



**FERTILITY INTENTIONS AND CONTRACEPTIVE USE AMONG HIV-POSITIVE WOMEN
OF REPRODUCTIVE AGE, (15-49) IN ZAMBIA: EVIDENCE FROM DEMOGRAPHIC AND
HEALTH SURVEY 2013-14.**

By

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A Dissertation submitted to the University of Zambia in partial fulfillment of requirements of a
Degree of Master of Arts in Population Studies

University of Zambia

Lusaka

2019



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APPROVAL

This dissertation of **David Mulemena** is approved as fulfilling part of the requirements for the award of the degree of Master of Arts in Population Studies at the University of Zambia.

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DEDICATION

I dedicate this paper to my late mum, **Fenny Mushanga Mulemena** (M.H.S.R.I.P) who always advised me to work hard given an opportunity and remain focused if I want to live a good life. “I

kept your words on my neck mum”!

ACKNOWLEDGEMENTS

This dissertation would not have been possible without the support of a large number of people in a wide range of capacities. Unfortunately, it is not possible to acknowledge by name all the people who contributed directly or indirectly in some way to the dissertation. First and foremost, I thank the Almighty God who has enabled me to accomplish this aspiration. I further extend my gratitude to Measure DHS for giving me access to a very sensitive dataset (HIV) to conduct my study.

Particularly, I am most indebted to my supervisor, **Dr. Namuunda Mutombo** for his guidance, motivating advice, assistance, and for sparing generous time to technically review my work despite his busy schedule. In a special way, many thanks are due to **Mr. Million Phiri** and **Mr. Andrew Banda** for criticising my work during mentorship which helped me move in the right direction.

Finally, I would want to thank all my friends, family members and not forgetting my lovely girlfriend (**Rabecca Bwato**) who rendered me assistance and believed that I can do it, may God Bless.

ABSTRACT

HIV infection is a strong predictor of fertility as it might influence one's fertility desire. HIV-positive women may have fertility desires and may intend to have children but these vary by socio-economic, socio-cultural and demographic characteristics. Studies of fertility intentions among HIV-positive individuals report a strong desire to have children. With the advent of Antiretroviral Therapy [ART], the quality of life for people living with HIV has also been improved potentially impacting fertility intentions among HIV-infected individuals. However, little is known about their fertility intentions. Thus, this study examines the fertility intentions and contraceptive use among HIV-positive women (15-49 years) in Zambia.

The analyses are based on women with linkable information on HIV testing, fertility preferences and contraceptive use from the nationally representative 2013-14 Zambia and Demographic Health Survey data. HIV data was merged with each woman's individual file which also contained household variables to create an analytical file. Analyses were carried out after merging the HIV test results and women's file. Cross-tabulations with Chi-square tests were conducted to ascertain the crude relationship and finally multiple logistic regressions were employed to identify the major independent predictors of fertility intention using STATA 14.0 with 5% level of significance.

Findings reveal that out of the total number of women (9,688) with linkable information on HIV testing and fertility preferences, 1,654 (17.1%) were HIV-positive. Among the HIV-positive women, a considerable proportion (46%) still has intentions for having children in future. However, the study findings indicate a 14% significant difference in fertility intentions between HIV-negative (60%) and HIV-positive (46%) women. This study has also found that majority (58%) of the HIV-positive women are not contraceptive users. Multivariate analyses revealed that HIV-positive women have lower odds of wanting more children when compared to their HIV-negative counterparts.

The study has concluded that predictors of fertility intentions and use of contraceptive among women are different by HIV status. From the findings, age, education level, marital status and parity were found to be the major predictors of fertility intentions among HIV-positive women while among the HIV-negatives; age, education level, parity, marital status, employment status, wealth quintile and region explained their fertility intentions. Predictors of contraceptive use among HIV-positive women include; marital status, parity, ethnicity, fertility intention, education level and age. The fact that many HIV-infected women expect to have children has important implications for the prevention of vertical and horizontal transmission of HIV. There is therefore, the need for comprehensive and continuous expansion of family planning, voluntary counseling and prevention of mother-to-child transmission (PMTCT) and integration of HIV treatment care among HIV-positive mothers to meet diverse reproductive intentions.

Key Words: *Fertility intentions; contraception; HIV status, women; Zambia*

LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ART	Anti-retroviral Therapy
CSO	Central Statistical Office
DHS	Demographic Health Survey
HIV	Human Immune-deficiency Virus
HIVPR	Human Immune-deficiency Prevalence Rate
MoH	Ministry of Health
NAC	National AIDS Council
NASF	National Strategic Framework
NHSP	National Health Strategic Plan
PMTCT	Prevention of Mother to Child Transmission
SSA	Sub Sahara Africa
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UNAIDS	Joint United Nations programme on HIV/AIDS
UNDP	United Nations Development Programs
WHO	World Health Organisation
ZAMPHIA	Zambia Population Based Impact HIV Assessment
ZDHS	Zambia Demographic and Health Survey
ZRHP	Zambia Reproductive Health Policy

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CHAPTER ONE: INTRODUCTION

1.0 Background

The human devastation being shaped by the Human Immune Virus and Acquired Immune-Deficiency Syndrome [HIV/AIDS] in sub-Saharan Africa [SSA] and other regions, and the ripple effect that this epidemic is having on communities around the world presents one of the greatest challenges to global public health. Nearly 40 years after the first case, HIV has continued to spread world over and it is now firmly established as an important public health issue. It is one of the most significant causes of illness and death in human life history (WHO, 2015). The burden is however, heaviest in SSA (UNAIDS, 2011 & WHO 2011); with approximately 58% of adults living with HIV (UNAIDS, 2012) and 53% of all adult deaths in the region are women (UNAIDS, 2013). In Zambia, for example, women (14.6%) than men (9.3%) are living with HIV and most of these women are still in their reproductive age (CSO, 2016). Since a larger proportion of these women are in the reproductive age (15-49), they risk infecting their new born babies and sexual partners and thus face difficult choices about childbearing.

Despite the risks and challenges on reproduction decisions among HIV-positive women, available research elsewhere revealed that this group of people continues to desire children even after knowing their HIV-positive status (Myer et al., 2007). Even infections like HIV do not seem to negatively modify subsequent reproductive intentions of some patients (Baylies, 2000 & Feldman et al., 2003); also majority (53%) of them intend having more than two children (Oladapo et al., 2005 & Iliyasu et al., 2009). However, the desire and intention of having children in the future among HIV-positive individuals has huge implications. Nonetheless, literature has provided insight on the growing recognition of the complex reproductive decisions faced by HIV infected individuals worldwide (UNAIDS, 2012).

Over the past two decades, the HIV epidemic in many parts of the world has drastically reduced, but in Africa the situation is very different. The Joint United Nations Programme on HIV/AIDS [UNAIDS] in 2010 reported that SSA still remains the region most heavily affected by HIV, accounting for 67% of the global prevalence of infections with women in the reproductive age being the majority of the population living with HIV in the region (UNAIDS,2010). In 2015, the World Health Organisation WHO highlighted that Africa is the leading continent and remains

the center of HIV epidemic in the world due to high poverty levels, lack of innovation, lack of capacity, and government commitments to fight against HIV (WHO, 2015). Since the beginning of the epidemic, it is estimated that more than 70 million people have been infected with the HIV virus in Africa and about 35 million people have died due to HIV infection in this continent. In 2008,UNAIDS estimated that three quarters of the 3.3 million pregnant women infected with HIV who gave birth each year lived in Africa, where most (700,000) of the annual new infections of HIV in children occurred (UNAIDS, 2008). Another report by the UNAIDS in 2012 showed that about 70% of the 34 million people living with HIV globally resided in SSA, with women comprising 58% of persons HIV infected (UNAIDS, 2012).These disproportionately higher rates of HIV among women of reproductive ages in SSA have implications not only for health but also life course transitions such as childbearing (ibid).

With an estimated population of about 16.8 million (CSO, 2013), Zambia is one of the countries hardest hit with the HIV/AIDS epidemic in SSA (NAC, 2012). For instance, the Zambia Population Based HIV Impact Assessment [ZAMPHIA] report indicates that the country's HIV prevalence rate stands at 12.3% (CSO, 2016). The report also indicates that the country has seen reduction in HIV prevalence from 16.0% in 2007 to 12.3% in 2016. There have been rigorous programs implemented in Zambia to prevent HIV infections among different population groups over the past ten years. For example, in programs such as introduction of free Anti-retroviral Therapy [ART], access to services such as Prevention of Mother to Child Transmission [PMTCT] of the virus, UNAIDS-909090, free testing and treatment in enhancing the lives of people living with HIV, have raised hopes for a normal life including the ability to have healthy children (MoH, 2014). This transformation is also changing the fertility desires and contraception behaviors among people living with HIV (Nam, 2009). In addition, the commencement of ART and tailor-made reproductive health services has also improved the quality of life and survival impacting the fertility desires and intentions among women living HIV. However, these intentions may be influenced by different factors which may include socio- economic and demographic ones - and are seldom recognized (UNAIDS & WHO, 2007).

Despite recent advances, Zambia is still considered to be among SSA countries with highest HIV prevalence in this region even having recorded huge reduction in HIV prevalence between 2007 and 2016. Furthermore, although the decline might be significant, the prevalence is higher

among females than among males in Zambia (CSO, 2016). This evidence suggests that understanding the fertility of HIV-positive women becomes critical to estimating HIV-epidemic trends from survey data to help plan for resource needs and coverage of prevalence of PMTCT services especially in resource-constrained countries like Zambia.

Contraception is among the family planning health services and ways of providing comprehensive HIV care among infected individuals. Contraceptive use in Zambia has significantly increased from 41% to 49% in 2007 and 2014 respectively (CSO, 2014). Though Zambia has recorded remarkable increase in contraceptive use and has been heralded as a family planning success story, it is estimated that among married women who use contraceptives, 20% have unmet need for family planning (CSO et al., 2014). Additionally, focus has been more on analysing the overall contraceptive trend rather the type of contraceptive method. A similar picture may be present among HIV-positive in Zambia. To date, there seem to be no contraceptive method which is absolutely recommended based on one's HIV status (Heikinheimo, 2009). Concerns have been raised about uncontrolled fertility especially among HIV-positive individuals, which has adversely influenced the socio-economic, demographic and environmental situations in the country (Kaida et al, 2010). While the provision of contraceptive services to HIV-positive women is a critical strategy to prevent unintended pregnancies (WHO, 2002), it has received less attention especially among this population in several settings.

For instance, worldwide, about 220 million women of the reproductive age have an unmet need for contraception and approximately 80 million unintended pregnancy occur yearly (Singh et al., 2010 & Darroch et al., 2011). Women living with HIV appear to have higher rate of unintended pregnancy (51% to 90%, compared to road global estimates (38%) (UNFPA, 2012). In addition, the likelihood of pregnancy for HIV infected women is up to three times higher following initiation of ART (Homsy et al., 2009 & Tweya et al., 2013). Further, improvement in quality of health status seems to have renewed interest in sex and has changed sexual behaviour of the infected individuals. However, HIV carries an increased risk of adverse pregnancy outcomes such as mother-to-child HIV transmission (Calvert et al., 2013). Helping people who are HIV infected achieve their family planning intention is an essential preventive health service and is one of the four prongs outline by the United Nations to reduce pediatric AIDS (Ki-moon et al., 2010). Available literature, have produced opposing findings on this subject particularly among

HIV-positive individuals. In the case of Zambia, little is known as the contraception behaviour of women living with HIV as few studies that have been conducted have not utilized the updated data to assess the contraception behaviour of HIV infected mothers. Those that have been done have only covered certain provinces. For instance, Nancy and friends in 2016 conducted a cross-sectional study on contraceptive use among HIV-infected women and men receiving ART in Lusaka. This study however, was limited in that its findings could not be generalized to the entire population.

