

MARRIAGE DYNAMICS AND FERTILITY IN THE ERA OF HIV AND AIDS IN MAHIKENG LOCAL MUNICIPALITY OF THE NORTH WEST PROVINCE, SOUTH AFRICA.

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DECLARATION

I certify that this thesis titled “*Marriage Dynamics and Fertility in the Era of HIV AND AIDS: A case study of Mahikeng Local Municipality, North West Province, South Africa*” is my own original work and it has not been submitted for any degree or examination in any other University or institution. I also declare that all other sources of information used in this thesis have been appropriately acknowledged.

Signed: _____

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LIST OF ABBREVIATIONS AND ACRONYMS

AIC	AIDS Information Center
AIDS	Acquired Immunodeficiency Syndrome
ANOVA	Analysis of Variance
ASFR	Age Specific Fertility Rate
ASSA	Actuarial Society of South Africa
ARV	Antiretroviral
CDC	Centre for Disease Control
CEB	Children Ever Born
CI	Confidence Interval
CSO	Central Statistics Office
DoH	Department of Health
DSD	Department of Social Development
HAART	Highly Active Antiretroviral Treatment
HBM	Health Belief Model
HIV	Human Immunodeficiency Virus
HSRC	Human Science Research Council
HR	Hazard Rates
MP	Mean Parity
MRC	Medical Research Council
MTCT	Mother-to-Child Transmission
NPU	National Population Unit
NWDC	North West Development Corporation
OR	Odds Ratio

PHM	Proportional Hazard Model (PHM)
PLHA	People Living with HIV AND AIDS
PMTCT	Prevention of Mother to Child Transmission
PPR	Parity Progression Ratio
PRB	Population Reference Bureau
SADHS	South African Demographic and Health Survey
SARPN	Southern African Regional Poverty Network
STATSSA	Statistics South Africa
STIs	Sexually Transmitted Infections
SPSS	Statistical Package for Social Sciences
TFR	Total Fertility Rate
UAC	Uganda AIDS Commission
UN	United Nations
UNAIDS	United Nations Programme on HIV and AIDS
UNCPD	United Nations Commission on Population and Development
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VCT	Voluntary Counseling and Testing
WHO	World Health Organisation

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Abstract

Marriage as one of the proximate determinants of fertility is in transition globally. In South Africa, age at marriage is increasing, marriage rate is declining, the prevalence of cohabitants and marriage dissolution is increasing, and single motherhood is on rise in a country where HIV infection is generalized. On the other hand, marital fertility is declining. The study was therefore premised by the changing marriage patterns and fertility in the context of a generalized HIV and Aids pandemic in South Africa.

The main objective of the study was to examine marriage patterns and lifetime fertility in the era of HIV and AIDS in Mahikeng local Municipality, with the view of assessing their dynamics and predictors. The study used cross-sectional data collected from 605 randomly selected women aged 15-49 years of age. Descriptive statistics including the Pearson's chi-square statistics and the Kaplan-Meier Log rank statistics and inferential statistics including the Cox Proportional Hazards Model and the nested Binary Logistic Regression Model were used in the analysis.

The study found that marriage rate was only 33%, the median age at marriage was 24 years and the mean parity of the women was only 1.9. The low marriage rate was significantly predicted by being African, living in the poorer socioeconomic neighbourhood, having tertiary education and work in the formal sector. Early marriage was predicted by rural childhood residence, having no/primary education, work in the informal sector and belonging to the 35 years or older age group. Conversely, use of contraceptives, perceived high risk of HIV infection and living in the poorer socioeconomic neighbourhoods delayed marriage. Furthermore, the lower lifetime fertility was predicted by sexual debut at 18 years or older, never married status, having tertiary education and work in the formal sector.

The study concludes that marriage rate in Mahikeng Local Municipality is low among African women; the age at marriage is increasing; and lifetime fertility is declining. Although perceptions of risk of HIV infection appear to impact marriage rate negatively, it appears not to be an important factor in fertility decisions in the study population. Either way, both processes could continue to compounding the HIV and Aids problem.

Programmes addressing socioeconomic inequalities through education and employment on one hand and the HIV and Aids pandemic through promoting HIV testing and HIV status disclosure on the other are important and can contribute to improving marriage and fertility behaviour in the study area.

Keywords: Marriage, lifetime fertility, HIV and Aids, Mahikeng

CHAPTER 1

1.1. INTRODUCTION

Marriage is the main and widely accepted determinant of intimate sexual union, family formation and childbearing. Marriage, in the absence of contraception, has been identified as one of the main proximate determinants of fertility. Early age at marriage and not duration of marriage is expected to lead to higher individual and societal fertility. Marriage has been identified as one of the factors associated with the transmission and acquisition of HIV as well as other sexually transmitted diseases. Therefore, the risk of HIV acquisition and transmission could affect the marriage rate, timing of marriage and fertility in societies where HIV is generalized.

Among married individuals, HIV may affect childbearing by lowering childbearing desires due to the fear of transmitting the virus to children through Mother-to-Child Transmission (MTCT). Other influences of HIV AND AIDS on fertility among couples include reduced desires for sexual intercourse as a result of the fear of contracting the disease from the infected spouse, non-viability of sperms and eggs and increased fetal loss (Fortson, 2009). However, the relationship between marriage, fertility and HIV in large epidemics has not been widely explored. Additionally, the mechanism through which HIV affects marriage is not well known and may vary by society.

The Mahikeng Municipality is the capital city of North West province where HIV is a generalized pandemic. The municipality is previously one of the disadvantaged largely black municipalities in South Africa. The basic premise of the study is that although there is a number of factors that determine marriage patterns, HIV could contribute to reducing the marriage rate, delay in age at marriage, and reducing fertility in the municipality. This study therefore, focuses on examining the main predictors of the marriage rate, the timing of first marriage and lifetime fertility in Mahikeng Local Municipality in the context of the high adult HIV prevalence rate.

1.1.2 Marriage patterns in South Africa.

This section presents the situation of marriage and fertility in South Africa. Marriage is a legally and socially accepted union of two or more persons of opposite and/or same sex (Kalule – Sabiti *et al*, 2007). The legality of such a union is usually established by civil, religious and customary means according to the customs and laws of each country. Marriage in the African context is a process, which may take several stages before recognition of the couple as a social, economic and a reproductive unit. In most societies, marriage involves a series of negotiations over several years (Mostert *et al.*, 1998; Kalule-Sabiti *et al.*, 2007).

Through marriage, unions are recognised by family, society, religious institutions and the legal system. Socio-cultural demand and unwanted pregnancy can propel individuals particularly women to marry, often early and against their will (Anderson, 2003). Studies on age at first marriage are important because of the close link between marriage and the onset of childbearing and fertility. Literature on these has been discussed widely in developed countries and in developing countries.

Marital Status consists of three states. The first is never married during which the individual is not in an intimate sexual union, does not share a common residence, has no economic interdependence with another individual and may not bear or rear children. The second state is marriage, which is the transition from never married state and is characterised by intimate sexual union, common residence, economic interdependence, and may or may not include childbearing and upbringing. The last stage is that of marriage dissolution which is characterised by the cessation of marriage and all its attributes through divorce or widowhood (Mostert et al., 1998; Yaukey, 1985).

Although young age at marriage and universality of marriage was common in Sub Saharan Africa in general and South Africa in particular, delayed marriage, increasing proportion of never married women and marital dissolution due to divorce appear to have increased since the 1960s (Palamuleni, 2010). The emergence of this pattern of marriage is now a global phenomenon, having started in the developed countries especially in the United States of America in the 1960s, mostly as a result of the feminist movements, which revolutionised the status and rights of women (Harkonen, 2013).

In sub-Saharan Africa, universal value of marriage was encouraged by religious and social condemnation of premarital and extra marital sexual relationships, premarital child bearing, and social and economic vulnerability of women. As a result, in these societies women married early and often to older men, thereby increasing their risk of marital dissolution mostly through widowhood (Udjo, 1996; Kalule-Sabiti et al, 2007). However, recent patterns of marriage, especially in South Africa suggest that a marriage transition characterised by delayed age at marriage, decline in marriage rate and marital

dissolution through divorce is on the increase (Udjo, 2009; Statssa, 2010; 2011). The introduction of contraceptives and legalization of abortion could have contributed to delayed marriage and the decline in marriage rate since women could still engage in premarital sexual activity without the risk of childbearing, and could have enabled unmarried women to remain sexually active for a long time (Doyle, 1999; Mostert et al, 1998).

In sub-Saharan Africa, divorce rates have been generally low, which has been attributed to the patriarchal social structure which reserved the right to be married and or divorced for males in most societies in this region. However, in South Africa, although divorce rate was higher among Whites and low among Blacks, the divorce rate in the latter has increased since the 1990s and the median age at divorce is now 38 years for women (Udjo, 1996; Statssa, 2010; 2011). Contrary to findings from a previous study which suggested that divorce rates tend to be higher where most women are opting to work in paid jobs (Doyle, 1999), in South Africa, divorce rates are higher in the lower socioeconomic groups where most people, especially women are unemployed or employed in low skill jobs (Statssa, 2011).

Another marital status which is on the increase in sub-Saharan Africa is widowhood. This has been attributed to the high male mortality due to AIDS, violence and economic hardship which subject them to tough conditions in providing for the needs of the family. In South Africa, Kwazulu-Natal followed by Gauteng experienced the highest increase in the proportion of widows while the Northern Cape and North West had lower, but increasing proportions of widows. However, these statistics could have been grossly under reported because of the relatively high proportion of cohabitation in the North West province (Palamuleni, 2011).

1.1.2 Fertility Trends

Global patterns and trends in fertility have been changing, influenced by mostly socioeconomic changes and other forces of modernization including the increasing use of contraception (Ainsworth, 1996). As a result, countries that have traditionally high fertility including those in sub-Saharan Africa such as Niger, Uganda, Ethiopia, Burkina Faso, Mali, Zambia, Malawi have started experiencing fertility decline (PRB, 2012). Within sub-Saharan Africa region, South Africa has perhaps experienced the fastest rate in fertility decline (PRB, 2012). Other countries with rapidly declining fertility rates are Botswana, Namibia, Swaziland and Zimbabwe (Moultrie and Timaeus, 2001; Letamo and Letamo, 2002). A few other countries including Kenya, Tanzania, Cameroon and Nigeria have suffered a stall in their fertility declines (Mturi, 2002; PRB, 2012), but the trend appears to be irreversible.

In South Africa, a number of studies and surveys have shown that fertility continues to decline in all racial groups and the decline accelerated after 1980 (Udjo, 2005). Fertility levels declined to 3.2 children per woman in 1996 from more than 6 in the 1970s, and 4 in the 1980s (Medical Research Council, 2002). By the end of the last decade, South Africa's Total Fertility Rate (TFR) was estimated at 2.4 (PRB, 2012). Despite this trend, TFR in South Africa varies by race with Whites having the lowest fertility rate followed by Coloureds and Blacks. By 2002, the total fertility rate (TFR) of Black South African women was 3.1 compared to 2.5 for Coloureds and 1.9 for Whites (Medical Research Council news, 2002). The decline in fertility was attributed mostly to contraception (National Population Unit(NPU), 2000) and other factors such as increasing levels of literacy particularly among whites and paid employment which enhanced women's ability to make decisions involving childbearing (NPU, 2000).

Differentials in urban-rural fertility show that for South Africa as a whole TFR for rural and urban women was 3.9 and 2.3 respectively in 1998 (Department of Health, 2007). Provincial differentials indicate that TFR was higher in Northern Cape (2.8) followed by Limpopo (2.7), Western Cape (2.6), and North West (2.5) Eastern Cape, Gauteng and Mpumalanga (2.3) and Free State (2.0). The lowest TFR was in Kwazulu Natal (0.6) (Department of Health, 2007; Kalule-Sabiti et al, 2008). It is not surprising that Provinces with lower fertility also have some of the highest HIV AND AIDS prevalence rates in South Africa (Department of Health, 2007). In 1996, the North West province had a TFR of 3.4 children per woman which declined to 3.1 in 2001 and further to 2.4 in 2007. Fertility rates vary by district, at district level in the North West province, TFR was found to be higher for Ngaka Moiri Molema (3.30) and Dr Ruth Mompadi (3.30) in 2007

followed by Dr Kenneth Kaunda (2.90) and Bojanala with 2.70. The TFR declined for all the districts except for Bojanala which slightly increased to 2.73 in 2011. The Ngaka Moiri Molema declined to 3.05 in 2011 where study area is compered.

1.1.3 HIV and AIDS prevalence

HIV and AIDS is a global pandemic. The global HIV and AIDS number was 33.2 million in 2010 having declined from 38.6 million in 2005, implying that interventions to reduce the number of HIV and AIDS are working (UNAIDS, 2011). The decline in HIV and AIDS prevalence rates suggests that apart from the declining rate of new infections, the proportion of people infected with the virus is also being reduced by mortality, especially in sub-Saharan Africa, where access to Highly Active Antiretroviral Treatment (HAART) is still limited to a few infected people who are in need of the treatment (UNAIDS, 2013). Nevertheless, sub-Saharan Africa continues to be the most affected region by HIV and AIDS in the world and accounts for 68% of all People Living with HIV and AIDS (PLHA) by the end of 2010 which increased to 70% and 71% in 2012 and 2013 respectively. Within the continent, the majority of infected people are women (UNAIDS, 2011).

However, there have been positive developments in the HIV and AIDS situation evidenced by the decrease in HIV and AIDS prevalence rate from 24.7 million in 2006 to 22.2 million in 2010; decline in total new infections from 1.9 million in 2007 to 1.8 in 2010; decrease in AIDS mortality from more than 2 million in 2005 to 1.4 million in 2010; and the increase in the number of infected people in need of HAART and receiving

the treatment from a few thousands in 2005 to more than 3 million in 2009 (UNAIDS, 2010; UNAIDS, 2014).

In South Africa however, the situation of HIV and AIDS is still dire. South Africa has the highest HIV and AIDS prevalence in the world (PRB, 2012). HIV and AIDS prevalence data collected from the latest round of antenatal surveillance show that 28% of all pregnant women in 2007 were infected with the virus (UNAIDS, 2007); and adult prevalence rate was 14.4% among males and 21.8% among females in 2009 (PRB, 2012). South Africa has reported 6.1 million people living with HIV which is a prevalence of 17.9 percent. AIDS is still reported to be the leading cause of death among adults in South Africa (Department of Health, 2010; UNAIDS, 2014).

Province	2002	2005	2008	2012
Kwazulu Natal	11.7	16.5	15.8	17.4
Free State	14.9	12.6	12.6	14.7
Mpumalanga	14.1	15.2	15.4	14.5
North West	10.3	10.9	11.3	13.9
Gauteng Province	14.7	10.8	10.3	12.8
Eastern Cape	6.6	8.9	9.0	12.2
Western Cape	10.7	1.9	3.8	5.1
Nothern Cape	8.4	5.4	5.9	7.8
Limpopo	9.8	8.0	8.8	9.4
South Africa	11.4	10.8	10.9	12.6

Source: Human Science Research Council (HSRC): 2014

Provincial variation in HIV prevalence among respondents aged two years and over indicated that currently, KwaZulu-Natal (17.4% in 2012) followed by Free State (14.7% in 2012), Mpumalanga (14.5% in 2012) and North West (13.9 in 2012) are among the top 4 highest with HIV and AIDS prevalence. The provinces with lowest HIV and AIDS prevalence rates were the Western Cape (5.1% in 2012), Northern Cape (7.8% in 2012) and Limpopo with a prevalence of 9.4% in 2012 which increased from 8.8% in 2005. The North West province was found to be among the four highest HIV prevalence rates in the country which indicated an increase from 10.3% in 2002 to 13.9% in 2012 which was supported by the increase in HIV prevalence among the Antenatal women increasing from 29.6% in 2010 to 30.2% in 2011 (Department of Health, 2012; HSRC, 2014).

Previous studies have attributed the high prevalence rate of HIV and AIDS to early age at sexual debut and delayed age at marriage which increased the duration of non-marital intercourse thereby, increasing the lifetime risk of exposure to HIV and AIDS infection (Bongaarts, 2006; Kalule-Sabiti et al, 2008). Other studies have attributed the high prevalence of HIV and AIDS in South Africa to increasing tolerance of premarital sexual intercourse and childbearing, which have been attributed to high cost of marriage, increasing economic independence of women and the general breakdown in the functions of the marriage and the family institutions (Gregson, 2002; Glynn et al, 2001). The high prevalence of HIV and AIDS may have contributed to the changes in marriage patterns characterised by the increasing age at marriage, decline in the marriage rate and increase in marriage dissolution, which may also have contributed to fertility decline.

1.2 HIV and Fertility

Marriage is an important determinant of sanctioned sexual behaviour which is the risk factor of transmission and acquisition of HIV and AIDS (Boerma et al, 2002; Clark, 2004). In most of sub-Saharan Africa including South Africa, traditionally marriage for women was characterised by a young age, marrying older men, and women derived their social recognition and economic security by being married and therefore remained subordinate and dependent on their husbands (Gregson et al., 2002). HIV and AIDS is now recognised as one of the factors influencing changes in marriage patterns in countries where the prevalence of the disease is high because of its effect on postponement of age at marriage and the decline in the marriage rate as a result of the actual and perceived risk of marital transmission of HIV and AIDS (Bongaarts, 2006; Mukiza-Gapere and Ntozi, 1995). A study in Uganda suggested that marriage has become a major source of the new wave of HIV and AIDS transmission and acquisition in that country (Uganda AIDS Commission, 2009), which could greatly contribute to changes in marriage patterns.

Although a few studies have suggested that women have been blamed by men for HIV and AIDS infection in unions in some countries, there is little evidence that HIV and AIDS infection could lead to marital dissolution through divorce (Hosegood, 2009). However, there is sufficient evidence to support the view that widowhood due to HIV and AIDS is a major contributor to marital dissolution in high prevalence countries. A previous study suggested that husbands are twice as likely as wives to be infected with HIV and AIDS first and male mortality is likely to occur before females because males are usually older and have lower survival probabilities after infection with HIV and AIDS, leading to the increasing number of widows (Carpenter et al., 1999). Although not examined in this study, it is also plausible that the HIV and AIDS epidemic is reducing

the probability of remarriage because of the stigma associated with marital dissolution due to the death of a sexual partner (UN, 2002; Caldwell, 1997; Mukiza-Gapere and Ntozi, 1995).

Other factors which may influence changes in marriage patterns are economic aspirations of women through employment, greater and prolonged participation of women in education and higher education aspirations which may lead to postponement of marriage and childbearing. A previous study found the fertility inhibiting effects of the proximate determinants of fertility was higher among women who had tertiary education and for women in urban than rural areas. This suggests that increasing level of urbanization, which has resulted in a greater shift of the population from rural to urban areas, may have contributed to the changes in marriage as one of the important proximate determinant of fertility in countries where contraceptive use is low (Ayiga and Lwanga, 2014; White *et al*, 2008).

However, in most socioeconomic and behavioural studies, the perceived and actual effect of HIV and AIDS on marriage dynamics has not been adequately investigated in societies where HIV AND AIDS is a generalized epidemic. Examining the impact of HIV and AIDS and the emerging marriage patterns characterised by delayed age at marriage and decline in the marriage rate in high prevalence countries is important in shifting the boundary of knowledge on the underlying factors influencing nuptuality.

Previous studies in the 1990s by Zaba and Gregson (1998), Allen et al., (1993) and Ryder et al., (1991) in high HIV and AIDS prevalence countries found that fertility is lower among women with HIV and AIDS. This is because the disease appears to reduce the

efficacy of the reproductive system which could lead to poor fertility performance for both men and women. As HIV and AIDS increases, the decline in fertility can be faster because the age at first birth may be influenced by HIV and AIDS, thereby indirectly contributing to fertility decline (Swartz, 2000, Setel, 1995). As HIV progresses into the AIDS condition, it damages the morphology and motility of sperms which could increase seminal abnormalities among HIV infected men with advanced AIDS disease (Politchet *al.* 1994).

Among women, fertility can also increase the progression of HIV to the AIDS condition in infected women; and may lower fertility rates through spontaneous abortions and stillbirths (De Cock et al., 2000; Temmerman, Chomba and Piot, 1994). It also affects fertility desires and outcomes as infected people may decide not to have additional children due to the risk of transmitting the virus to their children. HIV and AIDS may contribute to low desire for sexual intercourse among infected people. Additionally, the threat of HIV and AIDS may reduce childbearing desires in the general population. A study in Kenya found that women with higher HIV and AIDS awareness were more likely not to want more children and to desire smaller family size (Magadi and Agwanda, 2007). Although the effect of HIV and AIDS on the fertility of infected women has been widely explored (Fortson, 2009; Magadi and Agwanda, 2007; Lewis et al., 2004), there is dearth of information on the effect of HIV and AIDS on the fertility of the general women population. Investigating the effect of HIV and AIDS on the fertility of the general women population will increase our understanding of the effect of HIV and AIDS on fertility in South Africa.

1.3 Statement of the problem

In most sub-Saharan African countries, fertility has been declining due to changes in social, cultural, economic and demographic conditions. Among the forces of change in the demographic process are the changing marriage patterns characterised by delays in age at marriage and decreasing marriage rates. Other factors are the improving status of women through education and participation in the formal labour force, increasing readily accessible health care services, infrastructural development and improved level of literacy (Letamo and Letamo, 2002).

Marriage patterns as one of the proximate determinants of fertility are changing very rapidly in South Africa, where the rate of change has been greatest among Black women and in fairly a shorter time than has been experienced elsewhere (Budlender et al., 2004). The changes in marriage patterns in South Africa have been characterised by late marriages, increasing proportion of never married and marriage dissolution (Budlender et al, 2004; Palamuleni, 2010; Kalule-Sabiti et al, 2008). These changes have also contributed to the increase in the rate of premarital childbearing, proportion of single parent women headed households and proportion of destitute, orphans and vulnerable children.

The twin problem of changing marriage patterns and increasing levels of vulnerable households has partly contributed to the social decay characterised by high levels of criminality, high prevalence of HIV and AIDS and poverty among black South African communities (Palamuleni, 2010). In addition, the changes in marriage patterns may have contributed to the decline in the lifetime fertility rate in South Africa, although changing

socioeconomic conditions of women and the generalized HIV and AIDS epidemic have also been suggested as some of the factors for this growing phenomenon. In addition, the role of marriage as the event signaling family formation and childbearing also appears to have been eroded by changing socioeconomic conditions.

Across the country, the declining marriage rate and delayed marriage, and increasing proportion of never married are increasing the threat to the institution of the family and its functions. However, the cause of these changes and its effect on fertility has not been systematically examined and therefore remains unknown in Mahikeng Local Municipality, thereby creating a paucity of knowledge needed to address the problem and its social and economic ramifications. Previous studies suggested that the generalized HIV epidemic in sub-Saharan Africa is one of the major contributors to the changing marital patterns and declining fertility in high HIV and AIDS prevalence countries (Ntozi et al., 2003). This study therefore, focused on examining the main predictors of the marriage rate, the timing of first marriage and lifetime fertility in Mahikeng Local Municipality in the context of the high adult HIV prevalence rate.

1.4 Aim and objectives of the study

The aim of the study is to examine marriage dynamics and fertility in the era of HIV and AIDS in Mahikeng local Municipality of North West province in South Africa, with the view of estimating the marriage rate, median age at marriage, lifetime fertility of the women and identify their main predictors in Mahikeng Local Municipality.

The specific objectives of the study are to:

- i. Estimate the marriage rate in Mahikeng Local Municipality;
- ii. Estimate the median age at marriage in Mahikeng Local Municipality;
- iii. Estimate the lifetime fertility of women in Mahikeng Local Municipality;
- iv. Examine the main correlates of the marriage rate and timing of marriage in Mahikeng Local Municipality; and
- v. Investigate the main predictors of lifetime fertility in Mahikeng Local Municipality.

1.5 Hypotheses of the study

In this study, the following hypotheses were tested:

- i. Women who perceive high risk of HIV infection in marriage are likely to be never married than women who perceive low or no risk of HIV infection in marriage;
- ii. Women in the richer socioeconomic neighbourhoods are more likely to marry later than women in the poorer socioeconomic neighbourhood;
- iii. Women who had sexual debut at 18 years or older have fewer children than women who were less than 18 years at sexual debut;
- iv. Women who have the first birth at <20 years are more likely to marry earlier than women who have the first birth at 20 years or older;

- v. Women who perceive high risk of HIV infection in marriage marry later than women who perceive low or no risk of HIV infection in marriage; and
- vi. Women who perceive high risk of HIV transmission to children during childbearing have fewer children than women who perceive low or no risk of HIV transmission to children during childbearing.

1.6 Rationale for this study

The era of apartheid significantly changed behavioural and other life processes in South Africa. The experience of this phenomenon eroded the cultural values including marriage particularly among blacks in South Africa. In traditional societies in South Africa, marriage used to be early and universal; children were mostly born in marriage; and children and parents shared the same residence. However, apartheid changed all these aspects of the normal black family structure.

The introduction of the pass laws and the male labour migration system caused the introduction of a new family system - the separated and dysfunctional family system - where men and women were separated and family responsibilities left in the care of women alone. The family system in all practical purposes had seized. This probably facilitated the spread of HIV among black communities in South Africa to the extent that the black person, especially black women, literally became the face of HIV and AIDS in South Africa.

At the end of apartheid and post-apartheid period, a new system of family organisation took over especially in urban areas. These are the single women only family system and cohabitation form of sexual union. These systems gave greater roles and empowerment for the rapidly growing number of educated and employed women who are by large

independent. It also contributed to the increasing phenomenon of non-marital childbearing to the extent of it being tolerated in black South African society.

In all societies, the family is a basic unit of social organisation and therefore, performs the important functions of production, reproduction and socialisation of new members. No society will perhaps survive and perform the above functions effectively without the family structure, which is created by the institution of marriage. The fact that the marriage institution has come under serious threat by the increasing proportions of never married, single parent households, marriage dissolutions through separation/divorce and widowhood is a serious threat to the fabrics of society in South Africa.

It therefore means that marriage patterns are very important in not only family demography but also the proper functioning of society. The erosion of the marriage institution as the basic foundation of the family by whatever forces, be socioeconomic or health such as HIV, is a serious concern in this regard and therefore needs to be better understood.

Therefore, understanding the pattern of marriage, its determinants and its effects on fertility could provide some of the answers needed to revive the institution of marriage in South Africa. This will greatly contribute to understanding what is needed to enhance the institutions relevance and importance in reforming the social decay currently being experienced. Knowledge provided by this study adds to the existing knowledge and can be adapted by countries in sub-Saharan Africa currently experiencing changes in marriage patterns and fertility.

1.7 Organisation of the thesis

The thesis is organised in seven chapters. Chapter one presents the introduction which comprises of the background, statement of the research problem, objectives of the study, hypotheses of the study and the rational for the study. Literature review and theoretical framework are presented in chapter two. In chapter three, the methodology used in the study comprising of the study settings, research and sampling designs, data collection methods and description of study measures are presented. Also described in chapter three are data collection, data processing and analyses procedures. Chapter four presents results on marriage rate, its differentials and predictors. Chapter five examined the correlates of the timing of marriage. Fertility levels, differential and predictors are

presented in chapter six and chapter seven presents the discussion of the study findings, conclusions and recommendations for policy and future research.

Chapter Two

Literature Review

2.0 Introduction

The previous chapter presented an overview of the marriage patterns, fertility and HIV AND AIDS across countries and South Africa in particular. It also presents the statement of the research problem, aims and objectives of the study, hypotheses and significance of the study. In this chapter, the literature on marriage patterns, fertility and HIV AND AIDS are examined in detail. Previous studies have identified marriage as an important proximate determinant of fertility (Davis and Blake, 1956; Bongaarts, 1978; Bongaarts and Potter, 1983). Recently marriage has emerged as one of the avenues for the transmission and acquisition of HIV. In this chapter, factors influencing the prevalence of HIV are also discussed because perception of risk of HIV infection and perception of risk of HIV transmission to children are hypothesized to contribute to the marital and fertility situation in Mahikeng Local Municipality. Other factors are the socioeconomic characteristics and conditions of women in the Mahikeng Local Municipality.

2.1 Marital unions

Marriage is a difficult concept to define especially in developing countries especially in sub-Saharan Africa because it is a process rather than an event which involves quite a number of rituals such as exchange of Lobola, a ceremony and cohabitation (Arnaldo, 2004; Margherio and Williams, 2014). Marriage refers to the legal union of two persons and the legality of such union may be established either by civil, religious, or other means as recognised by the laws and customs of each country. Traditionally, marriage was a union between a man and a woman and the most important purpose of marriage was childbearing (Shryock and Siegel, 1976). However, the legal recognition of same-sex

marriages in many countries including South Africa has changed this perception of marriage. Nevertheless, in this study marriage will refer to the union between man and woman.

Marital status in the context of this study is divided into two main transitional stages including never married and ever married (currently married, separated/divorce and widowed). Marriage in the African context is usually early and universal. However, it differs according to regions, countries and religion. The variations could result from different cultural and development perspectives. In Africa, there are four main marital unions which include customary/ traditional marriage, religious marriage, civil marriage and common law marriages which are applicable to the South African marriage context.

2.1.1 Types of marriage unions

The 1998 Recognition of Customary marriage Act came into effect in 2000. It recognizes the diversity of cultural and religious approaches to marriage. The Act permits customary and traditional marriages to be recognised as legal marriages which include both *lobola* and cohabitation. Customary marriages can be monogamous or polygamous (Margherio and Williams, 2014). The second type of marriage is civil marriage where the state grants legal recognition through documentation of marriage to a partner irrespective of religious or cultural affiliation, in accordance with marriage laws of the state. A marriage is usually formalized at a wedding or marriage ceremony. The third type of marriage is religious marriages. This is a form of marriage sanctioned by religious processes and is common in all major religious groups in South Africa. It is a permanent and lifelong commitment between a man and a woman. The common marriage is the fourth type of marriage

common in South Africa. Common marriage is an informal marriage where two people have been living together in a domestic partnership for a certain length of time but were never joined in a marriage during a specific ritual or their marriage was never registered in a civil registry.

