic analysis resulted in the identification of eight main themes. The main themes included: (1) knowledge of PMTCT; (2) threat from the susceptibility of the illness and the severity; (3) perceived benefits of ART; (4) barriers to using ART; (5) perceived roles in treatment; (6) perceived negative behaviours of healthcare providers; (7) coping strategies and (8) women’s suggestions to scale up ART for PMTCT. The themes (including sub-themes) are shown in Table 5.2. The following sub-sections present the themes and sub-themes with illustrative quotes.

Table 5.2: Main themes and sub-themes

<table>
<thead>
<tr>
<th>Themes</th>
<th>Sub-themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of PMTCT</td>
<td>Reason for diagnosis</td>
</tr>
<tr>
<td></td>
<td>Knowledge of MTCT</td>
</tr>
<tr>
<td></td>
<td>Knowledge of PMTCT measures</td>
</tr>
<tr>
<td>Threat from the susceptibility of the illness and severity</td>
<td>Perceived susceptibility</td>
</tr>
<tr>
<td></td>
<td>Perceived severity</td>
</tr>
<tr>
<td>Perceived benefits of ART</td>
<td>To reduce viral load</td>
</tr>
<tr>
<td></td>
<td>Improved physical health</td>
</tr>
<tr>
<td></td>
<td>HIV free baby</td>
</tr>
<tr>
<td></td>
<td>Healthier and longer life</td>
</tr>
<tr>
<td></td>
<td>Hopefulness</td>
</tr>
<tr>
<td></td>
<td>Confidence in ART</td>
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<tr>
<td>Barriers to using ART</td>
<td>I’m healthy</td>
</tr>
<tr>
<td>Themes</td>
<td>Sub-themes</td>
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5.3.1 Knowledge of PMTCT

This theme included three sub-themes: reasons for diagnosis, knowledge of MTCT and knowledge of measures of PMTCT.

5.3.1.1 Reason for diagnoses

According to the interview data, none of the participants tested for HIV just to know their status. Participants tested for various reasons including attending ANC, ill health and marriage.

**Compulsory ANC HIV testing**

Attending ANC was the commonest reason given by participants for taking an HIV test. To start ANC, it was compulsory for them to take the test.

“When I came to the hospital they told me it was compulsory to carry out the test to start antenatal care. That was when I knew, and from then I’ve been taking the drugs” (P1).

“It was when I came in here for the second baby. They have to test when you’re pregnant. They do that; they tell us here every time, they will test, its compulsory” (P3).

“When I got my first pregnancy, so I came looking for antenatal. They run the test, so unluckily, they said I’m positive” (P5).

“In 2012, that was when I was pregnant for my first child. So I came here for antenatal. That was when they discovered” (P12).

**Ill health**
Other participants tested due to their ill health. Some of the participants explained how they were ill and family members took them to have some test done (including HIV test). Others went to see doctors on their own and were referred for some tests.

“I was sick; they (family members) took me to lab to do all test. So they did all test that’s how HIV too was discovered” (P4)

“It was when I was ill my sister told me to come and do test, so when I came they did all they tests and they saw the thing (HIV) (P15).

“That time I was not feeling fine. So I had to go and do the test. They (doctor) asked me to do all those test. I did the test and it was seen. I was positive” (P24).

“I was having severe headache, that’s why and my menstrual period is not flowing” (P17).

One participant indicated that she had HIV test after her baby took ill and later died.

“My baby took ill and when we got to the hospital I was told the baby had HIV. The baby later died. I didn’t know anything then about it (HIV), so I came here for the test and it was positive” (P7).

**Church wedding**

Participants were also diagnosed due to the compulsory requirement by churches to undergo an HIV test before any marriage is conducted.

“It was in my church, before you get wedded, you have to go through the test (HIV test)” (P19).

“It was the time we were preparing for my wedding, so we went together for the test. It was compulsory to test before they can wed you” (P18).
5.3.1.2 Knowledge of MTCT

The interviewed data showed that the participants possess different understanding about MTCT. The subthemes that emerged under this theme were correct knowledge, lack of knowledge and misconceptions about MTCT.

**Correct knowledge about MTCT**

All the interviewed women understood that an infected mother can transmit the virus to her child. When asked about the modes of MTCT, breastfeeding, pregnancy, labour and delivery were cited by some of them.

“It can happen during pregnancy, that’s when the child can have the sickness” (P2).

“This virus (HIV) may be transmitted to the child through various ways. It may be when you are pregnant. Sometimes it might be the child may not be infected but when it comes in contact with the blood during delivery. Sometimes it might also be when the child is breastfed, through breastfeeding. These are the major times that the child may be exposed to being infected or transmitted” (P6).

Women also understood that besides the modes of MTCT mentioned above, sharing of sharp objects such as a contaminated razor with a baby could result in transmission.

“If you share sharp object, and if you use it on yourself and you use it on the baby, you can transfer the virus to the baby” (P12).

“By using sharp things. Maybe my child has wound or something like scratch and maybe my blood have stained it (sharp objects), it might cause to infect the baby” (P24).
**Lack of MTCT knowledge**

Although the majority had good understanding of the modes of MTCT, some of the participants expressed lack of knowledge of the ways MTCT occur. Some of the participants responded thus:

“I don’t know” (P4)

“I don’t have any idea” (P7)

Lack of knowledge was reflected in some participants through expressions of doubt. For instance, one participant stated:

“Maybe blood transfusion or something like that” (P1).

**Misconceptions about MTCT**

Some of the participants possessed misconceptions about MTCT. Participants believed that MTCT occur through exposing the baby to the mother’s naked body. One participant responded thus:

“My own knowledge, I believe its transferring (HIV) to the baby…through exposing that baby to your naked body” (P20).

Another participant believes that MTCT can occur through kissing the baby:

“You have to avoid kissing the baby especially new-born because you can transfer it (HIV)” (P3).

In addition, one of the participants believed that MTCT occur through cutting of the umbilical cord during childbirth.
“Through the cutting of those things (umbilical cord) that connect the mother and the baby, the baby can be effected with it (HIV)” (P5).

**Sources of MTCT knowledge**

Further questions about the sources of their MTCT information were asked. The majority of the women mentioned through the hospital.

“I got it (MTCT information) from the hospital after the test” (P6).

“I just got it (MTCT information) from the hospital this few days” (P16)

Only one knew about MTCT before diagnosis through the media.

“I knew about MTCT even before I came to the hospital. Awareness is every where, through radio, television, friends, family” (P1)

**Knowledge of measures of PMTCT**

All the participants understood what antiretroviral drugs are, and why pregnant women take them. Most of the participants were aware that ART is given during pregnancy for PMTCT.

“It’s to prevent the child from getting the virus” (P7)

“Its to save your baby and save your life” (P5)

“To prevent mother child transmission” (P20)

“To prevent the virus from mother to child” (P19)

“To prevent the virus from passing from the mother to the child (P3)

Participants also explained that ART is given to the child at birth to prevent MTCT.
“A drug they will give for the baby that you will be dropping in his or her mouth after birth that can also prevent” (P18).

“There is a drug they will give to you for you to give to the baby, So, that drug will protect the baby, from you to transfer to the baby” (P5).

When asked if ART is available to them whenever they access the services, all the participants acknowledged that ART was available to them free of charge whenever they go to the hospitals to have them.

“They are available, they are free” (P3)

“There is never a time I come and they say it’s not available” (P20).

“Any time I come, I always get the drugs” (P7).

“The drugs have been distributed freely; anytime you come you have them” (P2)

In addition to using ART for PMTCT, participants understood other measures of PMTCT such as formula feeding and delivering in the hospital.

“The best place to deliver is hospital. That’s why I don’t go to any other place. The only protection I have… is that I’m not giving them breast. I don’t breastfeed; I just cancel my mind about that. I use formula feeding” (P1)

“It is very necessary for a positive woman to deliver in the hospital” (P5)

Women also shared the steps they have taken to prevent infection to their unborn children

“I take my drugs (ART) as prescribed and I don’t breast feed” (P6)

“When I am pregnant, I come to the hospital and follow the process, so that I can save the baby” (P5)
5.3.2 Threat from the susceptibility and severity of the illness

Perception of threat was based on two perceptions: perceived susceptibility and perceived severity. These sub-themes are described in the following sub-sections.

5.3.2.1 Perceived susceptibility

According to the HBM, perceived susceptibility refers to people's beliefs about the level of their risk of having a health problem (Frewen, Schomer and Dunne, 1994). In this study, perceived susceptibility refers to HIV-infected pregnant women's perceptions of susceptibility of their unborn children to HIV. Participants expressed the fear of transmitting HIV to their unborn children. Participants acknowledged that MTCT was a possibility. The following quotes illustrate this:

“I’m afraid of this one (unborn child), I’m really afraid, I’m just praying, and I believe God, He should just punish me alone, and leave the child” (P3).

“Sometimes I get concerned, that fear is there, as a human being let your baby not come and suffer what you are suffering. I use to think sometimes that as far as the thing (HIV) is in my body, it’s (MTCT) possible. I don’t want my baby to suffer what I’m suffering, so I always think of what to do that my baby will not have it” (P4).

However, some of the participants believe the only way transmission to a child can take place is when the mother is not taking ART

“You can only transfer to the child if you are not taking the drugs. If you notice your status and you start taking the drugs before you now take in, the baby will not be contaminated with this thing (HIV virus)” (P2).
5.3.2.2 Perceived severity

In this study, perceived severity is the perception of seriousness of the consequences of HIV in infants. Participants perceived that the consequences of HIV in infants would be disastrous. Women believed that due to the weak immune system of the child, it would be difficult for the child to withstand the effects of HIV.

“Well, being that the baby at that stage, the immune system is not high, it could seriously affect the baby’s health, making the baby get sick and unnecessarily having one ill health or the other. The major thing there is that, the immune system is being attacked” (P6).

“As a baby it can be serious because the baby body will not withstand the things that will come out from it (HIV infection), because she is still a baby. Maybe all those sickness, all those things that will come out from the baby body, or all those spots or all those things, the baby will not be able to withstand it. The baby will not be able to withstand the sickness that will come through the virus” (P5).

“it’s very dangerous, the baby’s own is more severe” (P24).

Participants also believed that because of the seriousness of HIV in children, and the availability of ART to prevent it, if mothers refuse to take ART and allow a child to be infected with HIV, such a child will not forgive the mother.

“It will be very serious. And I believe if that child survives the child will never forgive the mother because some of the mothers they know and they refuse to take drugs” (P3).

One of the participants shared an experience of another woman’s child that died due to AIDS.
“It will be very very serious, because I have seen one when I gave birth to my child. The mother gave birth to the child and died in two weeks’ time. The child was down and very ill” (P12).

Because of the perceived severity of HIV in infants, mothers are in a constant fight for their children’s survival, which is often related to religious affiliations.

“I always pray to God for God to help me. God should protect me from transferring it to them (her children). Because it’s not happiness something for you to hear that your baby is positive” (P5)

“I always prayed. I don’t want the baby to be positive. I don’t want that for the baby to be taking drugs everyday it’s not easy” (P17).

5.3.3 Perceived benefits and motivators of ART

The theme covers the benefits that participants perceive about using ART for PMTCT. Participants perceived ART as beneficial in terms of reducing viral load, improving physical health, prolonging life, and delivering HIV-free babies. These perceived benefits were a source of motivation to use ART for PMTCT.

5.3.3.1 HIV-free babies

Across the data, women were motivated to take ART during pregnancy because of the desire to have a healthy baby free of HIV. The following extracts support this point.

“When I discovered that I’m pregnant at the same time, and I need to fast (hurry) and start taking the drugs so that I don’t want my baby to become infected as a result of this (HIV). I love my life very well, and my baby’s life too is very more important to me. So in as much as I love my baby I will come and take it (ART), so that my baby will not be contaminated (infected)” (P2)
“I know very well that if I stick to the drugs the child might not have it (HIV). The other way round, you know if I don’t (take ART) before realising it the baby would be infected” (P2).

One participant explained how motivated she is to take ART despite the side effect of feeling hot for the sake of her innocent child.

“I don’t have a choice and for the sake of my baby. Even when I don’t want to (take ART), I tried to (take ART), no matter how hot (ART side effect) I will feel, I tried to take for the sake of an innocent baby” (P19).

One of the participants explained how she is nonadherent to ART without pregnancy, but during pregnancy she fully adheres to prevent MTCT.

“When I’m not pregnant at times I will find it difficult (to take ART). But when I’m pregnant and when I’m breastfeeding I don’t miss it. I don’t want the unborn child, the innocent baby to go through what I am going through” (P10)

For some of the participants, they believed it was their responsibility as mothers to do whatever it takes to protect the innocent child from having HIV. One participant believed that the child should not experience the consequences of something they are not aware of.

“The child must not know the sin of the father and the mother, the child is coming on his or her own. The sin of the father and mother must not affect the child because he or she is an innocent child. She is coming on her own, so everybody should bear his or her own consequences” (P16).

Another participant stated that a child infected with HIV will grow up to hate the mother because the child will realise later in life that there were preventive measures that the mother refused to adopt. She takes her ART medication to avoid blame from her children:

“I believe that child is innocent and you should protect that child very well and do whatsoever they tell you to do. If it is just you yourself, maybe you’ll go and kill yourself,
but you are bringing another person to the world. My only believe is that the child will come to hate you; especially a female child growing up with that virus is very bad. The child will definitely know that there was something (taking ART) you would have done to prevent her from having it. So it will be your fault, even God will not forgive you. I don’t want any of my children to blame me, I have to avoid it. So I have to take it (ART)” (P3).

Apart from preventing MTCT, one participant was motivated to take ART because she believes it will prevent transmission to her husband:

“So that my husband will not be infected, let me be the only one to suffer it” (P17).

5.3.3.2 To reduce viral load and prevent harm

Participants were motivated to use ART because of the belief that ART will reduce the virus in their system to prevent harming them and the baby:

“If I’m taking the drug, the drug will reduce the virus, so that it will not harm me and my baby. If I don’t take them, it (HIV) will harm me. That’s why I’m taking them, so that at the end I will see good result. And as I’m taking them now I think things are improving” (P14).

“It improves your immune system. Then all those virus, it subdue the virus; don’t allow the virus to do you any harm” (P13).

“It helps to bring down (the virus) and doesn’t allow the virus to grow more than the way it should be to prevent it from being transferred” (P3).

5.3.3.3 Improved physical health

Participants expressed how their health improved after commencement of treatment with ART. They regained control over their health which was threatened by the virus. Improved physical health was measured by their feelings and experiences. Participants recounted how they were sick and very lean, and how they felt better, looking good after commencement of ART.
“Compared to the time I was sick before coming to the hospital and now, since I started taking the drugs constantly, morning and evening, I feel better” (P19).

“What motivates me is that I remember there was a time I was very sick, I was so lean, but now that I have started taking my drugs, anybody that sees me will say you are looking good. I know the drugs are working, so I always want to take them” (P9).

It (ART) keeps me fit, I can eat, I can do everything” (P3).

One of the participants measured her improved health based on her CD4 count and weight:

“My CD4 is 1,600 and something, which is very high. Like today I’m 92kg. I live my normal life. In fact I don’t see much negative effect because of this sickness” (P1).

Due to the experienced benefits of improved health after the start of ART, some of the participants encouraged other people who were sick to take an HIV test so that they can access treatment.

“As I hear that one of my sister is sick, maybe she is ashamed. So I told her mother, let them carry her to hospital or carry her to lab. Let them do all the test maybe this one (HIV) is there. Or I will go by myself and tell her to go to the hospital and find out if this one (HIV) is there. So that she can start taking the drugs, because this drug has helped me” (P4).

“When I see some kinds of sickness in people, I used to advise them to come to the hospital and run this (HIV) test. I have to plead with someone to come and run test so that they can start treatment” (P7).

5.3.3.4 Healthier and longer life

Another significant perceived benefit of ART that motivated participants to take ART was to lengthen lifespan. Participants were concerned about a long lifespan, thus, knowing that ART
can prolong their lives so that they can take care of their children and live longer than their mothers was a motivation for them.

“I take it (ART) so I can live longer. The drug is helpful, makes people feel healthy. The drug is good…makes people to be strong” (P13).

“I take it (ART) because I wanted to be healthy, I wanted to live long and take care of my children” (P17).

“I wanted to stay for my mother because my mum is still alive. I don’t want to die and leave her, and because people are dying on the same sickness and I have seen somebody dying of it” (P12).

For other women, the will to live was a source of motivation to take ART. According to a 28 year old participant:

“Nobody wants to die, everybody wants to live. You want to live and survive. So you know the purpose that if you miss this drugs, maybe your status (CD4 count) will be coming down. The more you take this drugs the more this virus (viral load) drop. So you like yourself, you don’t want the virus to be rising, so you will be taking the drugs and going for what they say you should do” (P5).

“I want to live. If not of this drug I would have died. The sickness almost took my life. I don’t forget to take as far as they tell me not to miss” (P4).

5.3.3.5 Hopefulness

Participants view ART as a source of hope since there is no cure yet. According to these participants, taking ART helps to sustain their lives until a permanent solution comes.

“I know that I have to take the drugs until solution will come. I don’t need to bother myself but I still pray, and I’m still taking the drugs. Looking up to the end of this sickness” (P1).
Participants were optimistic about the treatment. They believed that in the nearest future, there would be a drug for permanent cure of HIV; this was a motivation for them to take ART.

“I will do everything possible for me to take the drug consistent until there is a way out. …I'm made to understand, the doctor told me in ten years to come there will be a cure. So I will still be taking (ART) and waiting, that is it” (P2).

“My belief is that whatever have a beginning will surely have an end. As far as God still give that sense to trace this drug that we are taking now, I know one day they will still trace the drugs that will stop everything” (P5).

In addition to the benefits already described above, one of the participants also felt ART opened her womb that was blocked for seven years. She explained how she conceived after some months of using ART.

“This drug has helped me well well. I know even this drug has opened my womb too. Because my womb, since almost seven years ago I did not see my period but I'm sleeping with my husband. It's like the sickness has dried my womb but as I start to take the drugs, after some months I now got pregnant, so I appreciate the drugs” (P23).

5.3.3.6 Confidence in ART

Due to the benefits of ART experienced by women in the present study, their confidence in using ART was built. Some of the women expressed their confidence in ART based on the experience of having given birth to HIV-negative children:

“…all my children are negative. The drugs works, that's why I don't miss my drugs” (P1).

“I practised it (take ART) and it worked. This is my third child and all of them they are negative” (P10).
“I know very well that if I stick to the drugs the child might not have it. The other way round you know if I don’t before realising it the baby would be infected” (P2).

5.3.4 Perceived barriers and concerns about ART

This theme was centred on pregnant women’s assessment of the difficulties they face in taking ART for PMTCT. These perceived barriers include side effects, taking ART every day, “I’m healthy”, forgetfulness, waiting time, cost, lack of food and C-section.

5.3.4.1 Side effects

Side effects were a major concern for pregnant women. The fear of sleepless nights and feeling hot caused by the drugs was a reason to skip doses.

“I feel very hot (side effect) in the night because I take the one of once in the night. …If it continue like this, it’s affecting me, and when I put to bed, it’ll be very hot. I use to feel this heat in the night, my head will be very hot, I have to wake up and shower. Well, let me be sincere once in a while when it’s very hot and, like one period when my gen (generator) was bad, there was no light, person can skip the drug for a while” (P19).

“That first time I was somehow discouraged because of the symptom (side effects) that I pass through. I was like being discouraged and all that” (P2).

One of the participant recounted how she continued taking her ART medication despite the side effects because she was counselled about it.

“I was being told when I was doing counselling that I will encounter all this things (side effects). That first time, when I see them (side effects) I know it’s for a while. That, after some time it would stop, depending on how I’m taking my drugs, that I will not have it again” (P2).
5.3.4.2 Taking ART everyday

Even though participants perceived ART to be beneficial in preventing MTCT, taking the drug every day was not convenient for some of the participants. Participants felt unhappy and uncomfortable taking ARVs every day.

“What I’m not comfortable is this every day, it’s not really easy for someone to take drugs (ART) everyday but I’m trying with it. That’s the part I’m not comfortable with. At least if it is maybe take when you are sick or when you are having …. (hiss), I don’t know how to put it but this one is just every day” (P18).

“I’m not happy because before I wasn’t taking anything but now I’m taking drugs every day, I’m not happy” (P14).

5.3.4.3 “I’m healthy”

While the benefit of improving health from ART motivated participants to use ART, in this case, it became a discouragement and reason for them to stop ART. Participants who felt healthy got tired of taking their ART medication, and this led to them stopping their medication.

“….because I’m healthy, I’m not sick, I always feel that I am okay, so I stop to take the drugs sometimes” (P17).

“I got fed up with the drugs; honestly speaking I got fed up. I stopped since 2013 until I came (for ANC). If not nurse said I should start, I wouldn’t have even start again… because I don’t have any problem I won’t lie you, I don’t have any problem, I was living like normal human being” (P8).

5.3.4.4 Forgetfulness

Participants in this study acknowledged missing their doses. Some participants attributed this to forgetfulness which results from being too busy with work.
“Sometimes when I’m busy doing house work, and because I put my phone on alarm, the alarm will ring and stop. You know when it stop and I don’t go to take the drugs, I will now forget” (P12).

“Let me be sincere, I do miss, at times, I used to forget the drugs, I won’t even remember” (P16).

“I have missed taking my drugs some times. There were times when I am busy doing work that I forgot to take them” (P7).

### 5.3.4.5 Waiting time

Participants were also dissatisfied with the length of time spent to access ART services at the hospitals. Accessing ART services at the hospitals was a time consuming task. One participant felt that her career was going to be ruined, as she has to wait for a whole day. She could not be there for her children, and she was very discouraged by this.

“Like me I have a certain time for me to go and pick my kids in school, and for such time you are still here in the hospital, you cannot do anything. I mean, it is discouraging. Having to come to clinic for a whole day, so I saw that it was going to ruin my career and whatever, so I stopped (accessing ART). It’s when I started clinic here (ANC) that the matron was telling me no, I shouldn’t have stopped” (P6).

One of the participants said that she used to go to the hospital in the morning at 6 o’clock and return after 5 o’clock in the evening.

“Sometimes I will come here 6 o’clock in the morning, you will stay till 5 o’clock. They waste time, the whole day, they will take the whole day, they waste time” (P14).
5.3.4.6 Cost

Some of the participants perceived formula feeding as costly and exclusive breastfeeding as inconveniencing.

“There’s one I really don’t like, that if you are (HIV) positive, if you breastfeed it should be exclusive breastfeeding only, no water, no other thing until when you stop breastfeeding. I’m still thinking on what I will do (about breastfeeding), why I’m saying so, because if you want to start a day child with formula, that’s when you have to be buoyant” (P18).

Whereas HIV-infected pregnant women are advised to deliver in the hospital to prevent MTCT and maternal mortality, this advice is often considered difficult to follow because of the financial implications. In the hospitals, women are asked to buy some items during delivery, and this is not convenient for some of them.

“We are advised to deliver in the hospital; all fingers are not equal with their list and the few things you will buy. In the house there is a big difference” (P17).

Although, transport fare was not an issue for the majority of the participants, one of the participants missed her ART appointment because there was no money for transport.

“Maybe at times I will not have transport fare to come over, then I will miss my appointment” (P16).

5.3.4.7 Lack of food

Some of the participants got discouraged and stopped taking ART due to hunger.
“There may not be food to eat in order to take the drugs. That will discourage me to take. I do take it (ART), I only skip just because of food” (P15).

One participant recounted when she did not receive her salary for three months and was unable to feed, leading to her stopping her medication:

“That 2013 I told you I stopped (taking ART), it was because of hunger. Because when we went for biometrics in my office, my salary did not come for three months. Honestly speaking, there was no money. I had no money to eat” (P8).

5.3.4.8 Caesarean section

Participants also expressed fear of C-section. They stopped accessing PMTCT services due to the fear of going through an elective C-section.

“The one they will tell us if your month is now, if you are supposed to born today and the baby did not come out by two days, you will go for this operation (C-section). So from there somebody will just be afraid to go back” (P17).

One of the participants had to deliver at home because of fear of going through the planned C-section.

“Like me now, I go to the hospital the next day, they said I should go for the operation because the baby took almost ten months. Already they have given me date to go to operation. I don’t want to pass through the operation and God want me to deliver normally, so I deliver at home and God protect the baby” (P12).

5.3.5 Perceived roles in ART treatment

The subthemes include perception about diet and ART, perception about hygiene and ART, and perception about support and ART.
5.3.5.1 Perception about diet and ART

Participants in this study perceived healthy eating as a role they must play in using ART. They felt that food, especially fruits and vegetables, were necessary when taking drugs like ARVs. They explained how the drugs adversely affect HIV patients when taken without food. The extracts below support these points:

“I have to take care of myself, eat good food and also take much fruits and vitamins to build up my immune system” (P6).

“I now do my diet much on fruits, as I’m taking the medication” (P2).

“You know this our status (HIV positive) you eat more of fruits, vegetables, nourishing food while taking the drugs. Many people are taking the drugs but there is no food. When you see them, the thing has shown that they have it (HIV). Those people are dying because you cannot be taking drugs with empty stomach” (P10).

5.3.5.2 Perception about hygiene and ART

In addition to eating healthy diet, women believed that practising personal hygiene was necessary to boost their immune system in order to enhance the effectiveness of ART for PMTCT.

“That if you are on medication (ART) and also, take precautionary measures to practise good hygiene, keeping yourself and the environment clean. Making sure that your immune system is high and it will also help to save you and your baby from infection” (P6).

“I live healthy lifestyle. I take care of my house and myself. I try to stay clean to prevent sickness. They (healthcare providers) said good hygiene is good as we are taking the drugs, it will help the baby as well” (P2).
5.3.5.3 Perception about support and ART

The husband’s involvement in access and uptake of ART was a common theme across all the married participants in this study. One of the participants who refused starting ART after being diagnosed was encouraged by her husband to start.

“My husband encouraged me, he encouraged me a lot and he said I should do it (start ART) irrespective of what happened. So I have to do it, and then I started taking the drugs” (P2).

Husbands support their wives with domestic chores so that the wives can take their medicines. For instance, one of the participants stated:

“…especially my husband, he’s helping a lot, when it’s almost time (to take ART) and I have not finished what I’m about to do, he’ll say keep it, go and take your drugs, he makes it easier for me, either he’ll prepare the kids because we don’t have any house help, …. so it’s always easy for me to take (ART)” (P3).

Participants also acknowledged that disclosing their status to their husbands enhanced their uptake of ART. Participants believed that their husbands’ awareness of their treatment minimised the tendency of secretly taking ART. Some of them explained how their husbands reminded them when it is time to take their medication.

“My husband is my treatment partner, he reminds me when it’s time. You have problem when you hide it from your partner. Maybe when he’s there you’ll be trying to hide, when he’s out so that you can take it, it will delay you” (P1).

“I really thank God for my husband, he will remind me of the time, you have not taken this (ART), its close to 9pm, take your drug. He makes my life, he makes me feel good” (P2).
In addition to husbands supporting and reminding their wives to take ART, one participant used her phone as a reminder in order not to forget to take ART.

“For me I also use my phone, I always set my phone on reminder, when it’s that time I must take It (ART)” (P1).

5.3.6 Perceived negative behaviours of health care providers

Some of the participants during the interview expressed how they were maltreated by healthcare providers while accessing PMTCT services. The maltreatment described by participants encompassed refusal to provide care, rudeness, verbal abuse as well as lack of sympathy and empathy.

5.3.6.1 Refusal to provide care

Participants recounted certain situations when they have been refused care when needed.

“Do you know when I took the form to the place (office), those girls (healthcare providers) there did not even collect the form from me, they were just looking at me. The third girl again was just looking at me. One of them said this one should collect, one of them said this one should, so I waited for after like two or three minutes. The other one said madam, wait, or go and come back after. So I waited there, none of them attended to me” (P18).

“Sometimes they will not answer us, we will sit down there, they will not answer” (P14).

5.3.6.2 Rudeness

Participants reported some rude behaviours of nurses and other staff when they visit the hospital for PMTCT services:
“Some (nurses and doctors), they look down on us, they will act as if we are not human being. They will talk to us anyhow, they will sigh they will hiss in the hospital they are nurses they are doctors” (P14)

“This people (staff) will just look at you as if you are the worst thing. I don’t know how to put it; they will make you feel bad. Before you even come they will ask you who asked you to sit down? Yes, in that unit (ANC), yes, say madam wait wait who asked you to sit down” (P18).

Participants pointed out that such rude behaviour is liable to discourage the desire to access and use ART in future.

“It’s discouraging when you talk to people anyhow. People will become tired and say okay, let me just give up, instead of me to be suffering like this, coming to this clinic to take drugs every time and they will be talking to me anyhow because of this thing (HIV)... Let me abandon the drugs, it’s better I die, let me abandon it and give up” (P14).

5.3.6.3 Verbal abuse

Verbal abuse was reported by participants in terms of doctors using negative words and shouting at them during delivery.

“The doctor was telling me all kinds of painful things that I don’t have anything I’m getting pregnant. You don’t have anything and you are giving birth, nothing nothing, he was shouting at me” (P14).
5.3.6.4 Lack of sympathy and empathy

Participants also expressed how unhappy they were with the lack of sympathy and empathy displayed by their doctors. One woman explained how the doctor put fear in her, telling her she will die during childbirth because of her blood that was low.

“I did my blood test and my blood level is low, is very low. When I come to the clinic this particular doctor that will attend to me, instead of him to talk things that will make me at least feel better, he will put fear in me, more and more. He will say this one your blood is low like this, if you give birth na casala (meaning death). I was scared” (P14).

5.3.7 Coping strategies

Women expressed different strategies they used in coping and living better with HIV and taking ART.

5.3.7.1 Religious beliefs

Religious beliefs were the commonest ways of coping among participants. Religious beliefs and faith in God were a source of strength for participants. One participant believed that God would remove the virus from her system someday, and that, it is not her portion to have HIV, the reason she is not worried about it.

“I would go on the drugs, but I still believe God will remove it one day from my system. Because it’s not for me, it’s not my portion but as for the present now it would take care of it. But I know God will remove it from me, I don’t worry myself about it” (P11).

Another participant expressed how she was shocked on receiving an HIV diagnosis and how discouraging it was, but she encouraged herself because she believes in God:

“I was so shocked when they tested me, because after my marriage in 2014 everything was okay. When I took in and came here for antenatal they test and say
it’s positive, I was shocked. It is discouraging, as a human being, you will say why are all these things? But you just encourage yourself. If God say you can’t die you cannot die, this sickness must not kill you” (P13).

Prayer was a religious coping strategy utilised by participants. Some of the women believed in God’s ability to heal them even through the drugs (ART) and prayers, and this comforted them.

“You will be taking your drugs; through prayer God will help. There is nothing God cannot do but they say heaven help those who help themselves. If you try to take the drugs and start praying to God, God will make a way. You will still take your drugs and with God all things are possible, through this drugs (ART), He can heal you through the drugs” (P17)

5.3.7.2 Not the worst disease

Some of the participants consoled themselves that HIV is not the worst disease. They believed other diseases kill more than HIV, thus, having HIV is not the end.

“This thing (HIV) is not the worse sickness. I have seen so many people with this sickness and they are alive. But people may have hypertension, this and that, and then they die suddenly, so I just encourage myself” (P13).

“To me, I’ll say HIV is not the end of the world, we have too many sicknesses. There are some sickness that you’ll stop taking some food, but this one, it is of no selection, you eat anything you want… at any time, you don’t stop your food, anything you want to eat you can eat, that’s that” (P1).

“It is not do or die affair like people think (P5).

5.3.7.3 Acceptance

Women accepted their status and taking ART, since they cannot change the situation.
“When you find yourself in such situation (HIV positive), there’s nothing you can do than to just accept it. Though at times it’s difficult to accept it, but you just have to accept while believing God for your healing” (P19)

“I know that I have to take the drugs until solution will come, I don’t need to bother myself” (P1).

One participant explained how she coped with ART side effects:

“I’m really disturbed, but I can’t’ do anything. Its not something I can change, so I have to try to cope with it (ART), especially the dizziness, the weakness and all that. But then, we have to consider the advantage (benefits of ART), we really don’t have to give up” (P6).

5.3.7.4 Non-disclosure

Participants concealed their HIV status through non-disclosure to prevent HIV-related stigma. This was a way of coping with their HIV status.

“You will not go and announce it that you have it (HIV). People will not treat you bad if they don’t know you’re positive, nobody will look down on you. Why I’m saying so because, some people even now, even friends, colleagues and family members, if they hear that you are HIV positive, they won’t even want to sit close to you. They think they will contact it. I just keep it (HIV status) to myself, only my husband knows. I have it but he is negative” (P18).

“I haven’t disclosed this to anyone. I don’t want anyone to know because I’m scared, they (family) won’t be happy with me. I just want to stay out of their trouble, as for now that I’m pregnant” (P15)
“It’s not for you to expose yourself; you don’t tell somebody the secret. That is what kill women. For instance you now go to your church and they say they want to pray, if you are positive come out, that is how you expose yourself, and everybody will start looking down on you” (P5).