However, considering that HIV can still be considered a strong predictor of fertility as it might influence one's fertility desire, it is imperative to study the fertility intentions in relation to contraceptive use with emphasis to HIV-positive women in order to proffer appropriate prevention measures and better integration of reproductive health services. This study therefore, attempts to assess the fertility intentions and contraceptive among HIV-positive women in Zambia as existing knowledge on this topic has demonstrated inconsistent and provided contradictory results.

1.1 Linking the study to Health Policy, Plans and Strategies

Zambia's long term vision (known as Vision 2030) is to become a prosperous middle income nation by 2030. In order to realize this vision, the country is working towards achieving the set Sustainable Development Goals [SDGs] and among them, is to ensure health lives and promoting well-being for all ages (UNDP, 2016). In this view, it becomes important to consider the aspect of reproductive health in the country as it is a crucial part of the general health. Not only is it a reflection of health during adolescence and adulthood, it also sets the stage for health beyond the reproductive years for both women and men. In this regard, reproductive health needs increase particularly for women, during the reproductive years (15-49) given that that the health of the newborn is largely dependant on the mother's health status (MoH, 2000).

Over the past 10 years, considerable progress has been made in strengthening the policy, legal, institutional and strategic frameworks for multi-sector response to HIV/AIDS. Among the efforts made, Zambia through its Ministry of Health [MoH] collaborating with other stakeholders, restructured the organization of the health sector to support the decentralization of planning and service delivery (MoH, 2006). In addition, strategic plans such as the National Health Strategic

Plan [NHSP], Zambia Reproductive Health Policy (ZRHP) and National HIV/AIDS/STI/TB Strategic Framework (NASF) were created in order to improve health care and all these are in line with the SDGs and the African Agenda 2063.

Particularly, the NASF was aimed at intensifying prevention of HIV, expanding treatment, care, and support for people affected by HIV/AIDS, mitigating the socio-economic impact of HIV/AIDS, strengthening the decentralized response by mainstreaming HIV/AIDS, improving the capacity for monitoring by all partners and integrate advocacy, and coordination of the multi-sectoral response (USAID, 2009). Despite all the great strides, the health sector continues to experience major challenges which influence the effectiveness of the systems that are in place. In addressing these lacunas, the country in its ZRHP and NASF incorporated objectives for promoting research in order to strengthen the prevention and effective management of STI/HIV/AIDS and reduce the rapid spread of HIV/AIDS. It is against this background that this study is formulated to help in breaking new grounds in health research. Specifically, it is envisaged that the study would be relevant to HIV/AIDS programmes especially on interventions on preventing mother-to-child transmission (PMTCT) of the HIV virus. Furthermore, the study may also serve as a guide in designing possible interventions for people living with HIV in Zambia as well as enriching demographic literature on fertility intentions and HIV/AIDS in Zambia and sub-Saharan Africa.

1.2 Statement of the problem

There has been a remarkable increase in the incidence of HIV infection in women and children that have resulted in major public health effort directed at preventing vertical and horizontal transmission. Strong evidence suggests that without intervention, HIV has between a 25% to 50% chance of infecting an HIV-positive mother's baby (Theree, 2007). Further, existing research on fertility intentions of HIV-infected individuals in SSA shows considerable diversity in perspectives on future fertility intentions. However, with the advent of Anti-Retroviral Therapy [ART], the quality of life for people living with HIV has also improved, potentially impacting fertility intentions among HIV-infected individuals (Harries al.2007, Maire et al. 2009 & Kaida et al. 2011) and yet little is known about their fertility intentions. The introduction of free ART means having HIV is no longer a big barrier to having children. This change has enormous implications for reproductive decisions and behaviors of HIV-infected individuals.

Further, issues of fertility and childbearing have received relatively little attention and available research on utilization and unmet need of family planning among women living with HIV in Zambia is still scanty. Therefore, this study endeavors to assess the fertility intentions among HIV-positive women to update existing knowledge and inform the healthy policy makers and programmes to promote efforts for provision of safer and healthier reproductive options among HIV positive women in Zambia.

1.3 Significance of the study

While studies (Mitsiwatet al.2012; Mellissa et al.2013; Joyce et al.2014) in Africa have explored how HIV status impacts the fertility goals of HIV-positive individuals, HIV can still be considered a strong predictor of fertility desire as it can influence one's desire and intention to have children and yet the relationship between HIV status and fertility intention is not clear among HIV-positive individuals as existing literature produce opposing results. Thus, new evidence on the nexus between fertility intention and HIV status is needed to provide new and better understanding of the implications for reproductive health services needs in future. To this effect, it is important to undertake such a study to provide a better and evidence based understanding of the influence of HIV status on fertility intentions coupled with contraceptive use among HIV-positive women in Zambia. This study may also serve as a guide in designing possible interventions for people living with HIV in Zambia and other parts of the regions which may have similar situation like Zambia.

1.4 Research Objectives and Questions

1.4.0 General Objective: The main objective of this study is to assess the fertility intentions and contraceptive use among HIV-positive women in Zambia.

1.4.1 Specific Objectives: The specific objectives of the study are;

1. To identify the socio-economic characteristics of HIV-positive women and their fertility intentions.
2. To compare fertility intentions between HIV-negative and HIV-positive women (15-49 years).
3. To examine contraceptive use among HIV-positive women (15-49 years)
4. To determine the association between fertility intentions and contraceptive use between HIV-negative women and HIV-positive women (15-49 years)

1.4.2 Research questions

In order to meet the stated study objectives, the study addresses the following research questions;

1. Does the knowledge of HIV status influence fertility intentions and contraceptive use among women living with HIV?
2. Are there differences in fertility intentions and contraceptive use by HIV status [HIV-negative or HIV-positive] among women, taking into account whether or not likely to know their HIV status?

CHAPTER TWO: LITERATURE REVIEW

2.0 Empirical Literature

2.0.1 Introduction

Zambia like any other SSA country has experienced a severe and devastating epidemic of HIV infection and AIDS for more than a quarter of century. The earliest documented case of HIV/AIDS in Zambia was reported in 1984 and since then the disease has spread at an alarming rate (WHO & UNAIDS, 2012). The country is now experiencing a generalized HIV prevalence rate of 12.3% (CSO, 2016). The impact of the disease has been mainly felt through the escalating morbidity and mortality that disproportionately affects women during their primary reproductive life. Although HIV/AIDS remains one of the world's most serious health challenges, treatment coverage expansion of ART has transformed HIV/AIDS into a manageable chronic illness for many people living with the condition. However, the changing nature of living with HIV poses questions about the implications of this treatment. Thus, this section presents a comprehensive literature review on fertility intentions, contraceptive use and HIV status with emphasis to HIV-positive women.

2.0.2 Fertility intentions among women living with HIV

Reproductive issues among people living with HIV and AIDS are attracting attention in research considering that the progress made in the provision of ART and other treatments has improved pregnancy outcome and reduced transmission. This has led to a reverse in fertility desires among the HIV-positive women (Thornton, 2004). Conversely, fertility issues for HIV-positive women have long been recognized as a potential problem with significant future implications and therefore deserving serious attention.

In all settings, researchers have attempted to look into fertility preferences of different populations but few studies have evaluated the influence of HIV status on fertility intentions among HIV-infected women in Zambia. Nonetheless, research on fertility intentions among HIV-positive women has produced general and varied results, indicating complex relationship between HIV status and fertility intention. For example, Harries et al (2007) conducted a study on fertility desires and intentions among HIV-infected individuals in SSA countries. Their

findings indicated that many HIV-infected individuals in SSA countries continued to wish to bear more children after diagnosis. Their study, however, was limited in its application as they chose to focus on few countries with high HIV prevalence in this region. Further, some countries with high HIV prevalence like Zambia were not part of this study. The study would have been more useful to conclude on the fertility desires and intentions of HIV-individuals if countries with high HIV prevalence like Zambia were included. Eliud and Ernestina (2014) carried out a study to determine how HIV status influences fertility desires among men and women living with HIV using mixed methods. Eliud and Ernestina concluded that factors which were independently associated with desiring a child among those living with HIV include, age, parity, social support, and household wealth of the respondent. These findings conform to Harriers' findings in Kenya. This understanding is critical because, from this pivotal research, Eliudes' study included both men and women living with HIV which may have generated rich results about for both sexes. The results may be suggesting important demographic and socio-economic variables to focus on when studying fertility issues among this group of individuals.

Studies led by Cooper (2007) and Nattabi (2009) found that cultural beliefs and practices are critical determinants of fertility intentions and one's ability to prevent pregnancy if desired. This finding is very important as it may be pointing out that people living with HIV may be willing to prevent pregnancies but may not do so due to some cultural beliefs. However, other studies from Uganda (Nakayiwa et al., 2006), South Africa (Laher et al., 2009; Kaida et al., 2011), Kenya (Magadi & Agwanda 2010), Malawi (Hoffman et al., 2008; Yeatman, 2009) and Zimbabwe (Feldman & Maposhere, 2003) generated opposing findings on the same topic. All these studies' findings revealed that most women intend to stop childbearing after an HIV diagnosis. Even though it is expected, the findings illustrate that after one's knowledge about HIV status, the desire for children reduces.

2.0.3 Factors influencing Fertility Intentions

In SSA, females have a lower chance to be literate and have poor access to education (USAID, 2012). This means that women are in a worse position than men to inform themselves about what is best for family reproductive health. Therefore, it is important to ask whether there is evidence that the educational attainment level of females and their fertility intentions are linked in any way. Understanding how education of females influences their reproductive decisions in the

household is important since education accounts for trends in various demographic dynamics. Some studies have shown a significant relationship between education and fertility intention. A study done by Kebogile (2017) on fertility intentions and use of contraceptives in Oromia region, Ethiopia among women living with HIV found a strong relationship between education and fertility intention. His findings indicated women living HIV and have either secondary or higher [University/ College] education have lower intentions of wanting more children. This is worth noting because education plays a key role to determining fertility. This is significant in that as ones' education increases, knowledge about HIV is also likely to increase. Kebogile's findings were in tandem with a study by (Ezeh 2007) in Ghana that made use of data from 1,010 matched husband-wife pairs in the Ghana Demographic and Health Survey 1998. The results of a study by Ezeh suggested that husbands on average are better educated than their wives, and that a man's contraceptive behavior depends on level of education. The findings explained that educated couples are more likely to use and approve of family planning than uneducated couples and also prefer to have fewer children.

In another study carried out by Cochrane (2007), it was noted that education was positively associated with fertility intentions in terms of birth regulation, increased awareness and use of modern contraceptive methods. The study further indicated that employment status is another likely predictor of fertility intention among HIV-individuals. A similar study was carried out in Kenya by Bankole et al (2011) which revealed that desired fertility is lower for women married to husbands employed outside agriculture, when compared to those in the agricultural sector. On the other hand, literature reveals that another potential factor of fertility intention is wealth status. For example, a study conducted by Jejeebhoy and colleagues (2000) found fertility intention to be positively associated with wealth status. These studies concluded that factors associated with fertility intentions include, age, education, employment status and wealth status.

2.0.4 Demographic, Socio-economic factors and Fertility Intentions

These factors are of great importance to the study of fertility intentions and contraceptive use among individuals living with HIV. These factors are said not only to speed up the risk of getting sick for HIV but also influences the chance of treatment. Studies in a number of settings have pointed to different factors which determine the fertility intentions and desire of HIV-positive women of which demographic and socio-economic factors are among them. For instance, young

age of HIV infected individuals is significantly associated with increased fertility intention (Getachew et al., 2010). However, studies on the association between education status and fertility intention among HIV-positive women is mixed, with some studies indicating no association between the two. A study conducted by Berhan (2013) on meta-analysis of fertility desires of people living with HIV found no association between education status and fertility desires. The findings of this study are telling that due to spread of knowledge awareness of HIV, it possible to find such a result from this group of individuals. However, the study may have been limited considering the sample size and the study environment. Moreover, existing literature on this topic presents different factors such as education level, wealth status, place of residence and marital status on the association between HIV status and fertility desires and intention around the world. Notwithstanding, other studies have indicated education status, parity, employment status, wealth status to be positively related with fertility intention among HIV-positive individuals (Getachew et al., 2010).