2.1.2 Marriage patterns

The changing patterns of marriage have been experienced worldwide prior to the 1960s. For instance, the United States has experienced the declining number of people getting married at the ages of 14 and 15 years around 1960s. This was argued to have contributed to the increase in proportion single or never married women (Bloom and Bennet, 1985). This change in marriage pattern could have only affected the timing of marriage, but not the overall marriage as some women in the 1970s and 1980s confirmed that they were only postponing marriage to a later date. However, other researchers such as Becker (1981) argued that, the increase in age at marriage is consistent with the decline in proportion married. Bloom and Bennet (1985) proposed two scenarios regarding the decline in marriage rates. The first is that marriage rates have declined due to the delay in marriages, the rates should increase again in the near future. But if the marriage rates declined due to the rise in proportion unmarried, then marriage rates will remain depressed in the future. Asian countries have also experienced a change in marriage patterns where some areas in Asia have experienced a declined fertility at a rate below replacement level mainly because of declining marriage rates. Asian countries had a good history of traditionally arranged and early marriage which had led to universal marriages. These systems have however been weakening in recent decades due to the remarkable developments in education, increasing urbanization and involvement of women in

economic activities outside the household (Jones, 2010; Budlender et al., 2004; Amoateng, 2004; Makiwane, 1996).

South Africa has recently experienced the declining proportion married, increased divorce rates, increased proportion never married and delayed age at marriage mainly due to increased economic independence of women (Gebreselassie, 2011; Margherio and Williams, 2014). Although, these changes have been observed in all racial groups, they have been greatest among Black African women (Udjo, 1996; Budlender et al., 2004; Amoateng, 2004). Previous studies reported the late mean age at first marriage in South Africa in the range of 27-29 years as compared to countries in rural Nepal where marriage is universal and early (Jennings, 2013; Udjo, 2001; Gebreselassie, 2011); the proportion of never married was at a staggering more than 69% by 2001 (Palamuleni et al., 2007); and marriage dissolution due to divorce and widowhood increased by more than two folds and is more common among women than men (Udjo, 1996).

The delay in age at marriage and increasing proportion of never married in South Africa has been attributed to a number of reasons. These are; commercialization of bride price referred to as “*lobola*”(Makiwane, 2004); improvements in the status of women through education and formal employment (Kalule-Sabiti et al., 2007); and the rapidly changing social norms characterised by longer duration in education, labour force participation and urbanization (Palamuleni et al., 2007). Education and employment of women have also greatly reduced the supply of marriageable men (Lichter et al., 1992) and narrowed potential of marriage partners since women are generally expected to marry men either with the same or higher level of education (Kalule-Sabiti et al., 2007).

Additionally, the higher cost of living and availability of family planning services could also explain the higher age at marriage in South Africa where the majority of the population lives in townships (Clark, 2004; White et al., 2008). Marriage instability can be attributed to the stable employment of women in the formal sector, which could discourage marriage through the earned incomes that increases women independence, which makes it possible to go on in life without marriage. Increased labour participation of women is perceived to reduce marriage returns, resulting in unstable marriages (Makiwane, 1996; Kalule-Sabiti et al, 2007). Literature on marriage patterns further revealed that the delay in marriage, decrease in the marriage rate and marital dissolution appear to be more common among the educationally and economically better off urban women (Garenne, 2004; Mensch et al., 2005; Palamuleni, 2011).

Cohabitation is similar to marriage except that the bride's price is yet to be paid to legally and culturally sanction the union. However, cohabitation is often treated synonymously with marriage in various contexts because it shares all the important attributes of marriage including intimate sexual union, common residence, economic interdependence, and have similar demographic, health and socioeconomic outcomes including childbearing and rearing (Waite, 2000).

The timing of marriage is an important dimension of fertility behaviour because marriage marks the beginning of regular exposure to the risk of pregnancy and childbearing. Studies have previously established that the changes in marriage patterns were largely influenced by socioeconomic changes which were first observed in the developed world (Sweeney, 2002). These studies suggested that improving the economic and social

standing of women is partly responsible for increasing the proportion never married and delay in age at marriage. Conversely, other studies suggested that increasing economic hardships triggered the need for women to join the labour market as a strategy to increase family income, and this has implications on decisions of women on either to remain single, marry or dissolve their marriages (Bulcroft and Bulcroft, 1993).

According to Margherio and Williams (2014), entry into marriage can be determined by availability of mates; feasibility of marriage and desirability of marriage. They further explain that the availability of mates is largely determined by the number of females in relation to the number of males eligible for marriage which largely depends on the socioeconomic standing of the men. The feasibility of marriage is a function of economic expectations which they argued is dependent on the couple's access to economic resources which includes among others, the ability of men to pay lobola and the ceremonial costs of marriage. On the other hand, they also argue that the desirability of marriage reflects the availability of viable alternatives for marriage such as woman's education and employment opportunities.

In contrast, in sub-Saharan Africa, a number of arguments have been presented for the changes in marriage patterns. Some previous studies attributed the marriage transition in some countries to the marriage squeeze hypotheses which suggests that the decision to marry was determined by the supply of marriageable men (Caldwell et al., 1983; Stein et al., 2007; Budelender et al., 2004; Palamuleni, 2010). These are men who suit the socioeconomic criteria desired by women to make them eligible for marriage (Lichter et al., 1992). In these societies, it was observed that there are far fewer economically

suitable men for women to marry, leading to the delay in marriage. Another group of studies attributed the delay in age at marriage to the direct effect of modernization and suggested that empowering women through education and participation in the labour force increased the opportunity cost of marriage in terms of employment and income. This is for instance, supported by studies by Jones (2010) who argued that the delay in age at marriage in some Asian countries is caused by the erosion of the traditionally arranged marriage system and the acceptance of singlehood emanating from modernity and women empowerment. Modernity and women empowerment has made women to prefer work to marriage (Garenne, 2004; Kamal, 2011). Another reason for the delayed age at marriage is the stress associated with the expectation of children immediately after marriage; and reluctance in family formation by women who are worried about problems of rearing and raising children such as the cost of childbearing, opportunity costs of children in terms of the women's time for other activities could also encourage delay in marriage (Jones, 2010).

In addition, although the delay in marriage is greater among women with a considerable level of education and women in urban areas (Lloyed, 2005; UNCPD, 2002), there is evidence to suggest that the marriage transition is also taking place among women with low education, in rural areas and in poorer economic status (Westoff, 2003; Garenne and Joseph, 2002). The reasons for the delay in marriage among the less empowered women are not clear. Nevertheless, in most parts of sub-Saharan Africa, women still marry early despite significant changes in the socioeconomic conditions, partly because of the cultural restrictions imposed on women, including access to education and paid employment outside the home (Yabiku, 2005; Kaufman and Meekers, 1998).

An underlying factor for the perpetuation of early marriage is poverty. Child marriage has often been seen as a strategy for economic survival. In situations of severe poverty, a young girl may be regarded as an economic burden and her marriage to a much older man as a means of survival. The situation of children in need of special protection, notably girls vulnerable to sexual abuse and HIV AND AIDS, suggests that early marriage is being used as a strategy to protect girls from sexual exposure (Kamal, 2012:08), or to pass the economic burden for their care to spouses. There are also reports from HIV AND AIDS researchers in Eastern Africa which suggest that marriage is seen as one option for orphaned girls by caregivers who find it difficult to provide for them. Fear of HIV infection, for example, has encouraged men in some African countries including South Africa to seek a young virgin as a wife (Garenne, 2004; Kamal, 2012).

Another factor that has been suggested to be associated with age at marriage in sub-Saharan Africa is the HIV AND AIDS epidemics. Two hypotheses have been postulated in this regard. The first, which appears to be generally accepted, but is not interrogated in this study because it does not form the focus of the study, yet remains relevant, suggests that late age at marriage is a risk factor for the spread of HIV (Stein *et al*, 2007). This is mainly attributed to the role of premarital sex in the spread of HIV. The argument suggests that women who marry late have a long duration of premarital sex which exposes them to the risk of HIV infection (Cleland *et al*, 1987). This suggestion is consistent with a previous study which found that HIV prevalence increased with higher age at marriage (Bongaarts, 2006). This is also supported by the comparatively large HIV epidemics in the South African countries such as Botswana, Swaziland and South Africa where age at

marriage are far higher than countries in Eastern and Western Africa such as Uganda, Kenya, Niger, Mali and Burkina-Faso (UNDP AND UNAIDS, 2011). However, considering the young age at initiation of sexual intercourse and the relatively common and tolerated premarital child bearing in Botswana, Lesotho, Swaziland and South Africa, a high prevalence of HIV among never married women should not be a surprise, which casts serious doubts on the hypotheses that delay in marriage, reduces HIV infection for women.

In contrast, there are also other studies which suggested that late age at marriage could reduce the risk of HIV infection. This is supported by another set of studies which found that HIV prevalence is higher among women who married at a younger age (Clark, 2004; Auvert et al., 2001). One possible explanation for this phenomenon is the likelihood that most women who marry at a young age are married to men years much older than themselves. Such men have been sexually active for a long time and with many sexual partners and perhaps may have contracted HIV in previous relationships. Lack of control in sexual and reproductive decisions by women who marry at a young age was also suggested as one of the most likely reason for greater exposure to HIV infection (Blanc, 2001). This view is also generally accepted especially in patriarchal societies where women have little say on sexuality and reproduction, a characteristic shared by countries with large HIV epidemics in the Southern Africa region (Otiso, 2006). One study found that in these societies, marriage is believed to guarantee women's identity, social standing, recognition, acceptance and economic security (Panday, 2000). However, what is not clear in the literature is, whether or not the fear of risks of HIV infection contributes to the delay in age at marriage and the marriage rate in these societies.

Other studies have noted with concern that marriage is emerging as the most important risk factor for the transmission of HIV which is attributed to lack of knowledge of spousal HIV status (Uganda Aids Commission, 2009; Uganda Ministry of Health/ICF international/CDC/USAID/WHO, 2012); and desire and pressure by men for their wives to bear children (Unge *et al.*, 2011; Mash, 2010;). These findings suggest that women, who perceive the risk of HIV infection to be high in marriage might delay age at marriage, remain unmarried or delay childbearing. However, there is not much evidence in South Africa to support this assertion because of lack of or inadequate empirical studies.

2.2. Fertility

Worldwide, fertility has declined driven mostly by the faster decline in developed countries where fertility is now at or below replacement level. Although fertility transition is now being experienced in nearly all developing countries due to social and economic development, declines in infant mortality, availability and access to contraceptives and other reproductive and sexual health services (Moultrie et al. 2008), in sub-Saharan Africa, with the exception of a few countries in the Southern African region, fertility levels are still high (Farrer, 2010; Machiyama, 2010; Bongaarts, 2002; Bongaarts, 2008;). High fertility is defined as a Total Fertility Rate (TFR) of 5.0 or more children per woman. The TFR represents the average lifetime births per woman implied by the age – specific fertility rates prevailing in one historical period (World Bank, 2010). Countries with high fertility in sub-Saharan Africa include Ethiopia, Burkina-Faso, Mali, Mozambique, Niger, Uganda and Zambia. The reasons for the high fertility in these countries include poverty, cultural factors, early age at first marriage and lower prevalence of contraceptives (UNDP AND UNAIDS, 2011; Garenne, 2004; Caldwell and Caldwell, 2002).

South Africa has experienced the greatest decline in fertility in sub-Saharan Africa (Caldwell and Caldwell, 2003; Sibanda and Zuberi, 1999; Udjo, 2003; Moultrie and Timeaus, 2003), where total fertility rate (TFR) declined from 6-7 children in the 1950s to 3.3 in the 1990s (Moultrie et al., 2008). The total fertility rate for South Africa currently stands at 2.4 children per woman (PRB, 2013). The fertility levels in South Africa vary along racial groups with Whites having the lowest TFR followed by Asians and Coloureds. Blacks have the highest TFR in South Africa. Within South Africa, the

North West province with TFR of 3.3 is one of the provinces with highest fertility since 1996, although it declined slightly to 3.1 in 2001 and 2.4 in 2007. Other provinces with the highest fertility rates are Eastern Cape and Northern Cape with a TFR of 3.7 children per woman (Statssa, 2011; Palamuleni, 2013).

2.2.1 Determinants of fertility in South Africa

Fertility is influenced by proximate and socioeconomic factors. The proximate determinants initially identified by Bongaarts (1978) are proportion of married women, duration of postpartum infecundability, contraceptive use and effectiveness, level of induced abortion and the proportion of women sterile. The socioeconomic and cultural factors, which mediate the effects of the proximate determinants, include level of education, occupation and income and place of residence (Bongaarts, 1982).

2.2.1.1 Proximate determinants of fertility

Marriage is an important proximate determinant of fertility because it increases the risk of conception for married women. Although childbearing takes place even among non-married women, in the absence of contraception, married women do not only bear more children than their unmarried counterparts, but the timing of marriage also determines the duration of reproduction (Amoateng, 2004; Bongaarts and Potter, 1983). As a result, early, enduring and universal marriage has been associated with the high fertility in sub-Saharan Africa (Garenne, 2004; Amoateng, 2004). Fertility decline in South Africa is therefore consistent with the changes that have taken place in the institution of marriage, and it can reasonably be argued that the persistent decline in fertility in South Africa could be partly associated with the changes in marriage patterns characterised by delay in age

at marriage (Amoateng, 2004) and marital dissolution which reduces fertility by reducing the duration of exposure to the risk of pregnancy and reproductive efficacy due to aging (Udjo, 1996; Makiwane, 2004), notwithstanding the widespread non-marital childbearing in South Africa (Naidoo, 2008).

Postpartum infecundability is the period after birth during which a woman remains infertile. This duration is determined by the duration of and intensity of breastfeeding and postpartum sexual abstinence. In societies where breastfeeding is generally prolonged and universal and there are postpartum sexual taboos, the primary determinant of birth interval is the duration of postpartum infecundability. Although breastfeeding is a natural contraception and keeps fertility lower than its biological maximum, the initiation and duration of breastfeeding have declined under pressure of modernization (Weeks, 2012). In South Africa, where breastfeeding was an inherent cultural practice, the practice has been eroded by modernization, prevention of mother to child transmission of HIV (PMTCT), participation of women in labour force, and the widespread use of contraceptives as a more effective fertility regulation mechanism (United Nations, 2002). In addition, HIV positive mothers in South have been given formula for free by government to prevent them from breastfeeding as a Prevention of Mother to Child Transmission (PMTCT) strategy and this reduces the prevalence of breastfeeding mothers. Other women were using both breastfeeding and bottle feeding. In 1998 around 87 percent of the babies were breastfed for at least 24 months (Palamuleniet *al.*, 2007). In South Africa in 2010 the Department of Health adopted the infant feeding strategy in order to reduce the increasing rate of infant mortality in the country. It was discovered that giving the ARVs to the HIV positive mother or HIV - exposed infant can significantly

reduce the risk of transmitting HIV through breastfeeding. The policy emerged from the World Health Organisation guidelines in 2009 which recommended that infants born to HIV positive mothers be exclusively breastfed for the first 6 months to lower the risk of HIV infection. In South Africa, women breastfeed their children for a short time, which is not adequate if contraceptives are not used to lengthen the birth spacing between children.

Postpartum abstinence is perhaps the most important contributor to the duration of postpartum infecundability especially in societies where postpartum taboos on sexual intercourse extend to several months or even to a few years after childbirth. In such societies, postpartum abstinence is based on the perception that sexual intercourse is harmful to either the mother, child or both (Davis and Blake, 1956), or on the notion that pregnancy while breastfeeding could “spoil” breast milk, leading to the premature cessation of breastfeeding, which is harmful to the young child (Weeks, 2012). However, abstinence is no longer used for the same reasons; lately it has been used as one of the HIV prevention strategies and referred to secondary abstinence. Abstinence intervention was meant to encourage young and unmarried individuals to abstain from sexual activities to protect themselves from exposure to HIV and other STIs. The modernized South African women is not likely to be amenorrhoeic because they can use other modern methods to prevent conception, which indicates that they are likely to become pregnant if contraceptives are not used (Setswe and Zuma, 2009; Palamuleni, 2011).

The third proximate determinant of fertility is contraceptive use and effectiveness. Fertility decline may be difficult to achieve without the use of effective contraception. Research has previously revealed that only societies where contraceptive use is

widespread have experienced substantial reduction in fertility (Bulatao, 1984). The underlying rationale for the provision of family planning in South Africa through contraceptive use where the infrastructure of service delivery was already in place was to enable individuals and couples to freely and responsibly decide on whether or not, when and the number of children they want (UNICEF, 2000). The use of contraceptives in the country was not available in the pre modern times. During the apartheid period, government began to support family planning as early as 1960 which was driven by fear of rapid population growth of black people which was perceived to be a threat to the system of apartheid. Around 1980s more than half of South African women were using contraceptives which led to the decline in fertility from 6 – 7 children between 1950 and 1970 to 4 – 5 children between 1980 and 1995. The current declined of fertility rate of the current declined further placed South Africa as one of the first countries to reach the fertility transition at early stage compared to other countries in the Sub Saharan African region. According to PRB (2013), the prevalence rate of contraceptives in South Africa for women aged between 15 and 49 is estimated around 60 percent (PRB, 2013; Mchunu et al., 2012). The high and universal knowledge of contraception in South Africa also greatly contributed to the high prevalence of contraception.

The fourth proximate determinant of fertility is abortion. Abortion is an effective method of fertility control in situations where women do not use contraception or where they experienced contraceptive failure (Shorter et al., 1992). Before the legalization of abortion in South Africa, the country experienced increased risk of deaths and complications arising from unsafe abortion due to unwanted pregnancies (Swaart 2002). Abortion was legalized in South Africa on socio economic grounds in 1996. However,

because of the socio-cultural and moral barriers to abortion in South Africa, the net fertility inhibiting effect of abortion on fertility is unclear or relatively weak. Possibility of legalized abortion in South Africa also has implication for early marriage and early childbearing. It was taboo to have a child before marriage in the past and contraceptives were barely used, as a result some of the marriages were a result of premarital pregnancies which led to early age at marriage and early childbearing. The legalization of abortion has indirectly increased the age at childbearing and marriage since it allows them to terminate the unwanted pregnancies and are not bound or forced to get married (Swartz, 2002).

2.2.1.2 Social and cultural determinants of fertility

Socioeconomic factors play important roles in fertility decline because they influence the proximate determinants in fertility reduction. In societies where fertility has declined substantially, socioeconomic development has been associated with the timing of the onset of the fertility transition. Studies have identified education as one of the socioeconomic factors significantly associated with fertility decline with women who have higher education have low fertility (Bongaarts, 2002; Stillwell et al, 2009). Education opens a wide range of opportunities to individuals through exposure to new ideas, new ways of perceiving and visualizing the world, of advancing decision-making role in the family and reproduction (SARPN, 2008; Dave, 2010). Education influences fertility in four main ways: first it increases the age at marriage (Makiwane, 1997); secondly, it inculcates new ideas, values, aspirations and behaviours which discourage high fertility (Pantelides, 2002; Dave, 2010). Education also increases the opportunity cost of childbearing on women's time for income generation through employment

(Tiefenthaler, 1997); and the cost of children's education depresses the demand for children (Caldwell, 1977; Demeny and McNicoll, 1998).

The second socioeconomic factor influencing fertility through the proximate determinants is women employment. The majority of studies find that fertility declines as income rises because higher incomes increase the availability of substitutes such as savings, insurance and pension schemes for children's economic contributions leading to a fall in the demand for children (Caldwell, 1978; Bulatao, 1979; Kalule-Sabiti et al, 2007). Additionally, higher income improves the nutrition and health of children thereby lowering infant and child mortality (Palamuleni, 2011). In such situation, fertility reduces as a result of increasing interval between births and reduction in the need for child replacement (Dave, 2010). Higher income also increases the demand for quality rather than quantity of children (Becker, 1981). Associated with income and education is the occupation of women. Ideological shift due to ascription from professionalism and participation in paid occupations contributes to smaller family sizes (Kammeyer and Ginn, 1971; Bulatao, 1984; Dave, 2010). This is because working women have other roles other than bearing and rearing children leading to conflict between work and reproduction (Swart, 2002; SARPN, 2008).

Another socio-cultural factor that influences fertility is place of residence. Rural fertility is generally higher than urban fertility (Bulatao, 1984). Urban women have fewer children because of access to better education, a wider spectrum of work opportunities, a more sanguine public health environment, and generally more avenues for self-improvement and social mobility. The age at marriage and childbearing are higher among women in urban areas than their counterparts in the rural areas (Ysong, 1975; Swart,

2002; Adebawale et al., 2012). Women in the urban areas also have more knowledge and easier access to modern contraceptives than those living in the rural areas (SARPN, 2008; White et al., 2008; Adebawale et al., 2011).

2.3. Trends and prevalence of HIV and AIDS.

Globally there were an estimated 34 million people living with HIV AND AIDS; 2.4 million new infections and 1.8 million deaths in 2010. In sub-Saharan Africa alone, the figure was 22.9 and 1.9 million people were living with HIV AND AIDS (PLHA) and newly infected respectively and the death toll from the disease was 1.4 million in 2010 (UNAIDS, 2011). The sub-Saharan Africa region continues to be the most affected by HIV AND AIDS in the world and women are more affected than men, mainly because of early age at sexual initiation and childbearing (UNAIDS, 2003). However, the rate of new infections in sub-Saharan Africa has decreased while the total number of people living with HIV AND AIDS continues to rise. The reduction in the rate of contracting the virus may partly be attributed to the success in reducing infections among young people, while increase in prevalence can be explained by the declines in AIDS mortality due to Antiretroviral treatment (UNAIDS, 2010; UNAIDS, 2011). The adult (15-49) HIV prevalence has increased from 15.9% in 2011 to 18.8% in 2012 and 2013.

South Africa is one of the countries with the largest burden of the HIV AND AIDS epidemic in the world and has the largest Anti-retroviral treatment programme world-wide, which has greatly contributed to stabilizing HIV prevalence in the country more recently (UNAIDS, 2011). The mortality burden as a result of the disease has been ameliorated from the previously high rates by more than one third (Human Science Research Council, 2005; Nicolay, 2008). The national estimates for HIV prevalence among South Africans in 2012 was 12.2% which increased from 10.6% in 2008. Differentials by race indicated that, Black Africans have the highest HIV prevalence rate (15.0%) as compared to other racial groups such as Coloureds (3.1%), Indians (0.8%) and

whites with a prevalence of 0.3%. In South Africa, the study conducted by the Department of Health among antenatal attendees shows that HIV prevalence has also remained high at nearly 30% (Department of Health, 2011). Despite the declining trends of the magnitude and impacts of the epidemic, it is important to mention that HIV AND AIDS has greatly affected South African society in all spheres including quality of health, demographic patterns and livelihood systems at the individual, community and national levels.

At the regional level, the North West province is one of the provinces with a high HIV prevalence in South Africa. HSRC (2014) reported that HIV prevalence in the province increased from 10.3% in 2002 and 10.9% in 2005 to 11.3% in 2008. The HIV prevalence shows no sign of declining in the province as it has increased to nearly 14% at the current period. This was further confirmed by the HIV prevalence among antenatal women in the province which stood around 30.0% between 2009 (30.0%) and 2011 (30.2%). The epidemiological curve for South Africa continues to put females at high risk of infection with an HIV prevalence of 14.4% as compared to 9.9% for males nationally (HSRC, 2014). At provincial level, HIV prevalence among women aged 15-49 years was estimated to be 14.4% in 2002 and 18.0% in 2005, before it declined to 17.7% in 2008. The HIV prevalence in the province slightly increased to 20.3% in 2012 (HSRC, 2014).

At the districts municipality level, Bojanala district was reported to have the highest HIV prevalence among the antenatal women with 34.9% in 2009, however Dr K Kaunda had the highest in 2010 and 2011 with a prevalence of 37.0% and 36.0% respectively. In Ngaka Modiri Molema district where this study was conducted, the HIV prevalence for

antenatal women was found to be at 25.1% in 2009 which slightly increased to 25.9% in 2010. However, in 2011 the HIV prevalence in the district showed a decline of 1.0% to 24.9 % (Department of Health, 2012). About two decades ago projections indicated that HIV AND AIDS would distort the demographic profile of the province by reducing the population aged 20-34. This effect was opined to be as a result of declining fertility from 3.2 in 1996 to 2.6 in 2011; increase in infant mortality rates from 110 in 1996 to 160 in 2011; and a fall in life expectancy at birth from 56.2 in 1996 to 43 years in 2016 (Department of Health, 2009; Department of Health; 2011).

The pattern of HIV infection in South Africa and North West province in particular are similar to elsewhere in sub-Saharan Africa. Heterosexual intercourse is the predominant means of transmission; the most affected population groups are those who are sexually active; economically productive; and mostly women (Onyensoh et al, 2013; Seutlwadi et al, 2012; Nicolay, 2008). However, recent trends suggest a shift of prevalence from the young to older adults aged above 30 years, indicating that progress in prevention efforts among young adults less than 30 years of age is being achieved (SA-Department of Health, 2009). Within these age group, women are generally more vulnerable to HIV infection due to biological, socio-cultural and economic factors which exacerbate their vulnerability to HIV infection and the AIDS disease (UNAIDS, 2004; HSRC, 2005; HSRC, 2014).

It is very important to understand the relationship between HIV risk and marriage. HIV prevalence is higher among women who are cohabiting with a prevalence of 24.3% followed by single (14.3%), widowed (13.8%) then divorced with 12.3%. However,

married people reported a lower HIV prevalence of 10.0% which indicated a lower risk of infection. However, females reported a slightly higher risk of infection of 10.8% compared to 9.8% for males.

Knowledge of various aspects of HIV AND AIDS is very important as it allows for appropriate plan of action in order to prevent new infections and treat those infected. HIV AND AIDS awareness education has been a major component of the strategy to address the pandemic in South Africa (Department of Health, 2005). Knowledge about HIV AND AIDS transmission accompanied by an appropriate reduction of behavioural risks is important in combating and reversing the spread of HIV AND AIDS. For instance, for the period 1998 and 2003, knowledge of HIV AND AIDS was almost universal (Human Science Research Council, 2005). Almost all men (95%) and women (93%) have heard of HIV AND AIDS at the end of 2010 (DoH, 2011).

Although knowledge of AIDS is almost universal in South Africa, knowledge of its prevention and adopting preventive behaviours remain a problem. Limiting sex to one uninfected partner is seen as a method to prevent HIV by 82% for men and 75% for women. Around 75% of women in the North West province agreed that using condom reduces the risk of HIV infection while 76% believe that limiting sex to one uninfected sexual partner reduces the risk of HIV infection (SA-Department of Health, 2009). It is acknowledged that knowledge of personal HIV status and disclosing infection status to sexual partners are important requirement for adopting effective HIV prevention behavior and timely treatment of AIDS (Kalichman and Simbayi, 2004). The questions which this study has attempted to answer are: i) Does perceptions regarding HIV infection in

marriage reduce the marriage rate? Does perception regarding HIV infection delay age at marriage? ii) Does perception of risk of HIV transmission to children during childbearing reduce the number of CEB?

2.4 Theoretical Frameworks

South Africa is a country with the most advanced marriage and fertility transition in sub-Saharan Africa, attributed to similar socioeconomic changes observed in the developed countries. This section discusses some of the theories relevant to marriage and fertility transitions in South Africa. The demographic transition theory provides the main frameworks used in understanding marriage and fertility processes in Mahikeng Local Municipality. The theory suggests that population's mortality and fertility level would decline as a result of social and economic transformations. The demographic transition theory states that societies that experience modernization undergo change. The theory suggests that for women to be developed they need to be empowered, women empowerment include the right to decision making and education. Education may affect the timing of marriage in many ways. When an individual is enrolled in school or college it is not desirable or feasible to marry as it is disruptive. School attendance often gives girl literacy and also exposes her to new ideas which shift her from traditional beliefs and values about early marriage (Ikamari, 2005). In respect of fertility, transition in marriage patterns is a critical dimension in fertility transition from high to low. The Wealth flow theory, the economic theory of fertility, the social psychological theory are some of the theories adopted to elaborate on fertility and the demographic transition, they all emphasized that socioeconomic transformation at societal as well as individual level plays a significant role in the transitions in marriage and fertility.

2.4.1 The wealth flow theory

The Wealth Flow Theory proposed by Caldwell (1976) postulated that fertility is determined by two wealth flow systems operating in two different socioeconomic contexts. The first is associated with “traditional” societies with low socioeconomic status. In these societies wealth flows from the younger to the older generation which encourage couples to maximize the number of children as each child contributes to the parent’s stock of wealth, security and social standing. The second is associated with developed societies where wealth flows from parents to children with parents bearing the responsibility of children’s well-being. This wealth flow system reduces the demand for children as having more children depletes parent’s stock of wealth. Lower demand for children in the socioeconomically advanced societies is achieved either by not marrying, marrying late and or using contraceptives. All these strategies contribute to lowering fertility.

The theory places the population under study in a paradoxical situation because of having both richer and poorer groups. On one end the richer and more transformed ‘modern’ society have adopted new values and responded with delayed marriage, low marriage rates which ultimately lower individual and societal fertility. In this population group the cost of children and their economic value are high and low respectively. On the other hand, the theory remains relevant to the poorer socioeconomic groups which live in the poorer socioeconomic neighbourhoods. In this group, although wealth flow is from younger to older generations, in fact marriage delay and lower marriage rate, which are part of the important predictors of fertility transition, are also observed in these groups. For example single parenthood and consensual unions are higher in this group.

2.4.2 Economic theory of fertility

The economic theory of fertility (Becker, 1960) suggested three related perspectives. First the demand for children depends on the cost of raising children relative to the contribution children will make (Jones et al., 2008). According to this perspective, parents will only have children if the cost of raising children is lower than the benefits children will contribute. The second perspective proposes that children are like other consumer items which parents must budget for and therefore, the demand for children depends on the cost and benefits of alternative goods and services and lifestyles given available and expected resources (Easterlin and Crimmins, 1985). The third perspective is the opportunity cost of childbearing on women's time and is assessed by what women will lose in terms of income through employment (Tiefenthaler, 1997). In this perspective career motivated women will bear fewer children since childbearing is not compatible with engaging in other socioeconomic activities especially employment (Franklin and Tueno, 2004).

In respect to the study population in Mahikeng Local Municipality, the economic theory of fertility is relevant because of the high cost of raising children; the high cost of living in terms of other household demands including food, housing, education and health care; and the drive for women empowerment through education and employment. The impact of these costs contributes directly to lower fertility through contraceptive uptake and indirectly through delayed age at marriage and higher non marriage rates due to longer schooling, change of attitudes, perceptions and values by education, employment and urbanization.

2.4.3 Psychological perspectives

A third theory reviewed in the context of this study is the psychological perspectives which proposed that the demand for children is determined by the actual and perceived positive and negative values of children. Whereas positive values comprise of companionship, continuity of lineage and economic and social security, negative values comprise of high cost of raising children, income lost due to childbearing and poor maternal health among others (Fawcett, 1977).

Regarding the positive values of children, fertility would be high if it were to be determined by companionship, lineage, economic and old age security. The situation of marriage and fertility in South African context, and indeed in the Mahikeng Local Municipality, appears to suggest that the values of marriage and fertility are changing in this population. Early age at marriage and high numbers of children are increasingly being seen as negative values and delayed marriages and fewer children constitutes positive values. On one hand, the changes in the marriage institution could be prompted by changing attitudes and perception regarding the value of marriage and the normal family structure (both parents and children). The South African fertility transition is largely the consequences of changing parental demand for children brought about by changes in economic cost and benefits of childbearing (Cleland et al, 1987).