5.3.8 Women’s suggestions for improved ART Uptake

5.3.8.1 Awareness

Awareness was suggested by most of the participants. Participants believed that continuous awareness about ART for PMTCT was necessary since children are born every day.

“Since children are born into this world every day so awareness should not stop. It should be done anywhere, everywhere, even in the churches” (P1).

Some participants suggested that awareness should be done in rural areas to empower their knowledge about the importance of taking ART. Participants explained how people still believed that once they start ART their grave is close.

“Government should create more awareness especially people inside rural area and empower them more, to let them know about the importance of the drugs. Many of them thought the moment they start taking the drugs, grave is close to them” (P10).

Participants proposed awareness to be done at town hall seminars and counselling to explain that taking ART can make people with HIV live longer.

“Doing some (awareness) maybe town hall seminar inside village. Then counsel them, tell them, explain everything to them about it (ART), that if they take the drugs it can make them live longer. They may live more than the person with hypertension, asthma, cancer all those…” (P13).

Others advocated awareness through television and radio:
“The only place that will make people to really know this thing (HIV) is real, is television or radio” (P5).

Some of the participants gave reasons why they believed there is need for more awareness. They expressed how people lack awareness of ART, that people are not aware that HIV can be managed to sustain the lives of infected persons. Especially those in the villages still believe that once any one is infected, death is the only option.

“People are not well informed, because they don’t know that this drug (ART) people are taking can sustain infected persons. Even me, as I heard that I have this thing (HIV) in my body, I was not myself, I was crying every day. I did not know that there is medication that can sustain some body. So people don’t know” (P11).

“Like my relatives, some of them don’t know, they live inside the village they don’t even know. They need to be educated more and more. When somebody have this thing (HIV), all they think is that, he will soon die, that one will soon die. They don’t even think that when taking the drugs he will even live longer than the person that is not having it. So they need to be educated” (P13).

One of the participants believed that awareness will go a long way to help women understand that all hope is not lost when one is infected with HIV and prevent suicidal attempts.

“It’s just all about awareness; create awareness, give them information because when you don’t have this information they cannot understand. They may think that all hope is gone. Some may kill themselves; they can even drink poison and die. But when you give them the awareness, talk to them that all hope is not lost, that the drug will help you, and help your child. I think that will go a long way” (P20).

Some of the participants had different views about creating more awareness. They believed that people should take responsibilities for their health and play their part in terms of accessing
available services, and that, people should not wait for health professionals and government to do everything for them.

“I think the doctors and government have their own part to play but you in person have. You have your part to play, that is, if you love yourself and you love your unborn child, so that is it. So they too the government will not do everything, they do radio programmes to tell us about this sickness, the drugs have been distributed freely, anytime you come you have them. They have done that one for you, they can't do all for you. Some women will prefer to stay in their houses and take native medicine (herbs) when they are sick, they will not go to hospital to know if they have this one (HIV)” (P2).

“You can only force the cat to the stream but you cannot force him to drink, so even with the awareness, it all depends on the individual to decide to take medication, you cannot force people to do it” (P19).

5.3.8.2 Food support

Participants advocated for food support for HIV-infected women to encourage them to remain in treatment. Some of them explained the significance of food in using ART by advocating that the government should make provision for food and cash to HIV-infected women to encourage them to access and stay on treatment. The need for government to create organisations that will be in charge of distributing food and money to HIV-infected women living in rural areas was emphasised during the interviews.

“I think government should have some organisation, like NGO that will go inside the village and distribute even if its food or with cash. Those people in the villages are dying because you cannot be taking drugs with empty stomach” (P10).

One participant felt they should be visited to give food and encouragement.
“There is something they (healthcare providers) should have done, visit us in our houses to encourage us and give food if there is no food” (P8).

One participant believed that providing food and money to HIV-infected women would be a source of hope and motivation for them to stay on ART.

“I will say once in a while, maybe they (government) should give out something; maybe provision, food, maybe money or things like that. You know we Nigerians when something comes there’s hope, but when there’s nothing, they will say why I’m I taking it (ART)? Some will even pray they should die and go. So, they should give more hope; provide food, money, any kind of assistance” (P1).

5.3.8.3 Interactions with Patients

Participants also suggested that healthcare providers should improve the way they interact with them.

“I think they need to improve the way they attend to people, the way to talk to people, encourage people, be polite to people, be nice to people. They should be nice with people, don’t talk to people anyhow” (P14).

“Everything in this life is advice. Because we women, we are so stubborn, so we need petting. One thing in women is that, they are so ashamed that how can they be positive. So it’s for people (health professionals) who are in control of this thing, to give them some advice and pet them. Because, if you pet a woman for her to understand where she is going to, she will know what she is doing for herself. But if it comes to a matter of anger, if quarrel comes, they will say, after all it’s not your life, if I die it’s my own, let me die” (P5).
One participant recounted how the matron encouraged her to do the HIV test when she refused. She believes that such encouragement is important to help women who refuse treatment to start ART:

“Like me, when I came here to register for antenatal, I wanted to stop. I refused the test because I did not believe that I can have this sickness (HIV). But the matron had to encourage me to do the test and to commence the treatment because I was positive. She really encouraged me, and explained everything to me. So I think it is to pet them (women) and encourage them to take the treatment. Some people don’t believe, even after they have done the test they still say no, they don’t have it, and will not take the treatment. But if they encourage and explain to them that it is important, they will do it” (P7).

5.3.8.4 Helping other women to access PMTCT

Apart from the government and healthcare providers improving their services to scale up ART uptake, women believe that they can also be of help in encouraging newly diagnosed women to start ART.

“Being the first time, they can take example from us. Those of us taking the drugs should encourage new women who come to test, to tell the person that I am with this thing (HIV), that I take the drug, my baby is negative. To tell the person that your baby will not be harmed, you will deliver the baby. To encourage them to take the drugs, when they see I’m healthy, may be they will listen” (P13).

Another participant who believed in encouraging other women to start treatment recounted how she helped a newly diagnosed pregnant woman who was devastated on receiving an HIV positive result to start treatment.
“I saw one woman last time I come for counselling, they told her that she is positive. This lady cried and said her life is finished, and was going home. I told her that her life is not finished; it is not the end of the world. It’s not die affair, you are not dying right now. The lady said my baby this and that; I said it’s you that will give that baby life. Be courageous so that you give that baby life. You want to go home and stay, to die because you are positive? That’s how she now followed me, we went there, and find out the way she will take the drugs. They counselled her while I’m waiting. It was just for her to go there and take the drugs. So I took her there to take her drugs” (P5).

5.4 Differences of socio-demographic profile

The differences in socio-demographic factors will only be discussed in relation to age, educational level, marital status and occupation. This is due to the homogeneity of the sample in terms of religion and place of residence, which resulted from the location of the study (urban cities) and the study setting which is dominated by one religion (Christianity) (Sampson, 2014)

**Educational level**

In terms of knowledge of the modes of MTCT, pregnant women who had correct knowledge were those with tertiary education. Lack of knowledge was reported mainly among pregnant women with secondary education. However, misconceptions about the modes of MTCT was the same across all educational levels. Pregnant women’s perception of susceptibility was the same across all educational levels. However, perception of severity was reported more among pregnant women with tertiary education. For perceived barriers to ART, pregnant women reporting side effects, feeling healthy, burden of taking ART every day, forgetfulness and waiting time fell across all educational levels, no difference was found. There were no
differences in educational levels of participants in terms of the perception of the effectiveness of ART in reducing viral load, preventing MTCT, improving physical health and longer life.

**Age**

For the purpose of this section, participants' ages have been divided into three groups: 25-30 years, 31-35 years and 36-40 years. Knowledge of MTCT was the same across all age groups. Pregnant women who reported a perception of susceptibility were those of younger age groups (25-30). Perceived severity was the same across all age groups. Perceived barriers and benefits were not different among women of different ages.

**Marital status**

There was no difference in knowledge of MTCT regarding pregnant women’s marital status. Perceived susceptibility and severity were not different among pregnant women of different marital status. However, waiting time was mainly reported as a barrier among married and cohabiting participants. Perceived benefits were not different among women of different marital status.

**Occupation**

There were no socio-demographic differences with regards to occupation

**5.5 Discussion**

The study highlighted a lack of knowledge and misconception about MTCT. Although the majority of participants were knowledgeable that pregnant women could transmit HIV to their babies through MTCT, some of them lacked the knowledge about the ways MTCT occur. MTCT was believed to occur through kissing, cutting of the umbilical cord and by exposing the baby to the mother’s naked body. This finding contradicts those from Nigeria (Joseph et al., 2018; Olugbenga-Bello et al., 2013) which reported high MTCT knowledge, but conforms to findings from South Africa (Ramoshaba and Sithole, 2017) and Ghana (Mariwah et al., 2017) where lack of knowledge were reported. Consistent with findings from Sudan (Elsheikh,
Crutzen and Borne, 2015) and Brazil (Neves and Gir, 2006), the interviews indicated that participants perceived their unborn children to be susceptible to HIV and that HIV is a serious condition in children. This perception was a motivation to take ART.

Participants were also motivated to use ART for PMTCT due to the perceived benefits of ART in terms of preventing HIV infection to the child, reducing the viral load to prevent harm to the baby and the mother, making them healthy and living longer. The desire to protect their babies from HIV appear to be the major reason and motivator to start and stay on ART. Similar to other studies (Boateng, Kwapong and Agyei-Baffour, 2013; Buregyeya et al., 2017; McLean et al., 2017), this desire of protecting their babies from HIV helped them to disregard or overcome barriers such as side effects which enabled them to stay on ART. The interviews also revealed that most of the participants were motivated to take their medication due to the support they received from their partners. Partners reminded their wives and assisted them with house chores which enabled them to take their medication on time and regularly.

However, some of the participants lacked control regarding their ability to fully adhere to ART due to several factors such as forgetfulness, feeling healthy/cured, taking ART every day, side effects, fear of C-section and lack of food, leading to missing or stopping their ART medication. This conforms to findings from other studies (Adeniyi et al., 2018; Buregyeya et al., 2017) where side effects, lack of food, too busy were identified as barriers to ART among pregnant women. Women developed different coping strategies to cope with their HIV status, lifelong ART and HIV-related stigma. Finally, suggestions were given by the interviewed women for increased access and use of ART for PMTCT.

5.6 Chapter summary

This chapter has reported the findings of the first phase (qualitative) of this study, collected through semi-structured in-depth interviews.
The aim of the qualitative phase was to explore the attitudes and perceptions of HIV-infected pregnant women towards ART for PMTCT.

Eight themes were derived from the interview data analysis: knowledge of PMTCT, threat from the susceptibility of the illness and severity, perceived benefits of ART, barriers to using ART, perceived roles in treatment, perceived negative behaviours of healthcare providers, coping strategies, and women’s suggestions to scale up ART for PMTCT.

Participants only tested for HIV as a compulsory requirement for ANC and church weddings, as well as when they were ill.

Participants displayed perceptions of susceptibility and severity of paediatric HIV.

ART was interpreted as a good treatment, able to reduce viral load, prolong life, keep them healthy and prevent MTCT.

Participants’ views about ART indicated underlying concerns about taking antiretroviral therapy. Lack of food, taking ART everyday, feeling healthy/cured and side effects were reasons for participants to stop or skip their ART medication.

Participants also reported some negative behaviours of healthcare providers such as verbal abuse, rudeness, lack of sympathy and empathy and refusal to provide care.

Different coping strategies such as religious beliefs, acceptance and non disclosure were used by participants to cope with their HIV status, HIV-related stigma and ART side effects.

Increasing awareness, food support and improving patient/provider interactions were highlighted by participants as areas that can help improve uptake of ART.

The next chapter describes how a questionnaire tool was developed from the interview themes and the methods used to conduct the second phase (survey) of this study.
Chapter 6: Phase Two Methods

6.1 Introduction

This chapter provides a detailed account of the second phase (survey) of the present study. It presents and explains the methods used in conducting the survey. The chapter presents the objectives of this phase and an overview of quantitative research. It discusses the sampling method (simple random sampling) and how the sample size was calculated. It then explains how the questionnaire was developed, tested in a pilot study and assessed for validity and reliability. It presents a summary of the variables used for the statistical analysis and the level
of measurement that the data fall into. Finally, it discusses the statistical tests used for the data analysis and ethical consideration.

6.2 Objectives

The objectives for the second phase are:

- To examine how attitudes and perceptions of HIV-infected pregnant women influence their uptake of ART for PMTCT
- To identify socio-demographic factors that influence attitudes of HIV-infected pregnant women towards ART for PMTCT

6.3 Overview of quantitative research

Bowling (2009) describes quantitative research as an approach that deals with quantities and examines relationships between variables. It involves the measuring of variables which results in numeric data that are analysed with statistical procedures (Bryman, 2006; Creswell, 2014; Saunders, Lewis and Thornhill, 2016). According to Saunders, Lewis and Thornhill (2016), in quantitative research there are often control measures to ensure that the data is collected in a standard manner for its validity. Lichtman (2013) opined that quantitative research follows clear objectives and guidelines, and is conducted in a public and general fashion which enhances its replicability. Quantitative research has also been described as a ‘researcher detachment’ approach (Denscombe, 1998). It is believed that bias from data collection and analysis is minimised due to the detachment of the researcher and the participants (Daniel, 2016). However, this can be seen as a weakness, as the researcher is limited in understanding the participants and obtaining an in-depth understanding of the research area (Berg, 2007; Cohen, 2011).

The approach often utilises random sampling methods and statistically calculated large sample sizes to ensure generalisation of findings (Bowling, 2009). It has been argued that because of the large sample size required, lack of resources can sometimes make it impossible to conduct quantitative research (Dudwick et al., 2006).
6.4 Cross-sectional survey

In surveys, cross-sectional designs are the most frequently utilised designs to assess associations and prevalence of chronic and also acute conditions (de Vaus, 2014). However, cross-sectional studies cannot infer causality due to the difficulty in establishing cause and effect (Bowling, 2009; Carlson and Morrison, 2009). Cross-sectional studies are also criticised for their inability to determine incidence (Sedgwick, 2014). Compared to other observational studies (case control and cohort studies), cross-sectional studies are inexpensive, quicker and easier to conduct (Sedgwick, 2014; Setia, 2016). Thus, this phase utilised a cross sectional design.

6.5 Sampling

For this study, simple random sampling was used to select participants (HIV-infected pregnant women). Simple random sampling involves random selection of individuals entirely by chance. It gives every individual equal opportunity of being selected, thereby allowing generalisability of findings (de Vaus, 2014). Numbers are given to members of the population of interest, using random numbers, sample units are selected without replacement in order to allow each sample unit to appear only once. Computer programs can be used to randomly select participants or names can be randomly picked from a hat (Bowling, 2014). The sampling frame (list of HIV-infected pregnant women attending ANCs during the period the study was conducted) were obtained from the teaching hospitals and unique numbers given to each patient. Using a hat, participants were randomly selected.

Simple random sampling provided an equal opportunity to all the individuals (HIV-infected pregnant women) who participated in the study to form a representative sample (Bowling, 2009; de Vaus, 2014). This method was aptly used for sampling because it is devoid of any bias and helped in collecting authentic data (Saunders, Lewis and Thornhill, 2016). It is one of the most commonly used sampling methods because of its simplicity and originality (de Vaus, 2014).
6.5.1 Sample size

Determining a sample size is a fundamental step in designing a quantitative research (Gogtay, 2011).

Sample size was statistically calculated using an assumption of 95% confidence level, and margin of error +/-5% (de Vaus, 2014).

\[
n = \frac{z^2 p (100 - p)}{E^2}
\]

where \( n \) = sample size,

\( z = z \)-score (1.96 at 95% confidence level),

\( p = \) proportion of respondents with attribute of outcome (percentage of pregnant women with knowledge of MTCT); 78% obtained from Ashimi et al. (2014) study conducted in Nigeria.

\( E = \) margin for error (0.05)

Thus,

\[
n = (1.96)^2 \times 78 \times (100 - 78) / (.05)^2
\]

\[
= 3.8416 \times 78 \times 22 / 0.0025
\]

Thus, the sample size equals 263.687, approximately 264.
6.6 Questionnaire development

Questionnaires are data collection instruments mostly used in quantitative research especially surveys in which every participant is asked to answer same set of predetermined questions that are arranged in the same order (de Vaus, 2014; Rowley, 2014; Saunders, Lewis and Thornhill, 2012). It has been established that questionnaires are efficient in collecting information from a large population because each participant answers same set of questions (Brace, 2008; Wong et al., 2012). Roopa and Rani (2012) added that questionnaires form the foundation of all surveys, and their favourable outcome depends on designing good questionnaires. Further, it is important when developing a questionnaire to ensure that a questionnaire gathers the precise information required to achieve the objectives and to answer the research questions (Roopa and Rani, 2012). Thus, designing of the individual questions should be driven by the data required to achieve the objectives of the study (Saunders, Lewis and Thornhill, 2012). In this study, individual questions were carefully structured to meet the objectives of the study.

According to Jenn (2006), research questions are either open-ended, allowing participants to freely express their views without restriction or closed-ended with response options for participants to choose. In this study, closed-ended questions that address the research objectives and response options were used (Bowling, 2009; Jenn, 2006). The questions were standardised (fixed) for all respondents, without variation in the wording of the questions (Bowling, 2009). Bowling (2009) and Rowley (2014) noted that structured questionnaires collect answers that are unambiguous, easy to enumerate and analyse. However, because of the pre-coded response choices, it is argued that structured questionnaires may produce pre-coded answers that were forcefully chosen by respondents because they are limited by the answers available (Bowling, 2009).

The researcher also considered issues around wording of the questionnaire in order to enhance valid responses (Saunders, Lewis and Thornhill, 2012). Thus, the researcher used
Saunders checklist for questionnaire wording (Saunders, Lewis and Thornhill, 2012). Saunders, Lewis and Thornhill (2012) explained that when designing a questionnaire researchers should use simple words and avoid abbreviations as well as avoid words that are offensive and ambiguous. Roopa and Rani (2012) suggested that words in a questionnaire should comply with participants’ way of thinking and only express one thought at any given time. The questionnaire was designed with unambiguous questions, easy to understand and quick to complete, in order to minimise the risk of respondents’ fatigue.

Bourque and Clark (1994) suggested three approaches for researchers to follow when designing questions: develop their own questions; adopt questions from other questionnaires and adapt questions from other questionnaires. In this study, the researcher developed her own individual questions from the themes that emerged from the qualitative phase in order to completely address the purpose and objectives of this research. In addition, questions were also adapted from the Beliefs about Medicines Questionnaire (BMQ). The BMQ is a standardised questionnaire consisting of 18 items which are answered on a scale of five point score ranging from strongly agree to strongly disagree. The BMQ assesses patients’ beliefs and concerns about prescribed medication. The BMQ is validated on different patient groups with high internal consistency and test re-test reliability (Alhalaiqa et al., 2015; Komninosa et al., 2012; Salgado et al., 2013).

According to Cooper and Schindler (2014), a survey questionnaire should consist of three main categories of questions: target, administrative and classification. Target questions collect information that provide answers to the study’s research questions. Classification questions collect socio-demographic information of respondents such as: marital status, age, sex, educational level. Administrative questions identify the interviewer, participant, the interview location, as well as the conditions of the interview (Cooper and Schindler, 2014). This study’s questionnaire consists of both target questions, as well as classification questions. Administrative questions were not considered necessary since participants usually prefer to be kept anonymous.
6.7 Final version

The final version of the questionnaire (Appendix 12) was grouped into three sections: A, B and C with the following headings: socio-demographic information, perceptions of ART and attitudes towards ART, respectively. Section A comprised of 10 questions covering participants’ socio-demographic data such as age, level of education, religion, residence, marital status and occupation. Response options were provided for participants to tick the box with the most appropriate response. Examples of section A questions include: how old are you in years? What is your occupation? Sections B and C comprise of 25 target questions. Section B consists of 14 perception questions with three responses each: yes, no and I don’t know. Section B covers four main categories: 1) perceived susceptibility and seriousness of MTCT with four questions; 2) perceived barriers to ART and PMTCT which consisted of two questions; 3) perceived quality of care with one question and perceived social support with seven questions.

A Likert scale was used in section C to measure attitudes of HIV-infected pregnant women. The Likert scale has been mainly used to measure attitudes due to its simplicity in administration and analysis (Likert, 1932). Over the years, researchers have faced challenges in converting personal attitudes and traits into quantitative measures (Boone and Boone, 2012). As a result of the difficulty in measuring attitudes, the Likert scale was developed for easy analysis of attitudes (Likert, 1932). In its original form, the Likert scale comprises of five-point response alternatives to each question. In this study, respondents were asked to indicate the extent to which they agree or disagree with the attitude statements on a five-point Likert scale with a score of five for strongly agree and a score of one for strongly disagree. Examples of section C items comprised of: taking ART will make me live healthy, by staying on ART I can prevent mother-to-child transmission. The questionnaire was kept short and simple in order to enhance response rate.
According to Leon et al. (2011), pilot studies are conducted to pre-test the research instrument that is intended to be used in the main study. Pilot studies are considered vital components of research processes due to the key role they play in assessing the feasibility of the research design, recruitment and data collection procedures (de Vaus, 2014; Leon et al., 2011). This provides useful results that point to amendments required in the design and plan of the main survey. Consequently, a pilot study was conducted before the commencement of the main survey. An ethics approval was obtained from the institute for Health Research, University of Bedfordshire as part of the main study’s approval (Appendix 13) and from the selected hospitals’ ethics committees (Appendices 9, 10 and 11). Participants were given information sheets (Appendix 14) and opportunity was given for questions before the start of the study. Participation was entirely voluntary.

The purpose of the pilot study was not to make claims for generalisation of the findings, thus, a purposive (non-randomised) sampling method was used to identify eligible participants. All participants were initially approached by the nurses and were asked if they would like to take part in the study. Participants who agreed to participate were sent to the researcher who provided further details about the research. Twenty six HIV-infected pregnant women (outside the research subjects) in one of the selected hospitals (Federal Medical Centre) participated in the pilot study.

The objectives of the pilot study were:

- To identify unforeseen flaws in the instrument
- To assess the clarity of the questions
- To assess the required time to complete the questionnaire
- To assess the response rate
- To assess the effectiveness of the questionnaire
Lessons learnt

The pilot study gave an idea of the time required to complete the questionnaire. A time range of eight to fifteen minutes was required to complete the questionnaire. Some questions during the pilot study were thought to be confusing for participants but not sensitive. For example, about four of the participants asked for clarification of question 15. This question was rephrased to prevent any confusion regarding answering the questionnaire during the main study. Question 15 asked: what do you perceive as barriers to taking ART and participating in PMTCT? After the pilot study, it was rephrased thus: what do you think can make it difficult or stop you from taking antiretroviral drugs and participating in PMTCT? In addition, the pilot study revealed that some of the questions required more response options. For example, about six of the participants wrote their own options not included on question 16 and ticked them. Also, two participants added options to question 18. Thus, more options including the ones written by participants were added to questions 16 and 18. Two options were added to question 16: ‘I felt better’ and ‘to avoid side effects’. For question 18, three options were added: ‘staff explains everything and listens to you’, ‘you were treated with respect and dignity’, ‘you were given the kind of care you wanted’. Participants revealed that the questionnaire was straightforward and easy to complete.

6.8.1 Validity

Different types of validity have been grouped into two broad classes: internal and external validity (Wong et al., 2012). External validity expresses how well results from one setting can be applied or generalised to other situations, settings or times (Steckler and McLeroy, 2008; Wong et al., 2012). Internal validity refers to the extent to which an instrument measures what it is designed to measure. In other words, an instrument is said to be valid when it measures the constructs and concepts it is meant to measure (Bannigan and Watson, 2009; Bolarinwa, 2015; Kimberlin and Winterstein, 2008). Four types of internal validity have been suggested
by researchers: construct validity, face validity, criterion-related validity and content validity (Bolarinwa, 2015; Saunders et al., 2012)

**Face validity**

This refers to the subjective assessment of the relevance and presentation of the instrument. It involves checking all the items in the instrument for reasonableness, relevance, clarity, readability, unambiguity and comprehensiveness (Bowling, 2009; Sangoseni et al., 2013). For this study, the questionnaire was face validated by discussing the questions with the researcher’s supervision team and other experts in this area of research before and after data collection. These experts evaluated the questionnaire in terms of its clarity, readability, relevance, presentation and typographical quality. Amendments were made based on their suggestions.

**Content validity**

Content validity emphasises how well the items in an instrument adequately reflect the constructs it intended to measure (Aravamudhan and Krishnaveni, 2015; Zamanzadeh et al., 2015). According to Zamanzadeh et al. (2015), an instrument can be assessed for content validity by utilising the standpoints of a group of experts which comprises of lay and content experts. Professionals who have work or research experience in the field are called content experts while potential participants for the study are termed lay experts (Zamanzadeh et al. (2015).

Content validation was applied in this study by the following:

- The items in the questionnaire were reviewed with the literature for refinement.
- During the pilot testing of the questionnaire, feedbacks and comments about the content of the instrument were received from the participants.
Experts in the area of this research were invited to review the questionnaire to determine whether it reflects the target constructs (Tojib and Sugianto, 2006).

**Construct validity**

Construct validity refers to how well the instrument measures the constructs being studied. In assessing construct validity, the data from the instrument is compared with variables related to the constructs being measured. Construct validity was assessed for the questionnaire when it was presented to experts for evaluation of all the items before the instrument was used for data collection. Also, the constructs in the questionnaire were reviewed with the conceptual framework (HBM) and the literature.

**Criterion-related validity**

Criterion-related validity, often called predictive validity, refers to the ability of the instrument to make precise predictions. In evaluating criterion-related validity, data from the instrument are compared with a gold standard or an external criterion using statistical analysis (Bannigan and Watson, 2009; Drost, 2011). This validity was not applied to this study since there was no intention of the instrument in predicting what will happen in the future or comparing the findings with an existing criterion.

6.8.2 Reliability

Reliability is the extent to which a measurement is repeatable when performed under different conditions (Bolarinwa, 2015). Drost (2011) explains reliability as the stability of measurement in which same result is obtained over a variety of conditions. Reliability simply refers to consistency. In assessing reliability, there are three main approaches: test-retest, internal consistency and alternative form (Saunders, Lewis and Thornhill, 2016).

**Test-retest**
This refers to the ability of the instrument to produce similar results when administered to same subjects twice under near equivalent circumstances (de Vaus, 2014; Heale and Twycross, 2015). Test-retest is referred to as a test of stability (Bowling, 2009). The statistical test compares between patient scores each time they provide their responses. However, researchers argue that test-retest reliability is a poor technique of determining reliability of an instrument, as it is difficult to administer the same instrument twice to the same sample (de Vaus, 2014; Saunders, Lewis and Thornhill, 2016). Furthermore, de Vaus (2014) argued that memory may be another challenge for this method, as individuals may remember their previous responses and respond the same way in order to be consistent. This is liable of artificially inflating reliability of the instrument (de Vaus, 2014). Thus, Saunders, Lewis and Thornhill (2016) suggested that this technique should only be used as a supplement to other techniques. Test-retest reliability was not applied to this study due to the type of sample (pregnant women). It was difficult to carry out data collection twice because some of the previous participants would have given birth, making them non-eligible to participate again. In addition, due to the limited time to complete the data collection and to present the findings, this method was not used to assess reliability of the instrument.

**Internal consistency**

Internal consistency measures the degree to which responses of items across a subgroup of questions that intend to measure similar construct are consistent (Bowling 2009; Heale and Twycross, 2015; Saunders et al., 2016). Several statistical techniques have been employed to determine internal consistency such as split-half reliability, item-total correlation and Cronbach’s alpha (Bowling, 2009). However, Cronbach’s alpha is mostly used to assess internal consistency (Saunders et al., 2016). The different sub groups in the questionnaire
measuring the constructs of this study were assessed for internal consistency using Cronbach’s alpha (Table 6.1).

Table 6.1: Reliability test

<table>
<thead>
<tr>
<th>Sections</th>
<th>N of items</th>
<th>Cronbach's Alpha</th>
<th>Cronbach's Alpha based on standardized items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude towards ART</td>
<td>10</td>
<td>.791</td>
<td>.797</td>
</tr>
<tr>
<td>Perceived threat</td>
<td>4</td>
<td>.733</td>
<td>.728</td>
</tr>
<tr>
<td>Perceived barriers</td>
<td>21</td>
<td>.544</td>
<td>.610</td>
</tr>
<tr>
<td>Partner support</td>
<td>3</td>
<td>.377</td>
<td>.359</td>
</tr>
</tbody>
</table>

**Alternative form reliability**

This method refers to the extent of agreement between different versions of the same questions worded differently but measuring the same construct (Saunders *et al.*, 2016). These versions of the same questionnaire are administered to the same individuals to determine if they are equivalent. This method was not applied to this study’s instrument due to limited resources and time.

**6.8.3 Administering questionnaires**

Data collection for the main study was undertaken in the Niger Delta region of Nigeria over a six-week period from November to December 2017. The researcher collected the data in person at the three tertiary hospitals selected for the study. Questionnaires may be distributed in two major ways: self-administered (administered by post, in person, telephoned, e-mailed
or internet) and interviewer-administered (characterized as face-to-face interviews, telephone interviews) (Bowling, 2005; Trochim and Donnell, 2006). While postal survey is widely used in research due to its benefits of reaching a wide geographical population (Bryman, 2012); it was not suitable for this study because of the ineffective postal system in Nigeria (Syed et al., 2012). Online survey was also not suitable for the present study due to the poor internet connection in Nigeria (Osuagwu et al., 2013). Even though there are advantages of using telephone survey, such as large-scale accessibility and anonymity, it lacks representativeness since some people may not be reached due to absence of landline or mobile phone (Boland et al., 2006). Thus, telephone method was not used for this study.

Administering in person became a more realistic way to distribute the questionnaires in the present study. All the questionnaires were administered by the researcher to HIV-infected pregnant women who were registered in the ANC units in the three study sites during the period of the study. With the help of the nurses, completed questionnaires were collected. A large number of pregnant women were present in the hospitals for their antenatal appointments and so this method of distribution was both convenient and led to a high response rate (Trochim and Donnell, 2006). De Vaus (2014) opined that face-to-face survey is effective in achieving high quality data and high response rate. Another important benefit of administering in person was the fact that respondents could ask for clarification of any question that they found difficult to understand (de Vaus, 2014).

Key strengths of using a questionnaire for data collection are that, even though they cover a large group of people, they are cheap, easy to administer and provide huge amount of information (Brace, 2008). The researcher does not need to be present as this has little or no effect on reliability and validity (McHorney et al., 1994), and the information collected can be quantified easily, either with a software package or by the researcher. However, it is argued that questionnaires are inadequate for understanding people’s feelings, behaviours and emotions (de Vaus, 2014).
6.9 Response rate

The total response rate is a crucial element in evaluating the sample’s representativeness (Rea and Parker, 2014). It is believed that when the response rate is high, it guarantees that the study’s sample represents the population and also curtails non-response bias (Groves and Peytcheva, 2008; Saunders, Lewis and Thornhill, 2016). On the contrary, a low response rate does not necessarily lead to a biased sample, but this is a possibility (Saunders, Lewis and Thornhill, 2016).

\[
\text{Total response rate} = \frac{\text{total number of valid responses}}{\text{total number of original sample}} \times 100
\]

Although, the importance of having a high response rate in survey research has been emphasised, however, in reality, researchers are likely to deal with non-responses (Saunders, Lewis and Thornhill, 2016). Similarly, Rea and Parker (2014) opined that in collecting primary data with humans, it is rare to achieve 100% response rate due to participants refusing to participate, failing to complete questionnaires or being unreachable. There is no minimum value agreed as a standard for response rate, although it appears to be generally accepted that a 75% and above response rate is good, and below 60% is suboptimal (Bowling, 2009).

This study achieved a response rate of 98%. A total of 260 out of 264 participated in the study; one potential participant was unreachable, two did not fully respond to the questionnaire and one refused to participate. Table 6.2 shows the responses achieved in the three study sites. The high response rate achieved in this study may be due to the face-to-face survey method employed. De Vaus (2014) stated that face-to-face surveys usually achieve a higher response rate as compared to other methods of administering questionnaires. This study’s response rate is in agreement with other related studies on PMTCT utilising pregnant women attending ANCs as participants. In Nigeria, studies assessing perception and knowledge of PMTCT among ANC attendees have achieved 93% response rate (Owoaje, Omidokun and Ige, 2012). Also in SSA, studies examining knowledge of PMTCT and its associated factors among ANC attendees have achieved 97% response rate (Abtew, Awoke and Asrat, 2016).
Table 6.2: Response rate

<table>
<thead>
<tr>
<th>S/N</th>
<th>Study sites</th>
<th>Response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Federal Medical Centre, Yenagoa</td>
<td>90 X 100 = 100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>Niger Delta University Teaching Hospital</td>
<td>81 X 100 = 96.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>84</td>
</tr>
<tr>
<td>3</td>
<td>University of Uyo Teaching Hospital</td>
<td>89 X 100 = 98.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Total response rate</td>
<td>260 X 100 = 98%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>264</td>
</tr>
</tbody>
</table>

6.10 Data analysis

The survey data was analysed using SPSS (Statistical Package for the Social Sciences) version 22. SPSS, founded in 1968 in the USA, is easy to use and yet extremely powerful. It is the most popular and oldest of the many computer programs currently available for statistical data analysis (Colman and Pulford, 2011). Bryman and Cramer (1999) also highlighted that using SPSS enables quantitative data to be scored and analysed very quickly and in different ways.