For example, the number of children [parity] a person has been found to have an influence on fertility intentions because there is a tendency that the desire for additional children may decrease as the number of living children increases. This postulation is based on the fact that economically, people's economic situation is not growing and the cost of raising children in recent times is higher than before. Therefore, the need to confirm to whatever kind of association exists between the demographic, socio-economic factors and fertility intentions among women living with HIV is imperative.

2.0.5 Socio-Cultural factors and fertility intentions

Evidence demonstrates that use of contraceptives is associated with the religious beliefs of individuals, and, in effect, influences fertility. Religious affiliations affect customs and practices of individuals regarding general norms which include modern contraceptive use. The belief system that is propagated by specific religion even influences the contraceptive method to be used (Ringheim, 2010). Ringheim also found that sterilization is not an acceptable contraceptive method among Muslims and Catholics. Another study by Jones and Dreweke (2011) confirmed that some individuals view the use of contraceptives as unacceptable due to their religious belief. For example, contraceptive use is strongly opposed by the doctrines of the Catholic Church and some other socially conservative religious groupings, including conservative Islam. A further

study by Warwick (2004) revealed that, most times, religious values create an important barrier for family planning practices. In summary, numerous reports show how religion affects fertility desires through contraceptive use in a population depending on the religious composition of that particular population. Based on this theory, it becomes essential to consider this variable in this study in the Zambian context to confirm whether the results will be any different from other studies particularly among HIV-positive women.

2.0.6 Demographic, Socio-economic and Socio-Cultural factor and Contraception utilization among women living with HIV

Africa is described as the most populous continent around the world with an estimated population of about 1.2 billion (Include source). WHO reported that African countries are all growing fast because there is large number of women who have no access to family planning (WHO, 2008). In turn, Zambia is among those African countries with the fastest population growth rate estimated at 2.7% and yet family planning services have become the interventions to slow population growth (CSO, 2011). Further, estimates from the UNAIDS report (2011) show that more than half of the 2.6 million new HIV infections were among women living in SSA (UNAIDS, 2011).

Providing preferred methods of contraceptive for HIV-positive women and avoiding unintended pregnancy is one of the primary means of preventing mother to child transmission of HIV to new babies and sexual partners. Furthermore, preventing unintended pregnancy is a global public health priority for addressing maternal and child health problem in HIV hyper-endemic settings (Petruney, 2008). Although the provision of contraceptive services to HIV-positive women is a critical strategy to prevent unintended pregnancies, it has been sorely neglected in most settings (WHO, 2002). As a result, research is acknowledging the importance of family planning given the difficulties HIV infected individuals on reproductive decisions. In addition, majority of women living with HIV are in their reproductive years, highlighting the critical need to address issues surrounding their reproductive and sexual rights in relation to childbearing and pregnancy (ibid).

Studies both in developed and developing countries have generated diverse results regarding contraception use among HIV-positive women. For example, studies conducted by Chen (2001); Paiva (2006); Kirshenbanm (2004) and Nakayiwa (2006) indicated that many HIV-positive

women continue to desire children despite the knowledge of their HIV status. Their findings however, suggest that meeting women's sexual and reproductive health needs ensures women have control over their reproductive health, as well as contributing to public health by reducing maternal, infant mortality and morbidity.

Unintended pregnancy is a common problem in both HIV-positive and negative women. A study conducted in Swaziland by Warren (2013) found that there is a difference in women's HIV status on unwanted pregnancies. However, Warren's findings indicated a higher rate of unwanted pregnancy among HIV-positive women than their counterparts. His findings concur with those of King (2011) in South Africa and Crede (2012) in Uganda who found that the rates of unwanted pregnancies were high among HIV-positive women. However, other studies have found contradictory results (Indicate source).

Studies have also reported that women who do not desire any more children are more likely to report using contraception than women desiring more children. A high level of education, being married, and a current use of ART have also been positively associated with the use of contraception (Andia et al., 2009). Another study headed by Kirunda (2010) in Uganda found that the integration of family planning into HIV/AIDS services appears to offer a lot of benefits. The benefits reported included an increase in family planning uptake by HIV-positive women and a reduction of stigma among HIV clients as opposed to the figures for free-standing contraceptive services. It also led to improved discussion of sex and fertility desires between HIV-positive women and healthcare workers. Kirunda's findings were replicated by the World Health Organization (2012) where it was observed that contraception and family planning are important for improving the health of a population because of associated benefits. Therefore, contraception plays a crucial role in meeting their reproductive health needs among HIV-positive persons.

HIV-positive women have different reasons and factors influencing their contraceptive utilization compared to their negative counterparts. A study led by Wenyenze (2013) indicated that the relatively high level of fertility has chiefly to do with a combination of cultural and socio-economic factors which determine the propensity of people to procreate. He also found that current marital status and an older age of women are positively associated with current family planning utilization. With regard to the association between education and contraceptive

utilization among HIV-positive women, different findings were reported in Uganda and Kenya respectively (Nattabi, 2011 & Obare, 2012).

2.1 Theoretical Framework

Theory is a framework that explains existing observations and predicts new ones. Normally research is built from theories as theory guide researcher by providing guideline and basic assumptions on area of study. Further, research provides the ways of establishing, formulating, strengthening and revising theory (Babbie, 2006). In this regard, this section of the literature review provides theories that have been formulated in line with the study area. Considering that the concept of fertility intention as a determinant of contraceptive use has had its share of criticism, it becomes imperative to consider such theories in the study of fertility intention.

2.1.0 Theories

The Theory of Reasoned Action [TRA] was formulated by Martin Fishbein and Icek Ajzen in 1975. This theory postulates that fertility intention is important in the study of fertility preferences as it may influence the behavior of individuals. In 1980, the TRA was supported by the Theory of Planned Behaviour [TBP] and was considered an extension to the TRA. The two theories [TRA and TBP] claim that a person's behaviour is influenced by his/her intention to have children, which is determined by three main predictors: attitudes, subjective norms and perceived behaviour control (Ajzen & Fishbein, 1975; Ajzen 1980 as cited in Miller 1995). However, the two theories received some critics in 1999 from Castle and his friends. For instance, Castle et al., (1999) argued that respondents may not have taken into account the effects of social pressure especially from family members as it relates to their stated fertility intention. The three frameworks provide a strong base in studying the fertility intention among individuals.

Another theory worth study is the "Preference Theory" formulated by Catherine Hakim's in 2003. Preference Theory is a sociological theory, which aims to explain the changes that women have experienced in contemporary societies regarding two lifecycle patterns: fertility and employment. This theory considers lifestyle preferences and values to be the principal determinants of women's fertility choices and outcomes. It emphasises the importance of cultural aspects as the key factors behind the recent changes in family and fertility that have occurred in all modern industrialised societies. Further, it hypothesize that preferences also shape men's

decisions, but “attitudes have an especially strong impact on women’s behaviour because women have genuine choices to make regarding employment versus home-making (Hakim, 2002). This study is considered critical in this study as includes some of the variables that have been selected in assessing the fertility intentions of aforementioned population of this study. It also provides a view from the TRA and TBP in explaining the factors that may influence fertility intention.

Based on these theories, this study attempts to assess the fertility intention focusing on the HIV-positive women of the reproductive age in Zambia through incorporating the HIV status. The study may draw the attention of population researchers in explaining the influence of HIV on fertility and contraception especially among the HIV-infected mothers.

In settings where HIV prevalence is high, management of sexual and reproductive health of HIV-infected women is critical to reduce HIV transmission, maternal, infant mortality, and morbidity. However, family planning utilization among HIV-positive women has not been well understood in Zambia. This is because most studies conducted have focused on the fertility preferences and desire of children among the general population of the reproductive age. In sum, there is no consensus on the associations between fertility intentions, contraceptive use behavior, and HIV status.

Figure 1.0 below show some of the possible factors that might have potential influence to fertility intentions and contraception use among individuals living with HIV. The arrows [continuous and dotted] on the conceptual model show the relation between one variable with another. The figure indicates that demographic and socio-economic factors [Age, education level, wealth quintile, marital status, parity and employment status] could interact at smallest level with Socio-cultural factors [religion, place of residence, region and ethnicity] to influence fertility intentions and contraceptive use. Additionally, demographic and socio-economic factors and socio-cultural factors could have a direct influence to fertility intention and contraceptive use at macro level. Conversely, fertility intentions may determine whether an HIV-positive woman would use contraceptives or not. The model above further shows possible interaction between the two Outcome variables [fertility intentions and contraceptive use]. Considering that HIV can still be considered a strong predictor of fertility and contraceptive use among HIV-positive women, it is therefore important to note that in the formulated framework, HIV status was used

as a selection criterion to identify the selected variables in the model and not as an independent variable.

2.2 Conceptual framework

The following diagram illustrates some of the causal factors that may influence fertility intention and contraception utilization.

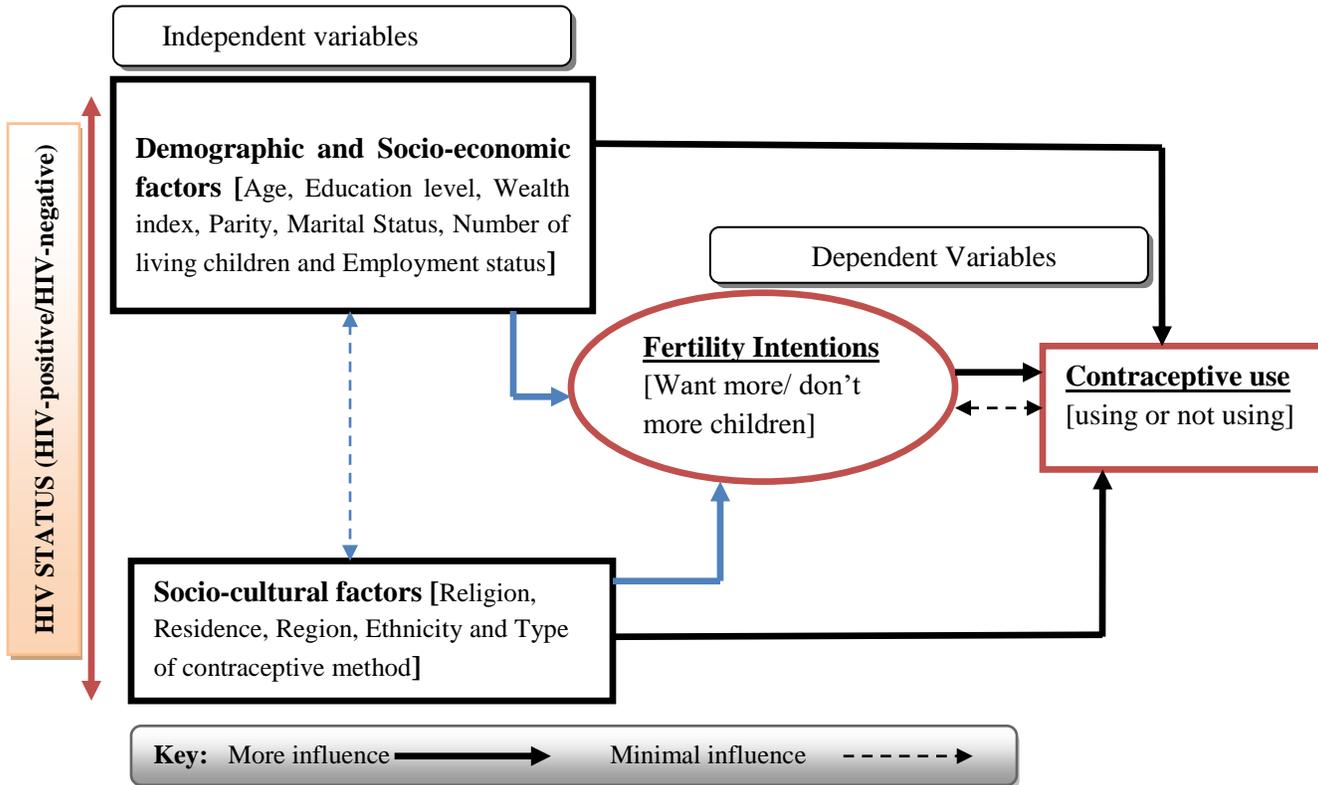


Figure 1: Conceptual framework

Designed by Author

CHAPTER THREE: DATA AND METHODOLOGY

3.0 Introduction

This section provides the details of the study methodology used. It elucidates the source of data, study population, study variables and their measurements, data analysis and ethical considerations.