2.4.5 The synthesis of the effects of the theoretical perspectives

The above theories provide that education, formal sector employment and urbanization are important determinants of marriage and fertility transition. These effects were first observed in marriage and fertility trends of European populations early in the 20th century,

which has been replicated elsewhere in the world especially in South East Asia and Latin American Countries' marriage and fertility transitions in the last few decades. The theories asserted that participation in education is associated with both delayed age at marriage and lower fertility (Brockhoff and Eu, 1993).

The theories suggested that education of women compete with marriage and childbearing and contributes to fertility decline in various ways. i) Education contributes to delaying the age at marriage, decreasing the marriage rate and lowering fertility by increasing the number of years in school thereby increasing age at first marriage and reducing the duration of exposure to childbearing. ii) Education inculcates low fertility values leading to lower number of children desired. iii) Education empowers women to take up contraception as a means of achieving their childbearing desires and achieving their career plans.

The theories also showed that participation in the formal labour sector increases age at marriage and reduce fertility (Bongaarts, 1982) by enhancing career options and increasing the opportunity cost of frequent childbearing in terms of the income that would be lost by women due to childbearing. Differentials in marriage and fertility are also observed by rural-urban residence and neighbourhood socioeconomic status (Goldstein and Goldstein, 1983), which could be attributed to changes in marital behaviour.

Changes in marriage patterns due to the effect of modernization experienced during the demographic transitions also contribute to fertility decline. Evidence in this era showed that delays in age at marriage significantly contributed to the lower fertility experienced in populations undergoing the demographic transitions. The decline in fertility was

attributed to the changes in marriage patterns characterised by delays in age at first marriage, declining proportion of married women and increasing prevalence of marriage dissolutions (Bongaarts and Porter, 1983).

2.5. Gaps identified

The literature and theoretical frameworks reviewed above are relevant and can to some extent explain marriage patterns and levels, differentials and predictors of fertility in Mahikeng Local Municipality. These can be used to address the following gaps in knowledge that have been identified:

- i. Despite the lower level of socioeconomic status among Blacks, there is a significant delay in the age at marriage and increasing proportion of never married marriageable women. The factors motivating the delay in marriage and its fertility decline implications even among less empowered women are not well understood. This study attempts to address this gap by examining the marriage patterns and its fertility implications in an urban area characterised by distinct socioeconomic communities- richer and poorer neighbourhoods.
- ii. Although age at marriage has increased among the socially and economically empowered women, it is still earlier than women in the socially and economically lower status group in Mahikeng Local Municipality. The factors contributing to early marriage among the socially and economically better women are not well understood. This study attempted to understand the differentials of marriage rate, age at marriage and lifetime fertility between communities and identify factors explaining these differentials.
- iii. The literature reviewed showed that there are significant gaps in the understanding of the role of HIV in influencing the marriage rate, timing of age at marriage and lifetime fertility. Particular emphasis on attitudes and perceptions regarding HIV in influencing the marriage rate, the timing of age at marriage and lifetime fertility/CEB is a gap in the understanding of HIV that this study attempted to address. Two main hypotheses are tested in this attempt. These are: “women who perceive the risk of HIV infection

in marriage to be high marry later than women who perceive the risk of HIV infection in marriage to be low or none”; and “women who perceive high risk of HIV transmission to children during childbearing have fewer children than women who perceive low or no risk of HIV transmission to children during childbearing.”

2.6 Conceptual frame work

The conceptual framework explaining the factors influencing the marriage rate/ever married rate, timing of first marriage and lifetime fertility in Mahikeng Local Municipality is presented in Figure 2.1. The relationship outlined in the conceptual framework by the pathways shown was developed based on the literature reviewed and the theoretical frameworks discussed above. The figure lists and illustrates the operation between the background, intermediate and outcome variables of the study. The conceptual framework was adopted from the Bongaarts’ framework which was first introduced by Davis and Blake where term ‘intermediate fertility variables’ was first outlined in the mid-1950s. They proposed a set of two intermediate fertility variables defined as the factors through which, social, economic, and cultural conditions can affect fertility (Bongaarts, 1982; Bongaarts, 2015). This was further developed by Bongaarts which included duration of marriage, effective use of contraceptive methods, induced abortion, and postpartum amenorrhea.

The background factors include three broad groups of variables. These include social variables which comprised of childhood place of residence, education and religion; economic variables which comprised of neighbourhood socioeconomic status and occupation of the women; and cultural factors which referred to race of the women. Other background variables are demographic in nature and they include age cohorts/groups of

the women, age at sexual debut, age at first birth, desired number of children ever born and contraceptive behaviour. The above variables are expected to influence the outcome variables indirectly through the proximate or intermediate variables.

The intermediate variables comprised of HIV related variables including attitudes to HIV testing, attitudes to positive HIV status disclosure and perceived risk of HIV infection in marriage. Also included among HIV variables is the perceived risk of HIV transmission to children during childbearing. Other intermediate variables in regard to lifetime fertility are also demographic in nature and they comprise of age at marriage and marriage rate. The outcome variables are divided into two: The first set are primary outcome variables which include the marriage rate measured as ever married or never married and the timing of marriage measured as the median age at marriage. The second type of outcome variable is secondary variable and this is the lifetime fertility measured as the number of CEB. The intermediate variables are assumed to influence the outcome variables directly and are therefore proximate factors.

Figure 2.1 shows the social, economic and cultural factors that influence attitudes regarding HIV testing and disclosure of HIV positive status. Women who have positive attitudes to HIV testing and disclosure of HIV positive status are more likely to take HIV tests, benefit from timely counselling, receive HIV and AIDS treatment and other support services and reduce the risk of transmitting HIV to their sexual partners and their children. They are also more likely to make informed decisions on whether or not to marry and when to do so; who to marry; and decide on whether to bear children or not, how many children to give birth to and when to do so. In these ways HIV attitudes can greatly affect the marriage rate, the timing of marriage and lifetime fertility of the women.

The social economic and cultural factors also influence the women's risk perceptions regarding HIV infection in marriage and HIV transmission to children during childbearing. Women who perceive high risk of HIV infection in marriage could remain unmarried or delay age at marriage; and women who perceive high risk of HIV transmission to children during childbearing could stop bearing children or reduce the number of CEB. In this way, perception of risks of HIV infection in marriage and perception of risk of HIV transmission to children during childbearing could affect the marriage rate, the timing of marriage and lifetime fertility.

Another set of intermediate variables that can be influenced by the social, economic and cultural attributes of the women are demographic factors. The social attributes such as childhood place of residence and level of education can affect the timing of age at sexual debut, age at first birth and desired number of children which are important determinants of age at marriage and lifetime fertility. Women who are educated, living in a higher socioeconomic neighbourhoods and are working in the formal sector or are students are also likely to marry at an older age, start child bearing at older age and desire fewer children. On the other hand, women who are young at sexual debut are likely to marry at a young age; start childbearing at a young age and have higher lifetime fertility than women who are older at sexual debut and at first birth.

Social, economic and cultural attributes of the women can also influence the marriage rate, the timing of marriage and number of CEB through the effects of age cohorts. This is because women of different age cohorts have different social and economic attributes. For example women in the younger age cohorts are more educated, more knowledgeable

and able to make independent decisions on life events such as marriage and childbearing. Their greater knowledge and decisions making capabilities enables them to marry later or not to marry at all and bear fewer children than women in the older age cohorts, whose marriage and child bearing decisions were strongly determined by the strong patriarchal system prevalent at their time.

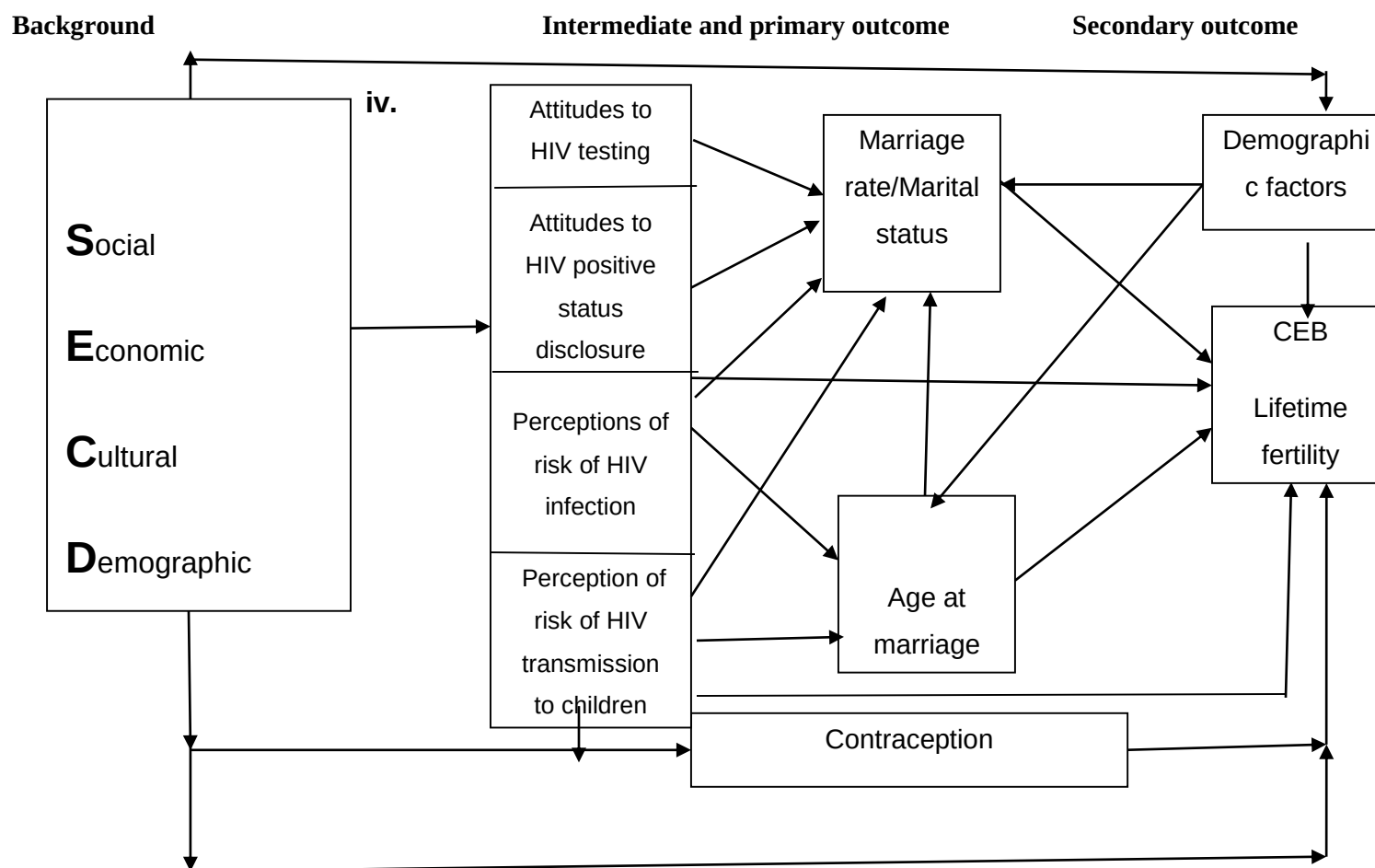
Another way through which social, economic and cultural factors can influence lifetime fertility is through contraception. HIV attitudes and perceptions can also influence lifetime fertility of women through contraception. Women with higher education and in the higher social and economic statuses are more likely to take up contraception as a means to control their fertility by using contraceptives to avoid unwanted and mistimed childbearing than women in the lower social and economic statuses. The level of unwanted and mistimed childbearing is also influenced by racial differences. Black women in South Africa are more likely to experience unwanted and mistimed childbearing than all other races individually and combined. This is because of challenges of accessing contraceptives among blacks, which is also influenced by attitudes towards contraception. Uptake of contraceptives also corresponds to the family size desires of the women which are influenced by social, economic and cultural attributes of the women.

Racial differences do not only influence access to contraceptives, but also risk to HIV infection, which is higher among black women than other races. As a result, being black represents the face of HIV and AIDS in South Africa. The higher risk of HIV infection and unwanted pregnancy among blacks is strongly associated with the family structure among blacks that contributes to the family's inability to perform the socialisation and

child upbringing functions of the family effectively. This is largely because of the large number of incomplete families in South Africa where many children grow up without the active presence of both parents.

The above description of Figure 2.1 clearly illustrates the pathways through which social, economic, cultural and demographic factors operate through a set of intermediate variables to affect the outcome variables of marriage rate, the timing of marriage and lifetime fertility in Mahikeng Local Municipality. The next chapter, Chapter Three, presents the methodologies used in data collection and analysis.

Figure 2.1 Conceptual frame work explaining marriage patterns, timing of marriage and lifetime fertility in the context of a high HIV prevalence



Chapter Three

Methodology of the Study

3.0 Introduction

This chapter presents the methodology used in the study. It specifically describes the study settings, study design and sampling design. Also described in this chapter are data collection methods, the variables on which data was collected and their measurements and data processing procedures. The data quality assessment and analysis methods are also described in this chapter. Ethical issues and how they were addressed and the main limitations of the study are also presented.

3.1 Study setting

3.1.1 Geographical Location

The Mahikeng Local Municipality, where the study was conducted is the Capital City of North West province in South Africa. The province was created after the end of Apartheid in 1994, and includes parts of the former Transvaal province and Cape Province, as well as most of the former Bantustan of Bophuthatswana. The North West Province is situated in the North of South Africa on the South Africa to Botswana border, fringed by the Khalahari desert in the west, the Gauteng province to the east, the Free State to the South and the Northern Cape to the west. The province occupies 8.6% of the total land area of South Africa.

The Mahikeng Municipality is located in the Ngaka Modiri Molema district, which occupies 28, 206 square kilometers of the land area of the North West province with a total population of 842 699. Ngaka Modiri Molema is among the 4 districts in the North West Province. The other three districts include Bojanala Platinum, Ruth Mompoti (Bophirima) and Dr Kenneth Kaunda (Southern). The district has 5 local municipalities which are; Ratlou (104,322), Tswaing (114,150), Mahikeng Local Municipality (259,478), Ditsobotla (147,596) and Ramotshere (137,439). The study is based on the Mahikeng Local Municipality which is located in Mahikeng the capital city of the North West Province. Mahikeng is the seat of the Provincial Legislature in which the majority of the National State Departments regional offices are located. Nestled next to the Botswana border, Mahikeng is a 3-hour drive from Johannesburg and about 294 km from Pretoria. The Municipality is a considerably big local municipality as compared to other four local municipalities located within the area of jurisdiction of Ngaka Modiri-Molema District Municipality. The total area of the Mahikeng Local Municipality is approximately 3, 703 sq km. It is divided into 28 wards consisting of 102 Villages and suburbs (Statssa, 2013).

3.1.2 Economic settings

Mining is the main contributor to the North West province's economy. The province is leading in the production of platinum; it also produces crops like maize, tobacco and paprika which are grown as cash crops. The province has agricultural, mining and eco – tourism opportunities among others. The unemployment rate of the Province is approximately 30%, about 35% of the population are illiterate while more than 60% of the population are living below the poverty line. The Mahikeng local municipality's

unemployment rate is 35.7% with youth unemployment rate (15 – 34 years) of 47.10%. Around 10% of the population in the municipality has never been to school (Statssa, 2013).

3.1.3 The Population size, structure, composition and characteristics.

The North West province has a total population of more than 3.6 million which is around 7% of the total population of South Africa, with more than 60% of people living in rural areas. Majority of people in the province are Black/ Africans accounting for more than 90%, mostly of the Tswana speaking stock. Smaller groups include Afrikaans, Sotho, and Xhosa speaking people are also available in the province. English is spoken primarily as a second language. Most of the population belongs to Christian denominations. About 52% of the populations are females and 32.9% are young people aged 10-24 years. Of these 3.6 million people in the province, 842, 699 people resides in the Ngaka Modiri Molema local district municipality, with blacks accounting for more than 94% (Statssa, 2013).

3.1.4 The Population structure of Mahikeng Local Municipality.

The population of the Mahikeng local Municipality is estimated at 291, 527 people with about 84, 239 households. About 30.8% of the population in the municipality are aged less than 15 years, 64.4% between 15 and 64 years while population aged 65 years and over comprise only 4.8%. The sex ratio for the municipality is estimated to be 94.5 males per 100 females with a population growth rate of 1.16% per

annum (Statssa, 2013; NWDC, 2014; Walmsley & Walmsley, 2002).

3.2 Study Design

This was a cross-sectional study which collected retrospective and current status data from women of childbearing age (15-49 years). A quantitative method was used in this study because of its proven capability and effectiveness in collecting measurable data necessary for developing quantitative indicators (Haider and Birley, 1999; Goddard and Melville, 2001). Data were collected from the women to assess their knowledge, attitudes, perceptions and behaviour on marriage and fertility. This information is important for identifying indicators that can be used to examine marriage patterns and fertility behaviour in the context of HIV AND AIDS.

3.3. Sampling Design

Sampling design type and procedures are important in determining the validity and generalizability of results obtained from all sample surveys. It is particularly necessary for assessing the robustness of samples for multivariate analyses (Israel, 1992). The sample for this study was selected from the total number of women population aged 15-49 years who live in the Mahikeng Local Municipality. Restriction to women aged 15-49 years was necessary because women in this age segment are in the active years of reproduction, susceptible to marriage, childbearing and HIV and AIDS. Assessing the marriage, fertility patterns, perceptions and behavior of such women in the context of HIV AND AIDS could provide better understanding of marriage dynamics and fertility in the era

of HIV AND AIDS. It also had the mechanisms of revealing whether marriage and fertility rates followed an increasing or downward trend.

3.3.1 Sample Size

In order to ensure representativeness of the data, sample size for this study was estimated using Cochran's sample size equation (Cochran, 1963). Cochran's equation takes into account the level of precision, sampling error, confidence level and the degree of variability. A confidence level of 95% was used in this study because of its reliability in assessing the statistical significance of the results. The sample size was based on information on the total number of women in the Mahikeng Local Municipality which was estimated at 68,608 in 2011 (STATSA, 2002). The Cochran's equation is as shown below:

$$n_0 = \frac{Z_{\alpha}^2 \times p \times q}{e^2} \quad 3.1$$

Where: n_0 is the sample size; $Z_{\alpha}^2 = 1.96$ (is the value of a coordinate on the horizontal axis which is known as the X- axis, the abscissa determines how far the straight line is from the Y – axis); e is the level of precision; p is the estimated proportion of women aged 15-49 in the study area. The study used proportion for women aged 15 – 49 as it is the targeted population in the study (STATSA, 2008) and $q=1-p$ Therefore, the sample size was calculated as follows:

$$\begin{aligned} n_0 &= \frac{(1.96)^2 (0.5) (1- 0.5)}{0.05^2} \\ &= \frac{(1.96)^2 * 0.25}{0.0025} = 384 \end{aligned}$$

The calculated sample size was found to be 384. To correct for the deviation in design, the calculated sample size was multiplied by the design effect of 1.5 which was selected in order to adjust for the statistically representative sample size (Israel, 2009), that is: $n_0 * 1.5 = 384 * 1.5 = 576$. The sample size was further multiplied by 5% to account for contingencies including non-response or recording error (Salganik, 2006). The total sample size was then found to be 605.

3.3.2. Sampling Procedures

A multi-stage sampling procedure was used to select the eligible respondents in the study area. At the first stage of sampling, the stratified sampling technique was employed where neighbourhood socioeconomic status was used as the stratification criterion to select wards. This criterion stratified sampling areas into two, namely the richer and poorer socioeconomic neighbourhoods of Mahikeng Local Municipality. Based on this criterion, 20% each, which is approximately 6 wards in the richer and poorer settings of the Mahikeng Local Municipality were selected. The aim was to capture a larger number of eligible women with a minimum sampling error and to achieve a more representative sample (Sarantakos, 1998) of women in both socioeconomic divides. From richer and poorer neighbourhoods areas, 3 wards each were selected by use of simple random sampling after compiling sampling frames of wards. The poorer socioeconomic neighbourhoods include the following wards: 1,3,4,5,11,14,15,16,17,18,19,21,22,23,26,27,28. The richer socioeconomic neighbourhoods include the following wards: 2,6,7,8,9,10,12,13,25,20,24.

Wards 6, 9, and 12 were selected from the richer stratum and wards 19, 22 and 28 were selected from the poorer stratum.

At the second stage, using the same sampling techniques, 20% of Enumeration Areas (EA) was also selected from each ward, implying that 3 EAs were selected from the 15 EAs in each ward bringing the total number of wards to 9 each in the poorer and richer areas making a total of 18 wards in the whole study. Poorer EAs included Magogwe TA, Magogwe Tlhabologo, Setlopo, Dithakong East, Dithakong west, Dithakong South, Signal hill, Longley Park, and Borola Tuku; and richer EAs included in the study are Montshiwa – extension 38, Wimpy – Kegomoditswe flats, Unit 1, Rivera park, Danville, Golf view, unit 12, unit 14 and unit 15.

At the third stage 34 households were selected from each EA using the systematic sampling procedure after listing all households in each EA. The systematic procedure involved the construction of sampling frame which included the list of all the households in each of the selected EAs. A random sampling method was used to select the first household among the first k^{th} household in the lists. This household was used as a random start (the beginning of the selection interval). Other households were thereafter selected into the study at the end of every k^{th} interval. In households where 2 or more eligible women were found, the respondent was chosen among the women using lottery method. In cases where there were no eligible respondent in a household or non-availability during the survey, that household was omitted and replaced

with the next household as recommended by De Vos et al (2005) and Bless and Higson-Smith (2000).

3.4 Data collection instruments and procedures

The type of data collection instruments and procedures are important determinants of the quality of data, which is the basis of all scientific inquiry and conclusions thereof. In this regard, a structured and mostly pre-coded questionnaire was used to collect the data. The structured questionnaire is the commonly used method of data collection in cross-sectional studies (Mann, 2003). This is because of its relevance and effectiveness in collecting retrospective and current status data. The questionnaire included demographic, socioeconomic and HIV AND AIDS variables. Most of the questions were adapted from the 2003 South African Demographic and Health Survey (SADHS). The questionnaire was pre-coded and translated into Tswana (The questionnaire is attached as Appendix 1). This is because most of the inhabitants of Mahikeng Municipality are indigenous Tswana. Back to back translation was done to ensure that the original meanings of the questions were not lost and for easy understanding of some of the important variables.

3.4.1 Description of variables

The variables in this study are classified into two, these are; the dependent and independent variables. The measurements of these variables are described below.

3.4.2 Dependent variables

Three dependent variables were studied. The first was ever married, which was defined as the proportion of women who are ever married as category “1”. The second category is the non-married woman, which was defined as women who have never entered a sexual union, which was categorised as “0”. The ever married category comprised of currently married/living together and formerly married (separated, divorced and widowed). Women who were living together like married couples were grouped with married women to be currently married as they are exposed to the same risks, for instance, they are exposed to the risk of childbearing as well as the risk of contracting sexual transmitted infections such as HIV. The second dependent variable was the timing of marriage. The variable was first collected as a continuous variable. This variable was later used to estimate the median age at marriage. Another dependent variable used in this study was lifetime fertility which was measured as the number of children a woman had ever given birth to (Children Ever Born (CEB)) at the time of the survey. Data on the number of children was collected as a discrete variable which was later grouped during data analysis as: “0” for women who had no children; “1, 2, 3, 4+”. Data on CEB was grouped into high and low fertility. In this regard, women with less than three children (0-2) are regarded as having low fertility and coded “1” and used as the event category and women who had three or more children were regarded as having higher fertility and was coded as “0” and used as the reference category.

3.4.3 Independent variables

The independent variables included were demographic and socioeconomic factors and perception of the women on a number of HIV and AIDS related issues. The demographic

data collected were age which was collected as a discrete variable but later categorised into seven 5 year intervals and into 15-24, 25-34 and 35 or more; age at first sex was collected as a discrete variable. However, those who never had sex were assigned code zero. This provided ground for the re-grouping of the variable as never had sex, had sex at ages under 18 years and had sex at 18 years or older. Age at first birth was also collected initially as a discrete variable and later categorised as had not given birth, gave birth at less than 18 years, 18-24 and 25 or more years. Other independent variables included; number of children desired which was also collected as a discrete variable but was later categorised as; desired no children “0”, desired only “1”, “2” and “3” or more children; and CEB which was grouped into “0”, “1”, “2”, “3” and “4” or more children.

The socioeconomic variables collected included; race categorised as Black Africans, Coloureds, Asian and Whites; childhood place of residence categorised as rural and urban; and neighbourhood socioeconomic status categorised as richer and poorer. Data were also collected on the highest level of educational attainment which was categorised as no/primary (combine due to smaller proportion of respondents in both categories), secondary and tertiary education. Additionally, data were collected on religious affiliation which was categorised as Christian, Traditionalists and other (minority religious groups including Muslims, Hindu and Sheikh). Data was also collected on the type of employment/occupational sectors the women were engaged in and were categorised as students regardless of age, formal sector and informal sector. Women who reported that they were not working were included as informal sector workers as they were regarded to be working as house wives. These variables are regarded to have important impacts on marriage and fertility.

Furthermore, data on women's HIV attributes were analysed to understand how HIV may affect marriage patterns and fertility. The data collected included attitudes to HIV testing categorised as positive and negative; attitudes to HIV positive status disclosure to spouse or sex partners; perceived risk of HIV infection in marriage categorised as high and low or no risk; and perceived risk of HIV transmission to children categorised as high and low or no risk.

3.5 Data quality assurance

Data quality is important for the validity and integrity of data collected, data analyses, and policy implication of the study. In this regard several data quality assurance procedures were implemented during this study. These included:

3.5.1 Training of the research assistants

Data collection was done by 9 research assistants who could speak both English and Tswana fluently. They were provided by Statistics South Africa Mahikeng provincial office, based on their experience and expertise in gathering similar information in the study area in the past. The research assistants (Enumerators) were trained by Statistics South Africa on data collection techniques. In addition, the research assistants were inducted for 3 days at the North West University, Mahikeng Campus by the researcher to update their skills as well as understand the study instrument. The training was conducted by the researcher and comprised of reviewing of the questionnaire, sessions on interviewing techniques, survey administration and how to complete the questionnaire. Also, smaller sessions were held to observe how the research assistant can administer the questionnaire to the respondents in local languages. The training included role plays to sharpen their skills and understanding of the questionnaire.

3.5.2 Pre-testing of questionnaire

The pre-testing of the study questionnaire was conducted in a different location outside the study area in order to assess the cultural appropriateness and also to identify any potential problems with the questionnaire design. Two enumeration areas were randomly selected, one urban and one rural and a total of 50 respondents aged 15-49 years were used during the pre-test exercise. The results of the pre-test were used to improve the quality of questionnaire, internal consistency, its reliability and validity. The pre-test also helped to familiarize the data collection enumerators with the questionnaire, data collection procedures and possible challenges they might encounter during the actual survey.

3.5.3 Supervision of administration of field work

Administration of field work was supervised by the principal researcher who doubled as the supervisor and field work data editor by ensuring that appropriate EAs were selected, distributed questionnaires, provided technical backstopping and checked questionnaires after completion. Editing of questionnaires for completeness and internal consistency was done in the field, office and later during data entry by the researcher. Questionnaires that were incomplete and inconsistent were returned for correction at the household where the interview occurred. All records of questionnaires were pre-coded for easy identification of household in each household if there was need for offsetting information in the questionnaires in the field.

3.5.4. Data entry

Data entry was guided by the researcher to ensure accuracy. This was done by research assistants after coding review. Data coding was done by the researcher to update all edited

responses that were not included in the initial pre-coded questionnaire. Epi-Data software was used for the data entry, which compared to other data entry programmes such as SPSS and STATA. These software packages have check and control abilities that greatly help to minimize errors during data entry. Data cleaning was also done after data entry to make necessary corrections, especially of values and outliers in data recode files using the original questionnaires.

3.6 Response Rate.

Overall, 92.2% of questionnaires were completed. As indicated in Table 4.1, the response rate was slightly higher in urban areas than rural areas. Call backs to increase response rate to 100% were unsuccessful.

Table 3.1 Response rate by type of ward

Type of residence	Wards	Questionnaires issued	Completed	Not completed	Completion Rate (%)
Urban	6	105	99	6	94.3
	9	105	103	2	98.1
	12	105	102	3	97.1
Sub total		315	304	11	96.5
Rural	19	105	97	8	92.4
	22	105	87	18	82.9
	28	105	93	12	88.6
Sub total		315	277	38	87.9
Total		630	581	49	92.2

3.7 Data Analysis

Data analyses were carried out with the use of SPSS version 22. The analyses were conducted at three levels: these are; univariate, bivariate and multivariate analyses.

Detailed description of data analysis procedures are discussed in the following sub-sections.

3.7.1 Univariate Analysis

Univariate analysis was used to describe the profiles of women by selected demographic, socioeconomic and HIV characteristics. This was done by use of frequency distributions to assess the structures of the data for bivariate and multivariate analyses. Variables which were found to have few cases in each category of variables were regrouped to create more robust categories for analysis.

3.7.2 Differentials and predictors of marital status

In order to achieve the aim on differential and predictors of marital status and fertility, bivariate and multivariate analyses were used.

3.7.2.1 Bivariate analyses

The bivariate analysis was used to examine two aspects of marriage patterns namely, marriage rates and timing of marriage and fertility levels using CEB. This was done as preliminary step to assess the generalizability of the findings from the sample used in the research to the study population (Bless and Higson-Smith, 2000). The first was the use of Chi-square statistic to assess the association between marital status and the individual demographic, socioeconomic and HIV characteristics of the women. The Pearson's Chi-square (χ^2) statistic was chosen because the dependent and independent variables are categorical. The Chi-square statistics is a non-parametric test used to assess the level of association between an independent and a dependent categorical variable (Bless et al, 2006). Chi-square test was done at 95% confidence interval with the level of significance set at 5% (0.05). The Chi-square model used is of the form:

$$\chi^2 = \sum_{i=1}^i \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \quad 3.2$$

where:

O_{ij} is the i th observation of the j th item; and E_{ij} is the i th expected value of the j th item. The decision rule was used to reject the null hypothesis in favour of the alternative if the p-value was less than 5% ($p < 0.05$).