6.10.1 Summary of variables

The survey data were organised into variables. Creswell (2014) defines a variable as a measurable or an observable attribute or characteristic of an organisation or individual that varies among the organisation or individuals being studied. Variables that probably influence or cause outcome are termed independent variables, while those who depend on the
independent variables are known as dependent variables (Creswell, 2014; Rea and Parker, 2014).

6.10.1.1 Independent variables

These covers socio-demographic and perception variables:

**Age:** This variable was coded into 3 categories, namely: 18-28 years, 29-39 years and 40-50 years. Age was used for both descriptive statistics (frequencies) and Kruskal Wallis test to determine if there were differences in attitudes among HIV-infected pregnant women of these age groups.

**Educational level:** This variable was coded into primary, secondary and tertiary for both descriptive and inferential statistics. Educational level was used for both descriptive statistics and Kruskal Wallis test to determine if there were differences in attitudes towards ART among HIV-infected pregnant women of these educational levels.

**Marital status:** This variable was coded into single and married. Single consists of participants who were never married, widowed, divorced and separated. Married consists of participants who were married or cohabiting. Marital status was used for descriptive statistics and Mann U Whitney test.

**Occupation:** This was coded into unemployed, self-employed and Government employed. Unemployed consist of participants without a job and house wives. Self-employed includes participants who engage in trading and farming for livelihood. Government employed includes those employed by the government and private sectors. Occupation was used for both descriptive statistics and Kruskal Wallis test.

**Members of household:** This variable had the following four categories: 1) living with spouse, which include those living with husbands or living with cohabiting partners, 2) living with children plus spouse, 3) living with relatives, which includes those living with own relatives and
in-laws, and 4) living alone. This variable was used for both descriptive statistics and Kruskal Wallis test.

**Place of residence:** This was coded into urban and rural. Rural consists of those living in both rural and semi-urban areas. Urban consists only of those living in urban areas. This was used for both descriptive and Mann Whitney test.

**Religion:** This had two categories: Christianity and Islam. Religion was used for both descriptive statistics and Mann Whitney test.

**Duration with HIV:** This had four categories: less than one year, 1-5 years, 5-10 years and more than 10 years. This was used for both descriptive statistics and spearman correlation.

**Duration with ART:** This had four categories: less than one year, 1-5 years, 5-10 years and more than 10 years. This variable was used for both descriptive statistics and spearman correlation.

**Perceived susceptibility:** A total score was calculated from the two items of perceived susceptibility, and recoded into three categories: high, low and no perceived susceptibility. Those who scored two were categorised as having high susceptibility, while those who scored one were categorised as having low susceptibility and those who scored zero were categorised as having no perceived susceptibility. This form of the variable was used for Spearman's correlation.

**Perceived severity:** For this variable, a total score was calculated from the two items of perceived susceptibility, and recoded into three categories: high, low and no perceived severity. Those who scored two were categorised as having high perceived severity, while those who scored one were categorised as having low perceived severity and those who scored zero were categorised as having no perceived severity. This form of the variable was used for Spearman's correlation.
**Partner support:** A total score was calculated and was used as a continuous variable for spearman correlation.

**6.10.1.2 Dependent variables**

These covers two variables: defaulting ART and attitude:

**Adhering to ART:** This variable was coded into defaulted and never defaulted. Defaulted includes participants who have missed taking ART at least once within the month prior to the start of data collection and those who had not missed were categorised as never defaulted. This variable was used for Chi-square test with perception variables and spearman test with attitude.

**Attitude:** This variable was a continuous variable derived from the summation of the 10 attitude items. It was used for spearman rho test to determine its relationship with the following variables: duration with HIV, duration with ART, perceived susceptibility, perceived severity and partner support.

**6.10.2 Level of measurement**

Variables can be measured at three main levels, namely: nominal (or categorical), ordinal and continuous (or interval) (Rea and Parker, 2014). Nominal variables are considered the lowest, next is ordinal and then continuous (de Vaus, 2014). A variable is regarded as nominal when its categories have no rank or order, examples include: gender, religious affiliations, marital status (Rea and Parker, 2014). Ordinal variable is organised into categories ranked in a meaningful order but the difference between the categories is not specified, examples include: academic level, educational level. A continuous variable has categories ranked in a meaningful way and the amount of difference or intervals between the categories is specified, examples include: height and weight (de Vaus, 2014). The data for this study were measured at nominal and ordinal level. Normality was checked, and non-parametric tests were used because the data was not normally distributed.
6.10.3 Data entry and coding

The responses of participants were manually transferred from the original questionnaire into an SPSS spreadsheet (data editor page). The SPSS spreadsheet allows the data to be arranged in a grid layout, with each row representing a case or a participant and each column representing a variable (Neuman, 2014). Numbers were assigned as labels or codes to categories of each variable (de Vaus, 2014). For example: the variable, religion was coded into 2 categories with numbers 1-2 assigned to them: 1 = Christianity and 2 = Islam. For multiple choice questions, where participants provided many responses to the same question, the dichotomy method was used to enter the data (de Vause, 2014). Variables were created for each response option and a code such as ‘no’ was used for response options not selected, and ‘yes’ was used for selected options. Value zero was assigned to ‘no’ code (not selected) and 1 was assigned to ‘yes’ code (selected) (de Vaus, 2014). Reverse coding was done for the negative attitude statements.

6.10.4 Missing values

De Vaus (2014) suggested that codes should be assigned to each variable in the same manner as valid responses even if the response is missing. These codes are generally known as missing codes. As stated by de Vaus (2014), there are no agreed guidelines about what type of code that ought to be assigned to a missing data in as much as the missing code is different from the valid response codes. For this study, missing values were coded as 99.

6.10.5 Data cleaning

Errors during coding have the ability to create problems during analysis, thus, accuracy is required when coding data to prevent misleading results (de Vaus, 2014; Neuman, 2014). Although it may not be possible to eliminate all errors during data entry and coding, it can be minimised by identifying and rectifying as much errors as possible (de Vaus, 2014). The task of cleaning the data can be time consuming and tedious but it is a necessary step that must be taken (de Vaus, 2014). Neuman (2014) suggests that researchers should check carefully after every coding for accuracy. For this study, accuracy was checked after every careful
coding, and if errors were detected they were corrected and checked again before proceeding to the next stage. At the end of the data entry and coding, the whole data set was cleaned by checking all the categories for impossible codes. For example, a participant’s religious affiliation is coded 1 = Christianity, 2 = Islam, thus, the legitimate codes for this variable are 1 and 2. However, an ‘11’ code was found in the religion variable field which indicated a coded error; it was deleted and recorded correctly. In addition, all the data was verified with the questionnaire for accuracy.

6.10.6 Significance test

Statistical inferences are established on the notion that generalising findings to the population from a sample is a possibility (Figueiredo Filho et al., 2013). However, researchers must guarantee that observed associations in a sample are not as a result of chance (Dahiru, 2008). A significance test is intended to provide objective measures for researchers to make decisions about generalisations that are valid (Figueiredo Filho et al., 2013). Thus, de Vaus (2014) suggested that researchers should understand significance tests before choosing a technique for statistical analysis. A significance test starts with putting forward a “null hypothesis (H₀) and an alternative hypothesis (Hₐ), which describe opposite and mutually exclusive patterns regarding some phenomena” (Figueiredo Filho et al., 2013, p.33).

Generally, a null hypothesis establishes the absence of an association between variables, while an alternative hypothesis establishes that variables are related (Dahiru, 2008). The null hypothesis is usually assessed by the p value, which is between 0 and 1 (de Vaus, 2014; Silva-Ayçaguer et al., 2010). It is recommended that a significant level of 0.05 be specified to help in making decisions whether the null hypothesis should be rejected or accepted (Dahiru, 2008). The lower the p value the less likelihood that the correlation will result from a sampling error. In other words, a low p value reflects a true correlation from a sample, suggesting that the null hypothesis be rejected and the alternative one accepted (de Vaus, 2014). In the present study,
a significance level of 0.05 was set for the inferential statistics to help in making decisions as to whether the null hypothesis should be accepted or rejected.

6.10.7 Hypotheses

The following are the null hypotheses for the present study:

1. Perception of HIV-infected pregnant women does not significantly influence the use of ART for PMTCT
2. Attitudes of HIV-infected pregnant women is not significantly associated with the use of ART for PMTCT
3. There is no significant difference in the attitudes of HIV-infected pregnant women with regards to age, occupation, educational level, place of residence and marital status
4. There is no significant relationship between attitudes and the following: defaulting ART, number of years with HIV, number of years of taking ART, perceived susceptibility, perceived severity and perceived social support.

6.10.8 Statistical analysis

The choice of the statistical tests performed for the current study was based on the type of the data collected (nominal and ordinal) and a review of the literature. Table 6.3 shows a summary of the statistical test used to test the study’s hypotheses.

Table 6.3: Summary of statistical test used to test the study's hypotheses

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Type of analysis</th>
<th>Statistical test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reliability</td>
<td>Cronbach’s alpha</td>
</tr>
<tr>
<td></td>
<td>analysis</td>
<td>alpha</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>Type of analysis</td>
<td>Statistical test</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>1) Perception of HIV-infected pregnant women does not significantly influence the use of ART for PMTCT</td>
<td>Association</td>
<td>Chi-square test</td>
</tr>
<tr>
<td>2) Attitude of HIV-infected pregnant women is not significantly associated with the use of ART for PMTCT</td>
<td>Correlation</td>
<td>Spearman correlation</td>
</tr>
<tr>
<td>3) There is no significant difference in the attitudes of HIV-infected pregnant women with regards to age, occupation, educational level, place of residence and marital status</td>
<td>Independent measures</td>
<td>Kruskal-Wallis test</td>
</tr>
<tr>
<td>4) There is no significant relationship between attitudes and the following: defaulting ART, number of years with HIV, number of years of taking ART, perceived susceptibility, perceived severity and perceived social support.</td>
<td>Correlation</td>
<td>Spearman correlation</td>
</tr>
</tbody>
</table>

### 6.10.8.1 Descriptive statistics

The term descriptive analysis is employed to describe or provide an outline of the data in a comprehensive manner, for example, deducing emerging patterns from a given set of data (Trochim, 2006). If the collected raw data is simply put forward, it will be cumbersome and difficult to understand what the collected data was depicting. Hence, descriptive statistics is important as it aids in presenting the data in a simple and comprehensive manner, which consequently leads to easy analysis and interpretation of data (de Vaus, 2014). De Vaus
(2014) highlighted three ways to conduct descriptive statistics namely: graphical, tabular and statistical. In graphical analysis results are presented as graphs, in tabular analysis results are presented in tables while in statistics results are displayed as a summary (de Vaus, 2014). In this study, descriptive statistics such as frequencies and percentages were conducted in tabular and graphical form to describe the sample with regards to participants' socio-demographics, perceptions and attitudes.

6.10.8.2 Inferential statistics

Inferential statistics uses mathematical methods, of which probability theory is the main component, to draw inferences about population based on the corresponding sample statistics (de Vaus, 2014). This study utilised inferential statistics such as Cross-tabulation, Chi-square test, Mann-Whitney, Kruskal-Wallis and Spearman correlation.

Cross-tabulations

Cross-tabulation analysis is also known as contingency table analysis, and is mainly used to describe relationships between variables (de Vaus, 2014). The cross-tabulation table displays frequency distribution of the variables considered in a matrix format. The table consists of two variables: independent and dependent variables. When creating a cross-tabulation, de Vaus (2014), suggested that the independent variable should be set across the top of the table and columns should be created and allocated for each category, while the dependent variable should be set on the side and rows are created for the categories. For this study, cross-tabulation analysis was carried out using SPSS to determine if there was a relationship between perception and ART. Two types of variables were used to create the tables: independent and dependent variables. The dependent variable included: adhering to ART. The independent variables were: perceived susceptibility and seriousness, perceived barriers to ART, perceived quality of care, and perceived social support. The dependent variable was set on the side, and rows were allocated to the categories. The independent variables were set
across the top and columns were allocated to the categories. Pearson’s Chi-square test was applied to the contingency table to test the significant association between them.

**Pearson’s Chi-square test**

The Chi-square test investigates association between two categorical variables. It is a non-parametric test used to evaluate significant differences (McHugh, 2013). Chi-square test has been used frequently in previous studies on attitudes towards ART (Kasumu and Balogun, 2014). For this study, a Chi-square test was utilised to determine if there was any significant relationship between perception variables and ART at 0.05 level of statistical significance.

**Kruskal-Wallis test**

The Kruskal–Wallis test is primarily used to compare two different populations in a non-parametric way (McCluskey and Lalkhen, 2007). The test involves collecting samples from different populations, ranking the combined data from smallest to largest and then observing the rank distribution. It is employed when the assumptions made through one-way ANOVA are not met. Both the Kruskal-Wallis test and one-way ANOVA determine significant differences to a continuous dependent variable due to a categorical independent variable (with two or more groups). In the ANOVA, it is assumed that the dependent variable is distributed normally and there is approximately equal variance on the scores across groups. However, such assumptions are not made while employing the Kruskal–Wallis Test. Thus, the Kruskal–Wallis test can be used for both continuous and ordinal-level-dependent variables. However, like most non-parametric tests, the Kruskal–Wallis Test is not as effective as the ANOVA (Rumsey, 2007). In the present study, the Kruskal Wallis test was used to investigate the differences in pregnant women’s attitudes towards ART regarding age, occupation, educational level and members of household.

**Mann-Witney test**
The Mann-Whitney test is a nonparametric test used to investigate differences among two groups. In the present study, the Mann-Whitney test was used to determine the differences in attitude regarding place of residence, religion and marital status.

**Spearman's correlation**

Spearman correlation is used in place of Pearson correlation when the data is skewed or fails the normality test (Yadav, 2018). A spearman correlation, denoted as ρ (rho), is performed to determine the direction and strength of association between variables (Yadav, 2018). The Spearman test was used to investigate the correlation between attitude and perception variables (perceived susceptibility, perceived severity and partner support) and uptake of ART. It was also used to determine the correlation between attitude and duration with HIV and also duration of taking ART.

**6.11 Ethical consideration**

The researcher sought ethics approval from the University of Bedfordshire Institute for Health Research Ethics Committee, which was given for both the pilot study and the main survey (Appendix 12). Other ethics approvals also given from the selected teaching hospitals’ ethics committees (Appendices 9, 10 and 11).

**Informed consent**

Written Informed consent was sought from all potential participants for the research. The consent forms were included in each of the questionnaires. The purpose and all that is involved with the questionnaires were fully explained to potential participants who were asked to consent in writing. Information sheets (appendix 13) were given to all potential participants. The researcher made it clear to potential participants that taking part in this research was voluntary, and that, they can withdraw from the study at any time if they wish to do so (Rea and Parker, 2014). Participation was entirely voluntary.
Confidentiality and anonymity were maintained in this study. Names of participants were not required on the questionnaires. Only the researcher had access to the stored raw data. Participants’ identities were protected by omitting any information that could lead to their identification during reporting of the findings.

Data storage

Efficient data management is required for good analysis (Dey, 2003). The data for this study was kept safely and securely. A password protected laptop and encrypted USB were used to store digital data. Questionnaires, consent forms and information sheets were securely stored in a locked cabinet in a secured facility located in the university. Destruction of the data will follow after completion of the study.

Incentive

No incentive was given for this study.

6.12 Chapter summary

The chapter has provided a detailed account of how the second phase (survey) was conducted. It described how the survey questionnaire was developed and the methods used to conduct the survey. The chapter has established the following key points:

- The aim of the survey was to examine how attitudes and perceptions of HIV-infected pregnant women influence their uptake of ART for PMTCT and to identify socio-demographic factors that influence these attitudes.
- The second phase (survey) utilised simple random sampling to recruit participants. Sample size of 264 was statistically determined.
The questionnaire tool was developed using the findings of the first phase qualitative analysis. Themes and quotes from the interviews informed the construction of the survey questions’ wording.

The questionnaire had three sections: A, B and C.

Section A consisted of participants socio-demographic information such as age, level of education, place of residence, marital status, year of diagnosis and when ART was initiated.

Section B consisted of perception questions such as perceived susceptibility, severity, social support and quality of care.

Section C had attitude statements.

The questionnaire was validated by experts in the field, and was pretested in a pilot study which resulted in minor amendments.

Reliability tests were conducted using Cronbach’s alpha.

Copies of the final version of the questionnaire were distributed in person to participants who consented to participate in the survey, and a 98% response rate was achieved.

Statistical analysis involved descriptive analysis, association, independent measures and correlation analysis using SPSS.

Ethical issues were considered; participation was voluntary, informed consent was obtained, confidentiality was maintained and the data was stored securely.

The next chapter presents the findings of the survey.
Chapter 7: Survey Findings

7.1 Introduction

This chapter describes the findings of the second phase (survey) of the present study. The statistical analysis for this study was conducted using the SPSS version 22. Details of the statistical tests are provided in chapter six. This chapter presents the participants’ demographic information and the frequencies of defaulting ART, perceived threat, perceived barriers, perceived quality of care and perceived social support. It then presents the association between perception variables and frequency of defaulting ART. The chapter describes the attitudes of respondents towards ART, as measured by the survey. The chapter presents socio-demographic factors that influence attitudes. Finally, it summarises the participants’ survey responses.

7.2 Description of participants

Survey data was collected from HIV-infected pregnant women residing in the selected two states. At the start of the field work, all the participants were attending ANCs in three tertiary hospitals located in the selected states. Respondents’ socio-demographic details collected in this study include age, marital status, religion, level of education, occupation, other household members and number of years with HIV and ART. Table 7.1 presents the socio-demographic information collected from participants.
Table 7.1: Socio-demographic information

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>Categories</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18-28</td>
<td>82</td>
<td>31.5%</td>
</tr>
<tr>
<td></td>
<td>29-39</td>
<td>136</td>
<td>52.3%</td>
</tr>
<tr>
<td></td>
<td>40-50</td>
<td>42</td>
<td>16.2%</td>
</tr>
<tr>
<td>Marital status</td>
<td>Married</td>
<td>246</td>
<td>94.6%</td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>14</td>
<td>5.4%</td>
</tr>
<tr>
<td>Religion</td>
<td>Christianity</td>
<td>253</td>
<td>98.4%</td>
</tr>
<tr>
<td></td>
<td>Islam</td>
<td>4</td>
<td>1.6%</td>
</tr>
<tr>
<td>Level of education</td>
<td>Primary</td>
<td>30</td>
<td>11.5%</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>87</td>
<td>33.5%</td>
</tr>
<tr>
<td></td>
<td>Tertiary</td>
<td>143</td>
<td>55.0%</td>
</tr>
<tr>
<td>Occupation</td>
<td>Unemployed</td>
<td>61</td>
<td>23.5%</td>
</tr>
<tr>
<td></td>
<td>Self employed</td>
<td>121</td>
<td>46.5%</td>
</tr>
<tr>
<td></td>
<td>Government employed</td>
<td>78</td>
<td>30.0%</td>
</tr>
<tr>
<td>Place of residence</td>
<td>Urban</td>
<td>219</td>
<td>84.2%</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>41</td>
<td>15.8%</td>
</tr>
<tr>
<td>Members of household</td>
<td>Living with spouse</td>
<td>113</td>
<td>43.5%</td>
</tr>
<tr>
<td></td>
<td>Living with spouse and children</td>
<td>122</td>
<td>46.9%</td>
</tr>
<tr>
<td></td>
<td>Living with relatives</td>
<td>12</td>
<td>4.6%</td>
</tr>
<tr>
<td></td>
<td>Living alone</td>
<td>13</td>
<td>5.0%</td>
</tr>
<tr>
<td>Duration of HIV diagnosis</td>
<td>Less than 1 year</td>
<td>55</td>
<td>21.2%</td>
</tr>
<tr>
<td></td>
<td>1-5 years</td>
<td>111</td>
<td>42.7%</td>
</tr>
</tbody>
</table>
Table 7.1 depicts the participants’ demographic information of this study. The ages of respondents were grouped into three categories: 18-28, 29-39 and 40-50. The majority were between the ages of 29-39 years (52.3%), 31.5% were between 18-28 years, only a few of them were between 40-50 years (16.2%). The majority were married or cohabiting (94.6%) and only a few were single (divorced, widowed or never married) (5.4%). Concerning religion, the majority of the respondents were Christians (98.4%) and 1.6% were Muslims. Regarding their educational level, all the respondents had formal education, with the majority educated up to a tertiary degree (55.0%), 33.5% had secondary education and 11.5% had primary education. With regards to occupation, the majority were self-employed (46.5%), 30.0% were government employed and 23.5% were unemployed. The majority (84.2%) resided in urban areas, and 15.8% resided in rural areas. Participants provided information regarding their household members, the majority (46.9%) had spouse and children living with them, 43.5% had only spouse in their household, 5.0% lived alone, while 4.6% had relatives living with them.

Table 7.1 also provided information of how long ago participants knew their HIV status and when they started taking ART to manage the disease. Most of the participants were diagnosed with HIV 1-5 years ago (43.8%), 26.9% were diagnosed 5 – 10 years ago, 21.9% less than 1 year ago, and 7.3% more than 10 years ago. The majority (43.1%) started taking ART 1 – 5

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>Categories</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5-10 years</td>
<td>73</td>
<td>28.1%</td>
</tr>
<tr>
<td></td>
<td>More than 10 years</td>
<td>19</td>
<td>7.3%</td>
</tr>
<tr>
<td>Duration of ART initiation</td>
<td>Less than 1 year</td>
<td>59</td>
<td>22.3%</td>
</tr>
<tr>
<td></td>
<td>1-5 years</td>
<td>112</td>
<td>43.1%</td>
</tr>
<tr>
<td></td>
<td>5-10 years</td>
<td>70</td>
<td>26.9%</td>
</tr>
<tr>
<td></td>
<td>More than 10 years</td>
<td>19</td>
<td>7.3%</td>
</tr>
</tbody>
</table>
years ago, 26.9% started 5 – 10 years, 22.7% started less than 1 year ago and 7.3% started more than 10 years ago.

7.3 Adhering to ART for PMTCT

Participants were asked about their ART medication, and how many times they have defaulted within the month prior to the study, Figure 7.1 depicts their responses. The majority (68.8%) of the women who participated in this study never defaulted in taking their ART medication within the month prior to the start of the study. Only 31.2% have defaulted at least once.

![Figure 7.1: Defaulting ART](image)

7.4 Perception of ART for PMTCT

Perception of ART for PMTCT includes perceived susceptibility, severity, barriers, benefits, social support and quality of care.

7.4.1 Perceived susceptibility

Perceived susceptibility was assessed by asking participants to indicate their awareness of MTCT and their perception about their risk of transmitting HIV to their unborn babies.
Descriptive statistics were conducted to examine percentage distributions of the variables (Table 7.2). The majority of the participants indicated that they were aware that HIV-infected pregnant women could transmit HIV to their unborn babies (93.5%), a few were not aware (2.7%), or had no idea if they could transmit the disease to their children (3.8%). As indicated by Table 7.2, more than half (59.6%) believed that it is possible for their own unborn children to get HIV from them. However, 33.8% disbelieve this possibility, while a few of them (5.8%) are not sure of the possibility of infecting their own children with HIV.

Table 7.2: Perceived susceptibility

<table>
<thead>
<tr>
<th>Perceived susceptibility</th>
<th>Variables</th>
<th>Categories</th>
<th>Frequency (Number)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Can a pregnant woman with HIV transmit the disease to unborn baby?</td>
<td>Yes</td>
<td>243</td>
<td>93.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>7</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I don't know</td>
<td>10</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>Do you believe it is possible for your unborn child to get HIV?</td>
<td>Yes</td>
<td>155</td>
<td>59.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>88</td>
<td>33.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I don't know</td>
<td>15</td>
<td>5.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing</td>
<td>2</td>
<td>0.8</td>
</tr>
</tbody>
</table>

7.4.1.1 Association between perceived susceptibility and adhering to ART

Chi-square tests were performed to determine association between perceived susceptibility and adhering to ART. The results of the Chi-square tests are presented in Table 7.3. As reported in Table 7.3, the majority of the respondents who believed that pregnant women infected with HIV can transmit the disease to their unborn children never defaulted in taking their ART medication within the previous month (68.7%), while 31.3% defaulted. Although, the majority of respondents with perception of susceptibility never defaulted, the Chi-square test revealed that the p value was 0.523. Since the p value was greater than 0.05, it can be concluded that the belief that pregnant women with HIV can transmit the disease to their
children is not significantly associated with adhering to ART for PMTCT ($X^2 = 1.181$, df = 2, $p > 0.05$). For others who believed that their own children could get HIV from them, the majority never defaulted (71.0%), while 28.4% defaulted. However, this difference was not statistically significant ($X^2 = 1.810$, df = 2, $p > 0.05$).

Table 7.3: Association between perceived susceptibility and ART

<table>
<thead>
<tr>
<th>Dependent variable (adherence to ART)</th>
<th>Independent variable (perceived susceptibility)</th>
<th>Count</th>
<th>%</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defaulted</td>
<td>Can a pregnant woman with HIV transmit the disease to her unborn baby?</td>
<td>76</td>
<td>31.3%</td>
<td>44</td>
<td>28.4%</td>
</tr>
<tr>
<td>Never defaulted</td>
<td>Do you believe your unborn child could get HIV?</td>
<td>167</td>
<td>68.7%</td>
<td>111</td>
<td>71.0%</td>
</tr>
<tr>
<td>Pearson Chi square</td>
<td></td>
<td>1.295</td>
<td></td>
<td>1.810</td>
<td></td>
</tr>
<tr>
<td>Df</td>
<td></td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td>0.523</td>
<td></td>
<td>0.405</td>
<td></td>
</tr>
</tbody>
</table>

7.4.2 Perceived severity

Perceived severity was assessed by asking participants to indicate their perception of the severity of HIV in infected children. Descriptive statistics were conducted to examine percentage distributions of the variables (Table 7.4). Table 7.4 revealed that the majority believed that HIV/AIDS is a serious health condition in children (90.4%), 6.5% did not believe HIV is a serious condition in children, while 3.1% were unsure whether it is a serious health condition in children or not. The majority also indicated that the thought of having a child with
HIV scares them (63.1%), 32.3% were not afraid of giving birth to HIV-infected children, while 4.6% were unsure of this fear.

Table 7.6: Perceived severity of HIV in children

<table>
<thead>
<tr>
<th>Perceived seriousness</th>
<th>Variables</th>
<th>Categories</th>
<th>Frequency (Number)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Do you believe HIV/AIDS is a serious health</td>
<td>Yes</td>
<td>235</td>
<td>90.4</td>
</tr>
<tr>
<td></td>
<td>condition in children?</td>
<td>No</td>
<td>17</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I don't know</td>
<td>8</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>The thought of having a child with HIV scares</td>
<td>Yes</td>
<td>164</td>
<td>63.1</td>
</tr>
<tr>
<td></td>
<td>me</td>
<td>No</td>
<td>84</td>
<td>32.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I don't know</td>
<td>12</td>
<td>4.6</td>
</tr>
</tbody>
</table>

7.4.2.1 Association between perceived severity and adhering to ART

Cross-tabulations and Chi-square tests were performed to determine the association between perceived severity and adherence to ART. The results are presented in Table 7.5 below. The table (Table 7.5) revealed that most of the respondents (70.6%) who believed that HIV is a severe condition in children never defaulted in taking their ART medication within the previous month, only 29.4% defaulted, however, there was no significant association. For participants who indicated that having a child with HIV scares them, the majority (84.8%) never defaulted. Only 15.2% defaulted. From the result of the Chi-square test, the p value was 0.000. Thus, it
can be concluded that HIV-infected women with the fear of having a child with HIV are less likely to default ART for PMTCT \( (X^2 = 52.863, \text{df} = 2, \ p = 0.000) \).

### Table 7.4: Association between perceived severity and adhering to ART

<table>
<thead>
<tr>
<th>Dependent variable (adherence to ART)</th>
<th>Independent variable (perceived susceptibility)</th>
<th>Count</th>
<th>%</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defaulted</td>
<td>Do you believe HIV/AIDS is a serious health condition in children?</td>
<td>69</td>
<td>29.4%</td>
<td>25</td>
<td>15.2%</td>
</tr>
<tr>
<td>Never defaulted</td>
<td>The thought of having a child with HIV scares me.</td>
<td>166</td>
<td>70.6%</td>
<td>139</td>
<td>84.8%</td>
</tr>
<tr>
<td>Pearson Chi square</td>
<td></td>
<td>3.682</td>
<td>52.863</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Df</td>
<td></td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td>0.159</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 7.4.3 Perceived barriers

In this study, a perceived barrier was defined as HIV-infected pregnant women’s perception of the psychological and tangible cost of using ART for PMTCT. Perceived barrier was assessed by asking respondents what they think can discourage or prevent them from taking ART. Different reasons were provided for why participants stop or skip taking ART medication within the previous month. Each of these reasons was correlated with adherence to ART for PMTCT. The variables were examined using descriptive analysis to determine their percentage distributions (Table 7.6).
From Table 7.6, it was observed that respondents reported different perceptions about what can prevent them from taking ART during pregnancy and participating in PMTCT. The commonest reason given by participants was simply forgot (45%), others (36.2%) reported being too busy as a reason to skip their ART medication. Some of the participants (24.2%) reported stigma as a barrier to ART and participating in PMTCT, for others (22.7%), ART was defaulted due to side effects. Other reasons for defaulting ART were fear of disclosure (19.6%), lack of privacy of counselling (16.9%), cost of clinic care (16.9%), out of stock of ARVs (13.5%), transport fare to clinic (12.7%), I felt better (12.7%), tired of taking pills every (11.9%), discrimination by staff (11.5%), fear of divorce (9.6) and husband’s consent (6.2%). Table 7.6 also revealed that participants skipped their medication due to lack of food (7.7%), drug was finished (5.8%) refusal to provide care (5.0%), verbal abuse of staff (5.0%), opposition from husband (4.6%), too many pills (4.5%) and poor staff morale (1.9%).

Table 7.5: Perceived barriers to ART and PMTCT

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Husband’s consent</td>
<td>16</td>
<td>6.2%</td>
</tr>
<tr>
<td>Opposition from husband</td>
<td>12</td>
<td>4.6%</td>
</tr>
<tr>
<td>Fear of disclosure</td>
<td>51</td>
<td>19.6%</td>
</tr>
<tr>
<td>Fear of divorce</td>
<td>25</td>
<td>9.6%</td>
</tr>
<tr>
<td>Stigma associated with HIV</td>
<td>63</td>
<td>24.2%</td>
</tr>
<tr>
<td>Discrimination by staff</td>
<td>30</td>
<td>11.5%</td>
</tr>
<tr>
<td>Cost of clinic care</td>
<td>44</td>
<td>16.9%</td>
</tr>
<tr>
<td>Transport fare to clinic</td>
<td>33</td>
<td>12.7%</td>
</tr>
<tr>
<td>Refusal to provide care</td>
<td>13</td>
<td>5.0%</td>
</tr>
<tr>
<td>Poor staff morale</td>
<td>5</td>
<td>1.90%</td>
</tr>
<tr>
<td>Lack of privacy of counselling</td>
<td>44</td>
<td>16.9%</td>
</tr>
<tr>
<td>Out of stock of ARVs</td>
<td>35</td>
<td>13.5%</td>
</tr>
<tr>
<td>Verbal abuse of staff</td>
<td>13</td>
<td>5.0%</td>
</tr>
<tr>
<td>Too busy with house chores</td>
<td>94</td>
<td>36.2%</td>
</tr>
<tr>
<td>Too many pills</td>
<td>12</td>
<td>4.6%</td>
</tr>
<tr>
<td>Variables</td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------</td>
<td>------------</td>
</tr>
<tr>
<td>Has any of the following ever made you skip your medication?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tired of taking pills everyday</td>
<td>31</td>
<td>11.9%</td>
</tr>
<tr>
<td>Drug was finished</td>
<td>15</td>
<td>5.8%</td>
</tr>
<tr>
<td>Simply forgot</td>
<td>117</td>
<td>45%</td>
</tr>
<tr>
<td>Lack of food</td>
<td>20</td>
<td>7.7%</td>
</tr>
<tr>
<td>I felt better</td>
<td>33</td>
<td>12.7%</td>
</tr>
<tr>
<td>To avoid side effects</td>
<td>59</td>
<td>22.7%</td>
</tr>
</tbody>
</table>

### 7.4.3.1 Association between perceived barriers and ART

Cross-tabulations and Chi-square tests were performed to determine whether the variables (perceived barriers) were associated with adherence to ART for PMTCT (Tables 7.7 – 7.10).