3.1 Source of Data

The study used secondary data from the 2013-14 Zambia Demographic and Health Survey [ZDHS] that had linkable information on HIV testing, fertility preferences and contraceptive use. The ZDHS is a nationally representative population based cross-sectional survey that is carried out approximately every 5 years. A detailed methodology used in this survey has been described by the Central Statistical Office of Zambia (CSO et al., 2014). The survey included a total of 16,411 women (15-49) and 14,993 men (15-59) and was conducted between August 2013 and April 2014. The respondents of this survey were interviewed from 18,052 households using women's and men's questionnaires respectively (ibid). The survey was designed to provide up-to-date information on levels and trends in fertility, childhood mortality, use of family planning, health and social indicators including HIV and AIDS at national as well as for urban and rural areas. Thus, during the survey respondents answered detailed questions regarding their reproductive health histories, reproductive health practices, recent pregnancy experiences, household assets, and access to health services (Opticit).

3.2 Study Population and unit of analysis

This study only includes the 9,688 women of the reproductive age (15-49 years) with linkable information on HIV status [positive or negative], fertility preferences and contraceptive use. If there was any woman who did not know their HIV status, they were not eligible for this study. In terms of fertility preference, only those who reported having a child, wanting to have more children or don't want to more children were included in the study. However, because some of the eligible women do not have consent forms to provide blood sample for testing, the file for reproductive data does not exactly match with HIV files (CSO, 2014). For this study, the non-matching were excluded from the analytical file during data analysis.

3.3 Study variables and their measurements

3.3.0 Independent Variables

The key predictor variable for this study is the women's HIV status [positive or negative]. Based on the conceptual framework (Figure 1) of the study, 12 potential predictors collected in the 2013-14 ZDHS were identified, age, education level, place of residence, religion, ethnicity, region, type of contraceptive method, employment status, wealth index, parity, number of living children, and marital status. The variable, region, was generated by grouping it into three regions based on HIV prevalence rate [HIVPR] of the province reported in the 2013-14 ZDHS. This was after assessing the percentages of HIV prevalence by region. It was noted that, some regions has very small proportions (less than 10%) for analysis which was deemed to distort the analysis. In this regard, the variable was regrouped into three broad categories (Region 1, 2 and 3) in order to have reasonable percentages. It is worth noting that the regrouping of this variable was based on the average HIV prevalence. Region 1 (HIVPR<10%) constituted Eastern, Muchinga and North-Western while region 2 (HIVPR 10% to 13%) included Central, Luapula, Southern and Northern, and Region 3 (HIVPR >13%) comprised of Copperbelt, Lusaka and Western. In addition, type of contraceptive method was categorized into two groups, namely, Short-acting method and Long-acting method. Short-acting method comprise of pill, condom [male and female], periodic abstinence, lactational amenorrhea, withdraw and folkloric method while Long-acting constitutes Injectables, Implants, Intra-uterine device and permanent method (Mutombo, 2014). Due to colinearity, the variable, number of living children was removed from model. Additionally, religion was grouped into two categories [other and Protestants] on order to neutralize the level of collinear between this variable others. Moreover, Collinearity was assessed, and for covariates that were identified to be strongly collinear ($r > =0.7$, using Pearson's correlation test) the variable more strongly correlated with fertility intention and contraceptive use were retained.

3.3.1 Dependent Variable

This study consists of two outcome variables, namely, fertility intention and contraceptive use. Fertility intention was measured using a question asked in the DHS on whether women wanted to have more children or not. For the analysis, a dichotomous variable was created with value of "1" for "Yes" and "0" for "No". Similarly, the variable for contraceptive use was derived from a

question to all women on whether they were currently using any family planning method to delay or avoid getting pregnant. The variable was dichotomized into 1 for “Yes” and 0 for “No”.

3.3.3 Identification of variables

Table 1: Independent and Dependent Variables

Concepts	Variables	Descriptions	Measurement of Scale
Dependent Variables			
1. Contraceptive use	Current Contraceptive use(v312)	0=Not Using contraceptives& 1=Using contraceptives	Nominal
2. Fertility Intention	Desire more number of children (v605)	0= Don't want more number of children & 1=Want more number children	Nominal
Independent Variables			
Demographic and Socio-economic factors	Current Age (v012) [Recoded]	1=15-24, 2=25-34 & 3=35-49	Ordinal
	Level of Education attainment (v106)	1=No education, 2=Primary,3=Secondary & 4=Higher	Nominal
	Wealth Quintile (v190) [Recoded]	1=Poorest [Poorest & Poor],2= Middle,3=Rich[Rich & Richest]	Nominal
	Parity (v201) [Recoded]	1=1-3, 2=3-4 & 3= 7+	Ordinal
	Marital status (v501) [Recoded]	1=Never married, 2=Currently married & Cohabiting3= Formerly married [Separated/Divorce/Widowed]	Nominal
Socio-cultural factors	Employment status (v717) [Recoded]	1=Working & 2=Not working	Nominal
	Place of residence (025)	1=Urban & 2=Rural	Nominal
	Ethnicity (v131) [Recoded]	1=Bemba, 2=Tonga, 3=Barotse, 4=Nyanja, 5=North westerners	Nominal
	Religion (v130) [Recoded]	1=Protestant & 2=Other [Catholics & Muslims]	Nominal
	Region (v024) [Recoded]	1= Region 1[Eastern, Muchinga & North-Western] 2. Region 2 [Central, Luapula , Southern & Northern] and 3= Region 3 [Copperbelt, Lusaka & Western]	Nominal
	Type of contraceptive method (v313) [Recoded]	1=Short-method & 2=Long-acting method	Nominal

Source: Extracted from ZDHS 2013-14

3.3.4 Operational definition

- i. **Contraceptive** – this is the intentional prevention of conception through the use of various devices, sexual practices, chemicals, drugs or surgical procedures. In this study, contraceptive use was referred to as whether one is currently using contraceptives or not.
- ii. **Fertility Intention**- this indicates the plan to have a child, or a plan that is confronted with individuals’ current situation. This study utilized the 2013-14 ZDHS question that was used to determine whether one wanted to have more children or not.
- iii. **Age**- This is the exact number of years a person has lived.
- iv. **Education Level**- this is the highest level of education a person has successfully completed.
- v. **Wealth Quintile**-this is the categorization of households into five quintiles (20%) of the total population.
- vi. **Parity**- this is the total number a women in the reproductive age (15-49) has ever had.
- vii. **Marital Status**- the state of being married or not married.
- viii. **Employment Status**- the position of being legally employed.

- ix. **Place of Residence**-this is the place in which a person lives or resides or dwelling place.
- x. **Ethnicity**-the fact or state of belonging to a social group that has a common national or cultural tradition.
- xi. **Religion**-the fundamental set of beliefs and practices generally agreed upon by a group of people
- xii. **Region**- an area, especially part of the country or world having definable characteristics.
- xiii. **Type of contraceptive use**- this is a method or device used to prevent pregnancy.

3.4 Data Quality, Assessment and Analysis

3.4.0 Data Quality and Assessment

Owing to the fact that there is no survey that is free of error, the DHS data may have some shortcomings. These shortcomings may affect interpretation of results and significantly influence the estimates to be obtained. Retrospective surveys may have sampling errors, under-coverage errors (omission of births), misreporting of births other vital events. It is also possible to omit eligible respondents (15-49 years) because some eligible women are missing at home or they just refuse to be interviewed. In terms of age, there can be misreporting of age of eligible women as well as age heaping as a result of digit preferences. In other instances, the respondents may not know the exact ages of these women, or even the women themselves may not know their exact ages. In other cases, there is a distortion of the age distribution of women by the interviewers themselves. This can be distortions with regards to eligibility. Some interviewers try to reduce work load by not interviewing these women and sometimes some women are pushed into the 50-54 age group in order to make them not eligible. In line with these shortcomings, it is always important to ensure that the data being used is of good quality such that the characteristics represent that of the population in order to make inferences. One way of doing this is through the use of external consistency checks. In this study, the 2013-14 DHS data was checked with regards to the distributions of the women in the reproductive age groups using the 2010 census data. The table below displays the results:

Age	2013/14 DHS		2010 Census	
	Number(n)	Percent (%)	Number(N)	Percent (%)
15-19	3,487	22.6	154,787	24.9
20-24	2,888	18.7	121,086	19.5
25-29	2,629	17.0	107,009	17.2
30-34	2,272	14.7	85,032	13.7
35-39	1,839	11.9	69,021	11.1
40-44	1,368	8.9	47,732	7.7
45-49	950	6.2	38,004	6.1
<hr/>				
15-24	6,375	41.3	275,873	44.3
25-34	4,901	31.8	192,041	30.8
35-49	4,157	26.9	154,757	24.9
Total	15,433	100.0	622,671	100.0

Source: Estimates from 2013/14 ZDHS and 2010 Census, Own computations. Missing information is deleted

From the observed calculated results on the age specific distribution of women (15-49), reveals that the data from the survey was consistent with that from census. This gave a higher level of confidence to use the DHS data because it gave an impression that the sample used in DHS's were representative of the actual Zambian population of women in the age group 15-49 years. On an overall basis, the 2013-14 ZDHS data gave a great level of confidence and validity to permit some higher level of analysis.

3.4.1 Data Analysis

Before commencing the actual data analysis, the HIV data set was merged with the woman's file which also contains household variables to create an analytical file. The merging of datasets was done using STATA commands; merge 1:1 v001 v002 v003 using dhs_hiv2013 and all those variables which did not match were dropped using the drop if _merge ~=3 command. Afterwards, the analytical file was created. Analysis was carried out after merging the HIV test results and women's files, and survey-specific weights (svy) were applied to both data files. The weights were applied to account for the degree to which a woman's chances of being selected for the sample depended on household size and other DHS sampling criteria.

3.4.2 Process of data weighting

Taking into account that the datasets provided by Measure DHS was not weighted, weights were applied after merging creating analytical file. This process involved identifying the variables to use for weighting which were assigned to each case in the merged dataset. In the analytical file,

variables, v021 (Primary Sampling Unit), v022 (Stratum) and v005 (weight) were used to set the dataset for weighting. Thereafter, a variable was generated “`sampwt=v005/1,000,000`” to allow all the observations be adjusted by generated factor. Finally, the dataset was set for weighting applying the survey-specific weights (`svy`) stata command.

3.4.3 Levels of analysis used in the study

This study used three levels of analysis which included: descriptive, bivariate and multivariate regression. At the descriptive level, frequency and percent distributions of selected background characteristics were presented by HIV status. At bivariate level, cross-tabulations with Chi-square tests were used to analyze the association between dependent variables and the selected independent variables. To assess the influence of HIV status on fertility intentions and contraceptive use among women, binary logistic regression analysis was conducted. All the analysis were carried out using stata software version 14.0, with 5% level of significance and using a ‘`svy`’ command to account for the complex DHS survey design.

It is worth noting that a new variable fertility intention was computed using the merged file from the original variable (wants within 2 years, wants after 2+ years, wants, unsure timing and wants no more) dropping those who were undecided, with zero children and declared infecund. The fertility intention variable was grouped in two categories: want more children (representing yes) and don’t want more children (representing no). Similarly, contraceptive use was computed from the former variable in merged file “Current use” which has four values (No methods, folkloric methods, traditional methods and modern methods). It was then grouped into two categories; use and non-use. The two dependent variables were recoded to become dichotomous dependent variables. Then multiple binary logistic regression analyses model were used to calculate odds ratios with 95% confidence interval to estimate association and to control the potential confounding variables. Strength and direction of the association presented using odds ratios relative to the reference category and 95% confidence levels.