The null hypothesis for the Chi-square test states that there are no differences between the observed and the expected frequencies. The alternative hypothesis states that there are significant differences between the observed and the expected frequencies. The alpha level, which is a measure of significance, was set at 0.05 indicating that the maximum probability of committing type one error is 5% i.e 95% accounts for the association between the dependent and independent variables, while the remaining

5% was left to chance. If the p value is higher than 0.05, it was concluded that there were no differences between the observed and expected frequencies and the null hypothesis was rejected and the alternative hypothesis was accepted (Key, 1997; Bless and Kathuria, 1993).

3.7.2.2 Survival Methods

The second bivariate analysis was to estimate the median age at marriage and this was estimated by the use of survival analysis because it requires the inclusion of all women in the study sample regardless of their marital status at the time of interview. Women who had not married at the time of the study were censored because these women were expected to marry at some time in the future or were at the risk of marriage even after the interview. Also, those who did not reveal their marital status were censored because their marital status could not be determined. In addition the method is appropriate for estimating the effects of other time varying covariates of women such as age, level of income, place of residence, neighbourhood socioeconomic status and education, which may impact on the probabilities of marrying as they change over time.

The Kaplan-Meier survival function was used to estimate differentials in the median age at marriage for women with different demographic, socioeconomic and HIV characteristics. The Kaplan Meier estimator takes the form:

$$\hat{S}(t) = \prod_{t(i) \leq t} \frac{n_i - d_i}{n_i} \quad 3.3.$$

where:

n_i is the number of women at risk for the event at time $t_{(i)}$; d_i is the number of events (marriages) observed at time $t_{(i)}$; $(n_i - d_i)/n_i$ is the conditional probability of surviving past a given time $t_{(i)}$ given survival to that time.

The log rank Chi-square test was used to statistically compare survival curves between the groups. The log rank test (Q) takes the form:

$$Q = \frac{(\sum_{i=1}^m d_{1i} - \sum_{i=1}^m \hat{e}_{1i})^2}{\sum_{i=1}^m \hat{V}(\hat{e}_{1i})} \quad 3.4$$

where: n_i is the total number of women at risk; d_i is the total number of women who experienced the event in both groups; $\hat{e}_{1i}$ is the expected number of women who married at time (t); V is the variance of $\hat{e}_{1i}$.

3.7.2.3 Multivariate analysis

The multivariate analysis was used to identify the predictors of marriage status by using binary logistic regression model. This form of analysis was chosen because the dependent variable is dichotomous or binary which follows a Bernoulli distribution and was coded “1” if the women are ever married and “0” if the women are never married. The combination of women who are currently married/living together and those formerly married as ever married in this study was as a result of the small proportion of formerly married in the study sample. The occurrence of marriage was estimated by examining the log odds for every unit change in the independent variables. The binary logistic regression model used in this analysis took the form below:

$$\text{Log}_e \frac{p_i}{1-p} = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_n X_{ni} + \epsilon_i \quad 3.5$$

where: p is the proportion of women in the sample who ever married; $\beta_1, \beta_2, \dots, \beta_n$ are parameters that were estimated and $X_1, X_2, \dots, X_n$ are the independent variables.

The exponential of the Beta coefficient ($\text{Exp } \beta$) is the ratio of odds associated with being married. At the sectionalized models, which are developed to assess the association of variables in each group with marital status, are included in the model. However, at the final model, only independent variables that were significantly associated with marriage status ($p < 0.05$) at the group level multivariate analysis are included in the multivariate model.

3.7.2.4 Cox Proportional Hazard Model: Risk Factors of Marriage Rates

Additionally, the Cox proportional regression model was also used to identify the significant risk factors of marriage using 4 models. The 4th model was used to identify the risk factors of marriage after controlling for all selected explanatory demographic, socioeconomic and HIV variables simultaneously. In the Cox Proportion Hazard model, the status variable is marital status and the time variable is time to marriage measured by age at marriage (t) represented by $h(t)$ which, is the probability of surviving up to a given age before marriage. The model was of the form:

$$h(t) = \frac{f(t)}{1 - F(t)} = \frac{f(t)}{S(t)} \quad 3.6$$

where

$F(t)$ is the cumulative distribution of survival time and $S(t)$ is the survivorship. To this end, the hazard function for the Cox Proportional Hazard model, conditional on covariate vector $\mathbf{X}$ (i.e. explanatory variables), takes the form:

$$h_i(t | \mathbf{X}) = h_0(t) \exp(\beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k) \quad 3.7$$

where

$h_0(t)$ denotes the baseline hazard function at that time - no particular form of probability distribution was assumed; $\beta_1, \beta_2, \dots, \beta_k$ represents exponentiated

coefficients, while $X_1, X_2, \dots, X_k$ are vectors of covariates (potential predictors) which are assumed to act additively on $\log h_i(t | \mathbf{X})$.

3.7.3 Current Fertility

In order to measure current fertility, the study employed Total Fertility Rate (TFR), defined by Preston et al., (1997), as the average number of children who would be born to a cohort of women who survive to age 50 according to the rates of childbearing of a particular period. A TFR which is defined in this manner is computed by summing Age Specific Fertility Rates from the age 15 to 49 years. Yadava and Kumar (2011) who regards Total Fertility Rate as the most popular index of fertility argues that it gives an idea about the average completed family size of a female during her entire reproductive span ignoring her mortality up to that period.

In this study TFR was estimated from the Parity Progression Ratios (PPRs) expressed as TFR_{PPRs} instead of the convectional Age Specific Fertility Rate denoted as TFR_{ASFR} . As pointed out by Retherford et al (2006), ASFRs are not the ideal measures of TFR as the decision for a woman to have the next child does not depend on her age. It does not reveal the proportion of females in that population who after having a specified number of children do not proceed to have the next birth (Yadava and Kumar, 2011).

Parity Progression Ratio (PPR) is referred to as the chance a woman would have to proceed to the next parity after giving birth to the first child i.e. having an additional child in the future (Retherford et al. 2006, Yadava and Kumar, 2011). A PPR is calculated from a life table by subtracting the proportion surviving at the end of the life table from one, yielding the proportions who fail by the end of the life table. Once

the PPRs have been calculated using the life table method, TFR is calculated from the PPRs as:

$$TFR = \frac{\sum_{i=0}^0 P_i + \sum_{i=1}^1 P_i + \sum_{i=2}^2 P_i + \sum_{i=3}^3 P_i + \dots + \sum_{i=6}^6 P_i + \sum_{i=7}^7 P_i + \sum_{i=8}^8 P_i + \sum_{i=9}^9 P_i}{1 - P_{9+}} \quad 3.8$$

The term ${}_0P$ is the expected number of first births; the term ${}_1P_i$ is the expected number of second births, and so on” (Retherford et al., 2006; Preston et al., 2001).

3.7.4 Estimation of mean parities

One of the outcomes of the study is estimating the lifetime fertility of the women, which was measured by using the average number of children ever born, usually known as Mean Parity. Differentials in mean parity by selected demographic, socioeconomic and HIV characteristics were estimated. The reported number of children ever born shows the cumulated fertility for women up to their ages at the time of enumeration.

Mean parity was computed using analysis of variance (ANOVA) which is referred to a statistical procedure used to test the degree to which two or more groups vary or differ, and the computational mode was dividing the CEB of women in a specific age group by the number of women in that age group.

3.8 Limitations of the study

This study may have been affected by a number of limitations. Firstly, most variables on sexual and reproductive behavior and HIV have legal, social and cultural implications which may have affected the quality of data collected. Some respondents are therefore likely to have incorrectly reported data on some of these, thus leading to systematic biases in their estimation and their effects. Secondly, respondents may

easily fail to accurately determine the timing of some of the events such as age at marriage/timing of living together and birth of children especially if these events happened long time ago or the children have died. Thirdly, this study adopted a cross-sectional design. Unfortunately, cross-sectional designs suffer from the estimation of time dependent variables leading to inaccurate estimation of the timing of events such as marriage, which is one of the main outcomes of this study. Additionally, the cross-sectional nature of the study makes assessment of the temporality of the characteristics of the respondents and their effects on marriage and fertility behaviour difficult. Finally, some respondents were not cooperative during the data collection process leading to refusals of some chosen subjects and thus caused some disruption in the sampling frame. Also, the sample size of this study was biased by the large proportion of the Black community in the sample. This is because the community investigated in this study is predominantly black. The dismal number of Coloureds, Asians and Whites in the sample makes the comparative analyses of marital status and fertility behaviour along racial lines rather difficult.

3.9 Ethical Issues

The study was approved at both departmental (Population Training and Research Unit -POPUNIT) and faculty (Human and Social Sciences Higher Degrees Committee) levels before referral by the North West University ethics committee for scientific projects with human participants. Permission to conduct the research was obtained from the Department of Social Development, Department of Health and Premier's office of North West Province. The Mayors and Councilors of Mahikeng Local Municipality and chiefs of selected wards were consulted and requested to support the study.

Informed consent was obtained from study participants after explaining to them the study objectives, purpose and processes of the study. All participants were legally and psychologically competent to give their consent. Furthermore, the respondents were assured that there are no direct benefits attached to the study and that the study is only for academic purposes. Participants were assured of their confidentiality and anonymity. Respondents were asked to participate voluntarily and were also made aware that they could discontinue the study if they so wished with no consequences.

CHAPTER FOUR

MARRIAGE RATE, DIFFERENTIALS AND PREDICTORS

4.0 Introduction

In the sub-Saharan African traditional society, marriage was early for women, universal and enduring (van de Walle, 1968; Lesthaeghe, 1989). In South Africa, this early and universal pattern of marriage was also observed until recently (Budlender et al., 2004; Makiwane, 2004). Divorce, especially among the black population was low and cohabitation was discouraged. Premarital and extramarital childbearing were also discouraged. However, recent trends have indicated that the proportion of women not marrying and marital dissolution have increased in South Africa (Palamuleni et al. 2007; Udjo, 1996; STATSSA, 2011), indicating that the institution of marriage is in transition.

A study by Palamuleni (2010) using national data of 1996, 2001 and 2007 shows that the marriage rate in South Africa declined from 35.2% in 1996 to 30.6% in 2001 and 27.6% in 2007. In the North West province, the marriage transition is characterised by increasing proportion of women remaining single, late marriages, increasing rate of marital dissolution and increasing proportion of women in cohabitation (Palamuleni et al, 2007; Kalule – Sabiti et al, 2007).

Previous studies have identified education and employment as the main predictors of changing marriage patterns elsewhere. The high prevalence of HIV in some sub-Saharan African countries, including South Africa has also been presented as a plausible factor influencing marriage patterns. However, little or no investigations to explain marriage patterns have been conducted in the study population. In this study it is postulated that attitudes and perceptions regarding HIV are some of the factors contributing to the marriage patterns in Mahikeng Local Municipality which is a

predominantly urban area. This chapter therefore presents data on the marriage rate, differentials of women by marital status which was defined as ever married and never married and predictors of marital status in the Mahikeng Local Municipality. Never married comprised of women who have never joined a culturally and legally sanctioned sexual union while ever married women comprised of those who are currently married, separated, divorced and widowed.

4.1 Socioeconomic differentials

This section describes the socioeconomic differentials in marriage patterns by racial groups, highest level of education, childhood place of residence, neighbourhood socioeconomic status, religion and occupation. These variables were selected because they are expected to influence marriage patterns.

4.1.1 Racial groups

There is evidence suggesting that marriage rate has declined in South Africa since the 1960's (Harrison and O'Sullivan, 2010). This phenomenon has come to be known as marriage flight. The decline in marriage rate is higher and more prominent among Black women, although this phenomenon has also been observed among Coloureds, Asians and Whites. Before the marriage "flight" marriage in South Africa was early and nearly universal (Budlender et al., 2004; Makiwane, 2004). Although the reasons for marriage flight have not been widely investigated, the changing economic situation, especially among blacks could have contributed to this phenomenon. The change in the medium of paying bride price "*lobola*" from cattle to cash could also have added to the changing marriage dynamics among blacks in South Africa. Bride price is widely regarded as a requirement which must be complied with before marriage can be sanctioned in most African cultures. This requirement has not changed much even with increasing rate of modernization. Wilson (1987) attributed

the increasing proportion of unmarried but marriageable black women in South Africa to a fall in the supply of marriageable men. This shortage appears to affect marriage probabilities of more educated, working and independent women.

In this study race is categorised as Black, Coloureds, Asian and White and the results are presented in Table 4.1 (in page 89). The table shows that Black women are the majority comprising of nearly 82% and Coloureds, Asians and Whites comprise of only 11.4%, 4.6% and 2.3% respectively. The smaller proportion of the other races is expected because of the racial composition of the North West province, which is predominantly black.

Differential of ever married women by race in Figure 4.1 over a third of blacks (34.1%) are ever married compared to 51.7% of coloured; 60.7% of Asians and 42.9% of whites. The results show that coloureds, Asian and Whites are more likely than Blacks to have been ever married. Race and marriage status were significantly statistically associated, with $X^2= 23.2$; $p=0.000$.

Figure 4.1 Percentage distributions of women by marital status and race

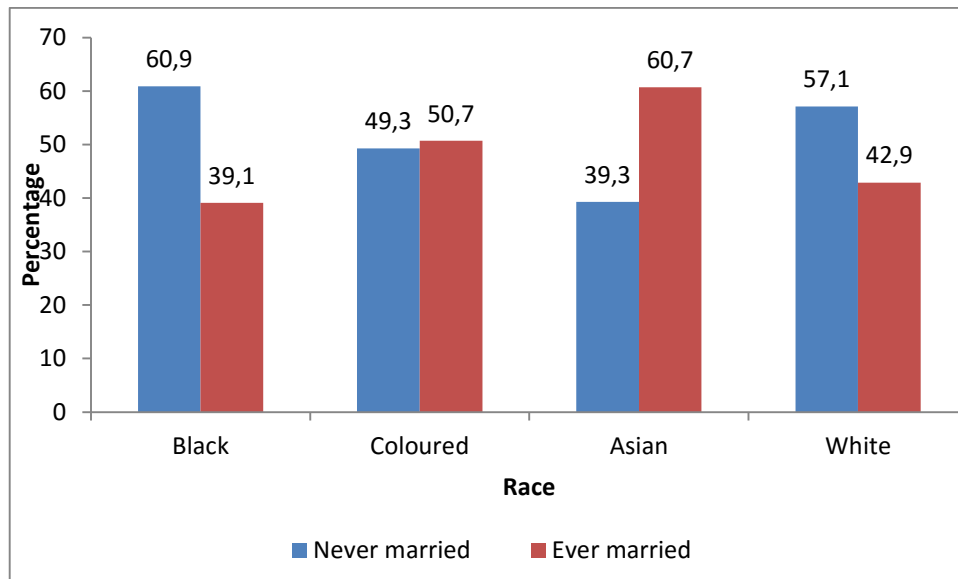
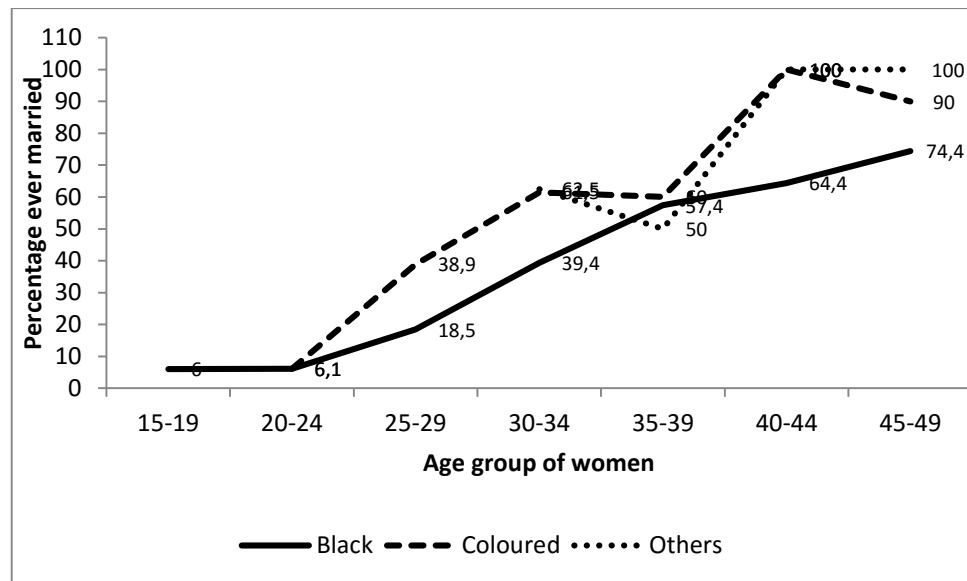


Figure 4.2 shows the distribution of ever married women by current age and race. The Figure shows that Blacks, compared to coloureds and other races (Asian and Whites) enter marriage in the 15-19 age groups. The proportion ever married black women also increase monotonically with age until age group 45-49. Coloureds on the other hand, enter marriage from the 20-24 age group and follow a similar age pattern in marriage as black women. Whites and Asians however, start marriage later in the 30-34 year age groups and have a similar age pattern of marriage as coloureds.

Figure 4.2 Percentage distributions of ever married women by current age and race



4.1.2 Childhood place of residence

Urban-rural differences have contributed to differentials in marriage patterns in most sub-Saharan African countries. As a result of the differences, population processes which are influenced by marriage patterns such as fertility are also different. Most sub-Saharan African countries have predominantly rural populations where marriage rates are high, early in teenage, nearly universal and persistent. This is because premarital sexual intercourse and childbearing, which are risks associated with delay in marriage were prohibited in sub-Saharan Africa (Kalule-Sabiti et al., 2007). However, the increasing process of modernization and other forces of social change, which have led to the adoption of lifestyles and attitudes that delay marriage and tolerate extra marital childbearing, has increased, mostly in urban areas of sub-Saharan Africa. These practices have been noted to be much higher in South Africa, where the majority of the population is now urbanised. This could be attributed to the differences in the cost of living; greater level of independence for women; higher levels of education; and a break down in the cultural values that encourage marriage.

Differentials in marriage patterns by childhood place of residence and neighbourhood socioeconomic status are presented in Table 4.1. The table shows that majority of the women, nearly 65.8% lived in rural areas in childhood and only 34.2% lived in urban areas in childhood. Differentials in marital status by childhood place of residence show that the proportion ever married is higher among women who lived in rural areas in childhood (37.4%) than urban areas (25.6%). About 74% and nearly 63% of the women who lived in urban and rural areas in childhood are never married respectively. Childhood place of residence was statistically significantly associated with, marriage with $X^2= 8.5$; $p=0.002$.

4.1.3 Neighbourhood socioeconomic status

Table 4.1 also presents the distribution of women and differentials in marriage rate by neighbourhood socioeconomic status. The table shows that nearly 52% and 48% of the women in the study are living in the richer and poorer socioeconomic neighbourhoods of Mahikeng Local Municipality respectively at the time of the study. Differentials in marriage rate by neighbourhood socioeconomic status show that 27.5% of the women in the poorer socioeconomic neighbourhoods are ever married compared to nearly 38.9% of those living in the richer socioeconomic neighbourhoods. Socioeconomic neighbourhood status is statistically significantly associated with marriage rate ($X^2= 9.8$; $p=0.003$).

4.1.3 Level of education

The level of educational attainment has been identified as one of the most important factors influencing marriage patterns world over. This is because it affects the probability of getting married, marriage dissolution and remarriages. Evidence in sub-Saharan Africa on the importance of level of education on marriage are many

(Stillwell et al, 2009; Kalule-Sabiti et al., 2007). These studies show that lack of education and low education are associated with a higher marriage rate, young age at marriage and universal marriage. Education also significantly narrows the number of prospective marriage partners for highly educated women (Licher, 2001) leading to delay in marriage.

A longer period of schooling delays age at marriage in two ways. First, schooling is incompatible with marriage and as such women who stay longer in the education system are more likely to marry at older ages or remain unmarried. Higher education also inculcates values and aspirations that prolong the age at first marriage, which is also attributed to the relative economic advantage and decision making capabilities associated with more educated women. Table 4.1 shows that overall women in the study sample were better educated. The majority of the women, nearly half (49.1%), had secondary education followed by 44.1% with tertiary education. Only 6.8% of the women had no or primary education.

The results of this study show that the level of education is inversely related with marriage. As hypothesized, the proportion of women who were never married increased with the level of education and as the level of education increases, the proportion of ever married women decreases. The majority of women with secondary (70.7%) and tertiary (65.9%) education are never married while nearly 41.5% of the women with no or primary education are never married. Conversely, 58.5% of the women with no or primary education are ever married compared to 29.3% and 34.1% of women with secondary and tertiary education respectively. The level of education is statistically significantly associated with marriage patterns, with $X^2 = 13.9$; $p = 0.001$.

4.1.4 Religious groups

Religion is one of the important determinants of marriage. In most societies around the world the social acceptance of marriage is determined by religion which has always been used as a source of blessing for successful marriage and prevention of marriage dissolution. It has also been an important factor in influencing the prevention of non-marital childbearing. Some religions including Christianity, which is the dominant religion in South Africa, imposes penalties for marital dissolution other than due to widowhood. In this study religious affiliation was categorised as Christian, Traditionalists (ART) and other groups which included Hindi, Sikhs and other minority religious groups. This categorization was necessary because the “other” religious groups were very few and Christians as the majority follow similar marriage requirements and rituals. The result of the religious distribution of women and differentials in marriage rate by religion is presented in Table 4.1.

Table 4.1 shows that overall Christianity comprising of Catholics and Protestants, is the most dominant religious belief in the study area. The majority of women, comprising of about 76.5% are Christians. African Traditionalists beliefs had a following of 16.5% and other minority religious affiliations comprise of only 6.9%. The table also shows that the majority of Christians (34.1%), other beliefs (31%) and Traditionalists (31%) are ever married. Religious beliefs and marriage status are not significantly associated with $X^2 = 0.48$; $p = 0.786$.

4. 1.5 Occupational groups

In traditional African societies, the cultural gender divisions of labour encouraged early and nearly universal and enduring marriage for women. However, there is evidence to suggest that this may have changed because of the increasing opportunities education, formal and paid informal sector occupations, thereby

reducing dependence of women on their spouse (Cherlin 1980; Becker 1981). Some of these opportunities have led to the delayed age at marriage, preference for celibate lifestyle and increased marital dissolution through divorce. Historically, age at marriage was low, universal and enduring because marriage was the only status symbol for women. Most women who married while working most certainly dropped work voluntarily or were forced by their spouses and kin to abandon work in preference to marriage. Women who preferred work to their marriage most certainly were divorced, because work was seen to be incompatible with marriage for women.

However, contemporary society attaches much significance to education and work as the primary means of empowering women. This has inevitably contributed to the increasing delay in age at marriage, increasing proportion of women remaining celibate and increasing proportion of marital dissolution through divorce. This trend in marriage patterns started in the United States, but is now increasingly becoming prevalent in sub-Saharan Africa in general and South Africa in particular (Garenne, 2004), where marriage as a means to women economic and social empowerment is increasingly becoming irrelevant (Westoff, 2003).

Caldwell et al., (1982) also argued that normative changes brought about by changing economic situations influence marriage patterns. Increasing participation of women in the labour force was identified as one of the factors leading to the adoption of western values and attitudes towards marriage characterised by monogamous marriage system, late marriages, individual choice of marriage partner and increase in marital dissolution. The South African societies are modeled typically on the Western economic and social structure making it reasonable to expect that participation of

women in education and the labour force would have similar effects on marriage patterns.

Table 4.1 presents the distribution of women by occupational groups. Occupational groups were categorised into three, namely students, formal sector workers (professionals, industrial workers) and informal sector workers (casual labourers, people without regular work and retired individuals). The table shows that the majority of women, nearly 54% are working in the informal sector and about 27% are students. Only 19% of the women are employed in the formal sector. Differentials by marriage show that as expected nearly 96% of students were never married. Conversely, about 65.2% of the women working in the formal sector were ever married. Regarding women in the informal sector, 37% of them are also ever married. The results show that occupation is statistically significantly associated with marriage, with $X^2 = 117.8$; $p = 0.000$.

Table 4.1 Percentage distribution of women by selected demographic characteristics and marital status

Demographic characteristics	Never married women	Ever married women	X²	Total number of women	
Race/Ethnicity					
Black	60.9	39.1	23.2; p=0.000	81.7	494
Coloured	49.3	50.7		11.4	69
Asian	39.3	60.7		4.6	28
White	57.3	42.9		2.3	14
Childhood place of residence					
Urban	74.4	25.6	8.5; p=0.002	34.2	207
Rural	62.2	37.4		65.8	398
Neighbourhood socioeconomic status					
Richer	61.1	38.9	9.8; p=0.003	51.9	314
Poorer	72.5	27.4		48.1	291
Highest level of education					
No-Primary			13.9; p=0.001		
Secondary	41.5	58.5		6.8	41
Tertiary	70.7	29.3		49.1	297
	65.9	34.1		44.1	267
Religious affiliation					
Christian	65.9	34.1	0.4; p=0.759	76.5	463
Traditionalists	69.0	31.0		16.5	100
Other	69.0	31.0		6.9	42
Occupation					
Student	95.8	4.2	117.8; p=0.000	27.4	166
Formal sector work	34.8	65.2		19.0	115
Informal sector work	63.0	37.0		53.6	324
Total	66.6	33.4		100.0	605

4.2 Demographic differentials

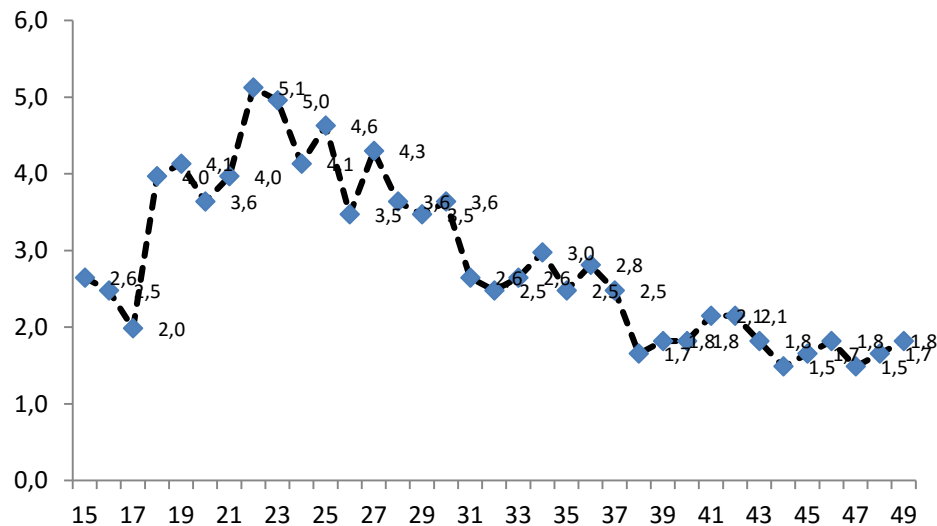
This section describes the demographic variables of women and differentials in marriage patterns. The main demographic variables used are current age, age at first sex, age at first birth, number of children desired and children ever born.

4.2.1 Current age

Age is one of the determinants of marriage status. The median age of the women in the study is 29.5 years. Figure 4.3 presents the distribution of the women by single years of age. The figure shows that overall the single year distribution of the women indicates that the proportion of the women increased with age and peaked at 21 years

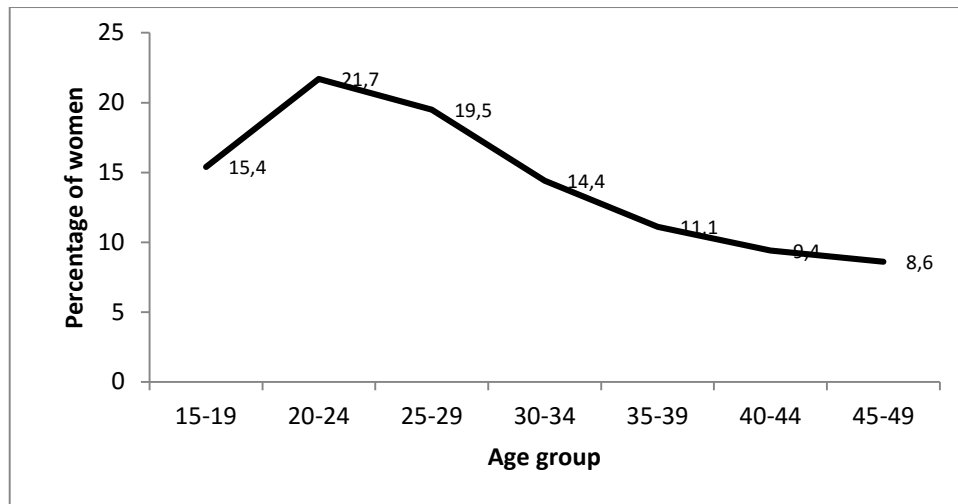
before gradually decreasing with age to the end of the reproductive period, which is the expected age pattern of women in reproductive period.

Figure 4.3 Percentage distribution of women aged 15-49 in single year ages



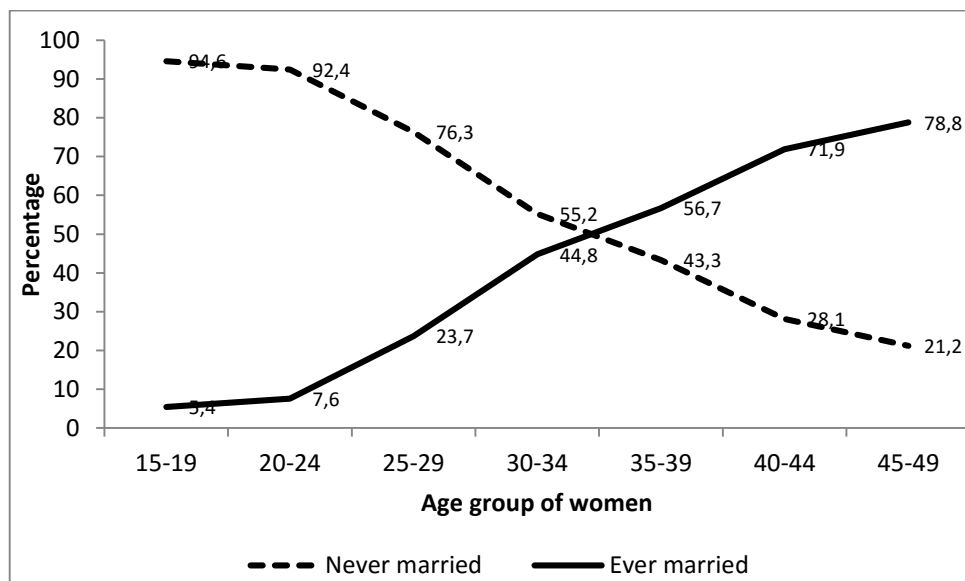
In this study, age has been categorised into seven 5 year age intervals and presented in Figure 4.4. The Figure shows that the proportion of the women increased from 15.4% in the 15-19 year age group to nearly 22% in the 20-24 year age group and declined monotonically thereafter to 8.6% in the 45-49 year age group. The median age of the women was 28 years.