Table 7.7 indicates that most of the respondents (87.5%) who perceived that husband’s consent was a barrier to taking ART and participating in PMTCT never defaulted in taking ART, only 12.5% defaulted at least once. However the Chi-square test indicated that the p value is greater than 0.05, thus, it could be inferred that adhering to ART for PMTCT was not significantly influenced by husband’s consent ($X^2 = 2.766$, df = 1, $p = 0.096 >0.05$). For others who reported that opposition from husband was a barrier to ART, the majority never defaulted (83.3%), only 16.7% defaulted at least once within the previous month. The Chi-square test indicated that there is no significant association between opposition from husbands or partners and adhering to ART for PMTCT ($X^2 = 1.231$, df= 1, $p=0.267 >0.05$).

As reported in Table 7.7, of the respondents who perceive that fear of disclosure was a barrier to ART, the majority (72.5%) never defaulted in taking their ART medication, only 27.5% defaulted at least once within the previous month. The result of the Chi-square test revealed a p value greater than 0.05, thus, it was concluded that there is no significant association between fear of disclosure and adherence to ART for PMTCT ($X^2 = 0.406$, df= 1, $p= 0.524 >0.05$). The majority (72.0%) of the participants who reported that fear of divorce was a barrier to ART never defaulted. Only about (28%) defaulted at least once within the previous
month. The Chi-Square test indicated a p value greater than 0.05, thus, it was therefore concluded that there is no significant association between fear of divorce and adherence to ART for PMTCT \( (X^2 = 0.128, df = 1, p = 0.720 >0.05) \). For others who reported that stigma was a barrier to ART, the majority (66.7%) never defaulted in taking ART, while 33.3% defaulted at least once within the previous month. However, there is no significant evidence of an association between HIV-related stigma and adhering to ART for PMTCT \( (X^2 = 0.184, df = 1, p = 0.668, >0.05) \).

Table 7.6: Association between perceived barriers and defaulting ART

<table>
<thead>
<tr>
<th>Dependent variable (adhering to ART)</th>
<th>Independent variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Husband/partner’s consent</td>
</tr>
<tr>
<td>Defaulted</td>
<td>Count</td>
</tr>
<tr>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Never defaulted</td>
<td>Count</td>
</tr>
<tr>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Pearson Chi square</td>
<td></td>
</tr>
<tr>
<td>Df</td>
<td></td>
</tr>
<tr>
<td>P value</td>
<td></td>
</tr>
</tbody>
</table>

Table 7.8 indicates a cross-tabulation of ART adherence with discrimination by staff, cost of clinic care, transport fare, refusal to provide care and poor staff morale. Of the respondents who reported discrimination by staff as a barrier to taking ART and participating in PMTCT, the majority never defaulted (80.0%), while 20.0% defaulted. However, the Chi-square test showed a p value greater than 0.05. This means, discrimination by staff does not significantly influence defaulting ART for PMTCT \( (X^2 = 1.967, df = 1, p = 0.161 >0.05) \). For respondents who reported cost of clinic care as a barrier to taking ART and participating in PMTCT, the majority (65.9%) never defaulted. Only 34.1% defaulted at least one time within the previous month.
According to the Chi-square test, there is no significant association between cost of clinic care and adhering to ART for PMTCT ($X^2 = 0.213$, df = 1, $p = 0.644 >0.05$).

Table 7.8 also indicated that more than half (69.7%) of the respondents who reported transport fare as a barrier to ART never defaulted, only 30.3% defaulted at least once within the previous month. However, the Chi-square test revealed that there is no statistical significant association between transport fare and defaulting ART for PMTCT ($X^2 = 0.013$, df = 1, $p = 0.910 >0.05$). Table 7.8 also depicted that most of the respondents (76.9%) who reported refusal to provide care as a barrier never defaulted within the previous month, while 23.1% defaulted. However, there is no significant association between refusal to provide care and defaulting ART for PMTCT ($X^2 = 0.416$, df = 1, $p = 0.519 >0.05$). The majority (80%) of respondents who believe that poor staff morale can be a barrier to ART, never defaulted in taking ART medication, only 20% defaulted at least once time within the previous month. However, there is no significant association between poor staff morale and defaulting ART ($X^2 = 0.296$, df =1, $p = 0.587 >0.05$).

<table>
<thead>
<tr>
<th>Dependent variable (adhering to ART)</th>
<th>independent variable (perceived barriers)</th>
<th>Discrimination by staff</th>
<th>Cost of clinic care</th>
<th>Transport to clinic</th>
<th>Refusal to provide care</th>
<th>Poor staff morale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defaulted Count</td>
<td>Count</td>
<td>6</td>
<td>15</td>
<td>10</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>20.0%</td>
<td>34.1%</td>
<td>30.3%</td>
<td>23.1%</td>
<td>20%</td>
</tr>
<tr>
<td>Never defaulted Count</td>
<td>Count</td>
<td>24</td>
<td>29</td>
<td>23</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>80.0%</td>
<td>65.9%</td>
<td>69.7%</td>
<td>76.9%</td>
<td>80%</td>
</tr>
<tr>
<td>Pearson Chi square</td>
<td></td>
<td>1.967</td>
<td>0.213</td>
<td>0.013</td>
<td>0.416</td>
<td>0.296</td>
</tr>
<tr>
<td>df</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td>0.161</td>
<td>0.644</td>
<td>0.910</td>
<td>0.519</td>
<td>0.587</td>
</tr>
</tbody>
</table>

From Table 7.9, of the respondents who reported lack of privacy of counselling as a barrier to ART, the majority (79.5%) never defaulted in taking their ART medication, while 20.5% defaulted at least once within the previous month. However, there is no significant association between lack of counselling privacy and adhering to ART for PMTCT ($X^2 = 2.827$, df = 1, $p=$
0.93 >0.05). The majority (71.4%) of the respondents who reported out of stock of ARVs as a barrier never defaulted, 28.6% defaulted at least one time within the previous month. The Chi-square test indicated that there is no significant association between out of stock of ARVs and adhering to ART for PMTCT ($X^2 = 0.126, df = 1, p = 0.723$). Table 7.9 also depicted that the majority (69.2%) of respondents who reported verbal abuse from staff never defaulted, only 30.8% defaulted. However, there is no significant association between verbal abuse of staff and adhering of ART for PMTCT ($X^2 = 0.001, df = 1, p = 0.975 >0.05$).

More than half (52.1%) of the respondents who indicated that too busy with work/house chores was a barrier to ART defaulted in taking their ART medication, 47.9% never defaulted. From the Chi-square test, it was concluded that there is a significant association between too busy with work/house chores and defaulting ART for PMTCT($X^2 = 30.196, df = 1, p = 0.000$). This means, HIV-infected pregnant women were more likely to default their ART medication within the previous month, when they were too busy with work or house chores. More than half (58.3%) of those who reported that too many pills was a barrier never defaulted in taking their ART medication, 41.7% defaulted at least one time within the previous month. According to the Chi square test, there is no significant association between too many pills and adhering to ART for PMTCT within a month ($X^2 = 0.648, df = 1, p = 0.421 >0.05$).

Table 7.8: Association between perceived barriers and adhering to ART

<table>
<thead>
<tr>
<th>Dependent variable (adhering to ART)</th>
<th>Independent variables (perceived barriers)</th>
<th>Lack of privacy of counselling</th>
<th>Out of stock of ARVs</th>
<th>Verbal abuse of staff</th>
<th>Too busy with house chores</th>
<th>Too many pills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defaulted</td>
<td>Count</td>
<td>9</td>
<td>10</td>
<td>4</td>
<td>49</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>20.5%</td>
<td>28.6%</td>
<td>30.8%</td>
<td>52.1%</td>
<td>41.7%</td>
</tr>
<tr>
<td>Never defaulted</td>
<td>Count</td>
<td>35</td>
<td>25</td>
<td>9</td>
<td>45</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>79.5%</td>
<td>71.4%</td>
<td>69.2%</td>
<td>47.9%</td>
<td>58.3%</td>
</tr>
<tr>
<td>Pearson Chi square</td>
<td></td>
<td>2.827</td>
<td>0.126</td>
<td>0.001</td>
<td>30.196</td>
<td>0.648</td>
</tr>
</tbody>
</table>
From Table 7.10, more than half (54.8%) of the respondents who reported ‘tired of taking pills everyday’ as a barrier to ART never defaulted, however, 45.2% of them defaulted in taking their ART medication. The Chi-square test indicated that there is no statistical evidence of any association between ‘tired of taking pills everyday’ and defaulting ART ($X^2 = 3.220, df = 1, p = 0.073 > 0.05$). Table 7.10 also indicated that more than half (53.3%) of the respondents who reported ‘drug was finished’ as a barrier to ART, defaulted at least once within the previous month, about 46.7% never defaulted. The Chi-square test revealed that there is no significant association between drug was finished and frequency of defaulting ART for PMTCT ($X^2 = 3.651, df = 1, p = 0.56 > 0.05$). Slightly above half (51.3%) of the respondents who simply forgot to take their medication within the previous month defaulted at least once, however, nearly half (48.7%) never defaulted. The Chi-square test revealed a strong statistical evidence of association between simply forgot and defaulting ART for PMTCT ($X^2 = 40.183, df = 1, p = 0.000$). This suggests that HIV-infected pregnant women who forget to take their medication are more likely to default ART for PMTCT.

The highest percentage (60.0%) of those who reported ‘lack of food’ as a reason not to take their ART medication defaulted at least once within the previous month, only 40.0% never defaulted. From the Chi-square test result, there is a significant association between lack of food and defaulting ART ($X^2 = 8.406, df = 1, p = 0.004 < 0.05$). Table 7.10 also indicated that 57.6% of respondents who skipped or stopped taking their medication because they felt better never defaulted, however, 42.4% defaulted. There is no statistical evidence of association between feeling better and defaulting ART. ($X^2 = 2.238, 1, p = 0.135 > 0.05$). The majority (66.1%) of respondents who reported side effects as a barrier to ART never defaulted.
however, 33.9% defaulted. there is no statistical evidence of any association between side effects and defaulting ART for PMTCT ($X^2 = 0.268$, df = 1, p= 0.605 > 0.05).

Table 7.9: Association between perceived barriers and ART

<table>
<thead>
<tr>
<th>Dependent variable (adhering to ART)</th>
<th>Independent variables (perceived barriers)</th>
<th>Tired of taking pills everyday</th>
<th>Drug was finished</th>
<th>Simply forgot</th>
<th>Lack of food</th>
<th>I felt healthy</th>
<th>Side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defaulted</td>
<td>Count</td>
<td>14</td>
<td>8</td>
<td>60</td>
<td>12</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>45.2%</td>
<td>53.3%</td>
<td>51.3%</td>
<td>60.0%</td>
<td>42.4%</td>
<td>33.9%</td>
</tr>
<tr>
<td>Never defaulted</td>
<td>Count</td>
<td>17</td>
<td>7</td>
<td>57</td>
<td>8</td>
<td>19</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>54.8%</td>
<td>46.7%</td>
<td>48.7%</td>
<td>40.0%</td>
<td>57.6%</td>
<td>66.1%</td>
</tr>
<tr>
<td>Pearson Chi square</td>
<td></td>
<td>3.220</td>
<td>3.651</td>
<td>40.183</td>
<td>8.406</td>
<td>2.238</td>
<td>0.268</td>
</tr>
<tr>
<td>Df</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td>0.073</td>
<td>0.56</td>
<td>0.000</td>
<td>0.004</td>
<td>0.135</td>
<td>0.605</td>
</tr>
</tbody>
</table>

7.4.4 Perceived quality of care

Perceived quality of care was assessed by asking respondents to indicate how they felt about the ART and PMTCT services they were receiving, and how they were treated by staff when accessing the services. First of all, a descriptive statistics (frequencies) was performed to examine the percentage distributions of respondents’ perception of the quality of ART and PMTCT services they received (Table 7.11). Further, the variables were correlated with adherence to ART (Table 7.12) using Cross-tabulations and Chi-square tests.
From Table 7.11, the majority (74.2%) received the kind of care they wanted, 47.3% expressed how staff explains everything and listen to them, and 36.5% expressed how they were treated with respect and dignity. However, 11.9% reported to have been ignored or avoided by staff and 6.2% expressed that they were disrespected or abused.

Table 7.10: Perceived quality of care

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>When using PMTCT services, did any of the following happen to you?</td>
<td>Staff ignored you or avoided taking care of you</td>
<td>31</td>
<td>11.9%</td>
</tr>
<tr>
<td></td>
<td>You were treated with disrespect or abused</td>
<td>16</td>
<td>6.2%</td>
</tr>
<tr>
<td></td>
<td>Staff explains everything and listens to you</td>
<td>123</td>
<td>47.3%</td>
</tr>
<tr>
<td></td>
<td>You were treated with respect and dignity</td>
<td>95</td>
<td>36.5%</td>
</tr>
<tr>
<td></td>
<td>You were given the kind of care you wanted</td>
<td>193</td>
<td>74.2%</td>
</tr>
</tbody>
</table>

7.4.4.1 Association between perceived quality of care and ART

Cross-tabulations and Chi square tests were performed to determine if perceived quality of care was associated with adhering to ART (Table 7.12).

Table 7.12 shows the association between perceived quality of care and adherence to ART for PMTCT. More than half (54.8%) of those who expressed that staff ignored or avoided them never defaulted in taking ART medication within the previous month, however, 45.2% defaulted at least once. The Chi-square test indicated that there is no significant association between staff ignoring or avoiding HIV-infected pregnant women attending ANCs and defaulting ART.
(X²=3.220, df=1, p= 0.073 >0.05). For others who were abused or treated with disrespect, half (50.0%) defaulted at least once within the previous month, while 50.0% never defaulted. The Chi-squared test indicated that there was no significant association between being abused or disrespected and defaulting ART for PMTCT (X²=2.823, df=1, p=0.093 >0.05). The majority (68.3%) of those who reported that staff listen and explain everything to them when they access ART services never defaulted, only 31.7% defaulted. However, there is no significant association between staff listening and explaining everything to HIV-infected pregnant women and adhering to ART for PMTCT (X²=0.033, df=1, p= 0.855 >0.05).

For respondents who were treated with dignity and respect, most of them (70.5%) never defaulted in taking their ART medication, only 29.5% defaulted at least once within the previous month. However, there is no significant association between being treated with dignity and respect and adhering to ART (X²= 0.197, df=1, p= 0.657 >0.05). For others who were given the kind of care they wanted, most of them (73.6%) never defaulted in taking their ART medication within the previous month, only 26.4% defaulted at least once. The Chi-square test indicated that there is a significant association between being given the kind of care they wanted and adhering to ART for PMTCT (X² = 7.809, df=1, p=0.005 < 0.05).

Table 7. 11 Association between perceived quality of care and ART

<table>
<thead>
<tr>
<th>Dependent variable (Adhering to ART)</th>
<th>Independent variable (perceived quality of care)</th>
<th>Count</th>
<th>%</th>
<th>Count</th>
<th>%</th>
<th>Count</th>
<th>%</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defaulted</td>
<td>Staff ignored you or avoided taking care of you</td>
<td>14</td>
<td>45.2%</td>
<td>8</td>
<td>50.0%</td>
<td>39</td>
<td>31.7%</td>
<td>28</td>
<td>29.5%</td>
</tr>
<tr>
<td></td>
<td>You were treated with disrespect or abused</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staff explains everything and listens to you</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>You were treated with respect and dignity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>You were given the kind of care you wanted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never defaulted</td>
<td>Count</td>
<td>17</td>
<td>54.8%</td>
<td>8</td>
<td>50.0%</td>
<td>84</td>
<td>68.3%</td>
<td>67</td>
<td>70.5%</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Count</td>
<td></td>
<td></td>
<td>142</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td></td>
<td></td>
<td>73.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 7.4.5 Perceived social support

Perceived social support was assessed by asking respondents to indicate how their husbands or partners support them in accessing and using ART. Also, respondents were required to indicate what reminds them to take their ART medication. A descriptive statistics was performed to examine the percentage distribution of the variables (Tables 7.13 - 7.15).

#### 7.4.5.1 Disclosure of ART

Table 7.13 shows the frequency of participants’ disclosure of their ART medication. As reported in Table 7.13, the majority (65.9%) of the respondents have disclosed their ART medication to their partners. 6.1% have also disclosed to other family members. Respondents also indicated that it was difficult to take ART in the presence of community (58.0%) and family members (41.7%).

**Table 7.12 Disclosure of ART**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does your spouse/partner know you are taking ART?</td>
<td>174</td>
<td>65.9%</td>
</tr>
<tr>
<td>Apart from your partner, do all other adults living in your household know you are taking ART?</td>
<td>16</td>
<td>6.1%</td>
</tr>
<tr>
<td>Is it difficult to take ART when a family member can see you?</td>
<td>110</td>
<td>41.7%</td>
</tr>
</tbody>
</table>
Is it difficult to take ART when a community member can see you? | 153 | 58.0

7.4.5.2 Association between disclosure and ART

Table 7.14 shows the association between disclosure and adherence to ART for PMTCT. From table 7.14, the majority (69.0%) of respondents whose partners have knowledge of their status never defaulted in taking their ART medication, only 31% defaulted. However, there is no significant association between partners having knowledge of their wives’ ART treatment and adhering to ART for PMTCT ($X^2 = 0.22, df = 1, p = 0.882 > 0.05$). The majority (87.5%) of participants who had disclosed to other family members living with them never defaulted, only 12.5% defaulted. However, this disclosure was not significantly association with adhering to ART for PMTCT ($X^2 = 3.320, df = 2, p = 0.190$). Of the participants who indicated that they have difficulty taking their ART medication in the presence of family members, the majority (62.7%) never defaulted, while 37.3% defaulted, however, there was no significant association ($X^2 = 5.312, df = 3, p = 0.150, > 0.05$). In addition, 68.0% of participants who find it difficult to take ART in the presence of a community member never defaulted, while 32% defaulted, no significant association was established for this difference ($X^2 = 0.262, df = 2, p = 0.877, >0.05$).

Table 7.13 Association between disclosure and ART

<table>
<thead>
<tr>
<th>Does your spouse/partner know you are taking ART?</th>
<th>Do all other adults living in your household know you are taking ART?</th>
<th>Is it difficult to take ART when a family member can see you?</th>
<th>Is it difficult to take ART when a community member can see you?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defaulted</td>
<td>Count</td>
<td>54</td>
<td>2</td>
</tr>
<tr>
<td>%</td>
<td>31.0%</td>
<td>12.5%</td>
<td>37.3%</td>
</tr>
</tbody>
</table>
Table 7.14: Reminders

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Husband/partner</td>
<td>135</td>
<td>51.9%</td>
</tr>
<tr>
<td>Other family members</td>
<td>52</td>
<td>20.0%</td>
</tr>
<tr>
<td>Friend</td>
<td>14</td>
<td>5.4%</td>
</tr>
<tr>
<td>Colleague</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Diary or calendar</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Phone or clock alarm</td>
<td>69</td>
<td>26.5%</td>
</tr>
</tbody>
</table>

7.4.5.3 Reminders

Table 7.15 shows different reminders used by the respondents to remind themselves of the time to take their ART medication. As indicated in Table 7.15, approximately 51.9% of the respondents reported that their spouse remind them to take their ART medication, 26.5% use their phone/clock alarm to remind themselves of when to take their medication, 20.0% that other family members remind them, 5.4% reported that friends remind them and 0.4% use diary/calendar as a reminder. None was reminded by colleagues.
1.1.1.1.1 Association between reminders and uptake of ART

Chi square tests were performed to determine if there is any association between reminders and adherence to ART (Tables 7.16).

As shown in Table 7.16, the majority (79.3%) of the respondents whose husbands/partners reminded them to take their medication never defaulted, only 20.7% defaulted. The result from the Chi-square test revealed that there is a significant association between partners reminding their wives to take medication and adhering to ART for PMTCT ($X^2 = 14.196$, df=1, $p= 0.000$).

For others who were reminded by other family members to take their medication, most of them (76.9%) never defaulted in taking ART, only 23.1% defaulted. However, the Chi-square test revealed that there is no significant association between family members reminding them to take their ART medication and adhering to ART for PMTCT ($X^2 = 1.977$, df=1, $p= 0.160 >0.05$).

The majority (71.4%) of the respondents whose friends reminded them to take medication never defaulted, only 28.6% defaulted at least once within the previous month. However, there is no significant association between friends reminding women to take medication and adhering to ART for PMTCT ($X^2 = 0.046$, df= 1, $p= 0.830 >0.05$). Most (69.6%) of the participants who use phone/clock alarm as a reminder never defaulted, only 30.4% defaulted at least once within the previous month. However, there is no significant association between using phone/clock alarm as a reminder and adhering to ART for PMTCT ($X^2=0.209$, df=1, $p= 0.648 >0.05$).

Table 7.15 Association between reminders and ART

<table>
<thead>
<tr>
<th>Dependent variable (adhering to ART)</th>
<th>Husband/partner</th>
<th>Other family members</th>
<th>Friend</th>
<th>Phone or clock alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defaulted</td>
<td>Count</td>
<td>28</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>%</td>
<td>20.7%</td>
<td>23.1%</td>
<td>28.6%</td>
<td>30.4%</td>
</tr>
<tr>
<td>Never defaulted</td>
<td>Count</td>
<td>107</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------</td>
<td>-----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>%</td>
<td></td>
<td>79.3%</td>
<td>76.9%</td>
<td>71.4%</td>
</tr>
<tr>
<td>Pearson Chi-square</td>
<td>14.196</td>
<td>1.977</td>
<td>0.046</td>
<td>0.023</td>
</tr>
<tr>
<td>Df</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td>0.000</td>
<td>0.160</td>
<td>0.830</td>
</tr>
</tbody>
</table>

### 7.4.5.4 Partner support

Table 7.17 shows the different ways participants believed they were supported by their partners with regards to accessing and utilising ART and PMTCT services. Table 7.17 indicated that slightly above half (52.1%) of the respondents received encouragement from their partners to take their ART medication, 13.1% indicated how their husbands accompany them to the clinic and 12.3% expressed how their husbands assist them with house chores to enable them take ART medication.

**Table 7.16: Partner support**

<table>
<thead>
<tr>
<th>How is your husband/partner involved in your treatment?</th>
<th>Variables</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>He encourages me to take my medication</td>
<td>136</td>
<td>52.3%</td>
</tr>
<tr>
<td></td>
<td>He accompanies me to the clinic</td>
<td>34</td>
<td>13.1%</td>
</tr>
<tr>
<td></td>
<td>He assists me with house chores to enable me take my medication</td>
<td>32</td>
<td>12.3%</td>
</tr>
</tbody>
</table>

### 1.1.1.1.2 Association between husband/partner support and adhering to ART

Chi square tests were performed to determine if there is any association between husband/partner support and adherence to ART (Table 7.18).

As reported in Table 7.18, the majority (80.9%) of the respondents who received encouragement from their partners to take their ART medication never defaulted, only a few (19.1%) defaulted at least once within the previous month. The Chi-square test showed that
there is a significant association between husbands encouraging their wives to take their ART medication and adhering to ART ($X^2 = 18.523, \text{ df } = 1, p = 0.000$). Most (79.4\%) of the respondents whose partners accompany them to the clinic never defaulted within the previous month, only 20.6\% defaulted. However, there is no significant association between husbands accompanying wives to clinic and adhering to ART for PMTCT ($X^2 = 2.036, \text{ df } = 1, p = 0.154, >0.05$). For others whose partners assisted with house chores to enable them take their ART medication, the majority (78.1\%) never defaulted in taking their medication, only a few (21.9\%) defaulted at least once within the previous month. However, there is no significant association between husbands assisting their wives with house chores and adhering to ART for PMTCT ($X^2 = 1.465, \text{ df } = 1, p = 0.226 >0.05$).

**Table 7.17: Association between partner support and defaulting ART**

<table>
<thead>
<tr>
<th>Dependent variable (adhering to ART)</th>
<th>Independent variable (husbands/partner support)</th>
<th>He encourages me to take my medication</th>
<th>He accompanies me to the clinic</th>
<th>He assists me with house chores to enable me take my medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defaulted</td>
<td>Count</td>
<td>26</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>19.1%</td>
<td>20.6%</td>
<td>21.9%</td>
</tr>
<tr>
<td>Never defaulted</td>
<td>Count</td>
<td>110</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>80.9%</td>
<td>79.4%</td>
<td>78.1%</td>
</tr>
<tr>
<td>Pearson Chi square</td>
<td></td>
<td>19.261</td>
<td>2.036</td>
<td>1.465</td>
</tr>
<tr>
<td>Df</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td>0.000</td>
<td>0.154</td>
<td>0.226</td>
</tr>
</tbody>
</table>

**7.5 Attitude towards ART**

This section describes the attitudes of respondents towards ART for PMTCT. Attitudes towards ART were assessed by providing statements about ART and asking respondents to indicate their level of agreement on a five-point Likert scale. A descriptive statistics was performed to
show the percentage distribution of respondents’ attitudes towards ART. Table 7.19 displays their level of agreement of the statements.

Table 7.19 revealed that most pregnant women showed positive attitude towards ART with the majority agreeing or strongly agreeing to statements about the benefits of ART. About 96.5% of the respondents believed that taking ART during pregnancy will prevent MTCT, 82.3% believed that taking ART makes them live healthy, 85.0% that ART will prolong their lives, 78.5% that ART reduces frequent sicknesses, 75% that ART helped them to gain weight and 74.7% believed that ART prevent them from being sick. Respondents also indicated positive attitudes by disagreeing with negative statements about ART. About 88.0% disagreed with the statement about taking ART only when they feel sick, 94.2% disagreed that ART will harm their babies, 85% disagreed that ART side effects can cause stillbirth or miscarriage and 83.1% disagreed that there is no need to take ART once they feel better.

**Table 7.18: Attitudes towards ART**

<table>
<thead>
<tr>
<th>Attitude Statements</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART makes me live healthy</td>
<td>F 8 F 13 F 25 F 92 F 122</td>
<td>% 3.1% % 5.0% % 9.6% % 46.9%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ART prolongs life</td>
<td>F 3 F 12 F 22 F 103 F 118</td>
<td>% 1.2% % 4.6% % 8.5% % 45.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ART helps me to gain more weight/energy</td>
<td>F 2 F 13 F 50 F 128 F 67</td>
<td>% 0.8% % 5.0% % 19.2% % 25.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ART reduces frequent sickness</td>
<td>F 3 F 17 F 36 F 133 F 71</td>
<td>% 1.2% % 6.5% % 13.8% % 27.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By staying on my ART medication, I can prevent MTCT</td>
<td>F 0 F 1 F 7 F 161 F 90</td>
<td>% 0.0% % 0.4% % 2.7% % 34.6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By staying on ART I can prevent being sick</td>
<td>F 2 F 14 F 48 F 133 F 61</td>
<td>% 0.8% % 5.4% % 18.5% % 23.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 7.5.1 Socio demographic factors influencing attitudes towards ART

Kruskal-Wallis tests were performed to test for significant differences in attitudes regarding age, educational level, occupation and members of household (Table 7.20). A pairwise comparison was done for variables that were significant (Tables 7.21 – 7.22 and Figures 7.2 - 7.3). A Mann-Whitney test was also performed to determine significant differences in attitudes among respondents of different marital status, religion and place of residence (Table 7.23).

#### 7.5.1.1 Kruskal Walis test for socio-demographic factors influencing attitudes

From Table 7.20, the Kruskal-Wallis test revealed that there were significant differences in attitudes towards ART and the following socio-demographic factors: level of education ($p = 0.003$) and members of household ($p = 0.006$). Since the $p$ values for educational level, and members of household are below 0.05, the null hypothesis was rejected and it was concluded that there are significant differences in attitudes towards ART among respondents of different educational levels [$X^2 (2, n = 260) = 11.649, p < 0.05$] and members of household [$X^2 (3, n = 260) = 12.428, p < 0.05$]. For age and occupation, the $p$ values were more than 0.05: $p = 0.168$ and $p = 0.175$ respectively. Since there is no statistical evidence to reject the null hypothesis,
it can be inferred that there is no significant difference in attitudes towards ART among respondents of different age groups \[X^2 (2, n = 260) = 3.564, p > 0.05\] and occupation \[X^2 (2, n = 260) = 3.492, p > 0.05\).

**Table 7.19 Kruskal-Wallis test for socio-demographic differences in attitudes**

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Independent Variables</th>
<th>N</th>
<th>Mean Rank</th>
<th>(X^2)</th>
<th>df</th>
<th>Asymp. Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attitude 18 – 28</td>
<td>82</td>
<td>126.89</td>
<td>3.564</td>
<td>2</td>
<td>0.168</td>
</tr>
<tr>
<td></td>
<td>Attitude 29 – 39</td>
<td>136</td>
<td>126.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attitude 40 – 50</td>
<td>42</td>
<td>150.51</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>260</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Level of education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attitude Primary</td>
<td>30</td>
<td>108.00</td>
<td>11.649</td>
<td>2</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>Attitude Secondary</td>
<td>87</td>
<td>114.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attitude Tertiary</td>
<td>143</td>
<td>144.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>260</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attitude Unemployed</td>
<td>61</td>
<td>136.34</td>
<td>3.492</td>
<td>2</td>
<td>0.175</td>
</tr>
<tr>
<td></td>
<td>Attitude Self-employed</td>
<td>121</td>
<td>121.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attitude Government employed</td>
<td>78</td>
<td>140.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>260</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Members of household</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spouse</td>
<td>113</td>
<td>143.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attitude Spouse and children</td>
<td>122</td>
<td>126.87</td>
<td>12.42</td>
<td>3</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>Relatives</td>
<td>12</td>
<td>75.92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alone</td>
<td>13</td>
<td>99.35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>260</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 7.21 shows the result of a pairwise comparison for educational level. From Table 7.21 and Figure 7.2, it can be concluded that there is no significant difference in attitudes towards ART between respondents with secondary and primary education (p>0.05). However, there are significant differences between secondary and tertiary (p<0.05), and also between primary and tertiary (p<0.05). This implies that respondents with tertiary education have more positive attitudes towards ART in comparison with respondents with secondary and primary education.

**Table 7.20: Multiple pairwise comparison for education level**

<table>
<thead>
<tr>
<th>Group pair</th>
<th>Test statistics</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary-secondary</td>
<td>-6.833</td>
<td>1.00</td>
</tr>
<tr>
<td>Primary-tertiary</td>
<td>-36.75</td>
<td>0.04</td>
</tr>
<tr>
<td>Secondary-tertiary</td>
<td>-29.918</td>
<td>0.01</td>
</tr>
</tbody>
</table>

**Figure 7.2: Pairwise comparison for educational level**
Table 7.22 shows the result of multiple pairwise comparison for members of household. According to Table 7.22 and Figure 7.3, the pairwise test revealed that there were no significant differences found for five of the group pairs: living alone—relatives (p > 0.05), living alone—children plus spouse (p>0.05), living alone—spouse (p>0.05), relatives—children plus spouse (p >0.05), spouse—children plus spouse (p >0.05). The pairwise comparison result revealed a significant difference between one group pair: spouse—relatives (p = 0.017). This suggests that HIV-infected pregnant women who live with their spouse have more positive attitudes compared to those living with relatives (p < 0.05).

Table 7.21: Pairwise comparison for members of household

<table>
<thead>
<tr>
<th>Group pairs</th>
<th>Test statistics</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living alone – relatives</td>
<td>-23.49</td>
<td>1.00</td>
</tr>
<tr>
<td>Living alone – children plus spouse</td>
<td>27.523</td>
<td>1.00</td>
</tr>
<tr>
<td>Living alone – spouse</td>
<td>44.455</td>
<td>0.258</td>
</tr>
<tr>
<td>Relatives – children plus spouse</td>
<td>50.952</td>
<td>0.149</td>
</tr>
<tr>
<td>Spouse – relatives</td>
<td>67.884</td>
<td>0.017</td>
</tr>
<tr>
<td>Spouse – children plus spouse</td>
<td>16.932</td>
<td>0.504</td>
</tr>
</tbody>
</table>
7.5.1.2 Mann U Whitney test for socio-demographic factors influencing attitudes

A Mann-Witney test was used to determine if there were significant differences in attitudes towards ART among respondents of different marital status, religion and place of residence. From the Mann-Whitney test result (Table 7.23), the distribution of attitudes across participants’ religious groups is not significantly different with a p value of 0.420. This implies that, HIV-infected pregnant women’s attitudes towards ART is not statistically different among those who are Christians (Mean Rank = 130.03, n = 256) and Muslims (Mean Rank = 160.50, n = 4) (U = 392.00, Z = -0.806, p>0.05). According to Table 7.23, the distribution of attitude across the marital status categories is the same, with a p value of 0.593. Since the p value is greater than the significance level of 0.05, the null hypothesis was not rejected. It can be deduced that the HIV-infected pregnant women’s attitudes towards ART for PMTCT is not significantly different among those that are married (Mean Rank= 131.09, n=246) and those single (Mean Rank= 120.07, n=14) (p >0.05, U= 1576.0, Z= -0.535). Table 7.23 also depicts that the distribution of attitudes across the different places of residence is not significantly different, with a p value of 0.571. It can be concluded that HIV-infected pregnant women’s attitudes towards ART is not significantly different among those living in urban (Mean rank = 129.36, n = 219) and those in rural areas (Mean rank = 136.60, n = 41) (U = 4239.5, Z = -0.567, p>0.05).