The model is described in the following logit function below and was adopted from Allison et al., 1999 & Hosmer et al., 2000;

$$\text{Logit}(F) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n$$

To estimate the probability of fertility intentions and contraceptive use for an HIV+ woman the function is denoted as;

$$P(F = 1) = \frac{\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n)}{1 + \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n)}$$

Where F= the dichotomous dependent variables called logit defined as;

- a) $F = (1=$ Use of contraceptive; $0=$ Non-use of contraceptive)
- b) $F = (1=$ Want more number of children [**Yes**] ; $0=$ Don't want more number of children [**No**]) and
- c) $P=$ estimates the probability of wanting or not wanting children, using or not using contraceptive.

β_0 =is the intercept

$\beta_1, \beta_2, \beta_3, \dots, \beta_n$ =Logistic regression coefficient of X_1, X_2, X_3, X_k

$X_1, X_2, X_3, \dots, X_n$ =Independent variables

\exp =Exponential value

Intercept is the value of y when value of all independent variables is zero. In this study, the exponential β (odds ratios) was used to depict the likelihood of wanting more children and using contraceptives than the reference category. Additionally, the values of odds ratios greater than 1 were interpreted as having greater likelihood of wanting more children or using contraceptives compared to the reference category, a ratio with a value less than 1 means lower likelihood either wanting more children or using contraceptives than the reference category while a ratio with a value equal to 1 meant having the likelihood of wanting more children or using contraceptives compared to the reference category.

In this study, the dependent variables (fertility intentions and contraceptive use) were explained by the odds ratios of the independent (explanatory variables) variables. The logistic regression is similar to the ordinal least square regression; however, this type of regression violates the linearity and normality assumption of the ordinary least square regression. Despite the noted limitation, multiple logistic regression models was in this study in that the two dependent variables had two outcomes and was dichotomized as highlighted earlier.

To test the significance of the logistic model in this study, a goodness-of-fit-test was model which involved building model using the Fitstat as a measure of fit for logistic of fertility intentions by HIV status for the 2013-14 ZDHS. The choice of the final model adopted in this study was done by comparing the Bayesian Information Criterion (BIC) of the first and second model. To choose a model that best fit the model, a lower BIC was considered. In this study the difference 647.645 (Refer to Appendix 1A) between model 2 and model 1 provided very strong support for using the model among the HIV-positive. Further, the difference of 482.449 (Refer to Appendix 1A) also provided strong evidence for adopting the model among the HIV-negative women in this study. Considering that goodness-of-fit work well with the same number of observation, it worth noting that it was not applied to the contraceptive use among HIV-positive women due to discrepancies in the number of observations.

3.5 Ethical consideration or statement

This study is a secondary analysis of the 2013-14 ZDHS and as such, no ethical approval was required. Considering that the Zambia Demographic and Health Survey [ZDHS] data sets are managed by micro-international under the measure DHS, the researcher registered and requested for access to data from DHS on-line archive and received an approval to access and download de-identified DHS data files particularly for this study. Further, the researcher provided justification to measure DHS on how the data was going to be used and how the research findings will or may contribute to national development on reproductive health issues. All guidelines, including treating data as confidential and not making effort to identify individual respondents, were respected.

CHAPTER FOUR: PRESENTATION OF RESEARCH FINDINGS

4.0 Introduction

This chapter presents the research findings based on the selected background characteristics (demographic, socio-economic and socio-cultural) of women (15-49 years) that may have a bearing on their fertility intentions and contraceptive behavior in relation to their HIV status. These variables include age, place of residence, marital status, religion, wealth quintile, education level, employment status, parity and, type of contraceptive method, region and ethnicity. The study findings are presented at three levels; descriptive statistics, bivariate (with Chi-square (χ^2)) tests and multivariate binary logistic regression analysis.

4.1 Descriptive Analysis

Table 3 below contains a summary of information on the number of women from the 2013-14 ZDHS. Overall, results show that 16,411 women were captured during the survey. Of the total number captured in the sample, 59% (9,688) had linkable information on HIV, fertility preferences and contraceptive use. Among those with linkable information on HIV fertility preferences and contraceptive use, 17.1% (1,654) were HIV-positive. Regarding contraceptive use, over half (57.8%) of the HIV-positives reported not using contraceptives.

Table 3: Distribution on number of women age 15-49 respondents included in the analysis, ZDHS 2013-14

Total Number of Women captured in the ZDHS 2013-14	16,411
Total Number of Women with linkable information on HIV testing and Fertility preferences	9,688
Total Number of HIV-negative Women	8,034
Total Number of HIV-positive Women	1,654
Total Number of HIV-positive Women using contraceptives	698
Total Number of HIV-positive Women not using contraceptives	956

Source: ZDHS 2013-14, Note: These estimates are weighted and Women with missing information is deleted

Table 4 below shows the distribution (numbers and percentage) on the selected characteristics by HIV status of the study respondents. Most (45.4%) of the HIV-positive women in the study were 35-49 years while the highest proportion of HIV-negative (40.1%) were 25-34 years. Results 61% of the HIV-positives lived in urban areas while 63% among HIV-negatives resided in rural areas. Among the HIV-positives, most (49.2%) of them had attained primary education followed those with secondary education. On the other hand, 55.2% of the HIV-negatives reported to have attained primary education at the time of the survey.

Table 4: Percent distribution of women (15-49) according to background characteristics, Zambia DHS 2013

Background Characteristics	HIV+ve Women		HIV-ve Women	
	Number	Percent	Number	Percent
Age				
15-24	221	13.4	2,212	27.5
25-34	681	41.2	3,219	40.1
35-49	750	45.4	2,602	32.4
Place of Residence				
Urban	1,010	61.1	2,948	36.7
Rural	643	38.9	5,085	63.3
Education Level				
No education	118	7.1	812	10.1
Primary	813	49.2	4,431	55.2
Secondary	641	38.8	2,450	30.5
Higher	80	4.8	339	4.2
Religion				
Protestant	1,320	20.2	1,449	18.0
Other [Muslim & Catholics]	333	79.8	6,585	82.0
Wealth quintile				
Poor	399	24.2	3,473	43.2
Middle	324	19.6	1,656	20.6
Rich	929	56.2	2,906	36.2
Marital Status				
Never Married	103	6.3	539	6.7
Currently Married	1,091	66	6,645	82.7
Formerly married	457	27.7	849	10.6
Parity				
1-3	903	54.6	3,977	49.5
4-6	561	33.9	2,535	31.6
7+	189	11.4	1,522	18.9
Employment status				
Working	1,046	63.3	4,836	60.2
Not Working	607	36.7	3,198	39.8
Region				
Region 1 [Low HIV prevalent]	228	13.8	1,946	24.2
Region 2 [Medium HIV prevalent]	536	32.5	3,160	39.3
Region 3 [High HIV prevalent]	888	53.7	2,926	36.5
Ethnicity				
Bemba	678	41.1	3,330	41.5
Tonga	270	16.3	1,491	18.6
Barotse	173	10.5	525	6.5
Nyanja	399	24.1	1,936	24.1
North-Westerners	131	7.9	749	9.3
Type of contraceptive method				
Short-Acting	576	82.6	3274	86.1
Long-Acting	121	17.4	529	13.9
Total	1,654	100	8,034	100

Source: ZDHS 2013-14, Note: These estimates are weighted and may not sum to totals because women with missing information is deleted. Note that only those women (15-49) with either HIV-positive or HIV-negative were analysed in this study focusing on the HIV-positives.

The vast majority (79%) of the study participants were Protestant followers by HIV status [HIV-positive or HIV-negative]. HIV-positive women in the rich (rich and richest) constituted a larger (56%) proportion while among HIV-negative, slightly over 40% live in households with poor wealth index. Results in Table 4 further indicate that higher proportions of the HIV-positive

women (66%) and HIV- negative (83%) women reported to have been married at the time of the survey. In terms of parity, majority (55%) of the HIV-positive women had one or three children.

Most of the HIV-positive women (63%) were currently working compared to their HIV-negative counterparts (60%). The highest proportions (43%) of HIV-positive women were from high HIV prevalent region [Copperbelt, Lusaka and Western provinces]; while highest proportions (39%) of the HIV-negative women came from the middle HIV prevalent region. In both instances, there were more women (HIV-positive (41%) and HIV-negative (41%)) who were Bembas. According to type of contraceptive method, short-acting method was mostly used by both HIV-positive (83%) and HIV-negative women (86%).

4.2: Bivariate Analysis with Chi-square tests (χ^2)

4.2.0 Fertility Intentions by women's HIV status

Table 5 below contains results of women's HIV status and the association between selected independent variables and the two outcome variables (fertility intention and contraceptive use) without controlling for the effects of the respondents' selected characteristics in bivariate analysis. In bivariate analysis, the following factors were significantly associated with fertility intentions; age ($p=0.000$), education level ($p=0.000$), wealth index ($p=0.001$), marital status ($p=0.000$), parity ($p=0.000$), employment status ($p=0.000$), religion ($p=0.041$), region ($p=0.036$) and ethnicity ($p=0.001$). However, the association between region, religion and the outcome variable (fertility intentions) was not strong. There was no association between place of residence and fertility intention.

Further, results show that HIV-negative women of age 15-24 and 35-49 years have more fertility intentions (91% and 80% respectively) for children in future compared to those in the age group 25-34. However, HIV-positive women 35-49 have lower (23%) fertility intentions than those in group blanket 15-34. The results reveal that fertility intentions reduce as age increases among HIV-positive women. Regardless of HIV status, women with secondary and higher education levels have higher fertility intentions. It is also shown that among the older HIV-positive women (35-49), majority (77%) reported not wanting more children in future. Table 5 also shows HIV-negative women in the poor wealth index group reporting having more (61%) fertility intentions

for children. As expected, HIV-positive in the rich wealth index category has highest (48%) fertility intentions.

Table 5 show glaring results on marital by fertility intentions among women. In spite of HIV status [HIV-positive and HIV-negative], women who are never in union have higher (86% and 60% respectively) fertility intentions for children than those who are either married or formerly married. Parity of the woman was also considered in this study as it may also determine whether to continue bearing children or not.. Table 5 above indicates that HIV-negative women with smaller number of children (1 to 3) more likely (84 %) fertility intentions while among the HIV-positive women, about 88% did not want more children in future. A similar observation is made among HIV-positive women (65%). Additionally, the association between fertility intention and parity is very strong. Findings show higher proportions (66%) of HIV-negative women without employment indicated higher intentions for children while HIV+ women with employment have higher (51%) intentions of having children in future.

There were more HIV-negative women (60%) with more fertility intentions compared to the HIV-positive women counterparts regardless of their religious affiliation. Majority of the HIV-negative women from rural dwelling have highest (60%) fertility intentions while HIV-positive women from urban areas reported higher (48%) fertility intentions for children in future. Moreover, women from region 1 indicated having higher (61%) fertility intentions among HIV-negatives while highest proportions (47%) of fertility intentions among HIV-positives were from region 3. With regard to ethnicity, results show that HIV-negative women who are Tonga speaking have higher (63%) fertility intentions while highest (47%) fertility intentions of HIV-positive women is observed among the Bembas.

4.2.1: Contraceptive use among HIV positive women

This sub-section presents the findings from the bivariate analysis with chi-square tests on contraceptive use by the variables included in the study among HIV+ women only. In this level of analysis, the variables which were strongly associated with contraceptive use include; marital status ($p=0.000$), ethnicity ($p=0.005$) and employment status ($p=0.015$). Though not significantly associated, education level ($p=0.051$), and age ($p=0.027$) were also associated with contraceptive use. Surprisingly, older women (35-49) are not using contraceptives while majority of the women with higher education had highest proportions (55%) of using contraceptives. The

results indicate that contraceptive use increases as education level increase. Furthermore, results show that most of the HIV-positive women from the middle (66%) and rich (60%) households are not using contraceptives in Zambia. Almost half (49%) of the married women were contraceptive users while majority (71%) of the formerly married (separated and divorced) women reported not using contraceptives.