Figure 4.4 Distribution of women by 5 year age intervals



Differentials of the women by marriage status are presented in Figure 4.5. The Figure shows that overall the proportion of ever married women increased with age from about 5.4% in the youngest age group (15-19) to 78.8% in the 44-49 age group.

Figure 4.5 Differentials in marital status by age group of the women



Conversely, the proportion never married decreased with age from 94.6% in the 15-19 years age group to 21.2% in the 44-49 age groups. Differentials of the women by current age groups and marital status were statistically significantly associated with $X^2= 184.7$; $p=0.000$.

4.2.2 Age at first sex

A number of studies (Zaba et al, 2004; Cremin et al, 2008) have identified age at first sex as an important correlate of marriage. These studies noted that women who started sex at a younger age were more likely to marry young. The table shows that overall the majority of the women (57.2%) initiated sexual intercourse at 18 years or older. Only 42.8% of the women initiated sexual activity at under 18 years of age. Overall, the median age at first sex was 18 years.

Table 4.2 also presents differentials in marriage by age at first sex indicating that the proportion never married decreased with age at first sex and the proportion of ever married women increased with age at first sex. The proportion who reported they were sexually active, but never married decreased from 73.0% among women who initiated the first sex at 18 years or older to 59.3% among women who initiated the first sex at less than 18 years. The proportion ever married increased from 27.0% among women who initiated sex at less than 18 years to 40.7% among women who initiated sex at 18 years or older. The results show that the marriage rate increased with age at sexual debut and marriage rate is significantly dependent on age at sexual debut, with $X^2 = 11.6$; $p = 0.000$.

4.2.3 Age at first birth

Age at first birth is an important determinant of marriage. In societies where marriage is early, most women will be expected to start childbearing in marriage. In such societies premarital childbearing is discouraged and often is associated with strong sanctions and many such women may remain unmarried for long. However, in some societies where premarital childbearing is tolerated such as in South Africa, it can be a means of marrying sooner as childbearing is often seen as a sign of proven fertility (Ikamari, 2008; Sarkar, 2010). Table 4.2 shows that majority of the women, nearly 50%, had the first birth at 18-24 years followed by nearly 36% who had the first birth at less than 18 years. Only 14.7% of the women had the first birth at 25 years or older.

The Table shows that the median age at first birth was 18 years for women who have never married, 21 years for women who have ever married and the overall median age at first birth was 20 years. Differentials in marriage rate by age at first birth is presented in Table 4.2 showing that marriage rates are higher among women who had the first birth at 18-24 years (46.9%) followed by women who had the first birth at under 18 years (35.2%) and lowest (31.9%) among women who had the first birth at 25 years or older. Sixty eight percent of the women had the first birth at 25 years or older. Age at first birth and marriage are statistically associated with $X^2= 8.3$; $p=0.015$.

4.2.4 Desired number of children

Desired number of children is an important demographic factor because it influences the fertility outcomes of couples (Feyisetan and Bankole, 2002; Ibisomi, 2008). In order for fertility decline to be sustained, there must be changes in fertility norms towards family sizes which are reflected by the demand for children. Table 4.2

presents data on the distribution of women by number of children desired. The table shows that nearly 10% of the women desired no children; nearly 17% desired one child; 41% desired two children; and nearly 13% and 19.5% desired three and four or more children respectively.

Differentials in the number of children desired by marriage indicate that the proportion of ever married women increased with increase in the number of children desired. Table 4.2 shows that only 13.6% of the women who desired no children; nearly 10% of the women who desired one child; and 26.8% of the women who desired 2 children are ever married. Furthermore, 51% and 66% of the women who desired three and four or more children respectively are also ever married. The results show that the proportion of ever married women increased with the number of children desired. Conversely, the proportion of women who are never married decreased with the number of children desired. The proportion decreased from 86.4% among women who desired no children to only 33.9% among women who desired four or more children. The mean number of children desired was lower for the never married women 1.7 than for the ever married women (2.3). The number of children desired and marriage were statistically significantly associated, with $X^2 = 107.4$; $p = 0.000$.

4.2.5 Children ever born

Marriage is one of the proximate determinants of fertility (Bongaarts, 1978; Bongaarts and Potter, 1983). In most societies, marriage indicates the onset of childbearing and the age at marriage and duration of marriage are important determinants of the number of children ever born (CEB) by a woman in her reproductive lifespan in the absence of contraception, abortion and sterility. Marriage is early, universal and enduring and mostly disrupted by widowhood, in societies where childbearing takes place in marriage. In these societies, premarital and extramarital childbearing is prohibited necessitating women to marry young and remain in marriage for a long time (Denis and Ntsimane, 2006).

In Table 4.2, the distribution of women by number of children ever born is presented. The table shows that the proportion of women decreased with increasing number of CEB. About 17.5% of the women have not given birth at the time of the survey. The proportion of women decreased from nearly 30% among women who gave birth to one child to 9.6% before rising to 16% among women who gave birth to three and four or more children respectively. Differentials in marriage rate by number of CEB show that only 0.9% of ever married women had not given birth. Thereafter the proportion of ever married women increased monotonically from nearly 11.7% among women with one child to 78.4% among women with four or more children. Overall, the proportion of never married women decreased with increase in the number of children ever born, while the reverse is true for ever married women. The number of children ever born and marriage rate are statistically significantly associated, with $X^2=204.0$; $p=0.000$.

Table 4.2 Percentage distribution of women by selected demographic characteristics and marital status

Demographic characteristics	Never married women	Ever married women	X ²	Total number of women	
Age cohort					
15-19	94.6	5.4	184.7; p=0.000	15.4	93
20-24	92.4	7.6		21.7	131
25-29	76.3	23.7		19.5	118
30-34	55.2	44.8		14.4	87
35-39	43.3	56.7		11.1	67
40-44	28.1	71.9		9.4	57
45-49	21.2	78.8		8.6	52
Median age	25.5	36.5		29.4	
Age at first sex					
Under 18	73.0	27.0	11.6; p=0.000	42.8	248
18 years or older	59.3	40.7		57.2	332
Median	17.8	18.5		18	
Age at first birth					
Under 18	64.8	35.2	8.3; p=0.015	35.8	176
18-24	53.1	46.9		49.5	243
25 years or older	68.1	31.9		14.7	72
Median	18	21		20	
Desired Number of children					
0	86.4	13.6	107.4; p=0.000	9.8	59
1	90.1	9.9		16.7	101
2	73.2	26.8		41.3	250
3	49.4	50.6		12.7	77
4+	33.9	66.1		19.5	118
Mean children desired	1.8	3.0		2.2	
Children Ever Born					
0	99.1	0.9	204.0; p=0.000	17.5	106
1	88.3	11.7		29.6	179
2	59.4	40.6		27.3	165
3	36.2	63.8		9.6	58
4	21.6	78.4		16.0	97
Mean CEB	1.2	2.8		1.8	
Contraceptive use status					
Ever used			4.7; p=0.020	84.3	509
Never used	68.4	31.6		17.7	95
	59.8	43.2			
Total	66.6	33.4		100.0	605

4.2.6 Contraceptive use status

The distribution of women by contraceptive use status is presented in Table 4.2. The table shows that the majority of the women, 84.3%, have ever used contraceptives. Only 16.3% of the women have never used contraceptives. Furthermore, the table presents the distribution of contraceptive use status by marital status of the women. The table shows that nearly 32% of the women who ever used contraceptives have ever married and only 43% of the women who ever used contraceptives have ever married. About 68.4% and nearly 57% of the women who ever used and never used contraceptives respectively, have never married. Contraceptive use status and marital status are statistically significantly associated, with $X^2 = 4.7$; $p = 0.020$.

4.3 HIV attitudes and perceptions

This section describes the differentials in marital patterns by HIV characteristics of women. The main HIV characteristics included in the analysis in this section are attitudes to HIV testing, attitudes to HIV status disclosure and perception of the risk of HIV infection in marriage. Also included in the analysis is the perception of the risk of HIV transmission to children during childbearing.

4.3.1 Attitude to HIV testing

Knowledge of HIV status is very important as it helps individuals to reduce the risk of HIV transmission. Individuals who test HIV negative have the opportunity to remain negative by reducing their risk through behavior change, including decisions of who they could marry. On the other hand, individuals who test HIV positive also have the opportunity to have access to early treatment and care, thereby ensuring that they lead a healthy and productive life. They are also in the position to ensure that their HIV negative sexual partners remain uninfected by engaging in protective sexual activities. The first step of protecting a sexual partner in a HIV discordant situation

is to disclose ones HIV positive status and encouraging ones sexual partner also to take a HIV test.

Data presented in Table 4.3 shows that the majority of the women, 86.8%, expressed positive HIV testing attitudes. Only 13.2% of the women expressed negative HIV testing attitudes. The data presented in Table 4.3 also shows that the majority of the women who expressed negative HIV testing attitudes are ever married (42.5%) compared to 32% of the women who expressed positive HIV testing attitudes. Conversely, 57.5% and 68% of the women who expressed negative and positive HIV testing attitudes respectively are never married. The majority of women who expressed negative HIV testing attitudes being never married is expected because of the effect of a positive test on marriage security. Additionally, positive HIV test is a major cause of marital violence, stigma and discrimination. However, attitudes to HIV testing and marriage status is statistically significantly associated in this population of women with $X^2 = 3.4$; $p = 0.044$.

4.3.2 Attitudes to HIV positive status disclosure to partner.

HIV infection status disclosure provides potential benefits to infected persons and their partners. However, the prevalence of HIV positive status disclosure especially in developing countries is very low. The main reason impeding self-disclosure of HIV positive status is stigma and discrimination, fear and shame. For women disclosure is also impeded by the perception that women are the ones who bring HIV in a relationship and has often led to violence against women and marital dissolution (Yang, et al., 2006; Orisakwe et al., 2012).

Results presented in Table 4.3 show that the majority of the women (83.8%) and only 16.2% of the women expressed positive and negative attitudes to HIV positive status

disclose to partners respectively. However, the majority of the women who expressed positive attitudes (64.9%) and negative attitudes (75.5%) to HIV positive status disclose to sexual partner are never married. Only 35.1% of the women who expressed positive attitudes to HIV positive status disclosure and 24.5% of the women who expressed negative attitude to positive HIV status disclosure to sexual partners are ever married. The reasons why married women express negative attitudes to HIV positive status disclosure to partners have been discussed in section 4.4.1. The relationship between attitudes to HIV positive status disclose and marriage status are statistically significantly dependent with $X^2= 4.1; p= 0.025$.

4.3.3 Perceived risk of HIV infection in marriage

The recognition that marriage is a major risk factor for HIV infection was noted way back in the 1990s. The increasing prevalence of HIV infections in marriage has greatly contributed to the need of preventing HIV transmissions in marriage and the increasing call for delaying age at marriage. This is because most women who get infected with HIV in marriage marry at young ages to mostly older men who could be already infected with the virus. It has also contributed to the likelihood of the decreasing marriage rates in some population groups, especially those with large HIV epidemics. However, studies on this subject have had mixed results. For example a study in Uganda concluded that the increasing prevalence of HIV infection was attributed to infections occurring in marriage (Uganda Aids Commission, 2012). Another study in Zimbabwe associated HIV infections with being sexually active among never married individuals (Gregson et al., 1995). However, in the literature available, no information exploring the perceived impacts of risk of HIV infection in marriage by women on marriage patterns was found.

The women in this study were therefore, probed for their perception of the risk of HIV infection in marriage. This was then used to examine the impact of perceived risk of HIV infection in marriage on the marriage rate of the women. Table 4.3 presents the result on the distribution of women by perception of risk of HIV infection in marriage. The table shows that 43% of the women perceived the risk of HIV infection in marriage is high and another 57% perceived the risk of HIV infection in marriage is low or none. Based on these perceptions, it was hypothesised that “women who perceive high risk of HIV infection in marriage are likely to be never married than women who perceive low or no risk of HIV infection in marriage.”

The result on differentials in marriage rate by perceived risk of HIV infection in marriage is presented in Table 4.3. The table shows that 73.5% of the women who perceived the risk of HIV infection in marriage to be high are never married compared to 61.4% of women who perceived the risk of HIV infection in married to be low. Conversely, only 26.5% and 38.6% of the women who perceive the risk of HIV infection in marriage to be high and low respectively are ever married. The result supports the hypothesis that perceived high risk of HIV in marriage decreased the marriage rate in this population of women. The perception of risk of HIV infection in marriage are statistically significantly associated with marriage rate with $X^2=9.6$; $p = 0.001$.

4.3.4 Perceived risk of HIV infection in childbearing.

The threat of HIV transmission may reduce childbearing desires in the general population. A study in Kenya found that women with higher level of HIV awareness

were more likely to want no more children and to desire smaller family size (Magadi and Agwanda, 2007), which was attributed to the perception that childbearing could lead to the transmission of HIV to children. In this regard, women in this study were asked their perceived risk of HIV transmission to children during childbearing. Data presented in Table 4.3 shows that 45% of the women perceived a high risk of HIV transmission to children during childbearing and nearly 55% perceived low or no risk of HIV transmission to children during childbearing.

Differentials in marriage rates by perceived risk of HIV transmission to children during childbearing are presented in Table 4.3. The table shows that 37.7% and 28.1% of the women who perceived high and low or no risk of HIV transmission to children during childbearing respectively are ever married. Conversely, 62.3% and nearly 70.2% of the women who perceived high and low or no risk of HIV transmission to children during childbearing respectively are never married. Perception of risk of HIV transmission to children during childbearing and marriage rate are statistically significantly associated with $X^2=4.2$; $p = 0.025$.

Table 4.3 Percentage distribution of women by selected HIV characteristics and marital status

Selected HIV variables	Never married women	Ever married women	X ²	Total number of women	
Attitude to HIV testing					
Positive	68.0	32.0	3.4; p=0.044	86.8	525
Negative	57.5	42.5		13.2	80
Attitude to HIV positive status disclose to partner					
Positive	64.9	35.1	4.1; p=0.025	83.8	507
Negative	75.5	24.5		16.2	98
Perceived risk of HIV infection in marriage					
High	73.5	26.5	9.6; p=0.001	43.0	260
Low/none	61.4	38.6		57.0	345
Perceived risk of HIV transmission in childbearing					
High	62.3	37.7	4.2; p=0.025	45.1	273
Low/none	70.2	29.8		54.9	332
Total	66.6	33.4		100.0	605

4.4 Predictors of marriage rate

The binary logistic regression model was used to identify the main predictors of marriage rate. The logistic regression method was chosen because the dependent variable, marital status used to estimate the marriage rate is dichotomous or binary and was coded “1” if a woman was ever married and “0” if otherwise implying that a woman was never married. Being ever married was measured by examining the log odds for every unit change in the covariates. Never married is used as the reference category. The analysis was done using four models.

Model 1 presents the main socioeconomic predictors on being ever married. The variables included in the model are: racial groups, childhood place of residence, neighbourhood socioeconomic status, and highest level of education, religion and occupation. The model fit was assessed by use of the Omnibus Test for Model Coefficient which showed that the model $X^2=60.3$; $p=0.000$, which indicates that the model is a good fit.

Table 4.4 Logistic regression model showing Odds ratios socioeconomic predictors of marriage rates

Selected socioeconomic variables	OR	CI
Race/Ethnicity		
Blacks	0.51*	0.30-0.81
Other races ®	1.00	
Childhood residence		
Urban ®	1.00	
Rural	1.73*	1.06-2.74
Neighbourhood socioeconomic status		
Richer ®	1.00	
Poorer	0.50**	0.32-0.78
Highest level of education		
No or Primary	2.92**	1.36-6.25
Secondary	1.24	0.78-1.96
Tertiary ®	1.00	
Religion		
Christian	1.71	0.69-4.22
Traditionalist	1.57	0.65-3.79
Others ®	1.00	
Type of employment sector		
Formal Sector	3.28****	2.01-5.37
Informal Sector ®	1.00	

Key: * - <0.05; ** - <0.01; *** - <0.001; **** - <0.0001

The results presented in Table 4.4 above show that compared to other races, the women are less likely to be ever married (OR=0.51, CI=0.30-0.81) if they are black. The women who lived in rural areas in childhood are also 1.73 (CI=1.08-2.79) times significantly more likely to be ever married. Compared to living in the richer socioeconomic neighbourhoods, the women are less likely to be ever married by 50% (OR=0.51, CI=0.32-0.78) if they live in the poorer socioeconomic neighbourhoods. This could be explained by the worsening socioeconomic conditions reflected in the poor labour market conditions for blacks in South Africa in general. As the rate of unemployment increases and levels of income fall, the number of attractive potential men for marriage for black independent women decreases. The women are also likely working in the informal low paid labour sector. The women are more likely to be ever married if they have no/primary education (OR=2.92, CI=1.36-6.25) than if they have

tertiary education; and if they are working in the formal sector (OR=3.28, CI=2.01-5.37) than if they work in the informal sector. Most women who grow up in rural areas and migrate to urban areas in adulthood are likely to have low education and therefore marry early. For some of these women, marriage becomes the only gateway for improving their own and their family's socioeconomic conditions.

Model 2 identified the demographic predictors of being ever married. The variables included in the model are age groups of the women, age at sexual debut, age at first birth, desired number of children, children ever born and contraceptive use status. The model fit was examined by the use of Omnibus Test for Model Coefficient which showed a model $X^2=212.3$; $p=0.000$, showing that the model is a good fit.

The results presented in Table 4.5 show that women in the 35 years or older age group are 3.44 (CI=1.50-7.50) times significantly more likely to be ever married than women in the 15-19 year age group. The higher rate of marriage in the older age group is expected as most of these women are culturally expected to be married. The younger women are less likely to be married mainly because they are mostly in school. The table also shows that compared to women who do not desire to have children, women who desire

Table 4.5 Logistic regression model showing Odds ratios socioeconomic predictors of marriage rates

Selected socioeconomic variables	OR	CI
Age cohort		
<19 ®	1.00	
20-34	1.13	0.55-2.28
35+	3.34**	1.50-7.45

Age at first birth		
<18 ®	1.00	
18+	1.04	0.58-184
Age at first birth		
<20 ®	1.00	
20+	0.52*	0.29-0.95
Number of Children Desired		
0 ®	1.00	
1	1.65	0.55-7.83
2	2.30	0.63-8.41
3+	4.08*	1.13-14.68
Children ever Born		
0 ®	1.00	
1	0.71	0.18-4.50
2	2.09	0.61-3.64
3	6.18*	1.20-5.11
4+	8.99***	1.41-14.22
Contraceptive use status		
Ever used	0.3****	0.01-0.12
Never used	1.00	

Key: * - <0.05; ** - <0.01; *** - <0.001; **** - <0.0001

three or more children are significantly (OR=4.08, CI=1.13-14.63) more likely to be ever married. This is mostly because marriage remains the sanctioned sexual setting in which childbearing takes place. Women who desire a higher number of children are likely to want to be married so as to legitimize the status of their children.

Furthermore, the women are significantly more likely to be ever married if they have given birth to three children (OR=6.18, CI=1.22-5.11) and four or more children (OR=8.99, CI=1.47-14.68) than if they have not given birth at all, which can still be explained by the social and cultural importance of marriage in childbearing. Conversely, Table 4.5 shows that women who had the first birth at 20 years or older are significantly less likely to be ever married by 48% (CI=0.29-0.95). Regarding contraceptive use status, the result in Table 4.5 shows that the women are more significantly less likely to be ever married if they used contraceptives (OR=0.30, CI=0.01-0.12).

Model 3 in Table 4.6 presents results of the effect of selected HIV variables. The variables included in the model are attitudes to HIV testing, attitudes to HIV positive status disclosure, perception of risk of HIV infection in marriage and perception of risk of HIV transmission to children during childbearing. The results show that only perception of high risk of HIV infection is a significant predictor of being ever married. The table shows that women who expressed positive attitude to HIV testing are 1.66 (CI= 1.05-2.91) times significantly more likely to ever married. The higher marriage rate among women with positive attitude to HIV testing could be explained by the mandatory HIV testing during antenatal care, which offers the opportunity to have a HIV negative baby through the PMTCT programme if a women tested positive for HIV. The perception of low or no risk of HIV infection in marriage (OR=2.08, CI=1.47-2.96) are significantly more likely to be married than women who perceive high risk of HIV infection in marriage. The higher marriage rate among women who perceive low risk of HIV infection in marriage is likely to be a HIV infection prevention strategy as most women may perceive higher risk of HIV infection in the unmarried state, which encourages risky sexual behaviour. For such women, marriage may offer a sense of protection against HIV infection.

Table 4.6 Gross Logistic regression model showing Odds ratios for HIV predictors on marriage rates

Selected socioeconomic variables	OR	CI
Attitude to HIV testing		
Positive	1.66*	1.05-2.91
Negative	1.00	
Attitude to HIV positive status disclose to partner		
Positive	1.00	
Negative	0.71	0.44-1.15

Perceived risk of HIV infection in marriage		
High	1.00	1.47-2.96
Low/none	2.08****	
Perceived risk of HIV transmission in childbearing		
High	1.00	
Low/none	0.74	0.52-1.05
Key: * - <0.05; ** - <0.01; *** - <0.001; **** - <0.0001		

Model 4 was used to identify the significant predictors of being ever married after all the significant socioeconomic, demographic and HIV variables in Models 1, 2 and 3 are simultaneously controlled for. The socioeconomic variables included in the model are racial groups, childhood place of residence, neighbourhood socioeconomic status, level of education and occupation. The demographic variables included in the model are age group of the women, age at first birth, number of children desired, CEB and contraceptive use status. Regarding HIV variables, attitude to HIV testing and perception of risk of HIV infection in marriage are analyzed. The Omnibus Test of Model Coefficient with $X^2=197.9$; $p=0.000$, shows that the model is a good fit.

The results presented in Table 4.7 shows that being black continues to be associated with low marriage rate. Compared to other races, blacks are 0.78 (CI=0.64-1.50) times less likely to be ever married. The effect of being black on being ever married increased by 27% of the level in Model 1. However, the level of significance observed by being black on the lower marriage observed in Model 1 has been lost after controlling for all other covariates.

The results also revealed that the neighbourhood socioeconomic status of the women is a significant predictor of the lower marriage rate. Women in the poorer socioeconomic neighbourhood are 50% (CI=0.29-0.68) significantly less likely to be married. The women were also more likely to be ever married if they had no/primary

education (OR=1.79, CI=1.25-2.44) than if they had tertiary education. The effect of having no/primary education on marriage was attenuated by more than 100% of the level in Model 1. The women who worked in the formal sector (OR=1.77, CI=1.86-3.66) are significantly more likely to be ever married than those working in the informal sector and the effect of formal sector work on being ever married was also attenuated by more than 150% of the level in Model 1.

Furthermore, age cohort of the women, age at first birth and the number of children desired are also significant predictors of being ever married. The women are significantly more likely to be ever married if they are 35 years or older (OR=2.13, CI=1.82-5.48); if they were 20 years or older at first birth (OR=2.30, CI=1.22-4.32); and if they desired three or more children (OR=3.10, CI=1.94-10.74). When compared to the results in Model 2, the

**Table 4.7 Logistic regression model showing OR predicting low marriage rate after
controlling for the effects all covariates simultaneously**

Selected covariates	OR	CI
Race/Ethnicity		
Blacks	0.47	0.64-1.50
Others®	1.00	
Childhood residence		
Urban®	1.69*	10.85-3.36
Rural	1.00	
Neighbourhood socioeconomic status		
Richer ®	1.00	
Poorer	0.55*	0.29-0.68
Highest education		
No or Primary	1.79*	1.25-2.44
Secondary	1.23	0.31-1.15
Tertiary ®	1.00	
Occupation		
Formal sector	1.77*	1.86-3.66
Informal sector®	1.00	
Age cohort		
<19 ®	1.00	
20-34	0.79	0.34-1.86
35+	2.13**	1.82-5.48
Age at first birth		
<20 ®	1.00	
20+	2.30**	1.22-4.32
Number of Children Desired		
0 ®	1.00	
1	1.64	0.36-7.39
2	1.87	0.53-6.52
3+	3.10*	1.94-10.74
Children ever Born		
0 ®	1.00	
1	0.75	0.17-3.16
2	2.51	0.60-10.41
3	5.00*	1.16-12.66
4+	9.26**	1.70-22.66
Contraceptive use status		
Ever used	0.28****	0.07-0.11
Never used®	1.00	
Attitude to HIV testing		
Positive	0.78	0.35-1.70
Negative®	1.00	
Perceived risk of HIV infection in marriage		
High	1.00	
Low/none®	1.92*	1.12-2.42

Key: * - <0.05; ** - <0.01; *** - <0.001; **** - <0.0001

effect of age group 35 or more, age at birth of 20 years or more and desiring three or more children was elevated by 121%, 178% and attenuated by 98% respectively. Women who have given birth to three and four or more children are 5 (CI=1.16-12.66) and 9.26 (CI=1.70-22.66) times more likely to be ever married and the effect of giving birth to three and four or more children are attenuated and increased by 118% and 27% respectively. Regarding the effect of perceived risk of HIV infection in marriage, Table 4.7 shows that women who perceived the risk of HIV infection in marriage to be low or none are 1.92 (CI=1.12-2.42) times significantly more likely to be married and the effect of perceived low risk of HIV infection on marriage was attenuated by 16% of the level in Model 3. This finding suggests that indeed HIV risk perception affects marriage decisions in this population. The finding also proves that women who perceive high risk of HIV infection in marriage are less likely to be married than women who perceive low risk of HIV infection. Conversely, ever use of contraceptives is a less likely predictor of marriage rate. Women who ever used contraceptives are 0.28 (CI=0.07-0.11) times significantly less likely to be ever married. The effect of uptake of contraceptives on marriage rate was attenuated by 2% of the level in Model 2.

4.5 Summary

This chapter presented marriage rates and its predictors. Overall the results from the chapter shows that the marriage rate in this population of women is low estimated at 33.4%. The proportion ever married also increased with the age group of the women. However, the proportion of ever married women is higher than the estimated for South Africa derived from the 2001 census (30.6%) and 2007 community survey (27.6%). However, it is slightly lower than the 1996 estimate which puts the marriage rate in South

Africa at 35.2%. Compared to other races, the black women are the most unlikely women to have been married. The chapter also shows that the marriage rate is higher in rural areas; higher in the richer socioeconomic neighbourhoods; higher among women with no/primary education; higher among Christians; and higher among formal sector workers.

There is also clear evidence which shows that women in the younger age groups are mostly never married at the time of the study. This is consistent with a population experiencing a marriage transition characterised by delay in age at marriage and increasing non marriage rate. The finding by age structure of the women is also an indication that the marriage institution is in transition mainly due to delayed age at marriage for the younger women. This could have been the effect of staying longer in the education system as well as greater independence of women due to engagement in the labour market as workers.

Marriage rates are expected to increase with the number of children desired and the number of children ever born, even though marriage transition is taking place. This is consistent with findings on marriage in many sub-Saharan African settings where fertility outside marriage is discouraged. The finding supports the view that the number of children desired and number of children ever born are significant determinants of the marriage rate in the predominantly black population where marriage remains the only socially and culturally sanctioned setting for childbearing.

The chapter revealed that although positive attitude to HIV testing revealed a higher marriage rate in the earlier model, this was not observed in the last model. However, the perception of low or no risk of HIV infection in marriage revealed a higher marriage rate

suggesting that women use marriage as a protection strategy for HIV prevention. This finding appears to confirm the alternative hypothesis that “women who perceive low or no risk of HIV infection in marriage are likely to be married than women who perceive high risk of HIV infection in marriage.”

Chapter Five

Correlates of the timing of first marriage

5.0 Introduction

In traditional African societies marriage was one of the most important transitions that adults must make. It was used to join not only two individuals, usually male and female for the purpose of procreation, but also families and communities and acts as a bridge for extension of relations (Kyalo, 2012). Marriage is also an institution that enables husband and wife to work together for the purpose of achieving common or shared social and economic goals. Because of the importance placed on marriage in traditional African societies, marriage was used as one of the yard sticks for assessing the social standing of adult men and women.

Marriage was also the only arrangement required for bringing forth new members of society through procreation (Gumu and Mace, 2013) such that in most societies, it was not complete until children are born in the marriage. In these societies, getting married and having children was not only a responsibility, but a critical social, moral and spiritual obligation (Kyalo, 2012). Marriage in the traditional African society was formalized by the payment of bride price, also known as “*Lobola*” in South Africa, which serves both as a symbol of appreciation to the wives family as well as compensation for the transfer of the rights of the woman’s natal family over her reproductive and productive roles to the husbands family (Bujo, 1992). Bride price was also the

glue that binds the marriage and consolidates the relations between the two families.

In societies where marriage is given a high social and economic value, age at marriage was early and universal as parents encouraged their daughters to marry at a young age and divorce was disapproved (Gurmu and Mace, 2013). Early marriage was also culturally encouraged to prevent premarital sex and childbearing which lowered the value of marriageable women (Kalule- Sabiti, Palamuleni and Makiwane, 2007). The young age at marriage and universal marriage has been blamed for the persistent high fertility in high fertility countries such as Niger, Uganda and Zambia (Ayiga and Lwanga, 2014). In these countries age at first marriage ranged from just under 16 years in Niger to slightly over 17 years in Uganda (Garenne, 2004). However, a marriage transition characterised by delayed age at first marriage and declining marriage rates is taking place in the Southern African region in general and South Africa in particular.

The traditional African marriage pattern is slowly evolving, but remains an important nexus in African cultures. Marriage in many sub-Saharan Africa societies continues to be at early age and universal. However, there is evidence to show that marriage transition is now advance in some countries in the Southern Africa region, especially South Africa. The marriage transitions in South Africa is characterised by the increasing abandonment of polygyny in favour of monogamy (Yasuko and Kao-Lee, 1997), declining marriage rate (Mhongo and Budlender, 2013) and delay in age at marriage (Ayiga and

Rampagane, 2013). New forms of marriages such as same sex marriages are now recognised and are on the rise in South Africa influenced by the socio-cultural accommodation of different sexual orientations.

Of the above transitions, perhaps delay in age at marriage has been the most notable change in marriage patterns in South Africa, and this can be attributed to the increasing empowerment of women through the modernizing influences of education, employment and urbanization (Garenne, 2004). Other previous studies similarly identified education, employment, urban place of residence and economic status of women as important predictors of age at first marriage elsewhere (Palamuleni, 2011; Jones, 1992).

Since the end of apartheid, the economy of South Africa not only opened up to the black population in general, but to women in particular contributing significantly in improving the status of women through expanding access to education and participation in the monetized labour force. These have directly delayed age at marriage as women stayed longer in education and reduced dependence on men for their wellbeing (Sanjiv, 2007). Additionally, education has been found to be the single most important factor for the postponement of marriage (UNICEF 2005); increasing knowledge of and access to effective contraceptives and avoidance of unplanned pregnancies that may compel women to marry at a young age (Bbaale and Mpuga, 2011); and improving the reproductive health of women including HIV prevention (Smith et al., 1999).