Table 7.22: Mann U test for socio-demographic differences in attitudes towards ART

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean Rank</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christianity</td>
<td>256</td>
<td>130.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>Rank</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Islam</td>
<td>4</td>
<td>160.50</td>
<td>392.00</td>
<td>33288</td>
<td>-0.806</td>
<td>0.420</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>246</td>
<td>131.09</td>
<td>1576.00</td>
<td>1602.0</td>
<td>-0.535</td>
<td>0.593</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>14</td>
<td>120.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>219</td>
<td>129.36</td>
<td>4239.50</td>
<td>28329.5</td>
<td>-0.567</td>
<td>0.571</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>41</td>
<td>136.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 7.5.2 Relationship between attitude towards ART and years with HIV and ART

A Spearman correlation test was performed to determine the direction and strength of association between attitudes towards ART and number of years with HIV as well as number of years with ART (Tables 7.24—7.25).

From the Spearman correlation test (Table 7.24), there was a significant relationship between attitude towards ART and number of years with HIV, with a positive spearman (rho) value, indicating a positive weak relationship. The null hypothesis was rejected. It can be concluded that, as the number of years with HIV increases, HIV-infected pregnant women’s attitudes also increases (rho = 0.311, p = 0.000), meaning they become more positive towards using ART for PMTCT.

**Table 7. 23: Correlation between attitude towards ART and years with HIV**
From Table 7.25, the result of the Spearman correlation indicates that there was a significant relationship between attitude towards ART and duration of taking ART with a positive Spearman (rho) value of 0.369, indicating a positive weak relationship. The null hypothesis was rejected, it was concluded that, as the number of years of taking ART increases, HIV-infected pregnant women’s attitude also increases (rho = 0.369, p = 0.000), meaning they become more positive.

Table 7.24: Correlation between attitudes towards ART and duration of taking ART

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Number of years with HIV</th>
<th>Correlation Coefficient</th>
<th>N</th>
<th>Sig. (2-tailed)</th>
<th>Attitude towards ART</th>
<th>Correlation Coefficient</th>
<th>N</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho with HIV</td>
<td>1.000</td>
<td>0.311**</td>
<td>260</td>
<td>.000</td>
<td>1.000</td>
<td>.000</td>
<td>260</td>
<td></td>
</tr>
<tr>
<td>Attitude towards ART</td>
<td>.311**</td>
<td>1.000</td>
<td>260</td>
<td>.000</td>
<td>1.000</td>
<td>.000</td>
<td>260</td>
<td></td>
</tr>
</tbody>
</table>

7.5.3 Relationship between attitudes towards ART and rate of adhering to ART

A Spearman correlation test was performed to determine the direction and strength of association between adherence to ART, partner support, perceived susceptibility, perceived severity and attitudes towards ART.
Table 7.26 shows the result of a Spearman test to determine the strength of relationship between adhering to ART and attitudes towards ART. The Spearman test (Table 7.23) indicates a moderate positive relationship between adhering to ART and attitudes towards ART (rho = 0.499, p = 0.000). This rejects the null hypothesis and suggests that, as HIV-infected pregnant women’s attitude towards ART becomes more positive, adherence to ART also increases (p = 0.000).

Table 7.25: Relationship between attitudes towards ART and adherence to ART

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Attitude towards ART</th>
<th>Correlation Coefficient</th>
<th>Adherence to ART</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1.000</td>
<td>0.499**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.</td>
<td>0.000</td>
</tr>
<tr>
<td>N</td>
<td>260</td>
<td>260</td>
<td></td>
</tr>
<tr>
<td>ART uptake</td>
<td>Correlation Coefficient</td>
<td>0.499**</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>260</td>
<td>260</td>
<td></td>
</tr>
</tbody>
</table>

7.5.4 Relationship between attitudes towards ART and perceived partner support

Table 7.27 shows the results of a Spearman test to determine the strength of the relationship between partner support and attitudes towards ART. From the Spearman rank test depicted in Table 7.27, there is a positive strong relationship between husband/partner support and attitudes towards ART (rho = 0.708, p = 0.000). Thus, the null hypothesis was rejected, suggesting that, as HIV-infected pregnant women’s support from their partner or husband increases, their attitudes towards ART becomes more positive (P = 0.000).
Table 7.26: Relationship between attitudes towards ART and husband/partner support

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Husband/partner support</th>
<th>Attitude towards ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho Correlation Coefficient</td>
<td>1.000</td>
<td>0.708**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
<td>260</td>
</tr>
<tr>
<td>N</td>
<td>260</td>
<td>260</td>
</tr>
</tbody>
</table>

7.5.5 Relationship between attitudes towards ART and perceived susceptibility

The relationship between attitudes towards ART and perceived susceptibility was assessed using a spearman correlation. The Tables (Tables 7.28—29) show the results of the Spearman test. From Table 7.28, there is no relationship between attitudes towards ART and perceived susceptibility, thus, the null hypothesis was accepted (rho = -0.010, p = 0.868).

Table 7.27 Relationship between attitudes towards ART and perceived susceptibility

<table>
<thead>
<tr>
<th>Correlation Coefficient</th>
<th>Perceive susceptibility</th>
<th>Attitude towards ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.000</td>
<td>-0.010**</td>
<td></td>
</tr>
</tbody>
</table>
### 7.5.6 Relationship between attitudes towards ART and perceived severity

From Table 7.29, there is no significant relationship between attitudes towards ART and perceived severity (\( \rho = 0.066, p = 0.286 \)).

#### Table 7.28 Relationship between attitudes towards ART and perceived severity

<table>
<thead>
<tr>
<th></th>
<th>Perceived severity</th>
<th>Attitude towards ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho</td>
<td>1.000</td>
<td>0.066**</td>
</tr>
<tr>
<td>Perceived severity</td>
<td>260</td>
<td>260</td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.286</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>260</td>
<td></td>
</tr>
<tr>
<td>Attitude towards ART</td>
<td>0.66**</td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.286</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>260</td>
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</tr>
</tbody>
</table>

### 7.6 Chapter summary

This chapter presented the results of the statistical analysis of the second phase (survey) of the current study. Both descriptive and inferential statistics were performed to test the study’s hypotheses. The following were established in this chapter:

- The majority of the participants were Christians, married, self-employed, lived in urban areas and were within the ages of 29 – 39 years.
While the majority of the participants (68.8%) reported to have fully adhered to their ART medication, a significant number of them (31.2%) defaulted within the month prior to the study.

The main reasons for defaulting ART as indicated in the analysis were: simply forgot, too busy with work/house chores, to avoid side effects, fear of disclosure, lack of privacy for counselling, cost of clinic care, feeling health/cured and lack of food.

The majority of the respondents have disclosed their ART medication to their partners. Participants received support from their partners in terms of reminding and encouraging them to take ART, accompanying them to clinics and assisting with house chores.

The Chi-square analysis established significant associations between adherence to ART for PMTCT and fear of having an HIV-positive child (perceived seriousness), husband/partner reminding and encouraging wives to take their ART medication, and being given the kind of care they wanted. Too busy with house chores, simply forgot and lack of food were significantly associated with defaulting ART for PMTCT.

The Kruskal-Wallis test revealed that attitudes towards ART for PMTCT differ significantly in some socio-demographic factors such as level of education and members of household.

The strongest correlation as revealed by the Spearman correlation test was indicated between attitudes towards ART and husband/partner support. Moderate correlation was found between attitudes towards ART and adherence to ART, while the weakest were indicated between attitudes towards ART and years with HIV and duration of taking ART.

The next chapter discusses and integrates findings of both qualitative and quantitative phases of the current study.
Chapter 8: Discussion

8.1 Introduction

The aim of the present study was to improve the understanding of the attitudes and perceptions of HIV-infected pregnant women towards the use of Antiretroviral Therapy (ART) to prevent mother-to-child transmission (MTCT) of HIV in the Niger Delta region of Nigeria. This aim was achieved through the utilisation of an exploratory sequential mixed methods, which consisted of two phases. Phase one involved the collection and analysis of qualitative data through the use of semi-structured interviews. Phase two involved the collection and analysis of survey data through the administration of questionnaires. The findings of phase one (semi-structured interviews) and phase two (survey) are presented in chapters five and seven.

This chapter discusses and integrates the analysis of both the qualitative and quantitative phases of this study in relation to the body of literature, theory and practice. In addition, the study’s limitations and contribution to knowledge are outlined.

8.2 Discussion of qualitative findings

The qualitative data was collected by conducting in-depth face-to-face interviews with HIV-infected pregnant women of the Niger Delta region of Nigeria. A sample of 24 individuals was selected for this study. Utilising a thematic analysis, eight main themes were derived from participants’ quotes in the 24 interview transcripts. The eight themes identified were: knowledge of PMTCT, threat from the susceptibility of the illness and the severity, perceived benefits of ART, perceived barriers, perceived roles in ART treatment, perceived negative behaviours of health care providers, coping strategies, and women’s suggestions to scale-up
ART for PMTCT. Each of the themes is discussed separately in relation to the body of literature.

8.2.1 Knowledge of PMTCT

The interviews revealed that most of the women had their first HIV test during their ANC visits. This finding contrasted those of other Nigerian studies where the majority of their participants voluntarily accessed HIV testing due to the desire to have knowledge of their HIV status (Amu, Olatona and Onayade, 2014; Ikechebelu et al., 2006; Olugbenga-Bello et al., 2012; Onyeonoro et al., 2014). The interviewed women considered the ANC testing to be a compulsory requirement for starting ANC. The Nigerian guidelines on ANC testing are in accordance with the WHO voluntary testing which allows one to decline or accept (NFMH, 2016). However, it appears that when implementing these strategies at the local level, changes are sometimes made such that what protects women’s rights to make decisions is disregarded (Rudrum, Oliffe and Brown, 2017). This was the case with the compulsory enactment of ANC testing at the study sites.

Although HIV screening represents a good opportunity to identify infected women, prevent MTCT and further transmission to partners, mandatory screening deprives women of the right to make decisions about their treatment and violates their autonomy (Ifemeje, 2012). In other instances, the interviewed women tested as a mandatory requirement for church weddings. Prospective couples are required by their Nigerian churches to test for HIV before marriages are conducted (Olugbenga-Bello et al., 2012). Despite the benefits associated with the mandatory pre-wedding testing in terms of helping to identify infected persons for early treatment and prevention, researchers have argued that, since it violates peoples’ rights, it should be made voluntary (Ifemeje, 2012). Other women in the present study were diagnosed due to ill health. This was consistent with finding from a study where ill-health was a reason to seek HIV testing (Musheke et al., 2013).
Although all the interviewed women knew that an infected mother can transmit HIV to her child, they displayed lack of knowledge about the modes of MTCT. This was in contrast with findings from Nigeria, where knowledge of MTCT was reported to be high among pregnant women attending ANCs (Dinwoke and Okafor, 2013; Moses, 2009; Olugbenga-Bello et al., 2013). However, lack of MTCT knowledge among HIV-infected mothers has been reported in qualitative studies conducted in other African settings (Mariwah et al., 2017; Ramoshaba and Sithole, 2017). In Ramoshaba and Sithole’s (2017) study to explore awareness of PMTCT, South African women lacked knowledge about MTCT; they believed that breast milk was healthy and cannot infect their babies, also, their babies can only be infected if they have an injury. Similarly, Mariwah et al. (2017) reported that Ghanaian women believed that MTCT cannot occur during pregnancy.

Despite being on PMTCT, the interviewed women displayed misconceptions about MTCT. Some of the women believed that MTCT occur through kissing the baby, cutting the umbilical cord during delivery and by exposing the baby to the mother’s naked body. Similar findings were reported in a Sudanese study, where women believed that MTCT occur through kissing (Elsheikh, Crutzen and Van den Borne, 2015). Other types of misconceptions were reported in other Nigerian studies utilising women as samples to investigate perception of PMTCT. In Olugbenga-Bello et al.’s (2013) study, Nigerian women believed that MTCT occur through mosquito bites. The misconception and lack of knowledge about MTCT reported in the present study is worrisome, as noted by Duff et al. (2010), that knowledge of MTCT and ART played key roles in accessing and using ART for PMTCT. Boateng and Awunyo-Vitor (2012) opined that low knowledge opens the window for MTCT.

The interviewed women expressed good understanding of the function of ART during pregnancy. Women highlighted that the sole aim of giving ART to a pregnant woman was to prevent transmission to the child. Women also expressed good understanding of other measures of PMTCT such as formula feeding and hospital delivery. This aligns with
Olugbenga-Bello et al.’s (2013) study where women identified that delivering in hospitals was a way to prevent MTCT.

8.2.2 Threat from the susceptibility and severity of the illness

In the present study, women reported a perception of threat. Perceived threat includes two perceptions: perceived susceptibility and perceived severity. According to the HBM, perceived susceptibility refers to a person’s beliefs about the level of their risk of having a health problem, and perceived severity is a person’s beliefs about the seriousness of a health condition (Frewen, Schomer and Dunne, 1994). In this study, perceived susceptibility refers to HIV-infected pregnant women's perceptions of susceptibility of their unborn children to HIV, while perceived severity is HIV-infected pregnant women’s perception of seriousness of the consequences of HIV in infants. Women perceived that their unborn children were susceptible to contracting HIV from them via MTCT. This was consistent with other studies (Elsheikh, Crutzen and Borne, 2015; Neves and Gir, 2006; Igumbor, Pengpid and Obi, 2006), where unborn children were perceived to be at risk of MTCT by mothers.

In Elsheikh, Crutzen and Borne’s (2015) qualitative study, it was reported that Sudanese women who participated in the study believed that there was a high possibility of their children getting infected with HIV. Similarly, in another qualitative study (Adedimeji et al., 2012), women also believed that MTCT was a possibility. Although the interviewed women believed MTCT was a possibility for HIV-infected women, some of them held that, as long as they were taking ART, it was no longer possible to transmit the virus to their unborn children. In the present study, descriptions of susceptibility were mainly elaborated through expressions of fear related to death of the child later in life, caring for a sick child and daily medication in childhood. Some expressed that they found themselves thinking about ways to prevent transmission of the disease to their children.
Pregnant women also perceived HIV as a serious condition in infants. The participants were afraid of the consequences of HIV in children, and this motivated them to take ART to prevent transmission to their infants. Some of the pregnant women perceived the consequences to be disastrous. They believed that the children would not be able to withstand the pain and sickness from HIV infection, which can lead to death. This finding was in agreement with other studies (Elsheikh, Crutzen and Borne, 2015; Neves and Gir, 2006) which reported that women perceive HIV in children as disastrous. In Elsheikh, Crutzen and Borne’s (2015) study, women believed that HIV had serious consequences in a child that could lead to disabilities and death. Many of the pregnant women in the present study found themselves affiliated to religion due to these perceived disastrous outcomes that the HIV would bring to their children. They want their children to survive, thus, they always prayed for God to protect their children from HIV. The two perceptions were associated with motivation to use ART for PMTCT. Similarities can be drawn from the HBM, which proposes that people will take health-related actions (using ART), if they perceive themselves at risk of a condition (MTCT risk), and if the condition (HIV) is perceived as severe (Frewen, Schomer and Dunne, 1994).

8.2.3 Perceived benefits and motivators of ART

Since the use of ART, it has been effective against the HIV and MTCT, leading to a reduction in morbidity, mortality and risk of MTCT. Thus, ART has received positive reviews from HIV-infected women (Connor et al., 1994; Schrimshaw, Siegel and Lekas, 2005; WHO, 2015). In the present study, results from the interview indicated that women suffering from HIV had overwhelmingly positive perceptions for receiving ART and believed its effectiveness. Perceived effectiveness of ART is a key factor that impacts its adherence (Buesseler et al., 2014; Murithi, Mash and Vanderbilt, 2015). In addition, perceived effectiveness of ART is believed to enhance positive attitudes (Chesney, 2000), and this might explain why most of the interviewed participants exhibited positives attitudes towards ART.
The interviewed women believed that ART would benefit them, as well as their babies, in several ways such as reducing the viral load, prolonging life, making them live healthy and preventing MTCT of HIV. These perceived benefits of ART reported by the interviewed women were the reasons for their motivation and utilisation of ART for PMTCT. However, several studies found negative perceptions of pregnant women regarding ART, which discouraged them from accessing and utilising ART (Levi, 2009; Stinson and Myer, 2012; Stinson et al., 2010). In these studies, women had doubts regarding the effectiveness of the therapy to prevent MTCT, some of them believed that ART could harm their babies or kill them, while some of them also believed that the medical intervention for HIV was not required (Levi, 2009; Stinson and Myer, 2012; Stinson et al., 2010). However, in the present study, the major motivation for initiating and continuing in ART treatment was the desire to give birth to healthy babies free of HIV. Many of the interviewed women chose to take ART so that their babies would be protected against infection from the HIV virus.

Other studies also found that women took ART to prevent MTCT. In a study conducted in Ghana among HIV-infected women, it was reported that women were motivated to utilise ART because they believe that ART was capable of protecting their babies from HIV infection (Boateng, Kwapong and Agyei-Baffour, 2013). Similarly, in Uganda, pregnant women’s desire to give birth to healthy babies (free of HIV) motivated their use of ART (Buregyeya et al., 2017). Whereas giving birth to healthy babies free of HIV motivated women to take ART, this may carry risks as women’s motivation to use ART may reduce once breastfeeding stops or after the baby is born, leading to poor adherence or discontinuation of their ART medication. In the present study, some pregnant women reported poor adherence of their ART medication when they were not pregnant or not breastfeeding. Similar findings were reported in Uganda (Buregyeya et al., 2017) and Tanzania (Ngarina et al., 2013). In these studies, women lost their motivation to use ART after successfully protecting their babies from HIV. This suggests the need for a comprehensive counselling and support mechanism to prepare pregnant women...
to sustain treatment after pregnancy and breastfeeding, and to emphasise the benefit of ART to their own health.

Pregnant women were also motivated to take ART because it reduces the viral load in their bodies, and protects them and their babies from the virus harming them. Viral load is defined as the amount or concentration of HIV in the blood (Steinmetzer et al., 2010). The higher the concentration of HIV in the body, the lower will be the CD4 cell count and hence, there will be a higher risk of contracting other illnesses and becoming sicker (Steinmetzer et al., 2010). Studies have suggested that a minimum of 95% adherence level is required to minimise HIV/AIDS progression and to maintain a long-term suppression of the viral load (Kim et al., 2014; Orrell et al., 2003). In the present study, pregnant women believed that taking antiretroviral drugs kills the virus in the body, improves their immunity and protects them and their babies from the disease, hence, improving their physical health.

Pregnant women expressed how their CD4 count increased on taking ART, and this means that the virus in the body is dying. They believe that the more drugs they take the lower will be the viral load. Similar findings have been reported by other studies. In Boateng, Kwapong and Agyei-Baffour’s (2013) study, participants believed that ART covers the virus and prevents it from increasing, thus keeping them and their babies healthy. Similarly, in another study by Schrimshaw, Siegel and Lekas (2005), it was found that women considered ART as beneficial because it improves their health and reduces the viral load. In contrast to the findings of the present study, McKinney et al.’s (2015) study found that Malawian women stop taking their ART medication once they realise their viral load has decreased. They have a perception that a time will come when they can stop taking the medication, if they take it regularly for a long time (McKinney et al., 2015).

Life expectancy is an important health indicator and has negative relation with HIV prevalence (McGuire et al., 2005). Taking ART leads to significant increase in life expectancy and quality of life (Campos et al., 2009). The interviewed women prefer to take antiretroviral drugs because
they believe that it will improve their physical health. Women expressed how they were motivated to take ART regularly due to their experience of improved physical health after taking ART. Similar findings were reported by Campos et al. (2009), who found that 66.4% of the patients in their study had very good quality of life after receiving four months of ART. The will to live longer and healthier life motivated the women in the present study to take ART regularly. Some of the women stated how they wanted to live longer so that they could take care of their children and mother. In a qualitative study, it was found that participants were aware of the health benefits of using ART (Vitalis and Hill, 2017). These health benefits included reducing risk of illness and death, reducing MTCT risk during pregnancy and breastfeeding, and improving their health (Vitalis and Hill, 2017).

Whereas improved physical health was a source of motivation for the majority of the women in the present study, some pregnant women reported low adherence or stopped taking ART when they felt cured due to improved health. This finding is consistent with those of other studies, for example, Ngarina et al. (2013) reported that women who felt relatively healthy stopped taking their ART medication. Another study by McKinney et al. (2015), reported that Malawian women who felt healthy skipped their ART medication. Similarly, in Nigeria, cross sectional studies conducted in other parts of the country have also reported that HIV-infected pregnant women missed their ART medication because they felt there was no need to take ART drugs since they felt healthy (Igwegbe, Ugboaja and Nwajiaku, 2010). The present study highlights the need for healthcare professionals to educate pregnant women on the importance of the continuity of treatment irrespective of their improved health, and to emphasise the fact that undetectable viral load or feeling better is not an indication that they are cured (Nieuwkerk and Oort, 2005).

Some of the interviewed pregnant women considered ART as a source of hope since there exists, currently, no known cure for HIV. They believed that ART helps them to sustain their health until some cure is discovered. They prayed that ART could end their sickness. Women felt that in the near future, a permanent cure for HIV will be discovered, and this was a
motivation for them to take ART. This finding was in contrast with Ngarina et al.’s (2013) study where Tanzanian women felt hopeless and were not interested in taking ART. In Zambia, women also felt hopeless, lacking the desire to live, and were ready to die rather than committing themselves to taking ART for life (Murray et al., 2009). Similarly, Indonesian women felt there was no hope, since HIV was incurable and they disbelieved in the effectiveness of ART, so they stopped taking ART (Lumbantoruan et al., 2018). To ease their suffering, pregnant women in the present study started looking for solutions or reasons based on religion to rely on. Pregnant women believed that if God gave us the sense to trace ART, He will help with tracing the cure. This was a source of hope and motivation for ART uptake. Whereas believing in God for a cure motivated uptake of ART in the present study, in a recent South African study, women stopped taking their ART medication because they believed God healed them through their pastors (Adeniyi et al., 2018).

8.2.4 Perceived barriers and concerns about ART

Different factors were identified as barriers to ART, which discouraged or stopped women from taking their ART medication. These barriers include long waiting times at hospitals, forgetfulness, side effects, lack of food, fear of C-section and perception of being healthy. Some of these factors were consistent with those identified in other studies. For example, recent studies have reported barriers such as: stigma, side effects, taking ART daily, forgetfulness, lack of food (Adeniyi et al., 2018; Buregyeya et al., 2017; and Murray et al., 2009), feeling healthy and too busy with work (Ngarina et al., 2013). In the present study, pregnant women expressed how being too busy with work led to forgetting to take their medications on time. They missed their doses from time to time. Pregnant women acknowledged the fact that they missed their doses while doing house or office work. Similar findings were reported in Ngarina et al.’s (2013) study, where participants did not find time to take their ART medication due to the daily life demands of both house and work duties. In another study (Adeniyi et al., 2018), women were unable to pick up their ART medication
because they were busy at work, for others, the clinic schedules interfered with their jobs, leading to poor adherence to ART.

Similar with findings from other regions of Nigeria (Igwegbe, Ugboaja and Nwajiaku, 2010; Olowookere et al., 2008), forgetfulness was identified as a reason for women to miss their ART medication. Some of the participants in this study used their mobile phones to set alarms and reminders in order to take their ART medicines on time. This agreed with findings from other studies. For example, in recent qualitative studies conducted in Ethiopia (Bezabhe et al., 2014) and Lesotho (Axelsson, Hallager and Barfod, 2015), mobile phone alarms were used as reminders to take ART. In other studies, supportive text messages were found to be positively associated with ART adherence (Bärnighausen et al., 2011; Horvath et al., 2012). At the time this study was conducted, sending messages as reminders for HIV-infected pregnant women was not an option in the selected hospitals. With the increasing use of mobile phones in Nigeria (Menson et al., 2018), adopting the use of a message reminder service for HIV-infected pregnant women could be a medium to reduce forgetfulness and enhance uptake of ART for PMTCT.

Most of the interviewed participants showed their dissatisfaction with services at the hospital. Accessing ART services at the hospitals was found to be a very time-consuming task. In the interviews, pregnant women complained how they spent their whole day in the clinic and expressed fear of having their careers ruined due to the long waiting hours. This long waiting time at the hospitals was a major reason that led some participants to avoid the treatment. Similar results were obtained by Miller et al. (2010), where they found the long time needed for treatment to be a barrier to treatment in spite of severe health conditions. Another study by Lumbantoruan et al. (2018), also reported that women expressed dissatisfactions with long waiting time, although in this study waiting time did not prevent access to treatment; women accepted the situation and hoped that it could be minimised. Qualitative studies carried out in South Africa (Miller et al., 2010) and Tanzania (Mshana et al., 2006) found that transportation time to access ART services was also a reason to avoid treatment.
In the present study, fear of having an elective caesarean section (ECS) discouraged pregnant women to access ART and PMTCT services close to their delivery due date. Participants explained how they gave birth at home in their previous pregnancies because of the fear of having an ECS. This was not surprising as studies have established that Nigerian women prefer vaginal delivery as it is culturally accepted and makes them real women, and consider ECS as abnormal (Ezeome, Ezugworie and Udealor, 2018; Jeremiah, Nonye-Enyidah and Fiebai, 2011; Sunday-Adeoye and Kalu, 2011). The call for educational intervention to empower HIV-infected pregnant women to make decisions based on what will benefit them and their babies’ health remains urgent. Also, counselling on ECS should be incorporated into ANCs’ classes.

Antiretroviral drugs (ARVs) are known to have both short- and long-term adverse effects. These effects vary for different drugs, drug classes and patients (Montessori et al., 2004; Carr and Cooper, 2000). These drugs are linked with hypersensitivity, lipodystrophy, mitochondrial toxicity and several drug-specific effects (Montessori et al., 2004). In the present study, nearly half of the women had concerns about the side effects of ART on their health. Some of the participants complained about having sleepless nights due to raised body temperatures after taking ARVs. Because of this, they sometimes skipped doses to have sound sleep. Participants felt discouraged to take medication due to the known side effects the drugs cause. This finding supports those of previous studies. In a report by Ammassari et al. (2001), the patients taking ART self-reported symptoms such as nausea, anxiety, confusion, anorexia, insomnia, taste perversion, fat accumulation and vision problems. Bam et al. (2015), assessed enablers and barriers of ART adherence and found that 61.9% of non-adherence respondents skipped medication because of side effects. However, adherence to ART is crucial for survival, to reduce risk of MTCT, and to improve quality of life and overall health. This suggests the need to provide counselling and educational intervention on how women can cope with the adverse effects of ART. Hawkins (2010) stated that knowledge of adverse effects of ART remains vital for both patients and healthcare providers.
Researchers have identified that people find it difficult to take medications regularly for long durations; they find it to be inconvenient (Farrell, Merkley and Ingar, 2013). In the present study, some participants felt unhappy, annoyed and uncomfortable taking drugs every day. In one study, it was found that the reasons for discontinuing or missing ART drug doses were being worried about having to take too many pills (Ammassari et al., 2001). In another study, women discontinued ART because they were tired of taking their ART pills (Adeniyi et al., 2018).

8.2.5 Perceived roles in ART treatment

The interviewed women believed they have roles to play in taking their ART medication. They believed that for the medication to function effectively in the body, diet, personal hygiene and partner support were necessary. These are discussed in the following sub-sections.

8.2.5.1 Perception about diet and ART

Many of the interviewed women in the current study found it necessary to have a healthy diet while undergoing antiretroviral treatment. They felt that drugs could adversely affect the HIV-infected patients when taken without food. It was therefore important to take care of themselves, by eating lots of fresh fruits and vegetables to build their immunity while taking medications like ARVs, to prevent adverse effects from the drugs. Thus, pregnant women advocated that the government should create initiatives and distribute food or provide money to the HIV-positive people living in the villages. According to the women, these people are dying of the disease as ART drugs cannot be taken on an empty stomach. This finding agreed with studies in Namibia (Tuhadeleni, Opotamutale and Nuuyoma, 2016), where women who participated in the study expressed how they eat before taking their medication to prevent dizziness (side effect). In this Namibian study, participants recommended that the government should provide food support to people taking ART. It appears in relevant studies that food
support is associated with increased utilisation of ART (Iroezi et al., 2013; Martinez et al., 2014).

Equally, it has been found in various researches that food insecurity negatively impacts ART outcomes. In a study by Weiser et al. (2009), it was found that food insecurity was prevalent in half of the HIV-infected poor individuals living in urban settings of San Francisco. Chop et al. (2017) specifically investigated the effect of food insecurity on uptake of ART among HIV-positive women. They found that food insecurity and hunger were common barriers for women to initiate and adhere to ART. Similarly, some of the women in the present study reported missing their ART medication due to hunger. Ivers et al. (2009) stated that as the HIV infection progresses, it creates a catabolic state in the body and makes infected individuals more susceptible to infections. This may be compounded by lack of calories and nutrient intake that leads to worsening of malnutrition (Ivers et al., 2009). Hence, the Nigerian government should take appropriate measures and create policies to provide food to poor HIV-positive women in order to increase the use of ART for PMTCT.

8.2.5.2 Perception about support and ART

Generally, many women face problems when they disclose their HIV-positive status to their sexual partners. In a study by Rujumba et al. (2012), most of the women do not prefer to disclose their HIV status due to fear of abandonment, violence, or of being accused of bringing infection into the family. Some of them took the help of their healthcare provider to disclose this sad news. However, those who disclosed their HIV status experienced positive responses from their partners (Rujumba et al., 2012). In the present study, the married individuals were greatly supported by their husbands. They felt that on sharing their HIV status and taking ART to their partners, they no longer had to take them secretly. This helped them to take ART regularly and timely. Some of the participants who refused to start taking the ART treatment were encouraged by their partners to start the medication. Some of the individuals received help from their husbands in domestic chores which helped them to take medication on time.
Pregnant women felt thankful to their husbands for caring about them and always reminding them to take the drugs on time. Therefore, the husbands' awareness of their wives' HIV treatment encouraged them to receive the treatment and take the medications on time.

This study therefore argues that medical treatment in combination with psychological and social support can help improve the use of ART for PMTCT. This reinforces the view that the government should promote an environment where women can disclose their status easily and get support from family members without fear of stigmatization. This finding is in agreement with other studies (Beals et al., 2006; McKinney, 2015); which suggested that medical attention alone is not enough for a successful ART delivery, as it also requires psychological and social support which incorporates encouragement. However, this finding disagreed with several qualitative studies (Colombini et al., 2016; Lumbantoruan et al., 2018; Vitalis and Hill, 2017).

Whereas disclosure to partners helped women to get support and take their ART medication regularly in the present study, it was a source of pain and stress for women from Guyana (Vitalis and Hill, 2017). In this Guyanese study, women who disclosed to partners or relatives had discriminating experiences such as being shunned, verbal abuse and uncomfortable living conditions (Vitalis and Hill, 2017). Similarly, in a recent Indonesian study (Lumbantoruan et al., 2018), male partners were physically and mentally abusive to their wives; they threw their wives medications away and prevented them from accessing and adhering to ART by refusing to give money for transport fare to clinic.

8.2.5.3 Perception about hygiene and ART

Hygiene is generally accepted as having a positive impact on health, especially for those living with HIV/AIDS since they may experience more hospitalisations, severe diarrhoea and deaths from opportunistic infections than uninfected individuals (Yates et al., 2015). Hygiene is considered a critical measure in preventing disease among HIV-infected people (Bartram and Cairncross, 2010). During the interviews for the present study, women understood the importance and role of personal, environmental and food hygiene to their health and that of
the babies while taking ART. They expressed how they cleaned their environment, food and took good care of themselves to stay healthy and help their ART medication to function well. Some of the participants believed that practising hygiene reduces the occurrence of opportunistic infections. Similar findings were reported in Namibia, where personal hygiene was believed to minimise infectious diseases in HIV patients (including women) (Tuhadeleni, Opotamutale and Nuuyoma, 2016).