In relation to parity, findings show that over two-thirds (71%) of the HIV-positive women with 4 to 6 children were not using contraceptives. Similarly, majority (58%) of Protestant followers among this group people were not contraceptives users while most (61%) of them are rural dwellers and yet contraceptive use was almost universal by region and ethnicity. Results in Table 4 indicates that two-thirds of the HIV-positive women who were using Short-acting method of contraceptives did not want any more children in future while 60% of these women were not using any form of contraceptives. The type of contraceptive method used was highly associated with fertility intention.

Table 5: Cross tabulation of fertility intentions and contraceptive use by characteristics according to women's HIV status ,ZDHS 2013-14

Covariate/Factor	Fertility Intentions (%)				P-value	Contraceptive Use (%)		
	HIV (-ve)		HIV (+ve)			HIV (+ve)		
	Want more children	Don't want	Want more children	Don't want		Using	Not Using	P-value
Demographic & Socio-economic factors								
Age								
15-24	90.5	9.5	85.7	14.3		47.4	52.6	
25-34	70.5	29.5	58.2	41.8	0.000**	47.3	52.7	0.027**
35-49	80.4	19.6	23.2	76.8		36.0	64.0	
Education Level								
No education	47.9	52.1	41.0	59.0		27.5	72.5	
Primary	56.0	44.0	42.8	57.2		38.6	64.4	
Secondary	69.6	30.4	50.1	49.9	0.000**	47.9	52.1	0.051*
Higher/Tertiary	60.5	39.5	54.2	45.8		54.5	45.5	
Wealth quintile								
Poor	61.1	38.9	41.9	58.1		43.9	56.1	
Middle	55.8	44.2	44.6	55.4		34.2	65.8	
Rich	59.8	40.2	48.3	51.7	0.010**	39.8	60.2	0.222
Marital Status								
Never Married	85.7	14.3	59.9	40.1		33.7	66.3	
Currently Married	60.9	39.1	53.2	46.8	0.000**	48.7	51.3	0.000**
Formerly Married	31.5	68.5	25.9	74.1		28.7	71.3	
Parity								
1-3	84.1	15.9	64.7	35.3		41.9	58.1	
4-6	47.3	52.7	27.5	72.5		43.9	56.1	
7+	15.7	84.3	12.1	87.9	0.000**	38.7	61.3	0.128
Employment status								
Working	55.1	44.9	50.8	49.2		41.3	58.7	
Not Working	66.3	33.7	43.3	56.7	0.000**	43.7	56.3	0.015**
Socio-cultural factors								
Religion								
Protestant	59.8	40.2	47.3	52.7	0.041**	41.8	58.2	0.461
Other	58.3	41.7	40.9	59.0		43.9	56.1	
Place of Residence								
Urban	59.3	40.7	48.2	51.8		44.2	55.8	
Rural	59.7	40.3	42.6	57.4	0.378	39.1	60.9	0.254
Region								
Region1 [Low HIV prevalent]	61.0	39.0	44.3	55.7		42.9	57.1	
Region 2 [Medium HIV prevalent]	58.7	41.3	44.8	55.2	0.036**	41.9	58.1	0.198
Region 3 [High HIV prevalent]	59.5	40.5	47.3	53.7		42.2	57.8	
Ethnicity								
Bemba	56.6	43.4	46.7	53.3		38.4	61.6	
Tonga	63.1	36.9	45.7	54.3		48.2	51.8	
Barotse	62.7	37.3	44.3	55.7		38.5	61.5	
Nyanja	60.1	39.9	46.0	54.0	0.001**	46.9	53.1	0.005**
North-westerners	61.9	38.1	46.0	54.0		40.1	59.9	
Type of contraceptive method								
Short-Acting	51.0	49.0	35.5	64.5		40.2	59.8	
Long-Acting	70.0	30.0	53.1	46.4	0.007**	56.0	46.0	0.054*
Overall Total	59.5	40.5	46.0	54.0		42.2	57.8	

Source: ZDHS 2013-14, Significance Level Codes: "****", "***" and **, "*" denote the *** p<0.01, ** p<0.05, *p<0.1 significance levels respectively.

4.3 Multivariate Binary Logistic Regression Analysis

To identify the major predictors of fertility intentions and contraceptive use by HIV status, Multivariate binary logistic regression was used. Multivariate binary logistic regression analysis was performed to find out the probability of wanting more children in future after the knowledge HIV status. Similarly, to find out the probability of using contraceptives by HIV status, multivariate regression was also conducted based on the set of background characteristics of women using the enter method. The process involved the transformation of dependent variables (contraceptive use and fertility intention) into dichotomous variables [contraceptive use was coded as non-use (0) and use (1) and fertility intention as follows: don't want more children (0) and want more children (1)] in order to have logit values which are natural logs of odds.. In this way, logistic regression estimated the odds of contraceptive use as compared to non-user as well as wanting more children compared to not wanting.

4.3.0 Results from binary logistic regression on contraceptive use by HIV status

Table 6A below presents results from multivariate binary logistic regression. The model estimates presented are effects of the HIV status on contraceptive use and are the net effects of selected independent variables [age, fertility intention, residence, education, wealth quintile, religion, marital status, parity, employment status, type of contraceptive method region and ethnicity] on contraceptive use.

Results in Table 6A, show that HIV-positive women 25-34 have lower odds of using contraceptives compared to women 15-24. Similarly, women 35-49 have lower odds of using contraceptives than those aged 15-24; and this difference is statistically significant ($p < 0.05$). Fertility intention was another variable used to determine the contraceptive usage among women by HIV status. Fertility intention was measured by whether a woman wanted more children or not. It is reveals that HIV-positive women who wanted more children have lower odds [OR=0.59; 95%, CI: (0.43-0.81)] of using contraceptives when compared to those who did not. Additionally, results show that the difference in using contraceptives was significant ($p < 0.05$). However, the odds of using contraceptives among HIV-negative women who wanted more children were 1.0 times higher compared to their counterparts who did not want children. Results indicate a difference in contraceptive use by HIV status of the woman against fertility intention.

Though not statistically significant, evidence shows that HIV-positive women from rural areas have lower odds (0.9) of using contraceptive than their urban counterparts. Similarly, results show that HIV-negative women from rural areas had lower odds of using contraceptives compared to those from urban areas and the difference among HIV-negative was statistically significant ($p < 0.05$). In general, findings suggest that place of residence may only be a factor among HIV-negative women.

Education level was categorized into four categories, with “no education” being the reference category. As expected, HIV-positive women with primary, secondary or higher education have higher odds of using contraceptives compared to those with no education. Further, HIV-positive women with secondary education are the most likely to use contraceptives as the odds of using contraceptive increase by 3.5 times. Similarly, HIV-negative women who have attained primary, secondary and higher education have higher odds of using contraceptives compared with women who have higher education being the most likely group.. In terms of religion, women who are Protestants by religion have lower odds of using contraceptive than those women in other religion groups. HIV-positive women in the middle and rich groups are less likely not to use contraceptive compared to those in the poor group. However, results show that HIV-negative women in the middle wealth quintile groups have higher odds [OR=1.37; 95%; CI: (1.17-1.61)] of using contraceptives when compared to those in the poor group.

Table 6A shows that the odds of using contraceptives among HIV-positive married women were 2.6 times higher compared to the never married. In contrast, the odds of using contraceptives for HIV-positive women who were formerly married (separated, widowed and divorced) were 0.8 times less likely when compared to the never married women. Equally, HIV-negative married women had odds of 2.3 times higher for using contraceptives when compared to their never married counterparts while the odds of using contraceptives among the formerly married (separated, widowed and divorced) were 29% less likely. During analysis, women with zero parity were dropped in the study as it only considered women with one or more children. Results in Table 5A show that HIV-positive women with more than 3 children (4-6 and 7+) are more likely (1.5 and 1.7 respectively) to use contraceptives compared those having 1 to 3 children. A similar observation is evident among the HIV-negative women. Regardless of the HIV status, women with more than 6 children are the most likely to use contraceptives. Despite these

findings being obvious, it is important to note that these women may have more experience on the costs associated in raising children, hence they may want to limit the number to 6. In addition, it could also be that after knowing their HIV status, they may want to prevent themselves from HIV and other diseases. This may imply the influence HIV may have on contraceptives. Overall, the difference in contraceptive use is statistically significant ($p < 0.05$) among women by HIV status.

Employment status was another variable that was considered in examining contraceptive use among HIV-positive women. According to table 6A, the odds of using contraceptives for HIV-positive women who are not working were 1.1 times higher compared to those in the working category. This means that HIV-positive women who are not employed have 10% chance of using contraceptives after their knowledge of HIV status. In the same way, the odds of using contraceptives among HIV-negative women was increasing by 1.0; this implies imply that the chance of using contraceptives after learning their HIV status increases by 5%.

Regarding ethnicity, Tongas, Barotse, Nyanjas and North-westerners with HIV-positive status were more likely to use contraceptives when compared with Bembas. Moreover, Tongas [2.12; 95%; CI: (1.42-3.178)] and Nyanjas [1.86; 95%; CI: (1.27-2.72)] were the most likely to use contraceptives; results indicate a significant difference when compared to the HIV-positive Bemba women. With the exception of North-westerners, the Tonga, Barotse, and Nyanja women with HIV-negative status were more likely to use contraceptives to use contraceptives when compared to Bembas.

Table 6A: Results from Logistic regression models on the effect of HIV status on Contraceptive use, ZDHS 2013-14

Covariate (Factor)	Category	HIV STATUS					
		HIV (+ve)			HIV (-ve)		
		Exp(β)	Sig.	C.I for Exp(β)	Exp(β)	Sig.	C.I for Exp(β)
Age	15-24 (RC)						
	25-34	0.791	0.162	[0.433-0.812]	0.996	0.954	[0.896-1.206]
	35-49	0.466	0.000***	[0.383-0.922]	0.621	0.000***	[0.858-1.226]
Fertility Intention	Don't want(RC)						
	Want More	0.598	0.001***	[0.433-0.812]	1.040	0.601	[0.896-1.206]
Residence	Urban (RC)						
	Rural	0.806	0.228	[0.567-1.145]	0.780	0.002***	[0.667-0.912]
Education	No education (RC)						
	Primary	2.189	0.011**	[1.192-4.018]	1.449	0.001***	[0.178-1.783]
	Secondary	3.485	0.000***	[1.835-4.617]	1.888	0.000***	[1.489-2.395]
	Higher	3.240	0.004***	[1.464-4.171]	1.977	0.000***	[1.406-2.779]
Religion	Other (RC)						
	Protestant	0.898	0.529	[0.645-1.253]	0.916	0.916	[0.853-1.53]
Wealth Index	Poor(RC)						
	Middle	0.936	0.749	[0.623-1.405]	1.374	0.000***	[1.174-1.606]
	Rich	0.993	0.976	[0.637-1.547]	1.365	0.002***	[1.126-1.656]
Marital status	Never married (RC)						
	Married	2.590	0.000***	[1.572-4.261]	2.285	0.000***	[1.798-2.905]
	Separated/Divorced	0.818	0.454	[0.485-1.382]	0.709	0.022**	[0.529-0.951]
Parity	1-3 (RC)						
	4-6	1.506	0.014**	[1.325-2.553]	1.403	0.000***	[1.259-1.640]
	7+	1.669	0.027**	[0.920-4.261]	1.505	0.000***	[1.798-1.997]
Employment status	Working (RC)						
	Not working	1.085	0.391	[0.900-1.308]	1.049	0.251	[0.966-1.140]
Region	Low prevalent (RC)						
	Medium prevalent	0.884	0.530	[0.601-1.299]	0.923	0.348	[0.781-1.090]
	High prevalent	0.933	0.708	[0.647-1.343]	1.022	0.858	[0.858-1.216]
Ethnicity	Bemba (RC)						
	Tonga	2.123	0.000***	[1.420-3.175]	1.244	0.018**	[1.038-1.490]
	Barotse	1.264	0.370	[0.806-1.981]	1.102	0.435	[0.862-1.408]
	Nyanya	1.861	0.001***	[1.272-2.723]	1.402	0.000***	[1.168-1.683]
	North-Westerners	1.482	0.087	[0.944-2.326]	0.835	0.066	[0.688-1.012]
Type of contraceptive method	Short-Acting (RC)						
	Long-Acting	0.230	0.021**	[0.001-1.900]	0.502	0.004***	[0.123-2.032]
Constant		0.303	0.015**	[0.116-0.792]	0.242	0.000***	[0.161-0.364]

Source: ZDHS 2013-14, Source: ZDHS 2013-14, Significance Level Codes: "****", "***" and "**" denote the *** p<0.01, ** p<0.05, *p<0.1 significance levels respectively; RC= Reference Category & C.I=Confidence Interval

4.3.1 Results from binary logistic regression on Fertility intention by HIV status

Table 6B contains results obtained from multivariate binary logistic analysis on fertility intentions and selected covariates. Results show that older women (25-49) are less likely to want more children after the knowledge of their HIV status than young women (15-24). As expected, women who are contraceptive users and HIV-positive were 41% likely to have fertility intentions for children in future, this difference was significant ($p < 0.01$) when compared with the non-users. The odds of wanting more children for HIV-negative contraceptive users were 1.044 times higher than for the no users. Though not significant among HIV-positive women, place of residence was found to be significant ($p < 0.01$) among HIV-negatives. HIV-positive women from rural dwellings were 14% more likely to want more than those from urban dwellings. Equally, HIV-negative women from rural areas were about 41% more likely to want more children compared to their urban counterparts.