On the other hand, delayed age at marriage also has advantages for women including the completion of their education, acquiring labour force skills, developing career interest and ultimately reducing family size (Jensen & Thornton 2003; Amin 1995;). Additionally, delayed age at marriage has been found to reduce the incidence of divorce and improve marriage quality (Norval, Jeremy and Robert, 2010). However, marrying later also has negative consequences that are important for reproductive health risks. Previous studies noted that delay in age at marriage increases the risk of pre-marital sex and unwanted pregnancies (Jones 2007); and could increase the risk of exposure to HIV infection due to the longer duration of premarital sexual activity (Bongaarts 2006; Clark, 2004).

Although it is now widely accepted that age at marriage in South Africa in general and in the North West province in particular has increased considerably, no empirical study has been conducted in the North West province to identify the factors that influence the timing of marriage in the province. As a result, the factors contributing to the delayed age at marriage in North West Province and its predictors have remained largely unknown. In this chapter, cross-sectional data were used to estimate the median age at first marriage in the Mahikeng Local Municipality and identified the risk factors predicting age at first marriage in the context of the generalized HIV AND AIDS pandemic in the area. In this chapter, the effects of childhood neighbourhood, age at sexual debut and the generalized HIV and AIDS pandemic on the age at first marriage was examined by testing the following hypotheses:

- i. “age at first marriage is lower among women raised in rural areas in childhood than women raised in urban areas in childhood”;
- iii. “women who perceived the risk of HIV infection to be high in marriage married at older ages than women who perceived low or no risk of HIV infection in marriage;” and
- iv. “women who perceived the risk of HIV transmission to be high in childbearing married at older ages than women who perceived the risk of HIV transmission to be low or not at all in childbearing.”

5.1 Marital status

Figure 5.2 presents the distribution of women by marital status. The figure shows that a third (33.4%) of the women reported that they were ever married and this proportion increased monotonically from only 5.48% in the 15-19 year age group to 78.8% in the 45-49.. The distribution shows teenage marriage is low in Mahikeng Local Municipality and the proportion of married women increased with age.

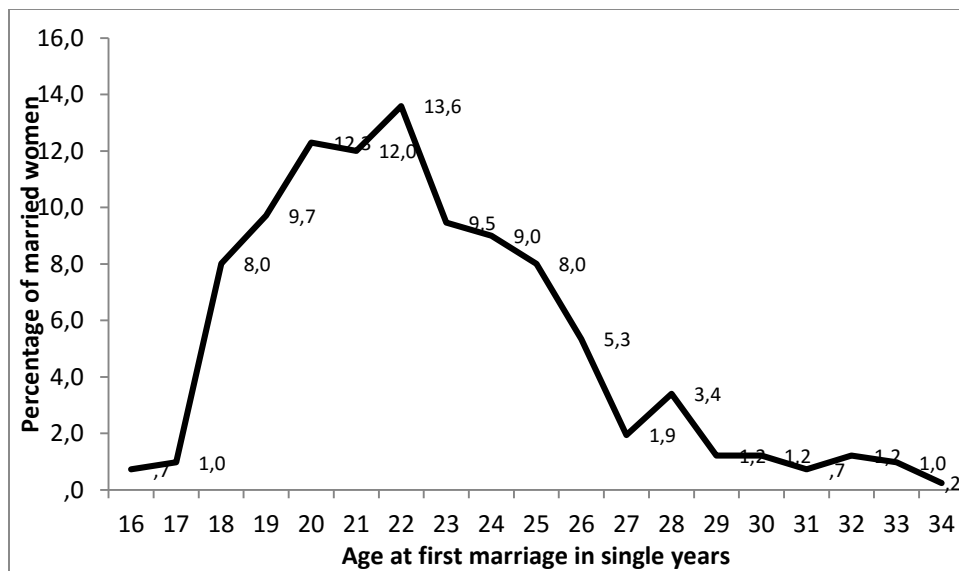
5.2. Age at marriage

In this section, the distribution of women by age at marriage, current age and selected socioeconomic variables are presented. The selected variables include current age, racial groups, childhood place of residence, neighbourhood socioeconomic status, and religious affiliation, highest level of education and occupation of women.

5.2.1 Age at first marriage

Percentage distribution of the married women is presented in Figure 5.1. The figure shows that the proportion of women married increased with the age of the women. Only 0.7% of the women married at exact age 16 and the peak age at marriage was 22 years (nearly 14%). A declining proportion of women married at the subsequent ages after 22 years of age and this is observed until age 34 years. The distribution of women by age at marriage is similar to that in the general population in South Africa.

Figure 5.1 Percentage distributions of women by age at first marriage

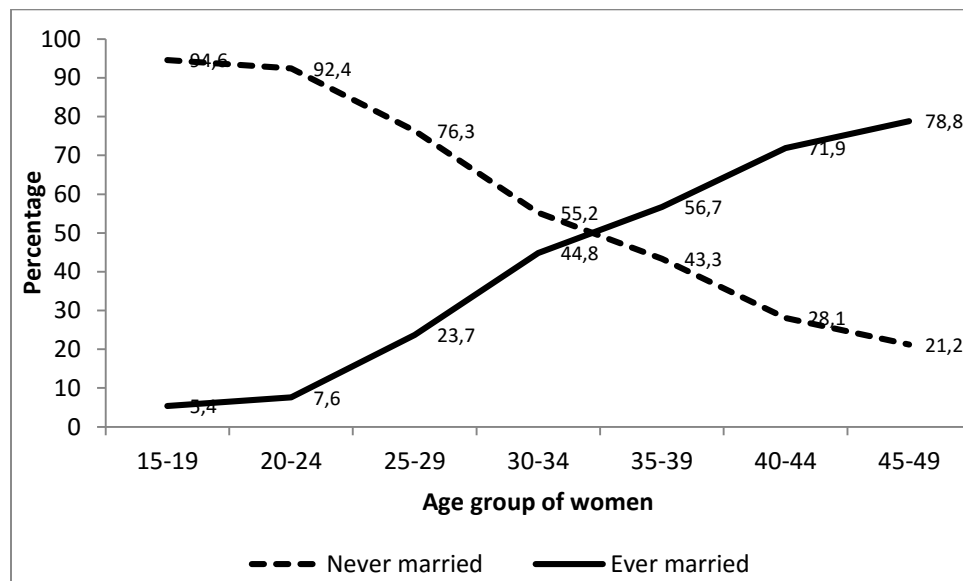


5.2.3 Distribution of women by marital status and current age

The distribution of women by marital status and current age is presented in Figure 5.2. The figure shows that the proportion of ever married women increased with age group of the women and that of never married women decreased with age group of the women, from 5.4% in the 15-19 year age group to 56.7% in age group 35 – 39, 71.9% in age group 40 – 44 and 78.8% in the 45-49 year age group. Age group of the women and marital

status is significantly dependent with $\chi^2=184.7$; $p=0.000$. The distribution follows the normal age pattern of married women.

Figure 5.2 **Distribution of women by marital status and age**



5.2.4 Age at marriage by current age

Figure 5.3 and Table 5.1 presents the proportion of ever married women by current age and age at marriage. The figure and table shows that only 3.7% of the ever married women married at teenage which is an indication that teenage marriages are quite uncommon in sample of urban women. The data also shows that the majority of the women in all age cohorts married at ages 20-24 years. Nearly 9.7% of the women currently in the age group 45-49, married when they were adolescents (<20 years of age). The cohort change in the age at first marriage is an indication that the marriage transition is taking place in the Mahikeng Local Municipality.

Figure 5.3 Distribution of women by age at marriage and current age

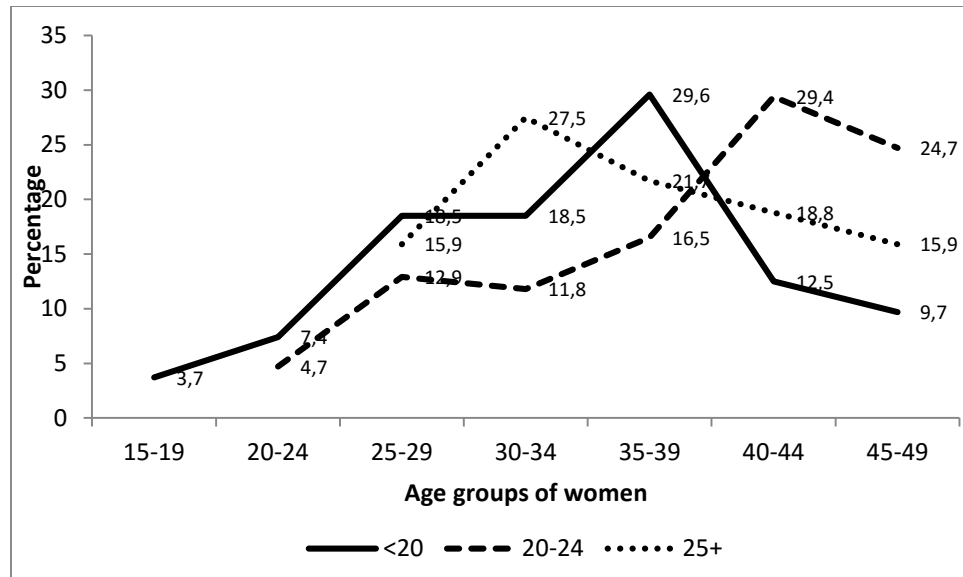


Table 5.1 Distribution of women by age at marriage and current age

Age group	Age at marriage		
	<20	20-24	25
15-19	3.7		
20-24	7.4	4.7	
25-29	18.5	12.9	15.9
30-34	18.5	11.8	27.5
35-39	29.6	16.5	21.7
40-44	12.5	29.4	18.8
45-49	9.7	24.7	15.9

5.3 Differentials in median age at marriage

Age at marriage is an important determinant of fertility and is influenced by a number of socio-demographic and HIV characteristics of the women in sub-Saharan Africa. In societies where fertility transition has started such as South Africa, marriage transition, particularly the marriage rate and age at marriage is expected to change. Understanding the timing of marriage and its predictors is important in shedding light on fertility

dynamics in such countries. This section therefore presents the median age at first marriage and its socio-demographic differentials.

The median age and its differentials were computed using the Kaplan-Meier survival method and the results are presented in Table 5.2. The difference by the categories of the socio-demographic and HIV characteristics were assessed at 95% Confidence Interval and the Log Rank Statistics. Median age at marriage was considered to be significantly different if the $p < 0.05$.

5.3.1 Demographic differentials in median age at first marriage

Age cohorts of women have been identified as one of the factors influencing age at first marriage. A study by Singh and Samara (1996) found that age at first marriage was earlier for women in the youngest age cohorts than women in the older age cohorts. The result of the differential in age at first marriage by cohort of the women is presented in Table 5.2. The table shows that overall the median age at first marriage in the study population was 24 years and it increased with the increase in age cohorts of women before declining at older ages.

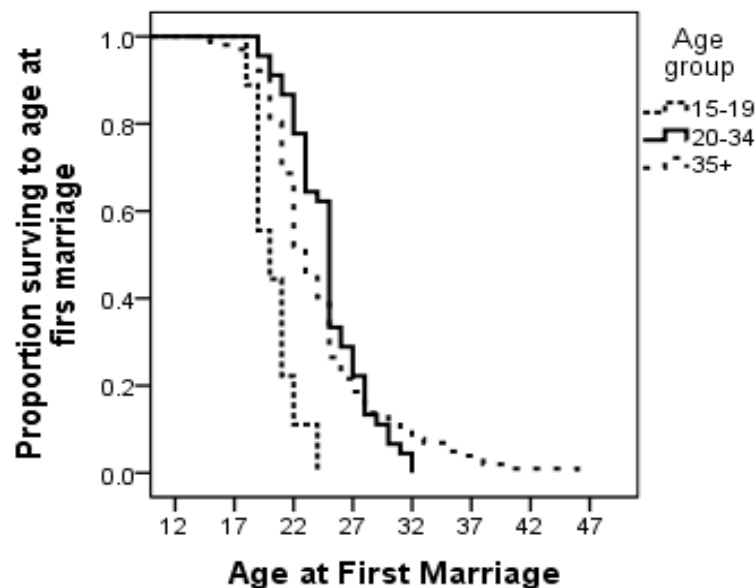
The median age at first marriage increased from 18 years in the 15-19 year age group to 25 years in the 20-34 year age group before declining slightly to 23 years in the 35 years or older age group. The median age at first marriage was also significantly different for women in the different age groups with a log rank $X^2 = 19.47$; $p = 0.0001$.

Table 5.2 Kaplan-Meier estimate of the median survival time to first marriage by selected demographic characteristics of women

Socio-demographic characteristics	Median survival time to first marriage	95% C.I	Log Rank χ^2-value
Total	24	23.5-25.5	
Age cohort			
15-24	18	17.0-18.9	19.47; p=0.0001
25-34	25	24.5-25.4	
=>35	23	21.8-29.2	
Age at first sex			
<18 years	21	19.4-22.5	12.8; p=0.001
=>18 years	25	24.3-25.6	
Age at first birth			
<20 years	21	19.5-22.5	6.8; p=0.05
20+	25	23.3-24.7	

The Kaplan-Meier plots in Figure 5.4 also shows that although women in the age group 15-19 year age group started first marriage later than the 20-34 and 35 years or older groups, overall they were married much earlier than the age group 20-34 and 35 years or older. The Kaplan-Meier plots in Figure 5.4 show that by age 22, eight out of every ten women (80%) in age group 15-19 reported they were married compared to 50% and 25% in the 35 years or older and 20-24 years age groups. The earlier age at marriage among women in the younger age cohort can be explained by the high levels of premarital sex and childbearing among this generation of women. It could also be explained by the increasing prevalence of cohabitation among the younger generation of women residing in urban areas, which form of sexual union was highly discouraged in the older generation of women. Many young women could choose marriage in the event that they become pregnant, a situation which was not tolerated among the women of older cohorts.

Figure 5.4 Kaplan-Meier plots showing survivorship to age at first marriage by age group of women



In societies where premarital sexual activity is highly discouraged and sanctioned, it is reasonable to expect that the difference between age at sexual debut, age at first birth and age at first marriage should be small. Conversely, in societies where age at sexual debut is inconsequential to childbearing or marriage, the duration between these life events may vary. A study in Cameroon by Lekha and Kiersten (2008) found that the interval between age at first sex, pregnancy and birth, and marriage is small, only 1.4, 1.3 and 0.5 years respectively.

In this study the effect of age at first sex and age at first birth on timing of first marriage was examined. The results presented in Table 5.2 show that the median age at first marriage increased with increase in age at first sex and age at first birth. The table shows that the median age at first marriage increased from 21 years among women who had the

first sex at less than 18 years of age to 25 years among women who had the first sex at 18 years or older and the differential is statistically significant with the long rank $X^2=12.8$; $p=0.001$.

In Figure 5.5, the Kaplan-Meier plots showing differentials in age at first marriage by age at first sex is presented showing that women who had sexual debut at less than 18 years of age married earlier than women who had sexual debut at 18 years or older. The Kaplan-Meier plots in Figure 5.5 show that by 25 years of age, 62% of the women who initiated sexual activity at less than 18 years had ever married compared to only 42% of women who had sexual debut at 18 years or older. Early marriage by women who initiate sexual activity at young age is often non-consensual in that many of these girls are forced into marriage either because of pregnancy or because of the fear that the loss of virginity has devalued them before other men. In some societies, parents also encourage the marriage of their daughters while they are still children in hopes that the marriage will benefit them both financially and socially, while also relieving financial burdens on the family, especially for girls who are out of school or have become pregnant.

Figure 5.5 Kaplan-Meier plots showing survivorship to age at first marriage by age at sexual debut

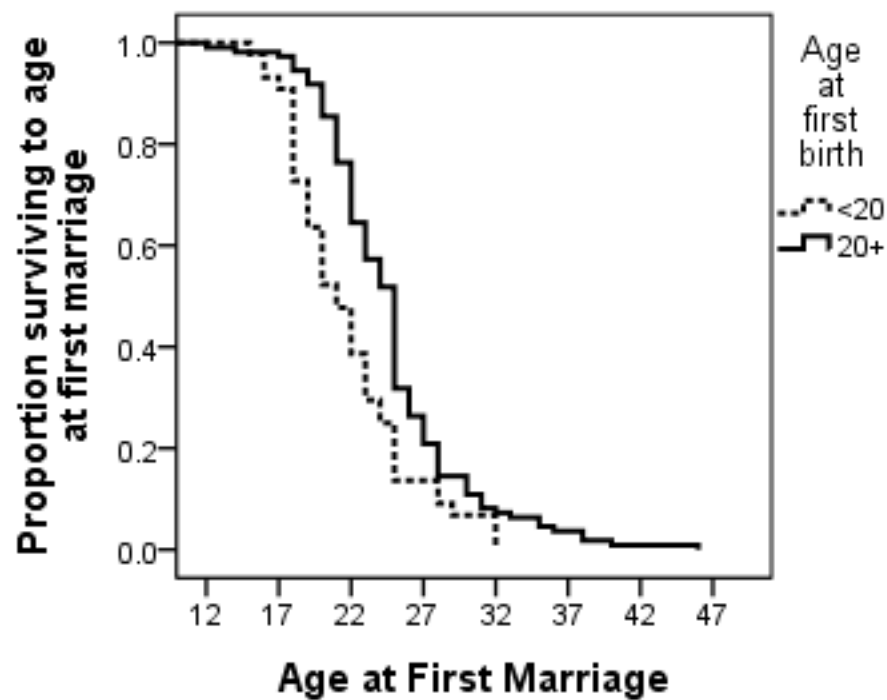


Similarly, the median age at first marriage increased from 21 years among women who had the first birth at less than 20 years to 24 years among women who had their first birth at 20 years or older. The results indicate a difference of more than 3 years between first sex, first marriage and first birth. First marriage and age at first sex and first marriage, and first birth and first marriage were significantly different with the log rank $X^2=6.8$; $p=0.05$.

Furthermore, figure 5.6 shows that women who gave birth at under 20 years married earlier than women who gave birth at 20 years or older. The Kaplan – Meir survival plot shows that by 22 years of age nearly 62% of the women who had the first birth at under 20 years of age had ever married compared to only 38% of the women who had the first birth at 20 years or older. Although some of these women might have got married before having their first birth, evidence in South Africa suggests that many of the women who

had their first birth at less than 20 years of age did so out of marriage. This is supported by the high prevalence of premarital childbearing in South Africa.

Figure 5.6 Kaplan-Meier plots showing survivorship to age at first marriage by age at first birth



5.3.2 Socioeconomic differentials in the median age at first marriage

Table 5.3 presents the differentials in the median age at first marriage for the women in the study sample by ethnicity, childhood place of residence, highest level of education, religion and occupation. The table shows that the median age was significantly different with log rank $X^2=11.73$; $p=0.001$ for women of different races. While Black women generally married later at 24 years of age, Coloured women married earlier than Blacks at 22 years of age and Whites/Asian women also married 2 years later than blacks, but at the same age as Coloureds at 22 years of age. The racial differences in median age at marriage are further illustrated by the Kaplan-Meier plots presented in Figure 5.7. The figure shows that indeed black women married later than whites and coloureds at nearly all ages except age 25. By 27 years of age, the data in Figure 5.7 shows that by age 37, nearly 55% of Whites/Asians and 50% of Coloureds are married compared to only 27% of Black women. The figure shows that whites, Asians and Coloureds are married earlier than black women in this population.

This difference in the median age at first marriage by race could be attributed to the different forms of unions of which cohabitation, common among blacks, is the most important, which tends to delay reported aged at marriage and also proportion of women married as in most indigenous cultures in South Africa, a woman is considered married only after bride price has been paid. Women in consensual unions are therefore likely to report themselves as single (Gumu and Mace, 2013).

Figure 5.7 Kaplan-Meier plots showing survivorship to age at first marriage by race



However, early marriage among Asians is likely as cultural and religious requirements make them marry young. In this society, many reasons are given by parents and guardians to justify child marriages. Economic reasons often underpin these decisions which are directly linked to poverty and the lack of economic opportunities for girls (Ayiga and Rampagane, 2013).

Differentials in the median age at first marriage are also presented in Table 5.3 by place of childhood residence. Differentials by childhood place of residence show that women who grew up in urban areas married later than women who lived in rural areas. While women who grew up in urban areas married at 25 years, those who grew up in rural areas

married 4 years earlier at 21 years of age. Age at first marriage in urban and rural areas are significantly different with log rank $X^2=28.3$; $p=0.0001$.

Figure 5.8 presents the Kaplan-Meier plots showing survivorship to age at first marriage for women in different ages by childhood place of residence. The figure show that women razed in urban areas married later than women in raised in rural areas at all ages. By 30 year of age, nearly 90% of the women who were raised in rural areas were ever married compared to about 80% in urban areas. Women raised in urban areas could have married later than those in rural areas because of the effect of education. Previous studies (Ayiga and Rampagane, 2013; Gumu and Mace, 2013) have identified education as an important predictor of age at first marriage. In fact most studies in developing countries show that age at first marriage increased with the level of education.

Figure 5.8 Kaplan-Meier plots showing survivorship to age at first marriage by childhood place of residence

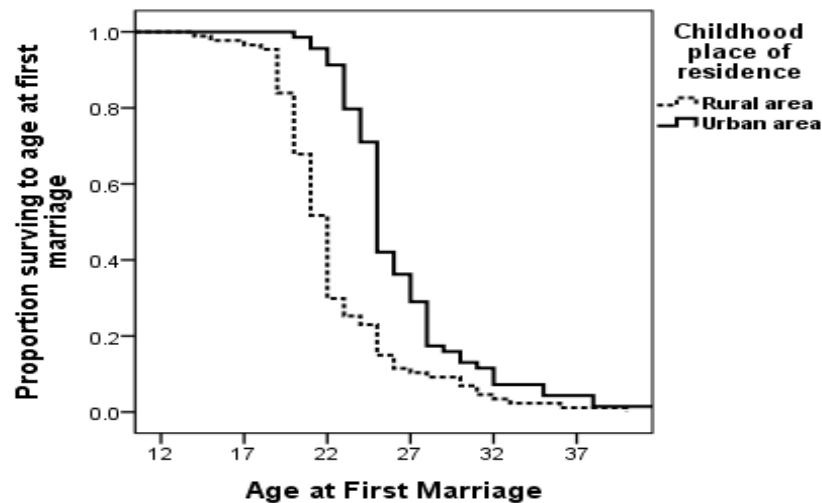


Table 5.3 Kaplan-Meier estimate of the median survival time to first marriage by selected demographic characteristics of women

Socio-demographic characteristics	Median survival time to first marriage	95% C.I	Log Rank χ^2-value
Total	24	23.5-25.5	
Race			
African	24	24.2-25.6	11.73; p=0.001
Coloured	22	20.7-23.3	
White/Asian	22	18.6-25.3	
Childhood place of residence			
Urban	25	24.6-25.4	28.3; p=0.0001
Rural	21	20.2-21.7	
Neighbourhood socioeconomic status			
Urban	21	19.9-22.1	26.3; p=0.0001
Rural	25	24.5-25.4	
Highest level of education			
No/primary	20	19.2-20.7	51.5; p=0.0001
Secondary	24	23.1-24.8	
Tertiary	26	25.2-26.7	
Religious affiliation			
Catholic	23	21.2-24.7	3.66
Protestant	25	24.3-25.1	
Traditional/no religion	22	20.3-25.6	
Other	21	18.8-24.1	
Occupation			
Formal sector	25	24.0-25.9	1.15
Informal sector	23	21.8-24.2	

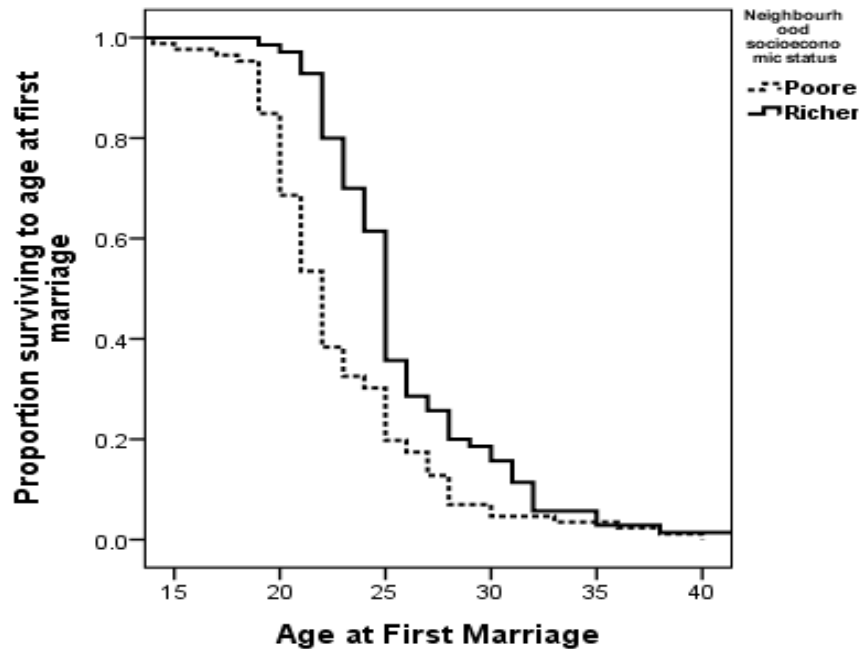
The socioeconomic status of both women and men has been found to be an important determinant of marriage. A study by McLanahan (1997) found that individuals who are poor are less likely to marry. Rates of marital instability are also found to be higher among the poor. Poverty in a way, therefore, contributes to changes in the values of marriage and family formation in opposite ways among individuals in both

the higher and low socioeconomic brackets. These changes are more likely in urban areas where the impact of poverty on families is greater than in rural areas. This is because the social safety nets that usually support families in economic distress are much weaker if at all in urban than rural settings. Women of higher socioeconomic standing who do not meet men with right economic criteria are therefore less likely to marry sooner as they take longer to find marriageable men. Women just like men therefore want to reap the economic advantages marriage offers. In this regard, Licher (2001) suggested that marriage can be used as a pathway out of poverty by women, only if women are able to find marriageable men from the economic perspective.

Data presented in Table 5.3 show that women in the richer socioeconomic neighbourhoods married 4 years later than women in the poorer socioeconomic neighbourhoods. This is an indication that women in the richer socioeconomic neighbourhood waited longer to get married because of failure to find marriageable men with the right marriage criteria in the Mahikeng Local Municipality marriage market. The difference in the median age at marriage for the two groups of women is statistically significant with $X^2=26.3$; $p=0.0001$.

Figure 5.9 shows illustrate the timing of marriage for women in the richer socioeconomic neighbourhoods and the poorer socioeconomic neighbourhood. The figure shows that by age 25 nearly 80% of the women in the poorer socioeconomic neighbourhoods are already married compared just over 60% of women in the richer socioeconomic neighbourhood.

Figure 5.9 Kaplan-Meier plots showing survivorship to age at first marriage by neighbourhood socioeconomic status



The results in this study show that indeed the age at first marriage increased with the level of education and the level of education was significant factor influencing the median age at first marriage with log rank $X^2=51.5$; $p=0.0001$. Table 5.3 shows that the median age at first marriage for women with no education was 20 years. Women with secondary education married at 24 years which was 4 years later than women with no/primary education. Women with tertiary education married at 26 years, 2 years later than women with secondary education and 6 years later than women with no/primary education.

Figure 5.9 presents the Kaplan-Meier plots showing survivorship to age at first marriage by the level of education of the women. The figure shows wide differences in age at first marriage for women in the different educational categories. Women with no/primary education married earlier than their counterparts with secondary education and tertiary

education at all ages. Additionally women with secondary education also married at earlier ages than women with tertiary education. By 25 years of age, over 90% of the women with no/primary education were ever married compared to about 42% and only 18% among women with secondary and tertiary education respectively. Education contributes in increasing age at marriage in four main ways. Firstly the longer duration in school prolongs age at marriage mainly because schooling is not compatible with marriage in most societies. Secondly, schooling inculcates values and norms that postpone marriage. Thirdly education opens up career paths that impede early marriage. Fourthly, education increases access to and adoption of contraceptives that prevents early and unwanted pregnancies, which are often the main factor encouraging early marriage.

Figure 5.10 Kaplan-Meier plots showing survivorship to age at first marriage by level of education



Furthermore, Table 5.3 presents differentials in median age at first marriage by religious affiliation of the women. Previous studies elsewhere identified that religion is an important risk predictor of age at first marriage (Sheela and Audinarayana, 2000; Sivaram, Richard and Rao, 1995). The results show that women who profess Protestantism married at 24 years of age compared to 21 years among Catholic women, 20 years among women who profess traditional beliefs and 18 years among women who profess other religions. The median age at first marriage was found to be not significantly different for women in the different religious groups.

Previous studies also have identified type of occupation as a significant predictor of age at marriage (Aryal, 2007). In this study occupation was categorised into three groups

namely students, working in the formal sector and working in the informal sector. However, the student group was removed from this analysis as none of the students was reported to have been married at the time of the survey. The results presented in Table 5.3 is on two categories of employment namely formal sector and informal sector employments. The results show that, the median age at first marriage was higher for women working in the formal sector (25 years) than for women working in the informal sector who married at 23 years. Age at marriage was also found not to be significantly different for women in the two occupational groups.

Furthermore, the results showing the Kaplan-Meier plots presented in Figure 5.11 seems to support this finding as the difference in timing of first marriage of similar ages for the two occupational groups is very small. This results is not consistent with a previous study by Goldin and Fatz (2014) in the United States where they observed that women's career paths significantly influenced age at first marriage. The study found that women employed in the professional careers married later than women employed in the non-professional careers. It is possible that unlike in United States where the women were engaged in the pursuit of professional and higher level careers, in Mahikeng Municipality, most of the women who work in the formal sector are engaged in low skill level and unskilled categories of the formal sector occupations.