8.2.6 Perceived negative behaviours of health care providers

Studies reported that women’s perception of the quality of ART services they receive influenced their use of the services (Boateng, Awunyor-Vitor and Jasaw, 2012; Valencia-Garcia et al., 2017). Due to the discriminating behaviours towards the HIV/AIDS patients in medical settings, women do not prefer to get tested, or receive health care services and they do not adhere to the recommended treatments (Ledda et al., 2016; Marranzano et al., 2013; Valencia-Garcia et al., 2017). The stigmatising behaviours of HIV healthcare providers towards patients are inversely linked with the satisfaction of patients with the health services (Li et al., 2013). This prevents voluntary access to counselling, testing and treatment in women suffering from HIV/AIDS (Valencia-Garcia et al., 2017). In the present study, some of the participants complained about being refused healthcare by their healthcare providers. Sometimes, the healthcare providers simply ignored the women or pass them on to the other person. Ultimately, no one looked after the concerns of these women. The participants also pointed out that such rude behaviour is liable to discourage the desire to access and use ART in future.

In the present study, some of the interviewed women reported how they were verbally abused by doctors during delivery of their babies. According to the interviews, such doctors reportedly used negative words and shouted at them, telling them not to opt to have a baby. They showed no sympathy or empathy towards the HIV-infected pregnant women as these made them unhappy. One of the interviewed women reported how the doctor put fear in her, telling her
that she will die during childbirth because of her blood that was low. This aligns with a Tanzanian study (Kruk et al., 2014), where scolding and shouting were reported as common behaviours of healthcare providers towards women. Similarly, in Ghana (Dapaah, 2016), some health workers condemned their clients (women) of being immoral because they thought that they had caught HIV through sex work. This Ghanaian study cited an instance where a doctor described a woman as a blockheaded who was not worthy to receive ART treatment (Dapaah, 2016). In some cases the patients who were rich and educated received high quality and immediate treatment by staff, however, the poor and uneducated had to wait in long queues to receive healthcare services (Dapaah, 2016). In a study by Andersen (2004), this kind of treatment was referred to as ‘differential treatment’. Such unprofessional attitudes discouraged the patients from opting for treatment (Andersen, 2004). However, in Indonesia, the interactions between HIV-infected women and healthcare providers seemed adequate as women described their health providers as kind and friendly (Lumbantoruan et al., 2018).

In the present study, the interviewed women’s expectations of their communications with providers were explicit, they craved for support, respect, warmth, feelings of confidence and trust, and also desired for providers who care about them. Boehme et al. (2012) opined that the client-provider relationship is connected with client satisfaction and treatment, and also plays a key role in HIV positive clients’ lives and well-being. Chochinov (2007) argued that healthcare professionals can impact positively on the experience of clients by displaying genuine empathy which will in turn promote the right conduct and effective communication. Providing healthcare with empathy that recognizes the individual beyond their requirement for care should be an important target of policies (Chochinov, 2007).

8.2.7 Coping strategies

Coping strategies was a theme that emerged during the thematic analysis. HIV-infected women experience different stressors associated with the chronic nature of the disease and taking life-long ART (Bravo et al., 2010; Brown et al., 2015). Kotzé et al. (2013) opined that
employing coping strategies is essential in reducing psychological distress associated with HIV/AIDS and ART. The interviewed women reported coping well in relation to their status and taking ART. The women demonstrated different coping strategies related to their religious beliefs, non-disclosure, acceptance and believing that HIV is not the worst disease.

Living with HIV can be difficult for women, as it manifests profound emotional and physical consequences especially in African settings like Nigeria where there is HIV-related stigma (Odimegwu, Akinyemi and Alabi, 2017). Women are more vulnerable to HIV-related stigma and are often denoted as prostitutes, unfaithful and vectors (Paudel and Baral, 2015). Many HIV-infected women have been abandoned by their community and family members (Owowabi et al., 2012). The present study indicated that women chose not to disclose their status to their friends, relatives (excluding partners) and community members to avoid being stigmatised. Non-disclosure became a strategy for coping with HIV-related stigma. Most of the women disclosed selectively; they only disclosed to their partners to receive support to cope with stressors related to HIV and ART. Not disclosing to other family members and friends was a way to prevent negative reactions such as abandonment and rejection. This finding is consistent with others studies, where fear of abandonment, rejection and violence were reasons not to disclose their status (Arrey et al., 2015; Hult et al., 2012).

Women indicated strong faith and beliefs about healing. Women believed that God would heal them of HIV. This belief about receiving healing from God did not translate into a belief that ART is unnecessary. Although, it seems conflicting to believe in supernatural healing and at same time depend on taking man-made drugs, it appears that most of the interviewed women were able to reconcile God’s ability to heal them and their understanding of staying on ART to remain well. The interviews revealed that women used prayer as a religious strategy to buffer stressors related to HIV and taking ART. Women’s faith in God and religious beliefs were a source of hope and strength, as well as a motivation to use ART for PMTCT. This is in contrast to other studies where religious beliefs were hindrances to using PMTCT services in Malawi.
(Muheriwa et al., 2013). In this Malawian study, respondents reported a perception that women who trust in God ought not to use PMTCT services (Muheriwa et al., 2013).

The interviews also highlighted how women coped with their status and taking ART by accepting the situation the way it is. Women understood that there is nothing they can do to change the situation. This finding is consistent with the body of literature, where HIV status acceptance was a coping strategy for HIV-infected women (Ashaba et al., 2017; Kotzé et al., 2013; Myint and Mash, 2008). In contrast, Kohli et al. (2014), reported denial and worrying about the future as coping strategies among HIV-infected Indian adults (including women). The interviews also revealed that women comforted themselves by comparing HIV with other diseases such as hypertension, diabetes and cancer, which they believe kill faster. They observed that HIV is not the worst condition, and the fact that they can eat anything gave them a feeling of consolation and relief.

8.2.8 Women’s suggestions to scale-up ART for PMTCT

In the present study, pregnant women gave their suggestions on how to improve uptake of ART during pregnancy in the areas they believed require improvement. Pregnant women believe that the knowledge about using ART for PMTCT is not sufficient as most people still believe that once ART is started, it takes them closer to their grave. They suggested that the government should create awareness programmes that will reach out to women in rural areas to empower them to know the effectiveness of ART for PMTCT. Some of the interviewed women highlighted the need for seminars to be conducted in both urban and rural areas to improve knowledge of ART for PMTCT. Others emphasised that radio and television stations should be used to create awareness about ART for PMTCT. Radio and television are known to be readily available to most Nigerians (Olugbenga-Bello et al., 2013). Thus, it is important to use these media to educate the public about ART for PMTCT.
Pregnant women also highlighted the need for ART and PMTCT services to improve. They expressed the importance of good provider-patient relationship, and suggested that staff should improve the way they speak to them, be polite and nice, encouraging patients. In Nigeria, similar suggestions have been reported, where participants recommended that HIV clinic staff should be polite and be taught communication skills (Olowookere et al., 2012). A food support programme was also advocated by the interviewed women. Women believed that lack of food prevents access to and use of ART for PMTCT. They suggested that the government should support them with food.

8.3 Discussion of quantitative findings

This section discusses the findings of the second phase (survey) of the study. The survey analysis is presented in chapter seven. The findings are discussed under sub-headings and compared with the existing body of literature.

8.3.1 Adhering to ART for PMTCT

The survey findings revealed that 68.8% reported to have fully adhered to their ART medication within the month prior to the start of the study. About 31.2% missed taking their ART medication at least once in the month prior to the start of the study. This finding aligns with Adeniyi et al. (2018) study conducted in South Africa, where about 31.0% of HIV-infected pregnant women were non-adherent to ART. The finding was lower than other Nigerian studies that focused on adherence to ART who reported 37.1 % (Oloowokere et al., 2008) and 37.4% (Shaahu et al., 2008) non-adherence, but much lower than 53% reported by a recent Nigerian study (Oginni et al., 2018). The reason for this difference may be due to the smaller sample size (66) used in the Oginni et al. study. This finding of 31.2% of the participants missing their ART medication is a key finding with important health implication on HIV-infected pregnant women. The percentage of the surveyed pregnant women missing their ART doses is worrisome, necessitating a timely intervention to optimise ART for PMTCT. Different ways need to be
investigated on how HIV-infected pregnant women can have a better understanding of how to overcome potential barriers to ART, and the significance of ART adherence in preventing MTCT.

8.3.2 Perception towards ART for PMTCT

This section of the chapter discusses the survey findings related to perceptions about ART.

8.3.2.1 Perceived susceptibility and severity

The survey indicated that most (93.5%) of the pregnant women knew that women infected with HIV could transmit HIV to their children. This was consistent with findings from Ghana, where the majority of the respondents (87.7%) had awareness of MTCT (Boetang, Kwapong and Agyei-Baffour, 2013). However, the awareness in this study was higher than similar findings from other studies in Nigeria where 76% (Owoaje, Omidokun and Ige, 2012) and 68% (Abiodun, Ijaiya and Aboyeji, 2007) were reported to be aware of MTCT among pregnant women. A possible explanation for the higher awareness of MTCT in the present study could be because these Nigerian studies were conducted in rural areas in comparison to the present study that was conducted in urban cities where women are more accessible to healthcare information and education (Nwagwu and Ajama, 2011). Another possible reason for the high awareness of MTCT could partly be due to the counselling given to HIV-infected pregnant women as part of the PMTCT programme. The pregnant women were also knowledgeable about the risk of transmitting HIV to their own unborn children (59.6%). This result is similar to and in agreement with findings from Ethiopia where 62.9% of pregnant women knew the possibility of MTCT (Asefa and Beyene, 2013). In the present study, about 63.1% of the pregnant women expressed that the thought of having a child with HIV scared them. Also, about 90.4% believed HIV remained a serious health condition in children.

Further analysis indicated that perception of susceptibility of their unborn children did not influence the use of ART for PMTCT. This is in contrast to other studies where perceived
susceptibility was statistically associated with utilisation of PMTCT services (de Paoli, Manongi and Klepp, 2004; Deressa et al., 2014). This finding is also in contrast to the HBM which states that perceived susceptibility influences the adoption of the recommended behaviour (Rosenstock et al., 1974). Although perception of HIV as a serious condition in children was not statistically associated with the use of ART for PMTCT, the fear of having a child infected with HIV was significantly associated with ART for PMTCT. This is in agreement with the HBM which suggests that perceived severity influences behaviour (Carpenter, 2010).

8.3.2.2 Perceived barriers to ART and PMTCT

The reasons considered, why pregnant women stopped or skipped taking ART medication were: simply forgot, husband’s consent, opposition from husband, fear of disclosure, fear of divorce, stigma associated with HIV, discrimination by health staff, cost of clinic care, transport fare to clinic, refusal to provide care, poor staff morale, lack of privacy for counselling, out of stock of ARVs, verbal abuse by staff and side effects of ARVs. These factors were grouped into personal, healthcare facility, therapy-related and partner-related factors.

Personal factors

Simply forgot was the most commonly cited barrier among the study subjects (45.0%) for skipping their medications. This finding agreed with the body of literature which reported that forgetfulness is a major barrier to taking ART (Adeniyi et al., 2018; Ankrah et al., 2016; Ekama et al., 2012; Igwegbe, Ugboaja and Nwajiaku, 2010; Mitiku, Abdosh, and Teklemariam, 2013; Okonsky et al., 2015; Okoronkwo et al., 2013; Wasti et al., 2012). Whereas simply forgot was the major reason to skip ART medication in the present study, other recent Nigerian PMTCT studies have reported sleeping/falling asleep during medication time as the most cited reason for women to skip ART medication (Anígilájé, Ageda and Nweke, 2016). The present study did not identify falling asleep as a reason for women to skip medication. Further analysis in the present study revealed that, simply forgot was statistically significant with ART for PMTCT.
Women were more likely to default ART due to forgetfulness. This corroborates with Mthembu and van Wyk (2014) study, which reported that forgetfulness is significantly associated with ART adherence.

Interventions such as counselling and education have been designed to minimise forgetfulness and enhance uptake to ART. In three studies that examined the impact of education on adherence of ART, respondents who received adherence education showed higher adherence compared to the control group (Jones et al., 2013; Kaihin et al., 2015; Omonaiye et al., 2018). However, Jones et al.’s (2013) study revealed that the impact of educational intervention on uptake of ART was not durable, suggesting that a repetitive or long-term intervention is needed to achieve a lasting impact on uptake of ART. Other interventions addressing forgetfulness to improve ART uptake include phone alarms or SMS reminders (Lester et al., 2010; Maduka and Obin-West, 2013). However, counselling intervention is considered a more effective method of improving uptake of ART compared to SMS or alarms. A clinical trial comparing the impact of alarm and counselling on ART uptake found that counselling provided significant and sustained effect on ART uptake (Chung et al., 2011). To minimise forgetfulness and overcome the defaulting of ART reported in the present study, it is recommended that pregnant women should be given long-term adherence counselling and SMS reminders, as well as to encourage women to use alarms at home.

Due to hectic schedules at work and taking care of household chores, pregnant women often skip their ART medications. Too busy with work/house chores was reported by 36.2% of the surveyed pregnant women as a reason to skip ART medication. Similar findings were reported by other studies, where being too busy was cited as a barrier to ART (Hansana et al., 2013; Mitiku, Abdosh and Teklemariam, 2013; Okoronkwo et al., 2013). The present study found a significant association between too busy with work/house chores and adhering to ART for PMTCT. Some of the surveyed pregnant women skipped or stopped taking medications because they felt better (12.7 %), there was no significant influence on using ART for PMTCT in the present study. Similar studies have reported ‘feeling healthy’ as a reason to skip or
discontinue ART medication (Igwegbe, Ugboaja and Nwajiaku, 2010). The survey also found that 7.7% of the pregnant women missed their ART medication due to lack of food. The present study found a significant association between lack of food and ART. In a qualitative study, lack of food was reported as the main reason to miss ART medication (Weiser et al., 2010). In this qualitative study, Ugandan women experienced increased hunger when taking ART and worse side effects when taken without food which were the main reasons to miss their medication in the absence of food (Weiser et al., 2010). Food assistance programmes have been designed to solve the problem of lack of food, however, maintaining such programmes seem to be challenging (Weiser et al., 2010).

**Healthcare facility factors**

The negative behaviours of the health care providers towards people suffering from HIV/AIDS and other healthcare—related inconveniences are also the reason for women to avoid taking ART or participate in PMTCT programmes. In the present study, the following were the negative behaviours of the health care providers towards HIV infected patients: discrimination by staff members (11.5 %), refusal to provide care (5.0%), poor staff morale (1.9 %) and verbal abuse (5.0 %). Li et al. (2013), in their study, reported that such stigma and discrimination towards HIV-infected individuals is often observed in medical settings. However, such behaviours are beyond being associated with HIV/AIDS. Discrimination and negative attitude were observed towards women and minority patients (Jones et al., 2002) and patients suffering from mental illnesses (Link et al., 2001). However, studies have established that good patient-provider relationships may increase pregnant women’s access and adherence to ART (Flickinger et al., 2013; Saleem, Kyeyagalire and Lunsford, 2014). Although in the present study, negative behaviours of healthcare providers were not significantly associated with adhering to ART for PMTCT, it was suggested that establishing a good patient-provider relationship ought to be a goal from the time ART is initiated (Peyre et al., 2016). Healthcare providers should be conscious of the influence of their relationship with HIV-infected women,
and behave reliably; providing women with optimal information and support (Peyre et al., 2016).

Confidentiality and privacy are key aspects of patient-provider communication in providing treatment and counselling services (Dapaah and Senah, 2016). Due to the perpetual HIV-related stigma, infected individuals prefer to use the services in privacy to prevent being recognised and to keep their status private. Previous studies demonstrated that in health services, privacy and confidentiality were often breached through their established practices (Bott et al., 2015; Kwapong et al., 2014). In Uganda, Kenya and Burkina Faso, HIV counselling and test results were given in crowded spaces where other patients can hear (Bott et al., 2015). Similarly, in Ghana, studies have highlighted breaches of privacy and confidentiality by healthcare providers (Kwapong et al., 2014). In the present study, 16.9% of the pregnant women reported lack of privacy for counselling as a barrier to ART for PMTCT. However, the study did not find any statistical significant association between lack of privacy and defaulting ART for PMTCT. In contrast to this finding, studies have established that perception of lack of privacy for counselling influenced women’s access and utilisation of PMTCT services. For example, in Northern Nigeria, lack of privacy of counselling was reported to prevent 86.7% of women from accessing PMTCT services (Anígilájé, Ageda and Nweke, 2016).

**Therapy-related factors**

Even though in Nigeria, ART is provided free of charge, ART-related expenses such as transport fare and the cost of clinic care (including PMTCT and ANC services) may impede access and use of ART for PMTCT. The survey findings revealed that 12.7% skipped their ART due to transport fare, while 16.9% due to cost of clinic care. Similar results were obtained by Miller et al.’s (2010) study in South Africa. In their study, in spite of severe health conditions and inconveniences due to poor health, the patients did not take treatment due to the transportation costs and the long waiting hours at the ART centres (Miller et al., 2010). A qualitative study carried out in South Africa by Mshana (2006) also found similar results. In the
present study, the cost of transportation and clinic care were not significantly associated with using ART for PMTCT. Contrasting findings have been reported in other studies. In a study conducted in Ghana, treatment cost was found to be significantly associated with defaulting ART among women (Boeteng, Awunyor-Vitor and Jasaw, 2012).

In the present study, some of the surveyed women complained that there were too many pills (4.6 %) and they were tired of taking pills every day (11.9%). Similar reasons were also observed in other studies (Molassiotis et al., 2002; Suleiman and Momo, 2016). Further analysis did not reveal any association between being tired of taking pills, having too many pills and adhering to ART. In contrast to this finding, pill burden was statistically significant with low ART adherence in other studies (Langebeek et al., 2014 O'Connor et al., 2012). In the present study, women were concerned about the side effects (22.7%). ART side effects have been identified in some studies as a statistical significant barrier to ART adherence (Mohammed et al., 2004). However, further analysis in the present study did not reveal any statistical significant relationship between side effects and adherence to ART for PMTCT.

**Partner-related factors**

Women in low and middle income countries (including Nigeria) depend on their husbands to make health-related decisions and to seek medical care (Ramjee and Daniels, 2013). In a study by Duff et al. (2010), it was found that women depended on their husbands for household and other finances. For this and other reasons too, they needed consent from their husbands for seeking treatment (Duff et al., 2010). In the present study, husband’s/partners’ consent (6.2%) and opposition from partners (4.6%) were reported as reasons to skip ART medication. The present study found no association between husband’s consent, opposition from partners and ART for PMTCT. This finding contrasted those of Flax et al. (2017), where women had difficulty taking ART or continuing in PMTCT due to opposition from husbands. In Flax et al.’s study, when the relationship was unstable, husbands threatened to stop their wives from taking their ART medication (Flax et al., 2017).
8.3.2.3 Perceived social support

**Disclosure to partners**

Findings from the survey indicated that 65.9% of the pregnant women disclosed their status to their partners and 6.1% to other family members. This was similar to a study conducted in the Niger Delta region of Nigeria on HIV-disclosure which reported that 62% of their participants disclosed to male partners (Ebuenyi et al., 2014). More recent studies conducted in the Northern (Nasir and Hassan, 2018) and South-Western (Oseni, Okafor and Sekoni, 2017) zones of Nigeria have also reported similar findings. It appears from the literature that even though socio-cultural factors or financial constraints hinder access and adherence, disclosure to partners help HIV-infected women to retain in treatment (Ebuy, Yebyo and Alemayehu, 2015; Rujumba et al. (2012). Naigino et al. (2017) reported that almost all the pregnant women in their study who were good adherers of ART were the ones who disclosed their status to their partners. Disclosing HIV-status to partners is well-known to alleviate emotional stress and empower women to receive material and psychological support from their partners and the social environment (Kirsten et al., 2011; Norman, Chopra and Kadiyala, 2007). However, qualitative studies have demonstrated that many pregnant women face difficulties with regards to disclosure to partners due to negative consequences. Due to fear of dreadful experiences, Kenyan women prefer not to disclose their status to partners (Rujumba et al., 2012), but non-disclosure is a common barrier to ART and PMTCT (Buregyeya et al., 2017; Duff et al., 2010). Similar to other studies (Buregyeya et al., 2017; Duff et al., 2010; Mepham et al., 2011; Nachega et al., 2005; Rujumba et al., 2012), the present study showed that 19.6% of the respondents reported fear of disclosure as a barrier to ART. However, this study found no significant association between fear of disclosure and adherence to ART for PMTCT. In contrast to this finding, Igwegbe, Ugboaja and Nwajiaku (2010) reported a significant association between non-disclosure and non-adherence. Fear of disclosure often leads to women not going to HIV clinics for check-up and treatments. They hesitate to start taking
treatments, or are afraid that someone will find out about it, hence, they face problem with storage of their ART drugs (Varga and Brookes, 2008; O’Gorman, Nyirenda and Theobald, 2010). Women are also afraid to disclose their status due to the fear of negative reactions in terms of not being allowed to take ART, abandonment, divorce or violence. Due to this fear, they do not give ART to their infants either (Duff et al., 2010; Theilgaard et al., 2011).

**Partner support**

Various activities were reported by pregnant women through which partners supported them. About 52.3% of the pregnant women were encouraged by their partners to take their ART medication, 12.3% were assisted with house chores to enable them take ART and 13.1% were accompanied to the clinic. Partner support was significantly associated with using ART for PMTCT. The findings revealed that pregnant women who were reminded or encouraged to take their medication by their partners were less likely to default ART for PMTCT. This was consistent with the body of literature, which revealed that support from partners influenced decisions to utilise ART and PMTCT services (Chouraya et al., 2017; Ebuy, Yebyo and Alemayehu, 2015; Elias et al., 2017; Farquhar et al., 2004; Kalembo et al., 2013; Msuya et al., 208; Naigino et al., 2017; Peltzer, Sikwane and Majaja, 2011). Specifically, in Peltzer, Sikwane and Majaja’s (2011) study, it was found that women who received higher partner support were better adherents in both maternal and infant ART. Similarly, in Chouraya et al.’s (2017) study to assess factors that influence ART initiation among pregnant women, ART initiation was 4.8-fold higher with women who received partner support than those lacking partner support.

Partner support acts as a facilitating factor in taking ART; the person suffering from the disease feels comfortable to take the ART drugs, tends to take them regularly, feels motivated to take the drugs or treatment for HIV and has a positive view towards fighting the disease (Gourlay et al., 2013). However, lack of support from partners is frequently observed in many studies. Although lack of partner support was not significantly associated with non-adherence in longitudinal studies (Schnack et al., 2016), qualitative studies have demonstrated that
pregnant women skip or stop taking ART due to lack of partner and relatives support (Bancheno, Mwanyumba and Mareverwa, 2010; Wasti et al., 2012).

Reminders

To be more adherent to ART, the surveyed women used several medication reminder methods such as alarm clocks, mobile phones, or relatives to remind them. About 51.9% of the study subjects were reminded by their partners to take medication. Some (20.0%) were reminded by other family members and 5.4% by friends, 0.4% used diary/calendar, while 26.5% relied on mobile phone or clock alarms to set reminders for their medication. Similar findings are reported in a study by Roux et al. (2011), where respondents used different reminder methods such as wrist watch or phone alarms for ART intake or took the help of their relatives to remind them. This Roux et al.’s study reported that those who used these reminders were more adherent to the treatment.

8.3.2.4 Perceived quality of care

Studies have established that HIV-infected women’s perceptions of the quality of care received at the clinic affect how they access and adhere to treatment (Mannava et al., 2015; Olowookere et al., 2013). Generally, the survey findings indicated that the majority of pregnant women were pleased with the quality of services they receive at the ART and ANC centres. They had a good patient-provider relationship; 74.2% reported to have received the kind of care they wanted. This was in agreement with previous studies which revealed that Nigerian people (including women) living with HIV receive good quality of ART services (Iwu et al. 2017; Nwabueze et al., 2011; Olowookere et al., 2013). Being given the kind of care they wanted was significantly associated with adhering to ART for PMTCT. However, a significant number of the surveyed women reported to have experienced stigmatisation; 11.9% reported how they were ignored or avoided by staff and 6.2% were disrespected or abused. This was consistent with findings from a cross-sectional study evaluating discriminatory practices in Nigerian
healthcare facilities against HIV-infected men and women (Owolabi et al., 2012). This Owolabi et al.’s study reported that respondents experienced discrimination from healthcare providers such as poor quality services, inflating cost for them, using extra gloves and segregating them from other service users.

8.3.3 Attitudes towards ART

The survey findings indicated that the majority of pregnant women have positive attitudes towards using ART for PMTCT. They believed that ART is capable of preventing MTCT (96.5%), prolonging life (85%), make them live healthy (82.3%), reduce frequent sicknesses (78.5%), help them to gain weight (75%) and prevent them from being sick (74.7%). The positive attitudes achieved in this study could be attributed to the inclusion of counselling as part of ANC and the PMTCT programme (NACA, 2014), and the desire to have a healthy child (Buregyeya et al., 2017; McLean et al., 2017). Similar findings were reported in southwest Nigeria where 98.1% (Kasumu and Balogun, 2014), 73.9% (Olowookere, Fatiregun and Adewole, 2012) and 77% (Afolabi et al., 2010) of their respondents had positive attitudes towards ART. In Olowookere, Fatiregun and Adewole, (2012) 83.6% of their participants believed that ART prolong life and 91.8% disagreed to taking ART only when they feel sick. In contrast to the positive attitudes reported in the present study, Otieno et al. (2010) reported negative attitudes such as disbelieve that ART is effective among their participants which restricted their readiness to receive HIV treatment/care.

In the present study, the surveyed women also displayed positive attitudes by disagreeing to negative statements about ART: 94.2% disagreed that ART could harm their babies, 88.0% disagreed to taking ART only when they feel sick, 83.1% disagreed to not needing ART once they feel better and 85% disagreed that ART can cause stillbirth or miscarriage. This finding is in contrast with other studies. For example, in South Africa, women believed that ART can harm their babies and cause miscarriage (Stinson and Myer, 2012). Another South African study assessing beliefs about ART among men and women on ART, reported that 20.3% of
their participants had doubts that MTCT can be prevented with ART (Mthembu and Van Wyk, 2014). In this South African study, 53.3% participants incorrectly believed that taking ART would harm their bodies (Mthembu and Van Wyk, 2014).

8.3.3.1 Relationship between attitudes towards ART and the following: adherence to ART for PMTCT, partner support, years with HIV and duration with ART.

The survey analysis revealed a moderate significant relationship between attitudes and adherence to ART for PMTCT. The findings revealed that the more positive pregnant women are towards ART, the more likely they will adhere to ART for PMTCT. This finding was in agreement with the body of literature, which revealed that attitudes influence adherence to ART (Charurat et al., 2010; Monjok et al., 2010; Otieno et al., 2010). This is also in agreement to the TPB which suggests that attitudes determine an individual’s intention or readiness to perform behaviour (using ART for PMTCT) (Ajzen, 2012). The survey analysis revealed a statistical significant weak positive relationship between attitudes and years with HIV and ART. This suggests that, as the years with HIV and ART increases, women’s attitudes towards ART becomes more positive. This is in contrast to Hansana et al. (2013), who reported that participants with longer duration of HIV diagnoses had negative attitudes (skipping medication) towards ART adherence. In another study by Andréo et al. (2001), participants on ART for more than two years had negative attitudes towards ART adherence. The study also revealed a strong positive correlation between attitudes towards ART and partner support. This implies that, the greater the support from partners, the more positive women’s attitude will be towards ART.

8.3.3.2 Socio-demographic factors influencing attitudes towards ART

The survey revealed that educational level had a statistical significant effect on attitudes towards ART, suggesting that pregnant women with tertiary education are more positive
towards ART as compared to those with secondary or primary education. This finding supported those of other studies, where socio-demographic factors were reported to influence attitudes and beliefs towards ART. In a study by Afolabi et al. (2010), educational level was significantly associated with attitudes towards ART. Similarly, in Tymejczyk et al.’s (2016) study to examine patients’ beliefs about ART initiation, educational level was found to be significantly associated with beliefs about ART as respondents with university education had better attitudes and beliefs about ART. The survey also found that members of household had a statistically significant effect on attitudes towards ART for PMTCT. Pregnant women living with their spouses had more positive attitudes compared to those living with their own relatives or in-laws.

Age, marital status, place of residence and occupation did not have statistically significant effect on attitudes towards ART for PMTCT. Contrasting findings are reported in other studies. In Tymejczyk et al.’s (2016) study, place of residence was significantly associated with respondents’ beliefs about ART, with those in urban areas having higher beliefs about ART compared to rural areas. In Afolabi et al. (2010) study, marital status was significantly associated with attitudes.

8.4 Summary and triangulation

The present study utilised both qualitative (in-depth interviews) and quantitative (questionnaire survey) methods to achieve its research aim. Triangulation of different data sources enhances the validity of research results, provides richer information and minimises limitations in qualitative and quantitative methods (Fielding, 2012; Mertens and Hesse-Biber, 2012). The in-depth interviews and survey data revealed a wide range of attitudes and perceptions of HIV-infected pregnant women towards the use of ART for PMTCT, and a combination of factors that influence them. HIV-infected pregnant women’s attitudes are not entirely influenced individually; other factors such as the healthcare system, healthcare staff attitudes, social support, duration of the illness and duration of taking ART also influenced their attitudes.
Both studies demonstrated that pregnant women were generally positive towards the use of ART for PMTCT. The interviews revealed that women believed that taking ART will benefit them in terms of helping them to deliver babies free of HIV, prolonging their lives, reducing viral load to prevent harm to the baby and the mother, and improving physical health. The interviewed women also believed that ART was a source of hope and survival. The interviewed women also expressed huge confidence in ART due to the experienced benefits of ART in terms of having given birth to HIV-negative children. The interviews also revealed that the identified benefits of ART were a source of motivation to use ART for PMTCT. During the survey, the majority of the respondents also highlighted the above ART benefits in the attitude section. The survey analysis indicated that attitude was positively related with adhering to ART for PMTCT, suggesting that, as pregnant women become more positive towards ART, the rate of defaulting reduces.

Despite the perceived benefits, both studies highlighted several concerns/barriers such as side effects, taking ART every day, feeling healthy, forgetfulness, too busy, and cost of clinic care which discouraged their use of ART for PMTCT. In addition, the interviews revealed that the fear of having an elective C-section and waiting time at the clinic was a reason for women to stop accessing PMTCT services. However, during the survey, waiting time did not appear to be a reason to miss their ART medication or PMTCT appointments.

Both studies demonstrated that partner support was valuable in using ART for PMTCT. A high level of partner support was reported in both studies which positively influenced adherence to ART for PMTCT. The interviewed women expressed how disclosing their status to their partners enhanced the use of ART for PMTCT as they no longer have to secretly take ART and their partners now remind them when it was time to take their medication. The interviewed women also expressed how their partners encouraged them to start ART when they initially refused, accompanied them to clinic and assisted with house chores to enable them take their ART medication. The surveyed women also cited the above roles as those played by their partners in using ART for PMTCT. In addition to the roles partners played, the interviews also
highlighted their personal roles in making their ART medication effective such as eating healthy diet, fruits and vegetables, and practicing personal hygiene. The interviewed women also expressed the significance of food when taking ART and explained how hunger led to worsened side effects, thus, they advocated for food support and money from the government and NGOs to enhance the use of ART for PMTCT.

The interviews reported negative behaviours of healthcare providers. The interviewed women expressed being shouted at, maltreated, verbally abused and refused care. However, the survey analysis revealed contrasting finding, with the majority expressing satisfaction with the healthcare services. Although, the majority of the surveyed women reported being given the kind of care they wanted, some of them reported being treated with disrespect or being abused. While the interviewed women felt that such negative behaviours of staff were capable of discouraging access and adherence of ART for PMTCT, the survey analysis did not find any statistical significant association with negative behaviours of staff and using ART for PMTCT. In addition, the survey analysis found a statistical significant association between being given the kind of care they wanted and using ART for PMTCT, suggesting that women who receive good quality care are less likely to default ART for PMTCT.

Socio-demographic factors that influence attitudes were also investigated in the survey analysis. Educational level and members of household were found to be statistically significant with attitudes towards ART for PMTCT. Duration of ART and HIV infection was positively correlated with attitudes. Partner support was positively correlated with attitudes towards ART for PMTCT.

8.5 Theoretical inferences

Two conceptual frameworks were adopted for the present study: HBM and TPB. Discussions of these frameworks and reasons for selecting them are presented in chapter two. Theoretical
models are important in explaining and enhancing our understanding of phenomena. They are mostly used to predict and explain behavioural changes.

Regarding the HBM, the main concepts applied in this study are: the individual's perception of threat, benefits and barriers. This study seems to be the first to utilise the HBM with regards to PMTCT research in Nigeria. The study revealed that the respondents generally perceived that their unborn babies were susceptible to HIV infection via MTCT, and that HIV is a serious condition in children which may be difficult for parents to care for. In contrast to the HBM, perceived susceptibility did not statistically influence the use of ART for PMTCT. However, the interviews revealed that the perceived seriousness of HIV in children motivated women to use ART for PMTCT, as their desires were to have HIV free babies. In support of the HBM, the statistical analysis also found a significant association between the fear of having an HIV-positive child (perceived seriousness) and the use of ART for PMTCT. Perceived benefits were related to women's belief that the intervention with ART for PMTCT is effective and beneficial in terms of preventing MTCT. Perceived barriers such as too busy with work, forgetfulness, stigma, lack of food discouraged women to completely adhere to ART.