Information in Table 5B shows that education level of the respondent was positively associated with fertility intentions in multivariate logistic regression analysis. Not surprisingly, findings reveal that HIV-positive women with primary, secondary and higher education were more likely to want more children than those without education. However, the significant difference in wanting more children is only observed among those with secondary and higher when compared to those with no education. Results shows a similar picture among the HIV-negatives with secondary education were most likely (2.4) to want more children. Religion of the respondent was found not to be significant with fertility intention. Surprisingly, the wealth quintile variable was found not to be statistically significant among the HIV-positive women. On the other hand, HIV-negative women either from the middle [OR=0.85; 95%; CI: (0.69-1.03)] or rich [OR=0.4; 95% CI: (0.615-0.99)] group were less likely to want more children when compared to the poor group. This difference was statistically significant ($p < 0.05$) among HIV-negatives.

According to marital status, results show that HIV-positive married women were more likely [OR=1.8; 95%; CI: (1.05-3.13)] to want more children regardless of the HIV status as compared to the never married women. On the other hand, women who were formerly married were less likely to want more children after discovering their HIV status. Results reveal that, regardless of

the HIV status, women with parity above 3 were less likely to want more children compared to those with 1-3 children. Further, HIV-positive women with 4-6 parity were 75% less likely to want more children than those with 1-3 parity while HIV-negative women of the same parity were 77% less likely to want more children; this difference was statistically significant ($p < 0.05$) in both cases. On the other hand, both HIV-positive and HIV-negative women with parity 7 and had 92% less likely to want more children as compared to their counterparts with 1-3 children. On the whole, results indicate that women with 7 and above were less likely to want more children after knowing their children.

In terms of employment status, results reveal that HIV-positive women not in employment were 35% less likely to want more children as compared to their working counterparts. However, HIV-negative women who are not working were 59% less likely to want more children when compared to those who are employment. Generally, study results show statistical significance difference ($p < 0.05$) in fertility intentions between those working and not working by HIV status. As expected, HIV-positive women from the medium and high HIV prevalent rates [HIVPR] have lower odds of wanting more children. Similarly, results show that HIV-negative women coming from medium and high HIVPR regions were less likely to want more children; the difference is significant when compared to those from low HIVPR region. Though not statistically significant, results show that Barotse and Nyanja HIV-positive women were 27% and 29% respectively more likely to want more children; when compared to the Bembas. Conversely, among HIV-negative women; Tongas (OR=1.19; 95%; CI: (0.95-1.51)) and Barotse [OR=1.00; 95%; CI: (0.74-1.37)] had higher odds of wanting more children as compared to the Bembas.

Table 6B: Results from Logistic regression models on the effect of HIV status on Fertility Intention, ZDHS 2013-14

Covariate	Category	HIV STATUS					
		HIV (+ve)			HIV (-ve)		
		Exp(β)	Sig.	C.I for Exp(β)	Exp(β)	Sig.	C.I for Exp(β)
Age	15-24 (RC)						
	25-34	0.361	0.001**	[0.199-0.654]	0.678	0.003**	[0.524-0.879]
	35-49	0.109	0.000**	[0.059-0.059]	0.155	0.000**	[0.116-0.205]
Contraceptive use	Not using(RC)						
	Using	0.588	0.001**	[0.432-0.799]	1.044	0.570	[0.899-1.211]
Residence	Urban (RC)						
	Rural	1.141	0.506	[0.773-1.683]	1.408	0.001**	[1.158-1.712]
Education	No education (RC)						
	Primary	1.273	0.238	[0.852-1.961]	1.283	0.001**	[1.105-1.481]
	Secondary	1.773	0.006**	[1.182-2.659]	2.418	0.000**	[2.058-2.841]
	Higher	1.912	0.021**	[1.102-3.317]	1.832	0.000**	[1.415-2.371]
Religion	Other (RC)						
	Protestant	0.915	0.641	[0.630-1.328]	1.068	0.480	[0.888-1.285]
Wealth quintile	Poor (RC)						
	Middle	0.981	0.935	[0.357-1.207]	0.845	0.092	[0.693-1.027]
	Rich	1.036	0.888	[0.412-1.376]	0.781	0.043**	[0.615-0.992]
Marital status	Never married (RC)						
	Married	1.809	0.034**	[1.045-3.130]	1.416	0.008**	[0.769-1.834]
	Separated/Divorced	0.627	0.096	[0.363-1.086]	0.362	0.000**	[0.268-0.490]
Parity	1-3 (RC)						
	4-6	0.254	0.000**	[0.182-0.356]	0.229	0.000**	[0.188-0.279]
	7+	0.081	0.000**	[0.041-0.163]	0.075	0.000**	[0.057-0.098]
Employment	Working (RC)						
	Not working	0.654	0.000**	[0.550-0.776]	0.407	0.000**	[0.376-0.448]
Region	Region 1[Low HIV prevalent](RC)						
	Region 2[Medium HIV prevalent]	0.765	0.226	[0.496 -1.180]	0.843	0.092	[0.692-1.028]
	Region 3 [High HIV prevalent]	0.784	0.242	[0.522-1.178]	0.782	0.047**	[0.602-0.926]
Ethnicity	Bemba (RC)						
	Tonga	0.877	0.572	[0.557-1.380]	1.199	0.121	[0.953-1.509]
	Barotse	1.266	0.346	[0.774-2.071]	1.009	0.950	[0.743-1.370]
	Nyanya	1.285	0.247	[0.839-1.967]	0.954	0.684	[0.760-1.196]
	North-Westerners	0.719	0.193	[0.438-1.182]	1.403	0.006**	[1.103-1.784]
Type of contraceptive method	Short-Acting (RC)						
	Long-Acting	0.423	0.000**	[0.277-0.647]	0.427	0.000**	[0.353-0.515]
Constant		3.909	0.000**	[2.605-5.405]	4.801	0.000**	[1.311-5.457]

Source: ZDHS 2013-14, Source: ZDHS 2013-14, Significance Level Codes: "****", "***" and "**" denote the *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ significance levels respectively; RC= Reference Category & C.I=Confidence Interval

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0: Discussion of findings

5.1.0: Overview

Given the degree of HIV epidemic among women and the current antiretroviral therapy [ART] scale up in Zambia; considering the issue of fertility is very important to ensure the delivery of integrated reproductive health along with prevention services provided to positive women. This study was aimed at assessing fertility intentions and contraceptive use of women living with HIV in Zambia. The study also sought to answer research questions on whether the knowledge of HIV status has any influence on fertility intentions and contraceptive use among women; and whether the likely knowledge led to larger differences in these outcomes (fertility intentions and contraceptive use) considering that the growing availability of ART may change the relationship. The predictors of fertility intention are discussed around identified major variables in the study. Correspondingly, details of factors associated with contraceptive use among HIV-positive is also explained among the major determinants.

5.1.1: Overview of main findings

Despite HIV infection continues being considered a strong factor on one's fertility desire, availability of ART and other preventive services seem to have impacted fertility intentions among individuals living with HIV. This study reveal that out of 1,654 HIV-positive women, a considerable proportion (46%) of this population still have intentions for having children in future despite their HIV-positive status. Given the potential health complications associated with childbearing, this is a surprising finding. Predictors of fertility intentions and use of contraceptive among women are different by HIV status. For example, the findings of this study reveal that age, education level, marital status and parity explained the fertility intentions among HIV-positive women while among the HIV-negatives, the following factors explained their fertility intentions: age, education level, parity, marital status, employment status, wealth index and region.

The prevention of unintended pregnancies among HIV infected women is highly dependent on the use of contraceptives. In this study, the factors that explained the use contraceptives among women living with HIV include: marital status, parity, ethnicity, fertility intention, education level and age.

5.1.2: Demographic, Socio-economic factors and fertility intentions by HIV status

The findings of this study highlights that the prevalence of fertility intentions of HIV-positive women is 46% in Zambia. These results are in a way consistent with those studies from South Africa (44% and 45%) (Cooper, 2009 & Kaida, 2011) respectively; Ethiopia (44%) (Asfaw and Gashe, 2014), but higher than reports from Uganda (24% and 29%) (Othman, 2010 & Wagner, 2013) respectively. The findings of this study show the fertility intention that of HIV-positive women in Zambia is higher than those from other countries. However, the observed differences in fertility intention might be related to study sites, time and study subject difference. The other probable difference could be associated that being HIV positive did not remove childbearing intentions rather there exist diversity. Despite higher proportion of HIV-positive intending to have children in future, this study has shown a 14% a significant difference ($p < 0.05$) in fertility intentions between HIV-negative (60%) and HIV-positive (46%) women. The proportion of HIV-positive women reporting more intentions for children in future could be accompanied with reasons such as; presence of ART, improvement of health conditions, influence of husbands, advice of health workers and to attain ideal family size. These findings may be suggesting a continuation in integrating target oriented and individualised counseling along with comprehensive care and supporting activities among women living with HIV.

This secondary analysis of the 2013-14 ZDHS reveals that education and parity are the strongest predictors of fertility intentions by HIV status among women. For instance, the fertility intentions for not wanting more children were increasing as education level increased. This entails that as one gets more educated there is a chance that knowledge of HIV also increases which may result into removal of the fertility desires and intentions for children especially after knowing the HIV status. These findings are in tandem with a study conducted by Kebogile (2017) in Oromia region, Ethiopia and those by Eliud and Ernestina (2014). They also conform to Harriers' et al (2007) findings in Kenya who used DHS data from several countries in SSA to assess fertility desires and intentions among HIV-infected individuals. The results also show that

women with higher parity (above 3 children) are more likely to stop childbearing after learning their HIV status. For example, this study has indicated that over two-thirds (73%) of HIV-positive with 4 to 6 children indicated no fertility intentions after knowing their HIV status while over half (53%) among the HIV-negatives did not want any more children. This implies that HIV status may reduce the intention for children in future. Evidence from a study led by Getachew in 2010 also discovered parity to have an influence on fertility intentions because there is a tendency for the desire for additional children to decrease as the number of living children increases. This postulation is based on the fact that economically, people's economic situation is not improving and the cost of raising children in recent times is higher than before.