Figure 5.11 Kaplan-Meier plots showing survivorship to age at first marriage by occupation



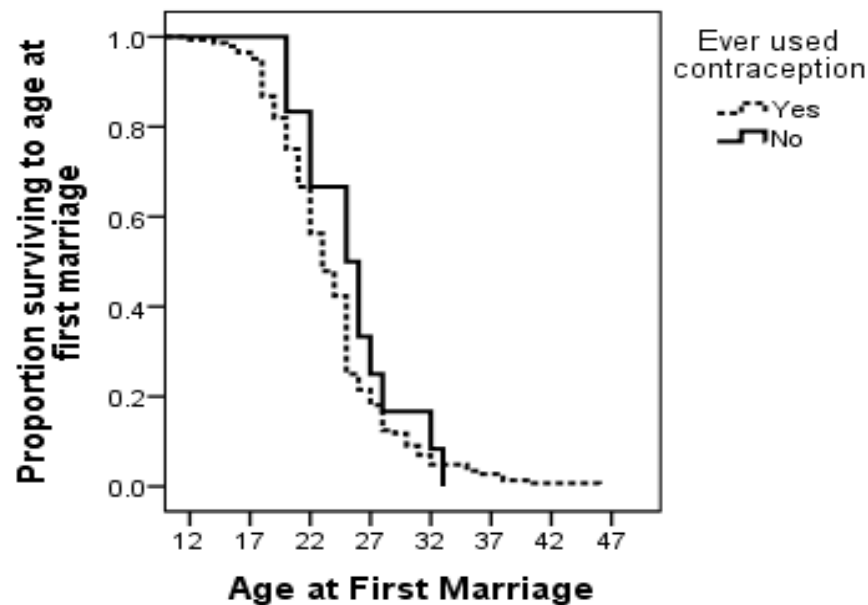
Table 5.4 present results on the effect of uptake of contraceptives on age at first marriage. Examining the effect of uptake of contraception was considered important as women who use contraceptives are likely to avoid unintended pregnancies which often drive women in marriage or union. The results show that uptake of contraceptives postponed the median age at first marriage by at least 2 years. Women who said they have ever used contraceptives previously, married on average at 25 years compared to those who have never used contraceptives. Previous uptake of contraceptives was significantly associated with the median age at first marriage with log rank $X^2=10.9$; $p=0.01$. These results are also consistent with a previous study by Goldin and Katz (2002) who found that uptake of contraceptives delayed age at marriage among college students who used contraceptives.

Table 5.4 Kaplan-Meier estimate of the median survival time to first marriage by contraceptive use

Socio-demographic characteristics	Median survival time to first marriage	95% C.I	Log Rank χ^2-value
Total	24	23.5-25.5	
Previous use of contraceptives			
Ever used	22	21.8-23.8	10.9; p=0.01
Never used	25	26.6-28.4	

The Kaplan-Meier plots describing differentials in timing of first marriage between women who have ever used and never used contraceptives is presented in Figure 5.12. The figure shows that indeed ever use of contraceptives appear to have had an effect on age at marriage. Women who have used contraceptives married later than those who have never used contraceptives at all ages. For example, Figure 5.11 shows that by 32 years of age, just over 80% of the women who reported that they have never used contraceptives were ever married compared to over 90% of the women who reported they have ever used contraceptives. This could be attributed to the effect contraception has in the prevention of unwanted pregnancies, which has been found to be one of the most common causes of early marriage among women. Most young women who get pregnant are often rushed into marriage mostly to protect the family name and honour, but also to protect the wellbeing of the women and their children.

Figure 5.12 Kaplan-Meier plots showing survivorship to age at first marriage by contraceptive uptake



5.3.3 Differentials in median age at first marriage by HIV AND AIDS factors

In Table 5.5, the median age at first marriage for women in the Mahikeng Local Municipality is presented by HIV factors of the women. The main objective of this section is to test the general hypothesis that HIV has impeded early age at first marriage. Specifically, the hypothesis tested in this section is: “women who perceived the risk of HIV infection to be high in marriage, married at older ages than women who perceived low or no risk of HIV infection in marriage.” Evidence on the effect of HIV and AIDS on the timing of marriage has been contradictory. The literature shows that some studies found that the risk of HIV infection are higher among women who married at a young age while others showed that the risk of HIV increased among women who delayed age

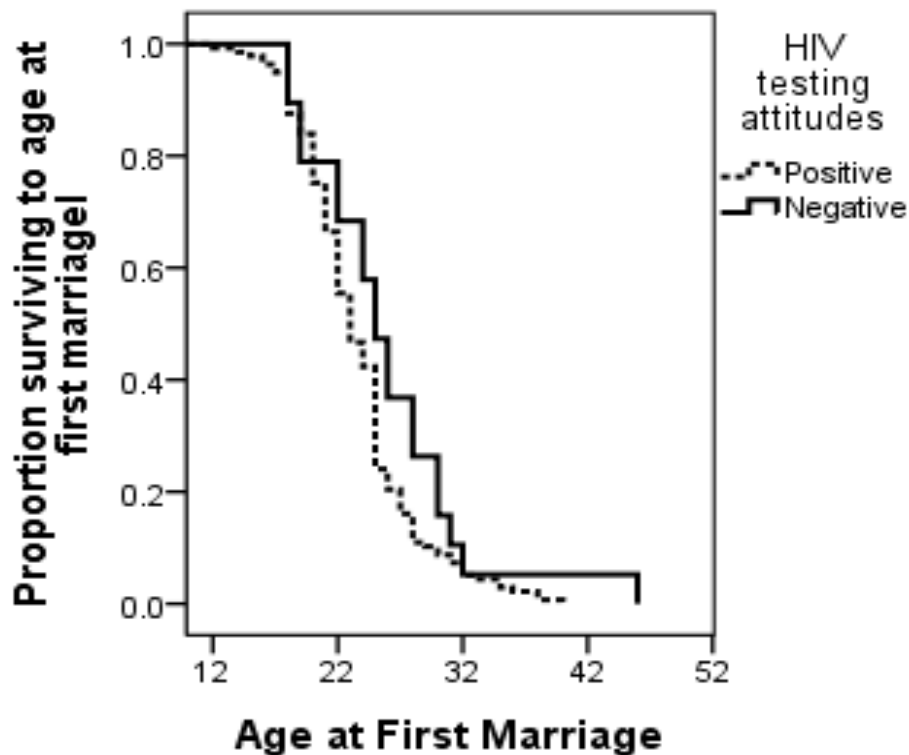
at first marriage. Other studies have also showed that the risk of HIV transmission to babies during childbearing is higher among women who married at a young age than among women who married at older ages. Although both groups of studies have their own merits, the present study examined whether or not age at marriage is influenced by HIV factors of the women including knowledge of ways of HIV transmission, attitudes regarding HIV testing, attitudes regarding HIV status disclosure to partners and perceptions of risk of HIV infection in marriage and perception of the risk of HIV transmission to babies during childbearing.

The effect of attitudes to HIV testing measured by willingness to test for HIV was assessed by asking the women whether or not they are willing to test for HIV and used to estimate its effect on the median age at first marriage. This is because HIV testing is encouraged for couples intending to marry. The results presented in Table 5.5 show that the median age at first marriage for women who had a positive attitude to HIV testing (willing to test for HIV) was 23 years and those who had a negative attitude to HIV testing (not willing to test for HIV) was 25 years. Women who reported a positive attitude to HIV testing married two years earlier than those who had a negative attitude to HIV testing. The result between the two groups of women are statistically significantly different with log rank $X^2 = 21.7$; $p = 0.01$.

Figure 5.13 also presents differentials in survivorship to age at first marriage for women at different ages by their attitudes to HIV testing. The figure shows that at each age women who expressed positive attitudes to HIV testing married earlier than those who expressed negative attitudes to HIV testing. By age 25 years, 85% of the women who

expressed positive attitudes to HIV testing were married compared to about 65% of the women who expressed negative attitudes to HIV testing.

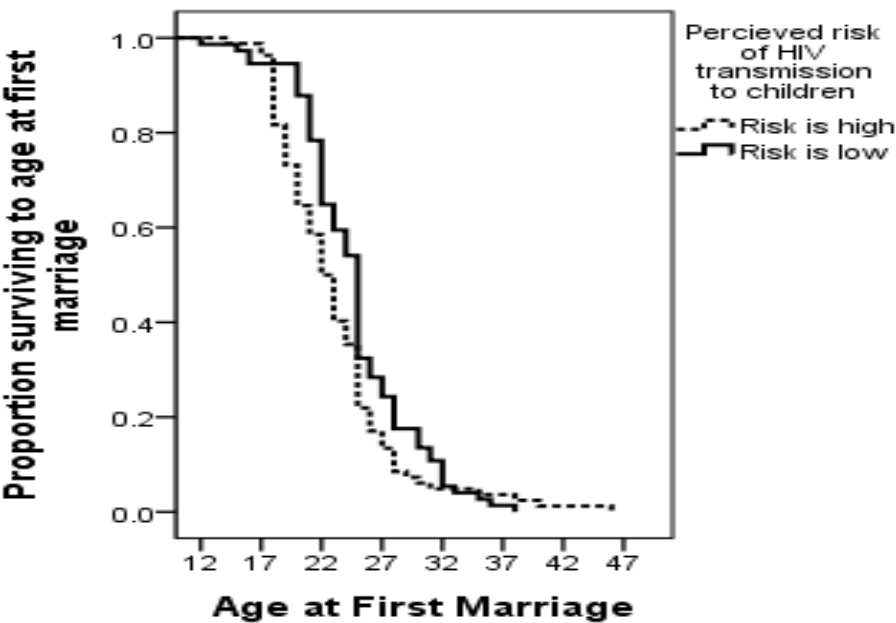
Figure 5.13 Kaplan-Meier plots showing survivorship to age at first marriage by HIV testing attitudes



The relationship between childbearing and HIV infection has been examined in sub-Saharan Africa. Some of these studies have found that women who initiate sexual activity early and start childbearing at a young age are at increased risk of contracting and transmitting HIV to their children (Rutenberg et al., 2003). This is because the conditions and behaviours that lead to childbearing are the same as those that lead to HIV infection, but also because the relatively under developed reproductive system in young women increase their risk of contracting and transmitting HIV. The differentials in the perceived

risk of HIV infection transmission during childbearing are presented in Table 5.5. The table shows

Figure 5.14 Kaplan-Meier plots showing survivorship to age at first marriage by perceived risk of HIV transmission to children during childbirth



that women who perceived the risk of HIV transmission to be high during childbearing, married at 25 years, two years later than women who perceived the risk of HIV transmission to be low or not at all during childbearing. Furthermore, Figure 5.14 shows that the perceived risk of HIV transmission in childbearing appears to influence the age at first marriage. By 25 years of age only 60% of the women who perceived the risk of HIV transmission to babies during childbearing to be high were ever married compared to nearly 80% of the women who perceived that the risk of HIV transmission to babies during childbearing is low or not at all. The differentials in the perceived risk of HIV

transmission in childbearing and age at first marriage was significant with log rank $X^2=10.1$; $p=0.01$.

Furthermore, the effect of perceived risks of HIV infection in marriage on age at first marriage was also examined. The results presented in Table 5.5 show that the median age at first marriage among women who perceived that the risk of HIV infection is high in marriage were married by 25 years of age which is 2 years later than women who perceived that the risk of HIV infection was low in marriage. The difference in the median age at first marriage between the women's perception of risk of HIV infection in marriage was statistically significant with log rank $X^2=13.9$; $p=0.001$.

Furthermore Figure 5.15 presents the Kaplan-Meier plot showing differentials of perceived risk of HIV infection in marriage by survivorship to age at first marriage. The figure shows that although the differences in first age at marriage between women who perceived the risk of HIV infection in marriage to be high and low or not all was small at lower ages (<20), the differences widened at older ages above age 20. By 23 years of age, the proportion of women ever married increased from about 20% and 22% among women who perceived the risk of HIV infection to be high and low respectively to nearly 50% and 62% respectively by 30 years of age.

Figure 5.15 Kaplan-Meier plots showing survivorship to age at first marriage by perceived risk of HIV infection in marriage

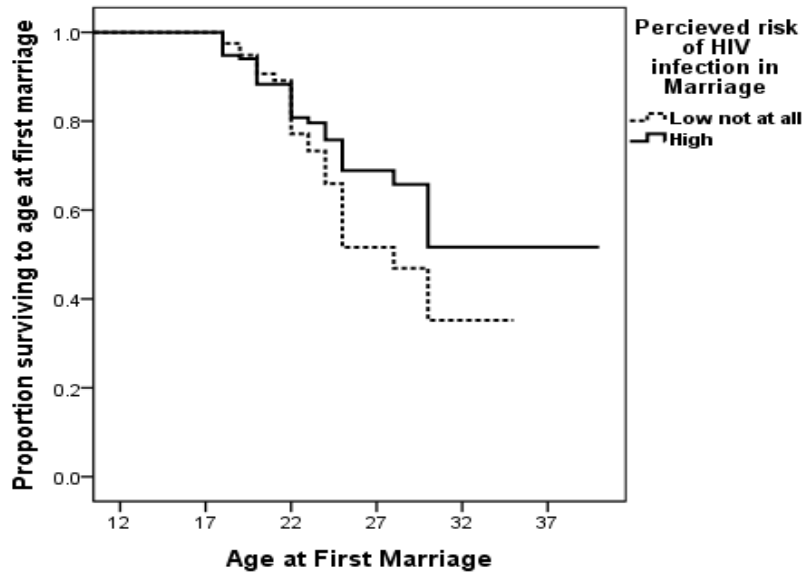


Table 5.5 shows that the differences in the median age at first marriage by attitudes to HIV status disclosure measured as willingness to disclose once HIV status to a sexual partner if they were to be infected. The results show that there was no statistically significant difference in the median age at first marriage between women who expressed positive attitudes to disclosure of their HIV status and those who expressed negative attitude to disclosure of their HIV status to their sexual partner if they were to be infected.

Table 5.5 Kaplan-Meier estimate of the median survival time to first marriage by HIV AND AIDS attitudes of women

Socio-demographic characteristics	Median survival time to first marriage	95% C.I	Log Rank χ^2 -value
Would marry a person with HIV			
Yes	24	23.2-24.7	0.19
No	25	17.8-32.1	
Attitudes to HIV testing			
Negative	24	23.2-24.7	21.27; p=0.01
Positive	22	20.6-22.3	
Attitudes to HIV status disclosure			
Negative	24	23.1-24.8	0.61
Positive	24	22.0-25.9	
Perceived risk of HIV infection in marriage			
High	25	24.3-27.7	13.9; p=0.001
Low or not at all	23	22.1-24.9	
Perceived risk of HIV infection in childbearing			
High	25	24.1-27.5	10.1; p=0.01
Low or not at all	23	22.1-23.4	
Total	24	23.5-25.5	Total

5.4 Risk factors of age at first marriage

The Cox's Proportional Hazard Model (PHM) was used to identify the correlates of age at first marriage. The hazard rates (HR) were estimated as the ratio of the number of women who were ever married at the time of the survey to the total number of women exposed to the risk of marriage. In this regard the assumptions of Cox Proportional Hazard Model which are that censoring is random and those censored at time t_i are representative of all subjects under study at time t_i (with the same covariate values) and

that the hazard functions for two different levels of a covariate are proportional for all values of t have been satisfied.

Women were regarded as having waited for a shorter duration to get married if the hazard rate was higher than 1.00. In the model, the dependent variable was ever married status which was obtained by asking the question: “Have you ever been married?” The women were coded “1” if they reported they were ever married and “0” if otherwise. The survival time variable is the age at first marriage measured as a continuous variable with a minimum of 16 years of age and a maximum of 34 years of age. The age at marriage was obtained by asking the question “How old were you when you got married for the first time?” Four PHMs were used to identify the risk factors of age at first marriage.

The first model examined was the association between marital status and socioeconomic factors of the women. In this analysis, the hypothesis “women in the richer socioeconomic neighbourhoods are more likely to have waited longer to be married than women in the poorer socioeconomic neighbourhood” was tested. Testing for this hypothesis is based on recent reports which indicated that marriage rates were falling because of the failure to find suitable men to marry by affluent and educated women, commonly referred to as the marriage markets effect in nuptuality studies. Additionally, the high cost of marriage indicated by the increasing bride price (lobola) is also reported to be impeding marriage in the poorer socioeconomic groups in South Africa.

The variables included in this model are: race categorised as Black, Coloured, Asian and White; childhood place of residence categorised as urban and rural; neighbourhood socioeconomic status categorised as richer and poorer; highest level of education

categorised as no/primary, secondary and tertiary education; and religion categorised as Catholic, Protestant, Traditionalist and Others (Muslims, Hindu and other minority groups). Occupation categorised as student, formal and informal sector work was also included in the analysis. The model fit was assessed by use of the Omnibus Test for Model Coefficient with the overall score of $X^2=28.4$, $p=0.004$ which shows that the model is a good fit.

The results of Model 1 presented in Table 5.6 show that the women were more likely to have married at a younger age if they were raised in rural areas (HR= 1.81, CI=1.13-2.88) than urban areas; if they lived in poorer socioeconomic neighbourhoods (HR=1.48, CI=0.31-0.74) than if they lived in the richer socioeconomic neighbourhoods; and if they had no/primary education (HR=2.89, CI=1.35-6.21) than if they had tertiary education.

Additionally, women who worked in the formal sector (HR=1.92, CI=0.04-0.20) and those who worked in the informal sector (HR=3.48, CI=2.11-5.72) were more likely to have married earlier than students. However, women who worked in the informal sector married earlier than women in the formal sector. Racial groups and religion were not significant risk factors of age at marriage in this population. Based on the results, we accept the hypothesis that “women in the richer socioeconomic neighbourhoods are more likely to have waited longer to be married than women in the poorer socioeconomic neighbourhood.” Although differentials in the risk of marriage revealed that Asians, followed by Coloureds and Whites married earlier than blacks, none of the races is a significant risk factor of early age at marriage.

Table 5.6 **Cox-Proportional Hazard Model indicating the socioeconomic risk factors influencing the timing of marriage in Mahikeng Local Municipality**

Socioeconomic variables	HR	CI
Racial groups		
Black	1.00	
Coloured	2.07	0.25-2.73
Asian	3.50	0.51-7.51
White	1.81	0.76-10.01
Childhood place of residence		
Urban	1.00	
Rural	1.81**	1.31-2.88
Neighbourhood socioeconomic status		
Richer	1.00	
Poorer	1.48****	0.31-0.74
Highest level of education		
No/primary	2.89****	1.35-6.21
Secondary	1.19	0.76-1.86
Tertiary	1.00	
Religious affiliation		
Catholic	2.11	0.79-5.61
Protestant	2.03	0.77-5.36
Traditionalist	2.41	0.84-6.86
Others	1.00	
Occupation of the women		
Student	1.00	
Formal sector	1.92*****	0.04-0.20
Informal sector	3.48*****	2.11-5.72

Key: * - <0.05; ** - <0.01; *** - <0.001; **** - <0.0001

Model 2 examined the effect of selected demographic variables on the timing of first marriage. The variables included in model are current age of the women categorised as 15-19, 20-34 and 35 years or older; age at sexual debut categorised as <18 and 18 years or older; age at first birth categorised as under 18, 18-24 and 25 years or older; and ever use of contraception which was categorised as ever used and never used contraceptives. The model fit was assessed by use of the Omnibus Test for Model Coefficient with the overall score of $X^2=144.9$, $p=0.000$ which shows that the model is a good fit.

Table 5.7 **Cox-Proportional Hazard Model indicating the demographic risk factors influencing the timing of marriage in Mahikeng Local Municipality**

Socioeconomic variables	HR	CI
Current age		
15-19	1.00	
20-34	0.74	0.39-1.39
35+	0.13*****	0.05-0.20
Age at sexual debut		
<18	1.00	
20+	1.12	0.67-1.88
Age at first birth		
<20	1.00	
20+	0.47***	0.28-0.78
Contraceptive use status		
Ever used	0.15*****	0.02-0.14
Never used	1.00	

Key: * - <0.05; ** - <0.01; *** - <0.001; ***** - <0.0001

The hypothesis tested in model is “women who had the first birth in teenage are more likely to have married earlier than women who had the first birth after teenage years”. This hypothesis is informed by the observation from previous studies that first birth can lead to marriage. This can occur under two conditions. Firstly in societies where premarital childbearing is not tolerated, girls who get pregnant are often forced into early marriage. On the other hand, getting pregnant is also a sign of the woman’s fertility which can lead sexual partners into formalizing relationships through marriage. In both of these cases, marriage can come sooner than expected.

In this model marrying early is ascertained if the HR is more than 1.00. The results of the analysis are presented in Table 5.7. The table shows that only age of all the demographic variables included in the model contributed significantly to marrying at younger ages. The results in the model show that compared to belonging to the age group 15-19, women were significantly more likely to have married at a younger age if they were aged 35 years

or older (HR=1.13, CI=0.05-0.20); and compared to those who had their first birth at less than 18 years, women who had the first birth at 20 years or older (HR=0.47, CI=0.28-0.75) were significantly less likely to have married early. The table also shows that women who reported they have ever used contraceptives are 0.15 times significantly less likely to have married at a younger age than women who have never used contraceptives. Age at sexual debut was not a significant risk factor of age at marriage. From the results in Table 5.6, we can reject the hypothesis that “women who had the first birth in teenage are more likely to have married earlier than women who had the first birth after teenage years”.

Model 3 examined the HIV related risk factors that could influence the timing of first marriage (table 5.8). The HIV related variables are those which have been identified to have an impact on the timing of marriage. They include attitudes to HIV testing categorised as positive and negative attitudes; attitudes to HIV status disclosure to sexual partners categorised as positive and negative attitudes; perceived risk of HIV infection in marriage categorised as high risk and low or no risk; and perceived risk of HIV transmission to children during childbearing categorised as high and low or no risk. The model fit was examined by use of the Omnibus Test for Model Coefficient with the overall score of $X^2=26.6$, $p=0.000$ which shows that the model is a good fit.

The hypothesis tested in Model 3 is “women who perceived the risk of HIV infection in marriage to be high waited longer than women who perceived low or no risk of HIV infection in marriage to get married.” The hypothesis is based on research findings in high HIV prevalence settings which indicated that women who marry at a younger age have an elevated risk of getting infected with HIV. This is because most women in these

societies who marry young get married to older men than themselves. Besides getting married to men who have already been exposed to HIV and are probably already infected with the virus, the sexual organs of young women are not appropriately matured, which could increase their susceptibility to infections including HIV. Young women also have no control over their sexuality, further increasing their risk of HIV infection in married. Based on these findings, women are counselled to delay marriage.

The results of Model 3 are presented in Table 5.8 showing that all the HIV variables included in the model are significant risk factors of the timing of marriage. The table shows that women who have a negative attitude to HIV testing were 51% (HR=0.49, CI=0.29-0.83) significantly less likely to have married at a young age. In addition, women who expressed a positive attitude to HIV disclosure to their sexual partners were 2.01 (CI=1.17-3.43) time significantly more likely to have married at a young age. The women were also significantly less likely to have married at a young age if they perceived a high risk of HIV infection in marriage (HR=0.80, CI=1.27-2.62); and less likely to have married at young age if they perceived a high risk of HIV transmission to children during childbearing (HR=0.62, CI=0.44-0.89). The above findings demonstrate that concerns regarding HIV infection are taken seriously by women in this population even though HIV may not be the only risk factor influencing marriage decisions. We therefore accept the alternative hypothesis that “women who perceived the risk of HIV infection in marriage to be low or none married earlier than women who perceived the risk of HIV infection in marriage to be high.”

Table 5.8 Cox-Proportional Hazard Model indicating the HIV risk factors influencing the timing of marriage in Mahikeng Local Municipality

Socioeconomic variables	HR	CI
Attitude to HIV testing		
Positive	1.00	
Negative	0.49***	0.29-0.83
Attitude to HIV status disclosure		
Positive	1.00	
Negative	2.01**	1.17-3.43
Perceived risk of HIV infection in marriage		
High		
Low/none	0.80**	1.27-2.62
	1.00	
Perceived risk of HIV transmission to children during childbearing		
High	0.62***	0.44-0.89
Low/none	1.00	

Key: * - <0.05; ** - <0.01; *** - <0.001; **** - <0.0001

In model 4, the risk factors to the timing of marriage are identified using socioeconomic, demographic and HIV related variables, presented in Table 5.9. The variables included in the model are those that are significant in Models 1, 2 and 3. Consequently, the following variables are included in Model 4: childhood place of residence, neighbourhood socioeconomic status, highest level of education, occupation, current age of the women, age at first birth, contraceptive use status, attitudes to HIV testing, attitudes to HIV status disclosure, perceived risk of HIV infection in marriage and perceived risk of HIV transmission to children during childbearing. As in the previous models, the model fit was assessed by use of the Omnibus Test for Model Coefficient with the overall score of $X^2=193.7$, $p=0.000$ which shows that the model is a good fit.

Results in Model 4 in Table 5.9 show that rural childhood place of residence (HR=1.75, CI=1.00-3.10); and neighbourhood socioeconomic status (HR=1.36, CI=0.28-0.83) remained significant risk factors of timing of marriage. However, their effects have been attenuated by 6% and 12% respectively. Therefore, the hypothesis that “women in the

richer socioeconomic neighbourhoods are more likely to have waited longer to be married than women in the poorer socioeconomic neighbourhood” has been confirmed.

Furthermore, Model 4 shows that the women were significantly more likely to have married earlier if they had no education (HR=1.63, CI=1.60-4.42), worked in the formal sector (HR=10.8, CI=3.91-15.28) and worked in the informal sector (HR=5.72, CI=2.30-10.89). However, the effect of no/primary education compared to tertiary in lowering age at marriage was attenuated by 126%. Compared to being a student, the effects of formal and informal sector work in lowering age at marriage was increased.

Table 5.9 **Cox-Proportional Hazard Model indicating the socioeconomic risk factors influencing the timing of marriage in Mahikeng Local Municipality**

Socioeconomic variables	HR	CI
Childhood place of residence		
Urban	1.00	
Rural	1.75**	1.00-3.10
Neighbourhood socioeconomic status		
Richer	1.00	
Poorer	0.48***	0.28-0.83
Highest level of education		
No/primary	1.63*	1.60-4.42
Secondary	0.88	0.51-1.53
Tertiary	1.00	
Occupation of the women		
Student	1.00	
Formal sector	10.8****	3.91-15.28
Informal sector	5.72***	2.20-10.89
Current age		
15-19	1.00	
20-34	0.91	0.47-1.76
35+	5.41****	2.63-11.13
Age at first birth		
<20	1.00	
20+	0.54***	1.28-3.57
Contraceptive use status		
Ever used	0.74****	0.02-0.19
Never used	1.00	
Attitude to HIV testing		
Positive	1.00	
Negative	1.33	0.65-2.73
Attitude to HIV status disclosure		
Positive	1.00	
Negative	0.70	0.34-1.46
Perceived risk of HIV infection in marriage		
High		
Low/none	0.59*	1.90-2.43
	1.00	
Perceived risk of HIV transmission to children during childbearing		
High	0.48*	0.52-0.95
Low/none	1.00	

Key: * - <0.05; ** - <0.01; *** - <0.001; **** - <0.0001

Model 4 also confirms that belonging to the age group 35 years or older significantly increased the risk of early married in this population by more than 5 (CI=2.63-11.13) times. The other demographic variables that delayed marriage was ever use of contraceptives (HR=0.74, CI=0.02-0.19). In Model 4, the perceived high risk of HIV infection in marriage (HR=0.59, CI=1.90-2.43) and perceived high risk of transmitting HIV to children during child bearing (HR=0.48, CI=0.52-0.95) as risk factors that reduced and delayed the timing of marriage respectively were confirmed. However, their effects were attenuated by 21% and 14% respectively. Based on this result, we accept the alternative hypothesis that “women who perceived the risk of HIV infection in marriage to be low or none married earlier than women who perceived the risk of HIV infection in marriage to be high.”

Other HIV variables, namely attitude to HIV testing (HR=1.33, CI=0.65-2.73) and attitude to HIV status disclosure to partners (HR=0.70, CI=0.34-1.46) were no longer significant risk factors of timing of marriage. The above results show that HIV does contribute to marriage decisions in this population. The result is consistent with the view that marriage is increasingly becoming an important risk factor for HIV transmission especially in discordant patterns and people are increasingly becoming aware of this risk. Nevertheless, we need to add that this by no means indicate that the perceived risks of HIV infections and transmissions are acting on their own in marriage decisions.

5.5 Summary

This chapter presented the results on the median age at first marriage and risk factors influencing the timing of marriage in Mahikeng Local Municipality. The chapter aimed at examining three hypotheses:

- i. “women in the richer socioeconomic neighbourhoods are more likely to marry later than women in the poorer socioeconomic neighbourhood”;
- ii. “women who have the first birth at <20 years are more likely to marry earlier than women who have the first birth at 20 years or older”; and
- iii. “women who perceive high risk of HIV infection in marriage marry later than women who perceive low or no risk of HIV infection in marriage.”

The results presented in the chapter show that indeed socioeconomic status which also determines neighbourhood residence is a significant risk factor in the timing of marriage. Women in the richer socioeconomic neighbourhoods in Mahikeng Local Municipality delayed marriage. The results also show that age at first birth is a significant risk factor in the timing of marriage. However, we accepted the alternative hypothesis which shows that age at first birth at 20 years or older delayed marriage. The effect of age at first birth (20 years or older) in the final model has been attenuated when it was subjected to the effects of other covariates respectively. This is notwithstanding the observation that premarital childbearing, often at younger ages, is common in this population. Finally, we also accept the alternative hypothesis on perception of risk of HIV infection in marriage. The finding shows that women who perceive the risk of HIV infection to be low or none in marriage married earlier than those who perceived high risk of HIV infection in marriage.

Other significant risk factors that reduced age at marriage are: rural childhood place of residence; having no or primary education; having a formal sector and informal sector work; and belonging to ages 35 years or older. Conversely, living in the richer socioeconomic neighbourhood, having the first birth at 20 years or older, ever use of contraceptives and perceiving a high risk of HIV transmission to children during childbearing delayed age at marriage. Delaying age at marriage has a number of benefits for women. The key benefits include increasing educational attainment, improving sexual and reproductive health, reducing maternal mortality, reducing childhood mortality and contributing to the general empowerment of women.

Chapter Six

Fertility levels, differentials and predictors

6.0 Introduction

Fertility is one of the three principal components of population dynamics. In this chapter estimate of level, differentials and predictors of current fertility are reported. Total fertility rate (TFR) is the most commonly used measure of current fertility. It is defined as the average number of children a woman would give birth to at the end of her reproductive life if she were subjected to the currently prevailing age-specific fertility rates (ASFRs) throughout her reproductive years (15-49). The ASFR is a measure of the age pattern of childbearing and defined as the number of live births to women in a particular age group divided by the number of women in that age group during the specified period. Children ever born (CEB) to a women, which is the mean number of children born alive to women in a particular age group, which is a measure of the lifetime fertility experience of a woman up to the time at which data were collected, can also be used to estimate current fertility. In this chapter, the mean number of CEB to all women in each age-group was used so as not to miss children born to women who were not married, which is common in the study population. It was also used because data needed to estimate TFR was not collected in the survey.