In support of the HBM, the present study revealed that the perceived benefits of ART outweighed the barriers; thus, the majority of women continued to show commitment to ART. Overall, the HBM was useful in understanding the use of ART for PMTCT. However, some of the constructs (e.g. susceptibility, some perceived barriers) were not significantly associated with the use of ART for PMTCT. This study supports the critics of HBM, suggesting that HIV prevention is complex requiring other constructs (e.g. social support) to promote HIV-preventive behaviour.

In terms of the TPB, the present study's findings supported the model. The study revealed generally positive attitudes towards ART. Women expressed how they received support from their partners. The favourable attitudes, coupled with the satisfactory social support received by women motivated them to utilise ART for PMTCT. The study also indicated that the decision
not to default ART was not a simple one, as different factors such as feeling healthy, burden of taking ART every day and side effects clearly influenced that decision. As a result, some of the women lacked control regarding their ability not to default ART.

8.6 Limitations

This mixed methods study focused on pregnant women attending ANC at government managed tertiary hospitals. This may have introduced bias, since other HIV-infected pregnant women may attend ANCs in private hospitals, and their views may be different. In addition, majority of the participants resided in urban cities, thus the findings may not represent those of rural dwellers. Furthermore, the study was conducted in the Niger Delta region of Nigeria which has a predominance of Christians (Sampson, 2014), making the sample homogenous in terms of religion. It has been indicated that religious beliefs can influence people’s attitudes and perceptions towards ART (Unge et al., 2011). Thus, the attitudes and perceptions reported in this study may not reflect those of pregnant women from other parts of the country dominated by other religions.

Design

The second phase of the present study was a cross-sectional study. Cross-sectional studies may not determine causal relationships since they are conducted at a specific point in time, and situations may produce different results if a different timeframe was used (Setia, 2016). Thus, associations determined in this study were only correlational not causal.

Data collection

During the data collection period, questionnaires were administered face-to-face to participants. This method is generally known to obtain a better response rate compared to other techniques such as telephone, online and postal surveys. However, it is believed that in face-to-face surveys participants may misrepresent their answers by providing more
acceptable responses due to the effect of social desirability which may bias the results of the study (Kaushal, 2014). Additionally, all the interviews took place at the hospitals in private rooms; this may have also introduced the effect of social-desirability on their responses. Nevertheless, being a setting that the participants were familiar with, and a location separate from clinic activities, they were relaxed. The researcher ensured that questions asked were not leading; rather, women had the opportunity to narrate their own story and were encouraged to explain in detail any important point raised for clarity.

**Data analysis**

Due to the categorical nature of the data, only non-parametric tests were utilised for the statistical analysis. Results of studies utilising non-parametric tests may have less statistical power compared to those of parametric tests (Rana, Singhal and Dua, 2016).

**8.7 Contribution**

This is the first study to explore HIV-infected pregnant women's attitudes and perceptions about using ART for PMTCT and to identify factors that influence these attitudes. Thus, this study makes a useful contribution to policy, designing and delivery of ART and PMTCT services in Nigeria.

**Theoretical**

The present study is the first to combine HBM and TBM to investigate ART for PMTCT among pregnant women. HBM and TPB provided important basis for understanding attitudes and perceptions towards the use of ART for PMTCT among HIV-infected women. Although one of the constructs (perceived susceptibility) in HBM did not influence using ART, the present study's finding supports the effectiveness of HBM and TPB, and the combination of both to provide a comprehensive understanding of the attitudes and perceptions towards using ART for PMTCT among HIV-infected pregnant women. Thus, the study encourages researcher to
adopt theories and models, and to combine them in one study to provide comprehensive answers to research questions.

Methodological

To my knowledge, this is the first study to utilise an exploratory sequential MM approach to explore attitudes and perceptions of HIV-infected pregnant women towards using ART for PMTCT. Thus, this study is expected to pave the way for other researchers and encourage the adoption of mixed method approach in future research regarding ART, PMTCT and HIV/AIDS, as well as other fields. The MM approach provided the opportunity to integrate findings from both the interviews and survey which provided a wider understanding of the attitudes and perceptions of HIV-infected pregnant women about using ART for PMTCT, as well as an array of factors that influence these attitudes and perceptions. The in-depth interviews with 24 HIV-infected pregnant women enabled an in-depth exploration of their attitudes and perceptions, providing the chance for further probing into responses and clarification of certain answers. This provided a rich data which was complemented by using a questionnaire survey to record attitudes and perceptions and identifies factors influencing these attitudes and perceptions on a larger sample size.

Most studies related to ART and PMTCT in Nigeria were conducted using hypotheses and data collection tools designed from the researcher’s (outsider) viewpoint. However, by utilising an exploratory sequential MM which allowed starting with a qualitative method, and building to a quantitative method, this study demonstrated that qualitative data from HIV-infected pregnant women (insider viewpoints) can suitably inform researchers to select constructs for developing survey hypotheses and questionnaires. In addition, majority of the existing Nigeria studies on PMTCT have used quantitative methods, thus this study has paved the way for Nigerian researchers to adopt qualitative methods in this area of research.

Policy and planning
The present study provided comprehensive information on attitudes and perceptions for HIV-infected pregnant women that can be utilised for interventions targeted to increase engagement with ART, PMTCT and ANC services in Nigeria. Some unfavourable health behaviours were identified, such as missing ART or stopping ART due to feeling healthy, and not accessing PMTCT services because of fear of elective caesarean section. This is important to help PMTCT staff prioritise resources. The non-adherence of 31.2% reported in this study is of great concern. Considering the serious consequences of non-adherence for the PMTCT programme, it is vital for interventions to be tailored to increasing ART adherence. Further, the finding that the majority of the participants had their first HIV testing on their ANC visits contradicts those of the Nigerian literature (Amu, Olatona and Onayade, 2014; Ikechebelu et al., 2006; Olugbenga-Bello et al., 2012; Onyeonoro et al., 2014).

8.8 Chapter summary

This chapter integrated the findings of both phases of the study. It discussed the attitudes and perceptions of HIV-infected pregnant women towards ART for PMTCT in relation to the body of the literature.

- The aim of the present study was to improve the understanding of the attitudes and perceptions of HIV-infected pregnant women towards the use of Antiretroviral Therapy (ART) to prevent mother-to-child transmission (MTCT) of HIV in the Niger Delta region of Nigeria.

- This aim has been achieved by collecting and analysing both semi-structured interview and survey data.

- Participants were highly motivated to take ART due to the desire to have babies free of HIV, to live longer and healthier in order to take care of their children.

- Some of the participants displayed negative attitudes towards ART by skipping or stopping to take their ART medication due to lack of food, feeling healthy and ART side effects.
• Socio-demographic factors such as educational level and members of household influenced participants' attitudes towards ART for PMTCT.

• Attitudes towards ART for PMTCT had positive relationship with partner support, duration of taking ART and duration of HIV diagnosis.

• Participants identified key roles that enhance the effectiveness of ART. These roles included partner support, eating healthy diet and practicing good hygiene.

• It is the first study to utilise an exploratory sequential MM approach to explore attitudes and perceptions of HIV-infected pregnant women towards ART for PMTCT.

• The finding supports the effectiveness of HBM and TPB in understanding attitudes and perceptions towards using ART for PMTCT.

The next chapter presents a summary of the thesis, the researcher's reflections, recommendations and a concluding thought of the thesis.

Chapter 9: Conclusion

9.1 Introduction

This chapter presents the concluding part of the present thesis. It presents a brief summary of the thesis, key findings, recommendations for healthcare providers, policy and practice, and future research. In addition, it presents a reflection of the researcher's academic journey and finally, it gives a concluding thought on the thesis.
9.2 Thesis summary

The overall aim of the present thesis was to improve the understanding of the attitudes and perceptions of HIV-infected pregnant women towards the use of ART for PMTCT, and to identify socio-demographic factors that influenced these attitudes. Literature reviewed in the Nigerian context about ART and PMTCT revealed that most of the previous research into PMTCT focused on HIV testing and breastfeeding for PMTCT; thus, little is known about ART for PMTCT. Nigerian studies on ART have taken their samples from the general population and none utilised HIV-infected pregnant women. During the literature review (chapter two), attitudes and perceptions were highlighted as elements that influence patients’ decisions to access and adhere to ART treatment. However, available evidence from the literature suggested that knowledge of this area in the Nigerian context still remains low. This necessitated the need to conduct the current study. In addition, most of the Nigerian PMTCT studies utilised quantitative methods and this is very much likely to limit an in-depth understanding of this area of research. The conceptual framework combined constructs of both the HBM and TPB, which guided the development of research objectives, topic guide and the questionnaire.

The present work was based on a MM approach and utilised an exploratory sequential design which combined qualitative and quantitative methods. For the qualitative phase, an inductive approach utilising semi-structured interviews was used to explore HIV-infected pregnant women’s attitudes and perceptions towards ART for PMTCT. A thematic analysis was used to analyse all 24 interviews which gave rise to eight main themes: (1) knowledge of PMTCT; (2) threat from the susceptibility of the illness and the severity; (3) perceived benefits of ART; (4) barriers to using ART; (5) perceived roles in treatment; (6) negative behaviours of healthcare providers; (7) coping strategies; and (8) women’s suggestions to scale-up ART for PMTCT. For the quantitative phase, a deductive approach utilising questionnaire survey was used. The purpose of the quantitative phase was to examine how the attitudes and perceptions reported
during the interviews influence the use of ART for PMTCT and identify socio-demographic factors that influence attitudes towards ART for PMTCT. The quantitative phase started by developing a survey questionnaire from the qualitative findings to investigate the statistical correlations between using ART for PMTCT and the following variables: perceived susceptibility, perceived seriousness, perceived barriers, perceived social support, perceived quality of care and attitudes towards ART. The survey also examined the statistical correlations between attitudes towards ART and the following socio-demographic factors: age, educational level, marital status, place of residence, members of household, and duration of HIV and ART.

Further, the results from both phases were interpreted in line with the wider literature in separate sections. Afterwards, both interviews and survey findings were integrated to draw inferences. Finally, the thesis ends by providing key recommendations for healthcare providers, policy and practice, and future research.

9.3 Key findings

This section presents a brief summary of the findings to answer the research question of the present thesis. The findings are presented according to the research objectives.

9.3.1 Objective one: to explore the perceptions of HIV-infected pregnant women about the use of ART for PMTCT

Several aspects of HIV-infected pregnant women’s perceptions were investigated, including perceived threat (susceptibility and seriousness) of MTCT, perceived barriers to ART, perceived benefits of ART and perceived quality of care. The findings revealed that most of the women believed that it was possible for their unborn children to be infected with HIV. However, some women also believed that, as long as they are on ART their children cannot be infected. During the interviews, women displayed lack of knowledge and misconceptions about MTCT. Women believed that MTCT can occur through kissing the baby, exposing the baby to the mother’s naked body and cutting the umbilical cord. The findings also revealed
that women perceived HIV to be a very serious condition in children; they believed that children may not withstand the negative effects of the virus, and caring for such children may be difficult for parents. During the survey analysis, perceived susceptibility did not appear to influence the use of ART for PMTCT; however, perceived seriousness of HIV in a child significantly influenced using ART for PMTCT.

In terms of the perceived efficacy and benefits of ART, women expressed how ART helped them in preventing transmission to their children in the past. Expanding the perceptions about ART, women also expressed how ART has been of benefit to their own health by improving their physical health. However, women expressed concerns about using ART. These concerns were grouped into: personal, health system, therapy related and partner related factors. Women expressed how they forget to take their medication and being too busy with work/house chores, feeling healthy, lack of food, lack of privacy of counselling and transport fare. Other concerns were side effects of ART, the burden of taking ART every day, poor staff morale and partners’ consent and opposition from partners. While all the factors mentioned above are important in using ART, most of them did not statistically influence utilisation of ART for PMTCT. Only simply forgot, too busy with work/house chores and lack of food significantly influence the use of ART for PMTCT.

In addition, the interviews highlighted a perception of negative behaviours of healthcare providers towards the interviewed women. These negative behaviours were classified as rude, abusive, and lack of empathy and sympathy. However, further investigation of patient-provider interactions in the quantitative phase revealed that perceived negative behaviours of healthcare providers did not statistically influence the use of ART for PMTCT. Instead, the survey revealed a generally positive interaction between women and their providers, with the majority of the surveyed women receiving the kind of care they wanted.

Furthermore, the study also unveiled some perceived key roles played in using ART for PMTCT. Women believed that for their ART treatment to be effective, they must practise
personal hygiene, eat nourishing foods such as fruits and vegetables, as well as a balanced diet, and use their phones to set reminders to ensure that medication time was not missed. Whereas these roles were believed to be necessary and important for the effectiveness of ART for PMTCT, a significant finding was the partners’ role in ART treatment for PMTCT. Male partners accompanied their spouses to clinics, assisted with house chores to enable them take their medication on time, gave words of encouragement and reminded them to take ART. Women believed that, without their partners’ involvement in using ART for PMTCT, it would have been difficult for them to stay on the treatment. Overall, findings from both the interviews and survey showed that women had positive perceptions about ART for PMTCT.

9.3.2 Objective two: to explore the attitudes of HIV-infected pregnant women towards using ART for PMTCT

Women’s attitudes towards ART ranged from slightly negative to positive. Similar to women’s perceptions about using ART for PMTCT, the majority of them expressed positive attitudes towards ART. Women held positive attitudes by expressing huge confidence in the efficacy of ART. Women took ART because they believed that if they stay on it, their unborn children will not be infected with HIV. Some of the women took their ART medication because they believed that taking ART will prolong their lives, help them live healthy to take care of their children, and also prevent transmission to their partners. Women’s experiences of successfully using ART for PMTCT in the past, positive beliefs about ART, partner support and the improved physical health contributed in shaping their positive attitudes towards using ART.

Negative attitudes were also reported. During the interviews, women reported stopping their ART medication because they felt healthy or cured and did not have need for the medication. For others, they were fed up of the burden of the daily regimen of ART, and since they were living a normal life they stopped taking ART. Also, some of the women felt ART side effects (e.g. feeling hot at night) were unbearable which led to missing their doses. Despite periods of
defaulting ART, most of the women showed commitment to using ART for PMTCT due to the strong desire to have healthy children free of HIV.

9.3.3 Objective three: to examine how attitudes and perceptions of HIV-infected pregnant women influence their use of ART for PMTCT

The findings revealed that perception of susceptibility did not influence using ART for PMTCT. However, perception of severity was significantly associated with using ART for PMTCT. Perceived barriers such as simply forgot, too busy with work/house chores, and lack of food were significantly associated with defaulting ART for PMTCT. Perceived partner support was significantly associated with adhering to ART for PMTCT. Perceived quality of care such as receiving the kind of care they wanted was found to be statistically significant with the use of ART. In addition, attitude had a moderately positive correlation with adherence to ART; thus, as women’s attitudes becomes more positive, adherence to ART increases.

9.3.4 Objective four: identify socio-demographic factors that influence HIV-infected pregnant women’s attitudes and perceptions towards ART for PMTCT

Socio-demographic factors influencing attitudes with regards to using ART for PMTCT have not been investigated earlier in Nigeria. The study indicated that there were no statistical differences in attitudes in relation to age, marital status, place of residence and occupation. However, the study found statistically significant differences in attitudes regarding educational level, and members of household. In terms of educational level, women with tertiary education had higher mean attitude score than those with secondary or primary education, suggesting that women with tertiary education will have more positive attitudes towards ART compared to women with secondary and primary education. With regards to members of household, women who lived with partners are more likely to be positive towards ART than those who lived with other relatives.
The findings also confirmed a weak positive relationship between attitudes towards ART and the duration of ART and HIV diagnosis. This suggests that as the years of taking ART increases, women’s attitudes towards ART becomes more positive. Although the interviews did not focus on factors influencing attitudes, it succeeded in highlighting both supporting and contrasting findings. In support, the interviews revealed that due to the long duration of taking ART and the experience of having HIV-negative children in the past, women were confident about the effectiveness of ART and more positive towards ART, which in turn motivated them to use ART for PMTCT. In contrast, the interviews also revealed that women who had been on ART for long durations felt they were healthy and possibly cured, leading to skipping and completely stopping their ART medications. Further investigation with qualitative methods would help in providing in-depth understanding of the reasons for these relationships.

In addition, the survey also examined the relationships between women’s attitudes towards ART and their perceived threat (susceptibility and severity) and partner support. These relationships have not been previously studied in PMTCT research. In terms of perceived susceptibility and severity, the present study did not find any correlation with attitudes towards ART. However, the study revealed a strong positive correlation between attitudes towards ART and partner support. This implies that, the greater the support from partners, the more positive women’s attitudes will be towards ART.

9.4 Recommendations for policy and practice

Improving knowledge of MTCT

The present study highlighted lack of knowledge and misconceptions about MTCT among HIV-infected pregnant women. Thus, healthcare professionals should be regularly trained to provide more detailed and quality information about MTCT, and to make sure that women understand what they are been taught during counselling sessions. Resources should be put
into educating the public about MTCT, giving them the correct information to eliminate misconceptions and improve knowledge about MTCT.

**Improving awareness of ART effectiveness for PMTCT**

From the interviews, women believed that the awareness of ART effectiveness to prevent MTCT was insufficient in the general population, thus, they suggested that awareness should be provided especially in rural areas to scale-up ART for PMTCT. In rural areas, awareness can be done through radio spots – the major source of MTCT and HIV knowledge in one Nigerian study (Olugbenga-Bello et al., 2013) and pictorial postcards or leaflets containing key information to benefit illiterates as well. In addition, village meetings could be alternative channels for awareness.

**Improving patient-provider communications**

Even though women had access to ART, attitudes of healthcare providers may discourage them from future access. The significance of patient-provider communications in ANC, ART and PMTCT services, including concerns about disrespectful and rude treatment, as well as lack of empathy were raised during the interviews. It is vital for healthcare providers to be trained on the importance of good client-provider relationship. However, overall enhancement of the health system; making the hospitals well equipped, and appropriately staffed will probably help in reducing tensions in the clinic, as well as between patients and providers. In addition, supervision, regular training courses and feedback from patients are also required to tackle the negative behaviours of some health professionals.

**Improving ART service delivery**
The present study highlighted lack of privacy of counselling as a barrier to using ART for PMTCT. Due to HIV-related stigma, infected people may prefer to receive counselling and ART services in private. Confidentiality and privacy should be promoted to encourage women access services. In addition, HIV-infected pregnant women face challenges regarding taking their ART medication as prescribed, leading to skipping their doses. Thus, it is suggested that pregnant women on ART should be monitored, and a supportive environment be created to enable women to freely share their concerns about taking ART. It will be a medium for addressing any concern and to emphasise the importance of adherence in prevention of MTCT.

**Improving strategies for partner involvement**

Considering the findings from both the interviews and survey highlighting that partners' support enhanced access and utilisation of ART and PMTCT services, and the survey analysis suggesting that opposition and lack of support from partners were barriers to adhere to ART, different strategies and support mechanism to enhance involvement of partners in ART and PMTCT programmes need to be considered. Despite the limited availability of rigorous evidence about the efficacy of partner involvement on utilising ART and PMTCT services, and pregnancy outcomes, the approach seems to be promising (Ekama et al., 2012), with added benefits of partner diagnosis and prevention of transmission to uninfected partners (Nyondo et al., 2014). The Nigerian PMTCT programme recommends partner testing for HIV (NFMH, 2016), but there has been little success (Okoli and Lansdown, 2014). Thus, strategies such as education and sensitisation of the public about the benefits of partner support in PMTCT programmes should be considered.

**Implementing text-message reminder**

Findings from both the interviews and survey analysis suggested that forgetfulness was the most common barrier to ART for PMTCT. This suggests that pregnant women need reminders
to adhere to their ART medication. Implementing a text-message reminder service, where reminder messages are sent to women daily will help in improving adherence to ART for PMTCT.

**Food support programme**

From the interviews, pregnant women skipped their ART medication due to the fear of experiencing worsened side effects of ART in the absence of food, thus, they advocated for a food support programme to enhance adherence to ART for PMTCT. Lack of food was also highlighted as a barrier to ART in the survey analysis, and it was significantly associated with defaulting ART for PMTCT. Studies have shown that taking ART leads to increased appetite, which may be an issue for those already struggling to feed (Weiser *et al.*, 2010). On the other hand, when ART is taking without food, they experienced worsened side effects, which makes it difficult for women struggling to feed to fully adhere to ART (Weiser *et al.*, 2010). In addition, a Nigerian study conducted by Sholeye *et al.* (2017) reported a prevalence of 71.7% for food insecurity among HIV positive Nigerians, and food insecurity has been found as a barrier to ART (Weiser *et al.*, 2010). Thus, the Nigerian PMTCT programme should incorporate food distribution that will supply food to HIV-infected pregnant women both in urban and rural areas to enhance uptake of ART. It may be difficult to sustain such a programme in a poverty-endemic setting like Nigeria, thus, HIV funding should prioritise food distribution for HIV-infected women who are economically disadvantaged.

**9.5 Future research**

Future research should consider qualitative exploration of HIV-infected mothers’ (pregnant and breastfeeding) experiences of utilising ART, ANC and PMTCT services, and how these experiences influence access and use of ART and PMTCT. Observations of these services will help in understanding the quality of services women receive and their interactions with providers.
The interviewed women reported missing their ART medication due to feeling healthy, side effects and forgetfulness. The survey analysis also reported that approximately 31.2% of pregnant women defaulted taking their ART medication at least once within the month previous to the start of the study. Thus, it will be imperative to monitor ART adherence for PMTCT. Also, the interviews revealed that some women stopped accessing PMTCT services due to the fear of having an elective C-section. Retention in PMTCT services should be monitored; and follow-up strengthened. In addition, pregnant women should be monitored if they return to use ANC and PMTCT services with other pregnancies.

Findings indicated that phone alarms helped women remember when to take their medication. Thus, future research is required to assess the effectiveness of reminders (phone alarm, text message service) in improving adherence to ART for PMTCT.

According to the findings, partner support was received by the majority of the women, and this positively impacted on their utilisation of ART for PMTCT. It might be important for future research to compare HIV-infected women who are married/cohabiting and others who are single, and how this could impact on using ART for PMTCT.

9.6 Dissemination

The findings of this study shall be disseminated to the National Agency for the Control of AIDS (NACA), ministries of health, community members, healthcare professionals and researchers.

**Healthcare professionals**

Meetings will be arranged at the health facilities, where the results will be communicated face-to-face to healthcare professionals. A short summary leaflet of the result and recommendations will be made available for healthcare professionals who are interested in receiving it. Since there is an aspect of the result highlighting issues around patient-provider interactions, it will be necessary to disseminate these results constructively and sensitively.
Ministries of health

A short leaflet will be made available for officials at both state and federal ministries of health. The leaflet will be shared with professionals working at the NACA. Meetings will also be scheduled to communicate the findings to health officials.

Publications and conferences

The qualitative part of this thesis has been published in a peer-reviewed journal: Women and Birth. In addition, a poster presentation was made at the Postgraduate Research Winter Conference, University of Bedfordshire, January 2018, where she was awarded the best presenter.

9.7 Reflection

It is argued that research is a non-stop process that continues as reflections are made on data collection, analysis, findings, implications and developing ideas (Bourke, 2014). England (1994) further explained that research denotes a communal space that is defined by participants and researchers. Thus, both participants’ and researchers’ identities can possibly influence the research procedures (Bourke, 2014). Brannick and Coghlan (2006) described the connection between participants and researchers using a concept called reflexivity. Reflexivity is described as a process of critically reflecting on self, analysing and acknowledging personal values, positions, subjectivities and involvements in research that could impact on data gathering and interpretation (Polit and Beck, 2010). This section is therefore devoted to present the reflections of the researcher’s preconceptions, beliefs and experiences, and to acknowledge how these might influence the research process. The whole process of conducting this research, from choosing the topic to the field work and writing up, as well as subsequent publication and conference presentations, has been a reflexive exercise.
The researcher is a female Nigerian who had her primary and secondary education, as well as her first degree in her country. After her first degree in human anatomy, the researcher worked with the ministry of health as a Youth Corper (a compulsory national graduate programme) for one year, where she learned that mortality and morbidity were more in women and children compared to men. This motivated her to look for ways to help in promoting health and preventing diseases in women and children. She joined health promotion campaigns and supervised vaccination teams to rural areas where children were immunised to prevent polio, meningitis, hepatitis, cholera etc. This led to her traveling abroad to study for a master’s degree in public health, taking into account that the knowledge gained would be used to help people to prevent illnesses and live healthier. While researching during the master’s programme, it was discovered that HIV/AIDS had captured global attention and was considered one of the major causes of morbidity and deaths among infected persons. Moreover, women and children were greatly affected by the epidemic. In addition, the available literature in Nigeria about MTCT of HIV appeared to be inadequate to inform interventions that will completely eradicate MTCT. The researcher’s academic background and the knowledge of, and interest in the area of HIV and MTCT was a major factor that prompted the researcher to undertake a PhD in the area.

Although Nigeria is a multi-cultural country, the researcher believes that her position as a Nigerian and understanding of the different cultures in the country, as well as her initial drive, gave her the connection and recognition that was beneficial in the process of conducting this research. Being an insider who shared the same gender and similar socio-cultural values with the respondents, the researcher was able to gain a deeper understanding of their attitudes and perceptions towards ART for PMTCT (Unluer, 2012). Additionally, understanding of formal hierarchy and how it works in Nigeria, helped the researcher to approach the right persons, and this provided easy access to the gatekeepers (nurses). Due to the HIV-related stigma in Nigeria, especially towards women, and the issue of non-disclosure reported in the literature, the researcher felt it would be hard to recruit HIV-infected women, and for them to freely
discuss their experiences and perceptions about taking ART would be difficult. This preconception was based on her understanding of the cultural and religious beliefs held by the society; it is commonly believed that HIV is a punishment for promiscuity, prostitution and adultery. However, the initial identification and discussion of the research with participants by the nurses helped to abate any fear of breaching confidentiality.

Further, being of the same sex, and having the interviews done in the hospitals (familiar place) enabled an environment of good rapport and trust, and this may have added to the individual rich stories expressed by the participants. However, negotiating and discussing the research made the researcher more conscious of the characteristics that made her an outsider. She was a graduate student studying abroad during the research, never pregnant, had no experience of ANC and did not understand what it means to be on medication daily for life. Being an outsider with an identity of a foreign PhD student/researcher; she had access to private rooms reserved for respected visitors and consultants. These rooms were used for both the interviews and questionnaire distribution; this may explain partly why participants were relaxed in discussing their stories during the interviews. While there are specific benefits and challenges associated with insider/outsider researchers, some researchers have questioned the insider/outsider dichotomy (Dwyer and Buckle, 2009). It is believed that researchers’ identities are relative, and able to change due to the time and location of the research, research participants, topic being studied and the researcher’s personality (Kerstetter, 2012). Thus, scholars have argued that a researcher should not be considered as one having all the characteristics of an insider or outsider (Dwyer and Buckle, 2009; Mercer, 2007). According to Dwyer and Buckle (2009), all researchers are positioned in various spaces between insider and outsider. Having both identities (insider/outsider) in this research was important during the data collection.

A key strategy utilised in engaging with participants was self-evaluation and constant dialogue of how her identity might affect the research. Thus, a diary was used during different stages of the research to document any feelings, thoughts and emotions about experiences, data
collection, analysis and challenges (Engin, 2011). These diary entries included: openness of participants’ responses; whether all the questions were understood; new approaches to be explored in subsequent interviews; the type of connection between participants and the researcher; and whether there are conflicting feelings with some participants’ responses. During the whole period of gathering data, the researcher set aside personal feelings, preconceptions and beliefs, and went with an open mind into the field, listened attentively, expressing understanding and empathy when concerns were raised. To avoid being influenced by her personal knowledge and beliefs, the researcher reflected on their stories. This provided an in-depth understanding about participants’ experiences and views on using ART, and this has expanded her knowledge about HIV-infected women's attitudes, perceptions and experiences about PMTCT. Findings were reported to present the true views, thoughts and feelings of the participants.

Finally, the researcher has been dumfounded by the show of kindness and support from the nurses and women who participated in this study. The whole PhD journey has enhanced her research skills such as oral presentation and writing skills.

9.8 Conclusion

This is a unique study; it is the first Nigerian PMTCT study to focus on ART for PMTCT among HIV-infected pregnant women. The study has demonstrated a comprehensive understanding of the attitudes and perceptions towards ART for PMTC, and socio-demographic factors influencing these attitudes. These findings have key implication for planning, policy and practice in the Nigerian PMTCT programme. The findings indicated that HIV-infected pregnant women had positive attitudes and perceptions towards ART. Women appear to attribute their attitudes and perceptions towards ART to their experienced benefits of ART in terms of improved physical health and having given birth to HIV free babies in the past, as well the support role played by their partners. These attitudes and perceptions towards ART influenced the use of ART for PMTCT among HIV-infected pregnant women. However, the study identified
important issues such as skipping or stopping ART medication due to feeling healthy, tired of taking ART every day, lack of food, lack of privacy of counselling, forgetfulness and too busy with work/house chores, as well as stopping the PMTCT programme due to fear of elective C-section.

Addressing weaknesses in the Nigerian health system may be a good way to improve ART and PMTCT usage. Although, decentralisation of services (ART and PMTCT), especially to rural areas, is probably going to increase access and adherence, there are more adaptable, innovative, cost effective and realistic measures that could help to achieve a quick impact. PMTCT interventions should be modified and tailored to the specific needs of HIV-infected pregnant women. Providing adequate information and counselling on the importance of staying on treatment even when they feel healthy or cured and how to manage side effects, as well as providing food and money to reduce defaulting of ART for PMTCT. Ensuring that HIV, PMTCT and ART counselling sessions are done in privacy and regular trainings are provided for healthcare providers to enhance the nature of their communication and relationship with patients. In addition, encourage male partners’ support to enhance access and consistent use of ART for PMTCT. To reach the goal of eliminating MTCT by 2020 will remain difficult unless decisive steps are taken regarding these practical measures and PMTCT interventions are targeted on women who are a vulnerable group. Eagerness for Nigerian new policy implementation must not prevent endeavours to alleviate prior or emerging issues in PMTCT service utilisation and delivery. The findings of this study may also be applicable to other SSA countries who share similar cultural backgrounds.

9.9 What the researcher would do differently

If given the opportunity to re-do this research, the following would be changed:

First, the study collected data from only HIV-infected pregnant women attending ANCs and receiving PMTCT services. Recruiting healthcare providers who directly care for these women
to assess their views about factors that encourage or hinder HIV-infected pregnant women from accessing and using ART for PMTCT would have enriched the data. Second, being a self-funded PhD, travelling abroad twice for data collection was expensive. Collecting the data on one trip would have been a more cost effective strategy.

Chapter 10: References


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# Chapter 11: Appendices

**Appendix 1: Letter of introduction**

```
FEDERAL MEDICAL CENTRE
P.M.B. 502
YENAGOA

OFFICE OF THE HEAD OF CLINICAL SERVICES

INTERNAL MEMO

<table>
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<tr>
<th>To</th>
<th>HOD – Obstetrics &amp; Gynaecology</th>
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<tbody>
<tr>
<td>From</td>
<td>Head of Clinical Services</td>
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<tr>
<td>Date</td>
<td>9th February 2016</td>
</tr>
<tr>
<td>Subject</td>
<td>Re: Research on “Attitudes and Perceptions of HIV-Infected Pregnant Women about the use of Antiretroviral Therapy for Prevention of Mother to Child Transmission of HIV in the Niger Delta Region of Nigeria.”</td>
</tr>
</tbody>
</table>

I write to introduce Puremeliwan Baldwin Major, a PhD student of University of Bedfordshire. He/She is currently carrying out a research project on the topic stated above.

Kindly assist him/her with the necessary data to enable him/her complete his/her research work.

Thank you.

Dr. P. P. F. Numbere
HCS
```
Appendix 2: Information sheet for phase one

INTERVIEW INFORMATION SHEET

Introduction

My name is Puremeluan Baldwin Major, a PhD student from the Institute for Health Research, University of Bedfordshire, United Kingdom. I am conducting a study to explore attitudes and perceptions of HIV-infected pregnant women to the use of antiretroviral therapy (ART) for prevention of mother to child transmission (PMTCT) of HIV in the Niger Delta Region of Nigeria.

Invitation to participate

You are invited to participate in this study. Before you decide, it is important for you to understand what the research will involve and why it is being conducted. Ask for clarification of any aspect you do not understand. Take time to decide whether or not you wish to participate.

Why are you being invited?

I am inviting Women who are pregnant, HIV-positive and aged 18 years and above attending antenatal clinics in the tertiary hospitals located in Akwa-Ibom, Bayelsa and Rivers states in the Niger delta region of Nigeria.