Though not very strong, age was another variable that was identified as a predictor of fertility intention. Results indicated that younger women (15-24) had more fertility intentions compared to older women (25-49). Even though this is expected, the results may suggest that older women who already have children may have experiences of costs associated in raising children which might lead to lower desires and intentions for children in future. In addition, this might also because when older women get to know their HIV status, they become more cautious which might change their fertility desires and intentions. On the other hand, results may be confirming the influence of HIV status on fertility intentions among women.

Under bivariate and multivariate analyses, employment was found to be positively associated with fertility intentions. Interestingly, results show that women not in employment have lower odds of wanting more children regardless of HIV status. This finding collaborates Getachew's (2010) observation. These findings are expected with the influence of HIV. This means individuals living with HIV may not want to have more children especially when they get to know the HIV status. The lower odds of wanting more children regardless may be because of future difficulties. This study has also shown that marital status is positively associated with fertility intentions. Not surprisingly, results indicated that married women either HIV-positive or HIV-negative were more likely (odd ratios; 1.8 and 1.4 respectively) not want more children. It is very likely that this finding reflects the effects of other confounding factors, such as age, number of children (parity) and the HIV status. These results are crucial in that they may entail that married women would not want to leave their children orphaned if they earlier. Finally, to determine the association between fertility intention and contraceptive use, contraceptive use was

treated as an independent variable. Multivariate analysis results showed that contraceptive use is highly associated with fertility intention and this was only observed among HIV-positive women. These results may be confirming the association of fertility intention and contraceptive use. Further, in the formulated framework, this finding may also suggest that fertility intention may directly influence the use of contraceptives among HIV-positive women.

5.1.3: Socio-Cultural factors and fertility intentions by HIV status

Variables which were considered under socio-cultural include; religion, region, ethnicity and type of contraceptive method. In bivariate analysis, religion, region, type of contraceptive method and ethnicity were found to be associated with fertility intentions. Multivariate analysis did not include any of these as risk factors of fertility intentions among HIV-positive women. This evidence differs from recent studies (Ringheim, 2010 & Jones and Dreweke, 2011) that reported a significant association between fertility intentions and these variables. Conversely, region and place of residence were identified as major socio-cultural predictors of fertility intentions among HIV-negative women.

5.1.4: Demographic, Socio-economic and Socio-Cultural factor and Contraception utilization among women living with HIV

In this study, the overall prevalence of contraceptive use among HIV infected women was 42%. This finding is lower than the reported prevalence of contraceptive use (49%) among women of reproductive age in Zambia. It is also lower than the studies conducted in South Africa (53%) and Addis Ababa, Ethiopia (78%) and Brazil (Paiva, 2003). The lower prevalence of contraceptive use in this study might be explained by the high level of intention for children (53%) among the married women. The other possible reason for the low prevalence of contraceptive use among HIV-positive women could be due to unavailability and lack of the preferred types of contraceptive methods at ART clinics.

The finding that 58% of the HIV-positive women not using contraceptives in Zambia translates into 956 HIV infected women out of the 1,654. These results are worrying considering that a number of family planning programmes in Zambia have been implemented not only to reduce fertility rate but also to help slow down the transmission of HIV. Moreover, strengthened family planning program efforts are cost effective points for HIV prevention (Reynolds et al., 2006).

However, the results may be reflecting the fact that HIV-positive women are expecting more children in future. Further, this evidence in Zambia is different from what Dube (2012) found in Malawi. In multivariate analysis, education level, marital status, parity were found to have more influence on contraceptive use. HIV-positive women with primary, secondary and higher education were more than two (2) times likely to use contraceptives compared to those with no education. These results may in a way suggest the influence of education on contraception and level of knowledge one would have acquired. Further, they are in line with the reported fertility intentions of HIV-positive women in this study which indicates that as education levels increase, the fertility intention reduces.

Findings from this study highlight that most of the contraceptive users among HIV-positive were below 35 years. The new evidence shows that Tongas, Barotse, Nyanjas and North-westerners living with HIV were more likely to use contraceptives than Bembas. This evidence is unique in a way considering that few studies conducted around SSA have considered this variable. Though considered in other studies, the results are different from this finding. Multivariate analysis of this study did not include employment status and wealth index as predictors of contraceptives among HIV-positive women. However, wealth index was a one of the strong predictors of contraceptive among HIV-negative women. The findings on HIV-positive women differ from other studies which reports significant association between contraceptive use and wealth index (King, 2011); (Crede, 2012) and (Warren, 2013)

Lastly, the study reveals that both HIV-positive and HIV-negative women using long-acting methods have lower odds of wanting to more children when compared to those using Short-Acting methods. These results may be only one of its kinds in the Zambian context considering available literature provides mixed results on the relationship between method of contraceptive and contraceptive use.

5.1.5 Linking study results with objectives

This study assessed the fertility intentions and contraceptive use among the HIV-positive women in Zambia. Overall, the Study findings have shown that a higher proportion of HIV-positive women (15-49) in Zambia have intentions of having children in future despite their HIV status. This has been confirmed under descriptive and bivariate level of analyses where 46% of the

HIV-positive women reported to have fertility intentions when compared to their HIV-negative counterparts (60%). This finding is surprising in the sense that the proportion of HIV-positive women intending to have children was expected to be much lower. On the other, the results may be reflecting the influence of availability of ART and other prevention measures that may have potentially improved the lives giving them hope of having a normal birth. In terms policy implication among providers, the findings may be pointing out the need for strengthen the health system especially for this group of people considering the high demand for children.

Specifically, the study compared the fertility intentions between the HIV-positive women and HIV-negatives. Findings of this study has shown that there a significant difference in fertility intention between the two groups. For instance, the study has indicated that 60% of the HIV-negative women wanted more children while 46% percent of the HIV-positive indicated to want more children ion future. Further, multivariate analysis also showed overall, HIV-positive women have lower odds of wanting more children in future compared to the HIV-negatives. The findings on this specific objective are in line with what other scholars found in Kenya, Malawi, Ethiopia and South Africa as highlighted earlier.

Considering that contraceptive is one of the primary means to preventing mother-to-child-transmission, the study also examined the use of contraception among the HIV-positive women. Like other studies in other SSA countries, the use of contraceptives among HIV-positive women (42%) in Zambia was lower than the overall contraceptive prevalence (49%). The finding on this specific objective may not be astonishing in that the intention for children among these women is higher. Moreover, the findings in bivariate analysis with chi-square tests showed significant association between fertility intention and contraceptive use. The results on this objective have also confirmed the interaction of the two outcome variables in the designed conceptual framework in the literature section. An attempt to identify the demographic, socio-economic and socio-cultural factors that may predict fertility intentions among HIV-positive women was made. The findings revealed that education and parity were the major predictors of fertility intentions among HIV-positive women while contraceptive use among HIV-positive women was driven by marital status, parity, ethnicity, age and education.

5.1.5 Limitation of the study

This study has several limitations and these stems from the inherent limitation of the ZDHS data set. Taking into account that ZDHS data is cross-sectional in nature, it may cause difficulties to determine the association between study variables and the association can only be discussed in terms of plausibility. Therefore, it is to note that only associations were examined in this study and no causality was done. In line with this, there could be several factors that may explain fertility intentions and contraceptive use among HIV-positives but information on variables such as reasons as why they would continue expecting more children despite being positive and availability of contraceptives is not collected in the DHS. Furthermore, ZDHS did not include information on perception and acceptability of these methods of contraceptives which would be included in this study. The last limitation is that no qualitative data was there to support evidence generated. This is because DHS is limited to quantitative data.

5.1.6 Conclusion

This study has assessed the fertility intentions of HIV-positive women in Zambia. Although most HIV prevention programmes seem to focus on prevention of pregnancy among HIV-positive women, this study has demonstrated that the intention to have children among this group of women cannot be disregarded and ignored.

Based on the findings of this study, the major predictors of fertility intentions among HIV-positive women include; age, education level, marital status, parity and type of contraceptive method in Zambia. The study concludes that use of contraceptive among this group of people is driven by marital status, parity, ethnicity, age and education. The study may have confirmed to some extent that availability of ART and other prevention services can still raise hopes for individuals living with HIV and they can believe to have a normal birth. It has been noted that the prevalence of contraceptive use among HIV-positive women is still low. This suggests high risk of unintended pregnancies among HIV-positive women in Zambia which may bring a lot of health challenges. Additionally, from the study findings it can be deduced that fertility intention influence the use of contraceptives among HIV-positive women.

Despite its limitations, the study has also provided better understanding of fertility intentions of HIV infected women and updated the existing knowledge on the factors associated with fertility intentions among these women and those that may change their contraceptive behavior.

5.1.7 Recommendations

Bearing in mind that Zambia hopes to ensure healthy lives and promote well-being for all at all ages as it strives to become a middle income by 2030 guided by SDG 3, it becomes essential to use updated information in formulating policy. Also given the degree of HIV epidemic among women and the current antiretroviral therapy [ART] scale up in Zambia; drawing recommendations from research findings is daunting and multifaceted. This section provides recommendations to help address the issue of reproductive health among the HIV-positive women in Zambia.

- Given the evidence on the demand for children among women living with HIV in future, there is need for comprehensive and continuous expansion of family planning, voluntary counseling and prevention of mother-to-child transmission (PMTCT) and integration of HIV treatment care among HIV-positive mothers to meet diverse reproductive intentions. This may further minimize the likelihood of HIV transmission to their partners and children and to help them meet the formidable challenges of undertaking parenthood while living with HIV.
- The prevalence of contraceptive use among HIV-positive women in Zambia is low, which suggests a high risk of unintended pregnancy. Short-acting methods [pill, condom (male and female), periodic abstinence, lactational amenorrhea) are the most preferred type of contraceptive methods. Thus, it is better to integrate these contraceptive methods with ART clinic especially among the HIV-positive mothers.
- Considering that this study lacked qualitative data, it is therefore, recommended that more studies using both quantitative and qualitative data are needed to help establish reasons as to why HIV-positive women in Zambia still intend to have more children in future despite their HIV status. This may require involving government through Ministry of Health and other stakeholders such as NGOs and Civil Society Organisations involved in HIV programmes and reproductive health. This may allow health policy makers and

other stakeholders dealing with reproductive health to have a better understanding on the services to provide to this group of people.

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Appendices:

Appendix 1A: Goodness of fit for the Binary logistic regression of the fertility intentions by HIV status						
Model:	HIV-positive			HIV-negative		
	Model 2	Model 1	Difference	Model 2	Model 1	Difference
	Binary Logistic	Binary Logistic		Binary Logistic	Binary Logistic	
N:	1,654	1,654	0	8,034	8,034	0
Log-Lik Intercept Only	-2665.3	-2665.3	0	-2212.759	-2212.759	0
Log-Lik Full Model	-2085.434	-2543.079	647.645	-1721.747	-2204.196	482.449
D	3190.869(1599)	4486.159(1580)	1295.290(19)	3443.493(952)	4408.392(971)	964.898(19)
LR	1331.730(21)	36.440(2)	1295.290(19)	982.025(22)	17.126(3)	964.898(19)
Prob > LR	0	0	0	0	0.001**	0
McFadden's R2	0.241	0.007	0.235	0.222	0.004	0.218
McFadden's Adj R2	0.233	0.005	0.228	0.212	0.002	0.209
ML (Cox-Snell) R2	0.675	0.03	0.645	0.635	0.017	0.617
Cragg-Uhler(Nagelkerke)	0.682	0.031	0.651	0.642	0.018	0.624
AIC	3.578	4.64	-1.062	3.579	4.53	-0.951
AIC*n	4236.869	5494.159	-1257.29	3489.493	4416.392	-926.898
BIC	-4025.126	-2864.293	-1160.834	-3108.587	-2274.455	-834.132
BIC'	-1176.044	-15.21	-1160.834	-830.611	3.521	-834.132
BIC used by Stata	4353.632	5514.465	-1160.834	3601.789	4435.921	-834.132
AIC used by Stata	4236.869	5494.159	-1257.29	3489.493	4416.392	-926.898

Source: 2013-14 ZDHS, own computations