What is the study about?

There is limited evidence on attitudes and perceptions about the use of antiretroviral therapy among HIV-infected pregnant women in Nigeria, especially in the Niger Delta Region. This study therefore aims to provide a better understanding of the attitudes and perceptions of pregnant women to the use of ART for PMTCT.

Why am I doing the study?
I am doing this research as part of my PhD study. It is anticipated that the study would provide useful information for HIV-infected pregnant women, healthcare professionals and policy makers for recommendations to improve use of ART which is believed to have the potential to ultimately reduce mother to child transmission of HIV.

**What would be involved?**

I would like you to take part in an in-depth (one-to-one) interview to discuss your views, understanding and opinions about using ART for PMTCT. The interview will last for about one hour and will be recorded if permitted in order for me to have a record of what has been discussed.

**What will happen to the result?**

The interview recordings will be transcribed on to a computer where it will be stored as encrypted files only accessible by the researcher and supervisors. The result of the transcripts will be reported in my PhD thesis which will be submitted to the University of Bedfordshire. The result of this study will be published in peer reviewed journals, presented at conferences, copies will also be sent to Nigerian States and Federal Ministries of Health, and the selected hospitals. A short summary leaflet of the result will be made available for participants who are interested in receiving it.

**Participation and Confidentiality**

Participation in this study is entirely voluntary. You have the right not to answer any of the questions that you do not feel comfortable answering. You also have the right to withdraw at any time from the study without any consequences for doing so.

The information you will provide will be confidential and your identity will be protected. Your responses will only be used for the purpose of this study and will not be disclosed to other parties. All the information will be reported anonymously to prevent identification. Your name will not be required in order to protect your identity. All transcripts of interview recordings will
be stored as encrypted files. Encrypted USB may be used to transfer files if need be. The digital voice recorder and all field notes will be stored in a locked cabinet. After completion of the PhD study, all the stored information and field notes will be deleted and destroyed respectively.

Risks

No risk or harm is anticipated in the course of your participation in this study. However, if there be any form of discomfort or distress as a result of your participation, please contact the researcher and the supervisor on the details provided at the end of this form for immediate intervention.

Contact details

If you require further information, please contact us on the following contact details:

Researcher:

Puremeluan Baldwin Major
PhD student in Public Health
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University of Bedfordshire, United Kingdom

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Email: puremeluan.major@study.beds.ac.uk

Supervisor:

Dr Shuby Puthussery
Senior Lecturer in Public Health

Department of Clinical Education and Leadership & Institute for Health Research

University of Bedfordshire United Kingdom

Email: shuby.puthussery@beds.ac.uk
Appendix 3: Consent form for phase one

Consent Form

A study on attitudes and perceptions of pregnant women to the use of antiretroviral therapy for prevention of mother to child transmission of HIV in the Niger Delta Region of Nigeria

The purpose of this study has been clearly explained to me

(Yes)   (No)

I understand that at any time I can withdraw from this study without giving a reason

(Yes)   (No)

I have been given an opportunity to ask questions, and I am satisfied with the answers provided

(Yes)   (No)

I agree to take part in this study

(Yes)   (No)

My signature below explains my willingness to participate in this research

Participant’s name (Printed): ……………………………………………………………………………………………

Participant’s signature ……………………………….. Date: ………………………..

Appendix 4: Interview guide
TOPIC GUIDE

Introduction to research

This is part of my PhD study on: attitudes and perceptions of HIV-infected pregnant women to the use of antiretroviral therapy for prevention of mother to child transmission of HIV. This study will give you the opportunity to express how you feel about using antiretroviral therapy, your opinion, experiences, and hopefully your voice will be heard. The results of this study will be included in my PhD thesis.

The interview is quite informal and voluntary, and should take about 30 minutes to one hour. You have the right not to answer any question, and to stop the interview at any time or for any reason. I would like to record this interview so that I can use it for reference while proceeding with this study. I will not record this interview without your permission. All the information you will provide is confidential, and will not be passed on to anyone else. All interview recordings will be stored in a secure work space until the completion of my PhD programme. The recordings will then be deleted. The findings from this study will be available as a short summary leaflet for all participants. If you would like to receive a leaflet please provide your email address on the form provided.

Please feel free to ask for clarification of any question if it's not clear. Also feel free not to answer any question you are not comfortable with.

Background/Medical information

1. How are you feeling generally with the pregnancy?
2. Could you tell me about yourself? [Ask about Age, Marital status, level of education, occupation, religion, area where they live]
3. When were you first diagnosed with HIV? [What made you decide to go for testing? What were the processes you went through before and after the test?]

Awareness/susceptibility/seriousness of MTCT of HIV
4. What do you understand by mother to child transmission (MTCT)? [Mode of MTCT, Sources of information, what they think about MTCT]

5. To what extent do you think that HIV can be passed on from a mother to her child, and exactly how? What do you think are the chances of your child getting HIV?

6. How serious do you think the effects of HIV are for your child, and why? [Are you concerned about the possibility of having HIV+ child? What step have you taken concerning that?]

7. Do you think MTCT is preventable? If yes, how?

**Perception and Attitudes towards Antiretroviral Therapy (ART)**

8. Describe the HIV treatment services available to you locally. Is ART available to you here? (Ask about the source of information about ART, how to access ART, where to obtain ARVs, current practice of ART service delivery).

9. When did you start ART? [was it immediately after you found out about HIV, what made you decide to access ART services, are you still on ARVs, any side effects, do you use alternative remedies?]

10. How would you describe your health generally since you started treatment? Could you tell me your experiences of being on treatment with ARVs?

11. What do you believe to be the function of using ART during pregnancy?
12. How do you feel about taking ART? [negative-concerns and positive, side effects, benefits]

13. What are the conditions that would make it easy for you to use ART during pregnancy?

14. What are the conditions that would make it difficult for you to use ART during pregnancy?

15. Overall, what is your opinion about ART?

16. What do you think needs to be done to encourage more HIV-infected pregnant women to initiate treatment or not to drop out of treatment?

17. What do you see as the ideal or perfect PMTCT-service? [Do you think that there should be more information and education about PMTCT and ART services? Where do you think that should be given: in the community, in clinics/hospitals or somewhere else?]

We have now finished the interview. Do you have any comments, or is there anything else you would like to add or ask?

Once again, thank you for taking part in the interview today.

Appendix 5: Transcript
INTERVIEW SIX TRANSCRIPT

Date of interview: 20/06/2016

Place of interview: Private room in the hospital

Participant’s demographic information:

Age: 40 years  Marital status: Married

Religion: Christian  Occupation: Teaching

Level of Education: Post-secondary  Area where you live: Urban

Researcher: A big thank you for accepting to take part in this interview. So, how are you feeling generally with the pregnancy today?

Interviewee: I’m feeling okay, this is my fifth pregnancy so the body is getting use to all the pregnancy sicknesses … (laughs). Although, I’m in my final stage, so no more feeling of vomiting and all that, waiting for delivery day. I’m due next month.

Researcher: Wow, that’s good to hear, and your children, have they been tested?

Interviewee: Oh yeah, all of them are negative, my husband is also negative

Researcher: Okay, so when did you do your first test for HIV?

Interviewee: That was during my first pregnancy, that was 2003. That was when it was discovered that…I’m…(HIV positive), though I did the first test it wasn’t seen but it was during the second one that it was seen that I was positive.

Researcher: So was it because of the pregnancy or you went on your own for the test?
Interviewee: No. It was when I came for registration for antenatal, that was when I knew.

Researcher: okay.. so what were the processes you went through before and after testing?

Interviewee: Hmm… they (healthcare providers) first of all did the counselling, okay, not much was done before the test. It was after the test that they (healthcare providers) taught me…..yes… It was after the test the counselling followed.

Researcher: okay, so what was the counselling all about?

Interviewee: they (healthcare providers) explained everything about the disease, giving me hope that I can still live a normal life if I take the drugs, and my baby will not be infected. I took treatment immediately and by then they demanded that my partner too go and do the test. He tested negative.

Researcher: so.. ehmm... what do you understand by mother to child transmission of HIV?

Interviewee: That this virus may be transmitted to the child through various ways: it may be when you are pregnant, sometimes it might be the child may not be infected but when it comes in contact with the blood during delivery, sometimes it might also be when the child is breastfed, through breastfeeding. These are the major… major times that the child may be exposed to being infected or transmitted, yeah, being infected.

Researcher: so all these information, did you get to know all these before you were tested positive?

Interviewee: No. I got it (MTCT information) from the hospital after the test. Why I am saying this is, when this was discovered, the level of awareness was not much. And by then, HIV was taken as may be a death warrant, and so many people could not stand the information and all that. So much of the information was not even there by that time. As at that time, the mother was not given any option of breastfeeding the baby at all. So, it was believed that certainly no measures will be taken aside from stopping the breastfeeding. But somehow now, at least awareness has gone that you can breastfeed your baby, or you can still carry your baby without
the baby being infected. In fact at that time, the idea was anything about the person is definitely going to affect the child.

**Researcher:** Okay… this is the information you’ve gotten, as an individual, what do you think about mother to child transmission, what is your own opinion about it?

**Interviewee:** well, the awareness has not stopped the transmission. The thing is, it all depends on the level of the virus in you, that in your medication (ART) the child could still be saved from infection, and that there are certain measures that has, the medication (ART) could stop. There are other preventive measures that could be taken during delivery so that the baby will not come in contact with the blood. Like when we were counselled, there was a suggestion that we could use a pad sort of, that could take in the blood, whereas when the baby comes out it stops the baby from coming in contact with your blood and it can now help the baby. That even with this medication too, that this baby could go on breast milk without being infected. The major thing there is that the mother should be on medication (ART).

**Researcher:** okay…

**Interviewee:** That if you are on medication (ART) and also, take precautionary measures on hygiene, keeping yourself and the environment clean. Making sure that your immune system is high and it will also help to save you and your baby from infection.

**Researcher:** so, with all these, as a person, do you think mother to child transmission is preventable?

**Interviewee:** It is, with the awareness it is. And it is, because by evidence (being on ART throughout pregnancy) from my experience the children I give birth to are not positive.

**Researcher:** so for a child who gets infected, how serious do you think the effects of the disease (HIV) will be for a baby?

**Interviewee:** Well, being that the baby at that stage, the immune system is not high it could seriously affect the baby’s health, making the baby get sick and unnecessarily having one ill
health or the other. Sometimes, they may be fortunate and can still sail through, may be the baby is fed well or so. The major thing there is that the immune system is being attacked so if the baby maybe is taken care of, probably given bath when you are supposed to, given good food; it may not necessarily be formula, some people may not be able to buy formula but they have our local food, the baby may still be okay health wise. The major thing there is hygiene and also carrying nourished or nutritive food for the baby, so the baby can still stand, can still overcome the effect.

**Researcher:** so have you at any point in time get concerned about your baby getting infected?

**Interviewee:** Sometimes, you know it’s had to take your mind off, but I know as long as you take your drugs, practice good hygiene the child won’t be infected.

**Researcher:** So what are the steps you’ve taken to prevent your unborn baby from being infected?

**Interviewee:** I take my drugs (ART) as prescribed and I don’t breast feed

**Researcher:** In all, what do you think about antiretroviral drugs?

**Interviewee:** Well… antiretroviral drug is, it’s advisable even though it’s tasking, having to take it every day and the side effects at the initial stage, feeling dizzy constantly and all that, but it’s good so far it helps you move on. Now we don’t really have cases where people die because of HIV as it was before. I think it has gone a long way to preserve people from leaving the stage of just the virus to AIDS, because initially it was the… having to transfer to AIDS before you know it. So the cases where like when a partner dies that it is now discovered that the other partner has AIDS and all that, but now it is not really so. So there is nothing wrong in having the antiretroviral drugs. It is effective, it has gone a long way, especially when it has to do with that mother to child transmission. It has really helped, rather than initially when we were told not to even go into get pregnancy and another thing too not to even breastfeed. So,
now these options are there, depending on your level the level of the virus in your body, so it’s okay, its a welcome thing, a welcome opportunity.

**Researcher:** So, have you been taking your drugs regularly since you started?

**Interviewee:** Yes, but at that initial stage I stopped (taking ART). It’s when I started clinic here that the matron was telling me no, I shouldn’t have stopped. Reasons were that at that stage, the way the drugs (ART) were given were like tedious, having to come to clinic for a whole day and here was I, I was in a private place, so I saw that it was going to ruin my career and whatever so I stopped (taking ART). When she now encouraged me I now suggested maybe I could be given the drugs on two two months interval so that to save that stress. How things run in the private is not the same in this thing. Getting to know about it may even make them fire you and all that. She really helped a lot and I thank her for that, for at least saving that …feeling….inconvinience.

**Researcher:** yeah, what about now, do you still have to wait that long?

**Interview:** Is not that tedious any more. The services are better now,

**Researcher:** so how would you describe your health generally since you started treatment? Could you tell me your experiences of being on treatment with ARVs?

**Interviewee:** My health is fine even though before now, before I embarked on the this thing (HIV treatment), one, knowing that I have to take care of myself, practice personal hygiene, and also take much fruits and vitamins to build up my immune system so, I don’t have exceptionally cases where I get sick unnecessarily except maybe when I expose myself to cold that I have catarrh and if I take one or two things I will be alright so, I am okay I don’t have problem health wise.

**Researcher:** Are there times when you have things that have been of discouragement to you from taking the drugs, or coming to the hospitital to access treatment?
Interviewee: Well, sometimes, maybe the time the drugs is finishing and I may be having much things to do and having to, you know the doctor has to sign a certain form and all that, then you have to go up, go to the pharmacy where you can get…

Researcher: Oh, you have to see the doctor first?

Interviewee: No, it is the form that needs to be signed giving the authority that I need the drugs. So, having to go through those processes, sometimes, and like I told you the side effects, though they told me it is not harmful, I have to, try to cope with it, especially the dizziness, the weakness, and all that, but then we have to consider the advantage, we really don’t have to give up.

Researcher: So what’s your motivation, what motivates you to keep coming, what encourages you?

Interviewee: One, initially, the drugs we used to buy, but now it is given free.

Researcher: Oh! When did they start that, giving freely?

Interviewee: well, because, as in the hospital may have subsidize for us and where it is given is no more tedious and the way the patients are treated is more of a confidential manner, where you won’t be treated as an outcast oh, this person has HIV nobody comes near you, nobody will want to talk with you, so to some extent that level of stigmatization is reduced though it is still there, at least it’s not more stressful as it was. That’s what motivates me.

Researcher: What do you think needs to be done to encourage more pregnant women to initiate treatment or not to drop out of treatment?

Interviewee: Yeah, like I said what puts me off was the stress. Now, even here, if not for the principal nursing officer that sometimes steps in, you come in here and you are stressed up, you may come very early and before your file is called for you to be attended to, sometimes maybe before your file is seen somebody that came very late is being attended to. So, such things will definitely discourage people. So in situation where by more doctors are given,
assigned to attend.. so that, that’s what I told my friend, that my previous pregnancy I don’t stay in antenatal later than 12noon, but sometimes you come and you sit up to 2:00pm before you leave the antenatal, so such thing will definitely discourage people to come to the hospital, they will still want to go somewhere else to deliver.

**Researcher:** yeah…

**Interviewee:** And like now presently there is strike. Last week the resident doctors were on strike, and we were depending on the …it was...they called it warning strike, now it was to finish on Monday, this Monday right..., so, consultants were to take care of the women. Now some consultants were here and some consultants were not here. Like me I was here my consultant was not there, he was busy and here again this week I’m not attended to. So such things will definitely discourage somebody. Already some people are saying they have to go and register somewhere else before the strike…it is, I told you this is my…I had three pregnancies, the second one was twins, that’s why… why I’m coming is I’m looking for a male…mhm…those ones are females. So all of them I delivered them here in the hospital, that’s why I keep telling them, well that I virtually do not really have reasons to stay away from here for now because all my deliveries I have not had any issues…all, even those twins, they were bridged before but when I delivered them they came from legs and I didn’t have any complications, I delivered normally. So, such things will definitely encourage me to come again.

**Researcher:** Hmmm.. yeah..

**Interviewee:** Except some people have issues, like a friend who said, even when she was in labour and when she was to be delivered of a baby; now they saw that she needed CS and while right at the theatre a doctor refused to carry on the CS saying that they have just commenced on strike. So, such things discourage… my dear that lady is still… as at yesterday she was telling me that she is still afraid, scared of this other pregnancy she is carrying that she really suffered. That a doctor could refuse to attend to a patient right in the theatre, because they have just commenced a strike. So, people will tend to definitely patronise the
private hospitals or whatever even though we have so many of the medical doctors running their own private hospitals now. But not everybody will be able to afford that, that’s why some people would stoop low to go to the local maternity homes. So such things, all those rigorous that you pass through and having to go to pay in a particular section getting a receipt before you are now given drugs, and all those things; if such is being minimised probably people will be encouraged. And more hands; there are certain times you have only three doctors consulting and here you have about one hundred, so by the time somebody comes…like me I have a certain time for me to go and pick my kids in school and for such time you are still here in the hospital you cannot do anything; I mean it is discouraging, so it’s… having to get more hands and people who are here should also be willing to work. Because somebody may say no I’m tired, will just be willing to attend to few people and will not want to attend to others again and wouldn’t mind. So things like that will discourage people. Another problem is this stigmatization. They still stigmatize people…

Researcher: up till now?

Interviewee: yes, they still do that (stigmatize). Sometimes for fear of being infected also and all that, that is it, you know Africa, once something sticks in their head, it's there. That is why even up till now, they will still have to spray you before you are allowed to travel

Researcher: We have now finished the interview. Do you have any comments, or is there anything else you would like to add or ask?

Interviewee: Well, ehm… I wanted to, because when I was interacting with my doctor about this side effect asking is there no how this drug will began and somebody doesn’t feel dizziness? And he gave me a blank answer that nothing could be done, that the only thing is that you just have to try and cope with it. Now, how long will this person have to live with this dizziness? Somebody needs to drive, somebody needs to go about doing one thing or the other, church and all that. Now he also suggested getting a leave. And I said this person being on leave is not enough. So, is there no how this drug will be done that this side effect is not
there, you take it and it's mild on you just like common paracetamol, and maybe the common vitamin C and it still do the job, because I was really really disturbed about the dizziness part of it, I became tensed, I couldn't do anything. I was even asking him are you certainly sure that the way I am affected that it will not affect the baby? He said no. Another thing, that there are people who may not be strong enough to stand the dizziness, and it might ignite some other things, probably raise the blood pressure of the patient or whatever. So I was asking couldn't there be any way this drug could be done mild?

**Researcher:** Yeah, you still need to speak to your doctor about it, if its really affecting you.

**Researcher:** Once again, thank you for taking part in this interview today. We have come to the end of the interview.

*End of Interview*
Appendix 6: Imported transcripts in NVivo
Appendix 7: Coded data extract in NVivo

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<td>PM</td>
<td>21/06/2014 18:20</td>
<td>PM</td>
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<td>10</td>
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<td>PM</td>
<td>22/06/2014 8:10</td>
<td>PM</td>
<td>22/06/2014 8:10</td>
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</tbody>
</table>

Reference 1 - 122% Coverage
I practiced it (new ART) and it worked, this is my third child and all of them they are negative

Reference 2 - 0.0% Coverage
The drug is really working

Reference 3 - 100% Coverage
[Table references not displayed]

Reference 4 - 100% Coverage
I know very well that if I stick to the drugs the child might not have it, the other way round you know it don’t before realising it the baby would be infected
Appendix 8: IHR ethics approval for phase one

7 April 2016

Puremoluan Baldwin Major
Student number: 1317693

Dear Puremoluan Baldwin Major

Re: IHREC Application No: IHREC669

Project Title: Attitudes and perceptions of HIV-infected pregnant women to the use of antiretroviral therapy for prevention of mother to child transmission of HIV in the Niger Delta Region of Nigeria

The Ethics Committee of the Institute for Health Research has considered your revised application and has decided that the proposed research project should be approved with no further amendments.

Please note that if it becomes necessary to make any substantive change to the research design, the sampling approach or the data collection methods a further application will be required.

Yours sincerely

[Signature]

Dr Yannis Pappas
Head of PhD School, Institute for Health Research
Chair of Institute for Health Research Ethics Committee
Appendix 9: NDUTH ethics approval

RESEARCH AND ETHICS COMMITTEE
NIGER DELTA UNIVERSITY TEACHING HOSPITAL, OKOLOBIRI

CLEARANCE CERTIFICATE


Project Title: ATTITUDE AND PERCEPTIONS OF HIV-INFECTED PREGNANT WOMEN ABOUT THE USE OF ANTIREtroVIRAL THERAPY FOR PREVENTION OF MOTHER TO CHILD TRANSMISSION OF HIV IN THE NIGER DELTA REGION OF NIGERIA.

Investigators: MAJOR PUREMELUAN.

Department/Institution: UNIVERSITY OF BEDFORDSHIRE.

Date considered: 23RD FEBRUARY, 2016.

Decision of the committee: APPROVED.

Chairman: Professor Olu Osinowo Signature & Date: 24/02/2016

DECLARATION BY INVESTIGATOR(S)

Protocol number:
To be completed in duplicate, and one copy returned to the Secretary, Research and Ethics Committee, Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State. I/we fully understand the conditions under which I am/we are authorised to conduct the above-mentioned research and I/we guarantee that I/we will ensure compliance with these conditions. Should any departure be contemplated from the research procedure as approved, I/we undertake to resubmit the protocol to the Research and Ethics Committee.

Signature: 24/02/2016
Appendix 10: FMC ethics approval

FEDERAL MEDICAL CENTRE, YENAGOA

Medical Director
Dr. D. O. Allagga B.Med. Sc (Pharm), MBBS,
FWACSM, FMA, Cert. ART Cleveland
USA, India, FICS
Tel: 08033103026, 08150655552
Email: dennisallagga@yahoo.com

Head of Clinical Services
Dr. P. F. F. Numbere MBBS, FWACSM.
Tel: 08134542773, 07013483558
Email: preyer71@gmail.com

Reference: MCY/BS/HCS/142/57

Puremician Baldwin Major
University of Bedfordshire

Re: Application For Ethical Committee's Approval For Data Collection For PhD Study

We refer to the above subject matter and wish to inform you that approval has been granted you to carry out a research project on “Attitudes and Perceptions of HIV-Infected Pregnant Women about the use of Antiretroviral Therapy for Prevention of Mother to Child Transmission of HIV in the Niger Delta Region of Nigeria.”

Kindly liaise with the Heads of Department of Obstetrics and Gynaecology for guide.

Regards.

Dr. P. P. F. Numbere
Head of Clinical Services.
Appendix 11: UUTH ethics approval

UNIVERSITY OF UYO TEACHING HOSPITAL, UYO INSTITUTIONAL HEALTH RESEARCH ETHICAL COMMITTEE (IHREC)

APPROVAL CERTIFICATE LETTER

Principal Investigator: Puremeluan Baldwin Major

Protocol Title: “ATTITUDES AND PERCEPTIONS OF HIV-INFECTED PREGNANT WOMEN ABOUT THE USE OF ANTIRETROVIRAL THERAPY FOR PREVENTION OF MOTHER TO CHILD TRANSMISSION OF HIV IN THE NIGER DELTA REGION OF NIGERIA”

STATUS

The University of Uyo Teaching Hospital, Uyo Institutional Review Committee has reviewed your protocol title: “Attitudes and Perceptions of HIV-Infected Pregnant Women About the Use of Antiretroviral Therapy for Prevention of Mother to Child Transmission Of HIV in the Niger Delta Region of Nigeria”

The research protocol described above has been approved by the University of Uyo Teaching Hospital, Uyo Institutional Health Research Ethical Committee (IHREC) as indicated.

J. E. Inyang
Secretary, UUTH
Uyo IHREC
Appendix 12: Survey questionnaire

Questionnaire Tool

Section A: Socio-demographic Information

1) How old are you in years?
   18-28 □  29-39 □  40-50 □  51+ □

2) What is your religion?
   Christianity □  Islam □  Others, specify -----------

3) What is your level of education?
   No formal education □  Primary □  Secondary □  Tertiary □

4) What is your marital status?
   Married □  Single □  Cohabiting □  Widowed □  Divorced □

5) Which area do you live?
   Urban □  Semi-urban □  Rural □

6) What is your occupation?
   Unemployed □  House wife □  Trading □  Civil servant □

7) Whom do you live with?
   Spouse □  Spouse and children □  Own parents □  In □  years □  Alone □
   □  Own parents □

8) How long ago did you first learn you were HIV-positive?
   Number of months ago....................

   xxv
9) Are you taking ART to manage your HIV?
   Yes □ No □ I don’t know □

10) How long ago did you begin taking ART?
    Number of months ago..................
    Number of years ago...................

Section B: Perception

The purpose of this section is to collect information about your attitudes and perception of taking antiretroviral therapy for prevention of mother to child transmission of HIV. Please tick the appropriate box.

Perceived susceptibility and seriousness of MTCT

11) Can a pregnant women living with HIV/AIDS transmit the disease to her unborn baby?
    Yes □ No □ I do not know □

12) Do you think HIV is a serious health problem in children?
    Yes □ No□ I don’t know □

13) The thought of having a child with HIV scares me.
    Yes □ No□ I don’t know □

14) I am afraid to even think about having a HIV positive child.
    Yes□ No□ I don’t know □
Perceived Barriers to ART and PMTCT

15) What do you think can make it difficult or stop you from taking antiretroviral drugs and participating in PMTCT?

- Husband’s consent
- Opposition from husband
- Fear of disclosure
- Fear of divorce
- Stigma associated with HIV
- Discrimination by health staff
- Cost of clinic care
- Transport fare to clinic
- Refusal to provide care
- Poor staff morale
- Lack of privacy for counselling
- Out of stock of ARVs
- Verbal abuse of staff

16) Has any of the following ever made you skip your medication?

- Too busy with house chores
- Too many pills
- Tired of taking pills every day
- Drug was finished
- Simply forgot
- Lack of food
- I felt better
- Fear of stigma
- Clinic not accessible
- To avoid side effects

17) Within the last one month, how many times have you missed taking your medication?

- 1 – 3 times
b) 4 – 6 times  

c) 7 – 9 times  

d) More than 10 times  

e) Never skipped my medication

**Perceived Quality of Care**

I would like to ask about what you think of the services you receive at this clinic

18) When using PMTCT services, did any of the following happen to you?  

   a) Staff ignored you or avoided taking care of you  
   
   b) You were treated with disrespect or abused  
   
   c) Staff explains everything and listens to you  
   
   d) You were treated with respect and dignity  
   
   e) You were given the kind of care you wanted

**Perceived Social Support**

I would like to ask about how individuals around you make it easier or harder for you to take ART.

19) If married or cohabitating: Does your partner / spouse know that you are taking ART?  

   Yes  
   No  
   I don’t know

20) If living with other adults. Do all the other adults living in your household know that you are taking ART  

   Yes  
   No  
   I don’t know

21) Is it ever difficult for you to take your ART when someone from your family can see you?  

   Yes  
   No  
   I don’t know
22) Is it ever difficult for you to take your ART when someone from your community or your workplace can see you?

Yes ☐ No ☐ I don’t know ☐

23) Is there anyone who regularly reminds you to take your ART?

Yes ☐ No ☐ I don’t know ☐

24) Has any of the following reminded you of taking your medication?

- Husband/partner ☐
- Other family member ☐
- Friend ☐
- Colleague ☐
- Diary or calendar ☐
- Phone or clock alarm ☐

25) During the past month, have you ever not taken your ART because you did not want someone to find out?

Yes ☐ No ☐ I don’t know ☐

26) How is your husband/partner involved in your treatment?

a) He encourages me to take my medication and remain in treatment

b) He accompanies me to the clinic

c) He assists me with house chores to enable me take my medication

Section B: Attitudes towards ART

I would like to ask you about your personal views and opinions about taking antiretroviral drugs to prevent mother to child transmission of HIV. Please tick (✓) the answer that best describe your opinion.
27) Taking ART will make me live healthy
   Strongly agree  Agree  Unsure  Disagree  strongly disagree

28) I don’t need to take my medication once I feel better
   Strongly agree  Agree  Unsure  Disagree  strongly disagree

29) ART Prolongs life
   Strongly agree  Agree  Unsure  Disagree  strongly disagree

30) ART helps me to gain more weight/energy
   Strongly agree  Agree  Unsure  Disagree  strongly disagree

31) ART reduces frequent sickness
   Strongly agree  Agree  Unsure  Disagree  strongly disagree

32) By staying on my ART medication, I can prevent been sick
   Strongly agree  Agree  Unsure  Disagree  strongly disagree

33) By taking my medication I can prevent mother-to-child transmission of HIV
   Strongly agree  Agree  Unsure  Disagree  strongly disagree

34) ART Side effects can lead to miscarriage and still birth
   Strongly agree  Agree  Unsure  Disagree  strongly disagree

35) Taking my medication every day will harm my baby
   Strongly agree  Agree  Unsure  Disagree  strongly disagree

36) I take my medication only when I feel sick
   xxx
Consent

My signature below explains my willingness to participate in this research

Participant’s signature …………………………………… Date: ………………………
Appendix 13: IHR ethics approval for phase two

13 October 2017

Puremeluan Baldwin Major
Student number: 1317693

Dear Puremeluan Baldwin Major

Re: IHREC Application No: IHREC784

Project Title: Attitudes and perceptions of HIV-infected pregnant women towards the use of antiretroviral therapy for prevention of mother to child transmission of HIV in the Niger Delta Region of Nigeria

The Ethics Committee of the Institute for Health Research has considered your application and has decided that the proposed research project should be approved with no amendments.

Please note that if it becomes necessary to make any substantive change to the research design, the sampling approach or the data collection methods a further application will be required.

Yours sincerely

Gurch Randhawa PhD FFPH
Professor of Diversity in Public Health & Director, Institute for Health Research
Acting Chair of Institute for Health Research Ethics Committee
Appendix 14: Information sheet for phase two

SURVEY INFORMATION SHEET

Introduction

My name is Puremeluan Baldwin Major, a PhD student with the Institute for Health Research, University of Bedfordshire, United Kingdom. I am conducting a study to understand the attitudes and perceptions of HIV-infected pregnant women towards the use of antiretroviral therapy (ART) for the prevention of mother to child transmission (PMTCT) of HIV in the Niger Delta Region of Nigeria.

Invitation to participate

You are invited to participate in this study. Before you decide, it is important for you to understand what the research will involve and why it is being conducted. Ask for clarification of any aspect you do not understand. Take time to decide whether or not you wish to participate.

Why are you being invited?

I am inviting women who are pregnant, HIV-positive and aged 18 years and above, attending antenatal clinics in the tertiary hospitals located in Akwa-Ibom and Bayelsa states in the Niger delta region of Nigeria.

What is the study about?

We know little about the use of antiretroviral therapy among HIV-infected pregnant women in Nigeria, especially in the Niger Delta Region. This study aims to give us a better understanding of the attitudes and perceptions of pregnant women to the use of ART for PMTCT.

Why is this study being conducted?
I am doing this research as part of my PhD study. It is expected that the study would give useful information which may result to recommendations to improve use of ART.

**What would your participation involve?**

You would be asked to complete a questionnaire survey that will take about 10 – 15 minutes to complete.

**What will happen to the findings of the study?**

The questionnaires will be analysed and the findings will be included in my PhD thesis, which will be submitted to the University of Bedfordshire. The result of this study will be published in peer-reviewed journals, presented at conferences. Copies will also be sent to Nigerian States and Federal Ministries of Health, and the selected hospitals. A short summary leaflet of the result will be made available for participants who are interested in receiving it.

**Participation and Confidentiality**

Participation in this study is entirely voluntary. You have the right not to answer any of the questions that you do not feel comfortable answering. You also have the right to withdraw at any time from the study without any consequences for doing so. Your signature will be required at the end of the questionnaire as a proof of your consent to participate in this study.

The information that you will provide will be confidential and your identity will be protected. Your responses will only be used for the purpose of this study and will not be disclosed to other parties. All the information will be reported anonymously to prevent identification. The questionnaires and all field notes will be stored in a locked cabinet only accessible by the researcher. Digital files will be stored as encrypted files in a password protected computer. Encrypted USB may be used to transfer files if need be. After completion of the PhD study, all stored information and field notes will be destroyed.

**Risks**
No risk or harm is anticipated in the course of your participation in this study. However, if there be any form of discomfort or distress as a result of your participation, please contact the researcher and the supervisor to discuss. The contact details are provided at the end of this form.

Contact details

If you require further information, please contact us on the following contact details:

Researcher:

Puremeluan Baldwin Major

PhD student in Public Health

Institute for Health Research

University of Bedfordshire, United Kingdom

Tel: +447440212460, +2348036654315

Email: puremeluan.major@study.beds.ac.uk

Supervisor:

Dr Shuby Puthussery

Senior Lecturer in Public Health

Department of Clinical Education and Leadership & Institute for Health Research

University of Bedfordshire United Kingdom

Email: shuby.puthussery@beds.ac.uk