Fertility has declined in virtually all countries in the world, although the pace of the decline is different for each country and major world regions. While most developed nations have achieved low levels of fertility, many developing countries in sub-Saharan Africa are still struggling to attain the first stage of their fertility transition. The transition in sub-Saharan Africa is important because although pockets of fertility decline are now noticeable in a few countries, most countries in this region are still grappling with high fertility, which is responsible for the high population growth rate

in the continent. Information on current fertility is essential for monitoring population growth and population policies and programmes.

6.1 Background and theoretical framework

The demographic transition theory provides the main framework used in this chapter.

The theory provides that education, formal sector employment and urbanization are important determinants of fertility decline. The framework is based on observations of fertility trends of European populations early in the 20th century, which has been replicated elsewhere in the world especially in South East Asia and Latin American countries where fertility has declined in the last few decades. The theory asserted that participation in education is associated with lower fertility (Brockerhoff and Eu, 1993). The theory suggested that education of women compete with fertility and contributes to fertility decline in various ways: i) education contributes to lower fertility by increasing the number of years in school thereby increasing age at first marriage and reducing the duration of exposure to childbearing; ii) by inculcating low fertility values leading to lower number of children desired; and iii) by empowering women to take up contraception as a means of achieving their childbearing desires and achieving career plans.

The theory also showed that participation in the formal labour sector reduces fertility (Bongaarts, 1982) by enhancing career options and increasing the opportunity cost of frequent childbearing in terms of the income that would be lost by women due to childbearing. Differentials in fertility were also observed by rural-urban residence and neighbourhood socioeconomic status. Urban residence during childhood or later in adulthood was also associated with lower fertility (Goldstein and Goldstein, 1983), which could be attributed to changes in marital behaviour.

Changes in marriage patterns due to the effect of modernization experienced during the demographic transitions also contribute to fertility decline. Evidence in this era showed that delays in age at marriage significantly contributed to the lower fertility experienced in populations undergoing demographic transitions. The decline in fertility was attributed to the changes in marriage patterns characterised by delays in age at first marriage, declining proportion of married women and increasing prevalence of marriage dissolutions (Bongaarts and Porter, 1983).

A new dimension not hitherto examined is the effect of HIV on population fertility levels. Although there is now evidence indicating that HIV reduces fertility at the individual level, its effect on population fertility, especially in high HIV prevalence populations remains spurious.

The demographic transition theory is relevant in explaining the fertility levels, trends and differentials in South Africa. Although fertility decline in South Africa started in the 1960s, the pace of the decline has increased greatly in all racial groups since the 1980s. Among the black population, the pace of fertility decline increased dramatically in the post-apartheid era mostly attributed to the increasing availability of education for black women, opening up of the formal monetised labour sector and freeing the population from movement restrictions imposed by apartheid leading to a massive increase in rural-urban migration. This educational, formal sector employment and migration revolution greatly contributed to the changing patterns in marriage and fertility behaviour of black women.

Additionally, the high prevalence of HIV could have also contributed to the above changes due to the perceived risk of HIV infection in marriage and transmission of HIV to children during childbearing. Southern Africa has the most pervasive problem

of HIV in the world. The pandemic is high, generalized and widespread. The North West province of South Africa has the third highest HIV prevalence rate in the country, which is hypothesized to contribute to changes in fertility behavior leading to lower fertility. This chapter therefore examined and presents whether or not high prevalence of HIV have contributed to lower fertility observed in this study population by showing the differentials in fertility by selected socio-demographic and HIV factors. The chapter also presents the predictors of fertility by identifying the significant factors that affect the level of current fertility.

South Africa is perhaps the only country in sub Saharan Africa to have experienced a fertility transition from a TFR of 6 in the 1960s to 3 in the 1990s (Moultrie and Timeaus, 2003; Swartz, 2002; Rossouw et al, 2012) and further down to 2.4 at the end of 2013 (PRB, 2013). Although, fertility level is low in South Africa, research suggests that differentials exist across the races with blacks experiencing higher fertility than any other racial groups (Moultrie and Timeaus, 2003; Swartz, 2002; Palamuleni, 2013).

Low level of fertility reported in South Africa compared to other countries in sub-Saharan Africa region is attributed to three processes that appear to have impacted greatly on the proximate determinants of fertility, especially age at first marriage and uptake of contraceptives. These variables are the increasing population of women with secondary and higher education, the increasing proportion of women entering the formal employment sector and increasing rural-urban migration by women (Swartz, 2002; Moultrie and Timeaus, 2003). These three processes have contributed in various ways in increasing the age at first marriage, increasing uptake of contraceptives and abortion. The increase in uptake of contraceptives in particular has

been facilitated by the investments in family planning services delivery (Caldwell and Caldwell, 1993; Onyenson et al, 2013) during the apartheid period, to achieve apartheid population policy which viewed the growth of black population as a serious threat to the apartheid system. As a result of the widespread availability of contraceptives, CPR in South Africa now stands at more than 70%, which contributed to the delay in age at first marriage and fertility (Ayiga and Rampagane, 2013).

The North West province where Mahikeng Local Municipality is located, and where this study was carried out is one of the municipalities experiencing declining fertility. Fertility levels in the province declined since 1996 from 3.4 children per woman to 3.1 in 2001 and further to 2.4 in 2007. In this chapter, we estimated the level, differentials and identified the main predictors of current and lifetime fertility. In the analysis, we tested two hypotheses namely: “women with secondary and tertiary education have lower fertility than women with no or primary education” and “women who perceive the risk of HIV transmission to children during childbearing to be high have fewer children than women who perceive low or no risk of transmitting HIV to children during childbearing.” These hypotheses are based on the expectation that the expansion in education opportunities and the high HIV prevalence rate in the North West province now estimated at 18% in the general adult population could have contributed to fertility decline.

6.2 Data and their measurements

This was a cross-sectional study on marriage dynamics and fertility in the era of HIV AND AIDS in the Mahikeng Local Municipality. The dependent variable used in this chapter is CEB which represents the reproductive experience of women up to the time data were collected. It also reflects both current and past fertility behavior of the women. Data on childbearing patterns were collected in this study by asking each

woman a series of questions including the total number of CEB, the number of sons and daughters currently living with the mother, the number of children living elsewhere, and the number of children who were born alive but later died.

Data on the number of CEB was collected as a continuous variable by asking women to report the number of children they have ever given birth to which was later grouped during data analysis as : “0” for women who had no children; “1”, “2”, “3”, “4+”. The independent variables were demographic, socioeconomic and HIV variables associated with the women. The demographic variables comprised of age which was categorised into seven five year intervals of 15-19 ...45-49; age at first sex categorised as under 18 years and 18 years or older; age at first birth categorised as under 18, 18–24 and 25 years or older; and race/ethnicity which was categorised as Black, Coloured, White and Asian. Socioeconomic variables included in the analysis were place of childhood residence categorised as urban and rural; neighbourhood socioeconomic status categorised as richer and poorer; religious affiliation categorised as Christians, Traditionalists and other minority groups (Muslims, Hindu, etc); and occupation at the time of data collection categorised as student, formal and informal sectors. Use of contraceptives was also included in the analysis and was categorised as those who used and never used contraceptives.

Attitudes to HIV testing categorised as positive attitudes (willing to test for HIV) and negative attitudes (not willing to test for HIV); attitude towards disclosure of HIV status categorised as positive attitudes (willing to disclose HIV positive status to sexual partner if infected) and negative attitudes (not willing to disclose HIV positive status to sexual partner if infected); and perceived risk of HIV infection in marriage categorised as high risk and low or no risk were analysed. Perceived risk of HIV

transmission during childbirth categorised as high risk and low or no risk was also included in the analysis.

6.3 The socio-demographic profile of the women

This section presents the profile of the women on whom data were analyzed in this chapter. The profiles are presented by demographic, socioeconomic and HIV variables. The profile involved 605 women aged 15-49 years.

6.3.1 Distribution of women by demographic variables

In this sub-section, the demographic profile of the women are described by current age, age at sexual debut, age at first birth, Children Ever Born (CEB) and contraceptive use. The age of the women was categorised into seven 5 year intervals namely 15-19, 20-24, 25-29, 30-34, 35-39, 40-44 and 45-49. Overall, the proportion of the women, except for the 15-19 year age group, reduced with the increase in age of the women, which is an expected distribution. Figure 6.1 shows that the proportion of the women increased from 15.2% in the 15-19 year age group and peaked at nearly 22% in the 20-24 years age group. It then declined monotonically to 8.6% in the 45-49 year age group. Overall, the median age of the women was 28 years (Table 6.1).

Figure 6.1 Distribution of women in the reproductive ages by age in five year age groups



The age at sexual debut is another important determinant of fertility. In this study it is hypothesized that women who initiate sexual activity at younger ages (<18 years) have a higher number of CEB. In Table 6.1, the distribution of the women by age at sexual debut is presented. The table shows that the median age at sexual debut was 18 years and 4.1% of the women had not initiated sexual activity, 41% and nearly 55% of the women were less than 18 and 18 years or older respectively at sexual debut. Overall, the majority of the women in the study population were sexually active and the majority had sexual debut at older ages.

Table 6.1 **Distribution of women by demographic variables**

Demographic Characteristics	Percent	Number
Age		

15-19	15.2	92
20-24	21.8	134
25-29	19.5	118
30-34	14.4	87
35-39	11.1	67
40-44	9.4	57
45-49	8.6	52
Median age	28 (SD= 9.2)	
Age at first Sex		
Never Had sex	4.1	25
<18 years	41.0	248
18+	54.9	332
Median age	18 (SD=2.4)	
Age at first birth		
No Births	18.7	113
<18	29.3	177
18-24	40.2	243
25+	11.9	72
Median age	20 (SD=2.2)	
Children Ever Born (CEB)		
0	17.8	108
1	29.9	181
2	26.4	160
3	16.2	98
4+	9.6	58
Mean	1.9 (SD=1.2)	
Previous use of contraceptives		
Ever used	84.3	510
Never used	15.7	95
Total	100.0	605

Table 6.1 also presents the women by age at first birth and CEB. The table shows that 18.7% of the women had never given birth followed by 29% who had the first birth at less than 18 years. About 40% had the first birth at 18-24 years and only nearly 12% had the first birth at 25 years or older. The table also shows that the mean number of CEB was 1.9 and the proportion of the women decreased with increase in the number of CEB. The minority of the women (17.9%) had no children and nearly 30% and 26.4% had one child and two children respectively. Only 16.2% and 9.6% of the women had three and four or more children respectively.

Furthermore, Table 6.1 presents the distribution of the women by contraceptive behavior. The table shows that the proportion of women varied by contraceptive use behavior. The majority of the women, 84.3%, have ever used contraceptives and only 15.7% have never used contraceptives. Distribution of women by contraceptive use behavior is expected to influence the fertility of the women. A population in which contraceptive use is high is expected to have a lower fertility rate (Nalwadda, 2010), which is consistent with the fertility rate and contraceptive use prevalence in North West province of South Africa where CPR was estimated at 60.5% (STASA, 2010).

6.3.2 Distribution of women by socioeconomic variables

The distribution of the women by socioeconomic variables is presented in Table 6.2 by race, marital status, childhood place of residence, neighbourhood socioeconomic status, religion, level of education and occupation. Race is an important predictor of fertility. Previous reports in South Africa by STATSA shows that differentials in fertility in South Africa varied by race. Fertility rates are higher among Blacks than Coloureds, Whites and Asians. Table 6.2 shows the distribution of the study sample by race. The table shows that nearly 82% of the women were Black followed by 11.4% of Coloureds, 4.6% of Asians and 2.3% of Whites.

Table 6.2 Distribution of women by selected socioeconomic characteristics

Socio-economic Characteristics	Percentage	Number
Racial groups		
African	81.7	491

Coloured	11.4	69
Asian	4.6	28
White	2.3	14
Childhood place of residence		
Urban	34.2	207
Rural	65.8	398
Neighbourhood socioeconomic status		
Richer	51.9	314
Poorer	48.1	291
Highest Level of education		
No/Primary	6.8	41
Secondary	49.1	297
Tertiary	44.1	267
Marital Status		
Never Married	66.6	403
Ever Married	33.4	202
Religion		
Christian	76.5	463
Traditionalists	16.5	100
Others	6.9	42
Occupation		
Student	27.4	166
Formal sector	19.0	115
Informal sector	53.6	324
Total	100.0	605

Another important socioeconomic predictor of fertility is marital status. Ever married women are more likely than never married women to have higher fertility because they are exposed to the risk of conception in the absence of contraceptive use through exposure to regular sexual activity. In Table 6.2, the data shows that 66.6% of the women were never married and 33.4% were ever married at the time of the survey. This distribution indicates that the marriage rate in this population is low which has been observed by a previous study (Palamuleni, 2011).

Furthermore, Table 6.2 presents the distribution of women by their childhood place of residence and neighbourhood socioeconomic status. Childhood place of residence have implications on fertility of women with those who lived in rural areas in childhood having higher fertility than those who lived in urban areas in childhood

(Osei-Hwedie and Osei-Hwediei, 1992). Data presented in Table 6.2 shows that the majority of the women (65.8%) lived in rural areas in childhood. Only 34.2% lived in urban areas in childhood.

Previous studies in sub-Saharan Africa including South Africa indicate that education is one of the most important predictors of fertility. Women with tertiary or secondary education were found to have lower fertility than women with no or primary education (Kravdal, 2002). Table 6.2 describes the distribution of the women by level of education. The table shows that the majority of the women attained secondary education (49.1%) followed by 44.1% who attained tertiary education. Only 6.8% of the women attained no or primary education. Overall, the distribution of the women shows that they are relatively better educated.

Religion has also been found to be an important socioeconomic predictor of fertility. The distribution of the women by religion is presented in Table 6.2 showing that the majority of the women are Christians (76.5%) followed by Traditional African believers (16.8%). Only 6.9% of the women belonged to other minority religious groups (Muslims, Hindi, etc).

Regarding occupation, previous studies identified occupation as one of the predictors of fertility in developing countries (Budig, 2003). The distribution of the women by occupation is presented in Table 6.2 showing that 53% of the women were employed in the informal sector and 27% of the women are students. Only 19% of the women were employed in the formal sector.

6.4 Distribution of women by HIV variables

This section describes the profile of the women by selected HIV characteristics, including attitudes to HIV testing, attitudes to HIV status disclosure to sexual partners

if one were infected, perception of the risk of HIV infection in marriage and the perception of the risk of HIV transmission to children during childbearing. This profile is presented in Table 6.3.

The HIV related variables of the women are important predictors of fertility. This is because HIV is one of the sexually transmitted infections that have a serious impact on the reproductive health of the population in general and that of women of reproductive age in particular. The mostly sexual nature of HIV transmission directly and indirectly affects fertility by reducing the reproductive efficacy of infected individuals, reducing the desire for childbearing among infected individuals and by reducing the marriage rate in large HIV epidemics.

Table 6.3 presents the distribution of the women by knowledge of how HIV is transmitted. As expected in large HIV epidemics, the table shows that the majority, nearly 87% of the women reported positive HIV testing attitudes; nearly 84% reported positive HIV status disclosure to sexual partners if they were infected; and 57% of the women reported they perceived the risk of HIV infection in marriage to be low or none which is expected to affect fertility through the marriage rate in this population. Table 6.3 also shows that nearly 55% of the women perceived a low risk or no risk of HIV transmission to children during childbearing, which is expected to affect fertility by lowering the desire for children among HIV infected individuals.

Table 6.3 Distribution of women by selected HIV related variables

HIV AND AIDS Characteristics	Percent	Number
Attitudes to HIV testing		
Positive	86.8	525
Negative	13.2	80
Attitudes to HIV status disclosure to partner		
Positive	83.8	507

Negative	16.2	98
Perceived risk to HIV infection in marriage		
High	43.0	260
Low or not at all	57.0	345
Perceived risk of HIV transmission in childbearing		
High	45.1	273
Low or not at all	54.9	332
Total	100.0	605

6.5 Estimation of Parity Progression Ratio (PPR)

TFR is a cross – sectional index that measures fertility at any one point in time, and approximate it to the expected completed fertility of all women in the childbearing age groups. However, there are differentials in TFR by age groups as TFR takes a cohort dimension to account for the tempo of fertility change, as women progress the reproductive ages of 15 to 49 years. The TFR may remain unchanged, but there may be changes in the ages at which women give birth (Hinde, 1998; Sahoo, 2009; Gould, 2015).

In this study TFR was estimated from the Parity Progression Ratios (PPRs) expressed as TFR_{PPRs} instead of the convectional Age Specific Fertility Rate denoted as TFR_{ASFR} . Retherford et al (2006) stated that ASFRs are not the ideal measures of TFR as the decision for a woman to have the next child does not depend on her age. ASFR also does not reveal the proportion of females in a population who do not proceed to the next birth after having a specific number of children (Yadava and Kumar, 2011).

A woman's parity is defined as the number of children that she has given birth to. On the other hand, Parity Progression Ratio (PPR) is defined as the proportion of women of a specified parity who eventually move to the next parity during their lifetime (Sahoo, 2009). PPR is simply defined as the probability that a woman has an (+1st)

birth given that she already has had i births. The TFR for the women in this study has been calculated using the formula stated below (Sahoo, 2009):

$$TFR = \frac{p_0 + p_0 p_1 + p_0 p_1 p_2 + p_0 p_1 p_2 p_3 + p_0 p_1 p_2 p_3 p_4 + p_0 p_1 p_2 p_3 p_4 p_5}{1 - p_5 +} \quad 6.1.$$

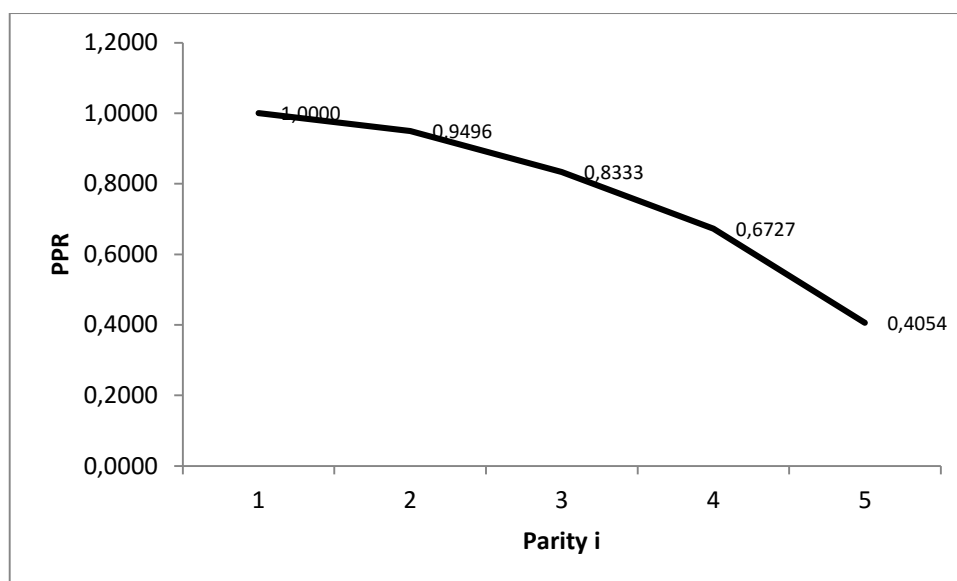
The calculated TFR is presented in table 6.4.

Table 6.4 Calculation of Parity progression from parity distribution of women aged 45 – 49

Parity i	W_i	P_i	Cumulated P_i	PPR
0	2	0	139	1.0000
1	7	7	139	0.9496
2	11	22	132	0.8333
3	12	36	110	0.6727
4	11	44	74	0.4054
5+	6	30	30	
TFR				2.7

The estimated TFR of the study population is presented in Table 6.4 showing that the estimated TFR from the PPR is 2.7 children per woman. For women who have never given birth, there is 95% (0.9496) chance that they will have a child. There is also a 95% (0.9496) chance that a woman aged between 45 and 49 has a second birth given that she has had a first birth. Furthermore, women aged between 45 and 49 years of age have 83% (0.8333) chance of giving birth to a third child given that she has already had the second child. The table further showed that the women have a 67% (0.6727) and 41% (0.4054) chance of having the 4th and 5th child respectively given that they already had the third and fourth children.

Figure 6.2 Parity progression Rate from parity distribution of women aged 45–49



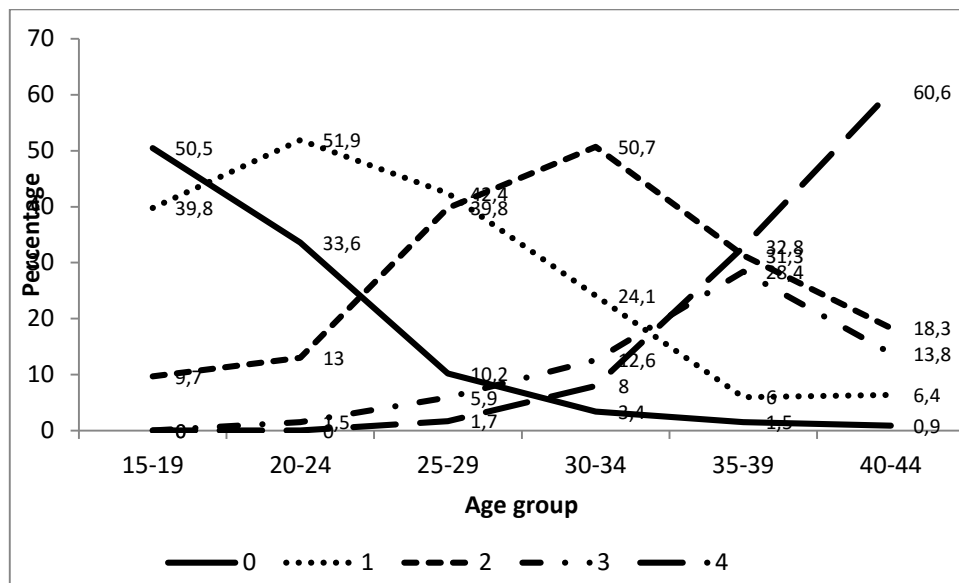
6.6. Differentials in children ever born

This section discusses differentials in CEB by demographic, socioeconomic and HIV variables of the women.

6.6.1 Differentials in CEB by demographic variables

Age is an important variable in examining differentials in fertility. This is because fertility level varies by age such that women in the older age groups are expected to have more children than women in the younger age groups. This is because women in the older age group, other factors remaining constant, would have had a longer exposure to the risk of childbearing than women in the younger age groups. Figure 6.3 and Table 6.4 present differentials by age groups showing that as expected, the number of CEB increased with age group of women. The table shows that 51.1% of the women in the 15-19 year age group had no children and the proportion of women with no children decreased as age increases to 45-49 where only about 2% of the women had no children. Conversely, the proportion of women with 4 children increased from no children in the 15-19 year age group to 60.6% among women aged 40-49 years of age.

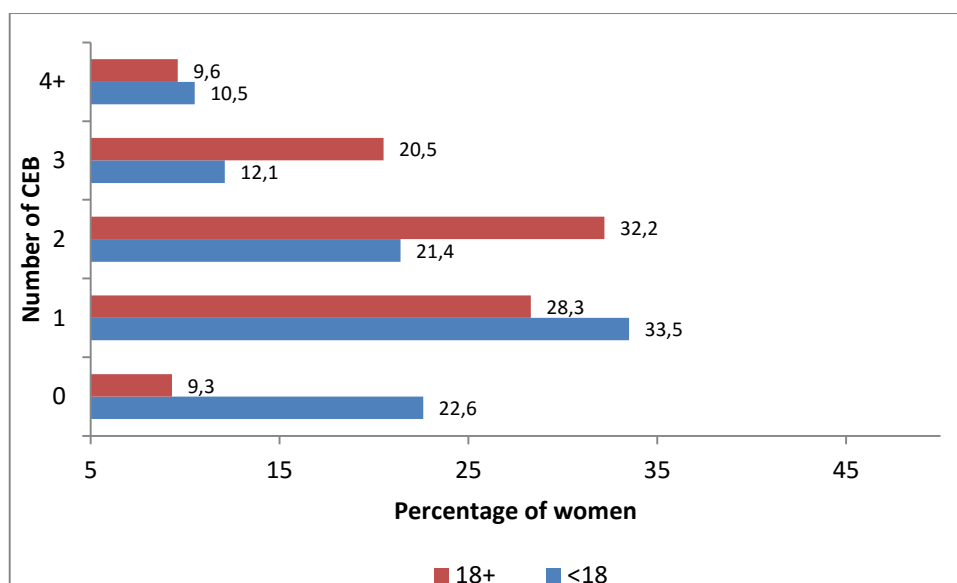
Figure 6.3 Percentage distributions of women by age groups and CEB



The results presented in Table 6.4 shows that age groups and CEB are significantly associated with $\chi^2=480.4$; and $p=0.000$.

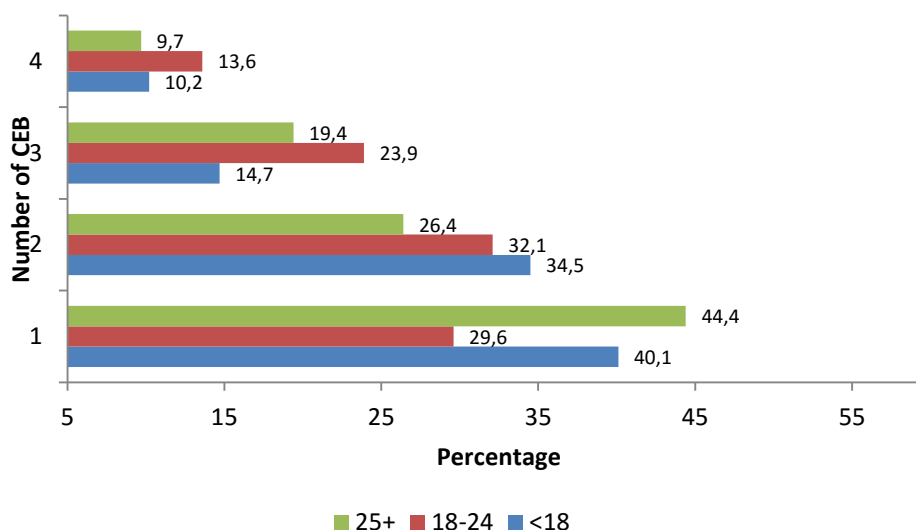
Age at sexual debut is one of the important determinants of fertility. A young age at sexual debut increases fertility rate in the absence of contraception because apart from having a longer exposure to the risk of child bearing, women who initiate sexual activity at a young age also marry early and are frequently subjected to marital childbearing compared to women who delay sexual debut. Figure 6.4 and Table 6.4 present data on the differentials in CEB by age at sexual debut showing that more women regardless of the age at sexual debut had fewer children. The table shows that the majority of the women who initiated sexual activity at less than 18 years (32.8%) and 18 years or older (35.1%) had only one child. In contrast only 10.5% and 9.6% of the women who initiated sexual activity at less than 18 years and 18 years or older had four or more children. The results show that age at sexual debut is not significantly associated with CEB with $\chi^2=11.9$; $p=0.018$.

Figure 6.4 Percentage distributions of women by age at sexual debut



Age at first birth is also an important determinant of fertility. In societies where age at first birth is low, the number of CEB has been observed to be higher in the absence of contraception (Mpoup and Saha, 1998). This is because women who initiate childbearing at a young age are exposed to the risk of childbearing for a long time by the end of their reproductive ages. Figure 6.5 and Table 6.4 present data on the differentials in CEB by age at first birth showing that more women regardless of the age at first birth had fewer children. The table shows that the majority of the women who initiated childbearing at less than 18 years (40.1%), 18-24 year (29.6%) and 25 years or older (44.4%) had only one child. In contrast only 10.2%, 13.6% and 9.7% of the women who initiated childbearing at less than 18 years, 18-24 years and 25 years or older had four or more children respectively. The results indicate that most women in this study population who initiated sexual activity at an older age had fewer children. The results show that age at first birth is significantly associated with CEB with $\chi^2=17.2$; and $p=0.028$.

Figure 6.5 **Percentage distributions of women by age at first birth and CEB**



Differentials in CEB by contraceptive use status are presented in Table 6.4. The table shows that overall 35.8% and 63.7% of the women who never used and ever used contraceptive method respectively have ever given birth. Childbearing is more common among women who ever used contraceptive than those who never used contraceptive. For instance, among women who ever used contraceptive, 34.1% and 24.9% had given birth to one and two children respectively while only 12.0% and 8.8% have given birth to three and four or more children respectively. Conversely, the proportion of women who have never used contraceptives but have given birth to one, two, three and four or more children is 30.5%, 22.1%, 8.4% and 5.3% respectively. Just over 20% and 33.7% of the women who ever used and never used contraceptives respectively have not given birth. The results suggest that most women who reported using contraceptives started to do so after having given birth. In this regard it was likely that contraceptives were used as a method of preventing further childbearing or for purposes of child spacing. Contraceptive uptake and CEB are statistically significantly associated with $\chi^2=10.2.0$; $p=0.048$.

Table 6.5 Differentials in children ever born by selected demographic characteristic of women

Demographic characteristics	0	1	Children ever born			4+	Total	X²
			2	3				
Age group								
15-19	50.5	39.8	9.7				92	480.4; p=0.000
20-24	33.6	51.9	13.0	1.5			132	
25-29	10.2	42.4	39.8	5.9	1.7		118	
30-34	3.4	24.1	50.7	12.6	8.0		87	
35-39	1.5	6.0	31.3	28.4	32.8		67	
40-49	0.9	6.4	13.3	13.8	60.6		109	
Age at first sex								11.9; p=0.018
<18	22.6	33.5	21.4	12.1	10.5		238	
18+	9.3	28.3	32.2	20.5	9.6		328	
Age at first birth								
<18	-	40.2	34.5	14.7	10.2		177	17.2; p=0.028
18-24	-	29.6	32.1	23.9	13.6		243	
25+	-	46.4	25.4	18.4	9..7		72	
Contraceptive use								
Ever used	0.7	35.1	33.0	18.6	12.6		430	7.2; p=0.037
Never used	0.0	40.7	20.1	29.0	6.5		62	
Total	40.7	21.7	20.3	10.4	6.9		100.0	Total

6.6.2 Differentials in CEB by socioeconomic variables

In this section, differentials in CEB are presented by race, marital status, religion, and childhood place of residence, current place of residence, level of education and occupation of the women. Studies on differentials in fertility by race in South Africa have shown that fertility has always been lower among Whites followed by Asians, Coloureds and Blacks (Rossouw, Burger

and Burger, 2012). Fertility rates among whites and Asians have already reached below replacement level while those among Coloureds and Blacks are still above replacement level. In Table 6.5, the differentials in CEB are presented by race. The table shows that the majority of women who had no children were black (16.5%) followed by Coloureds (10.8%), Whites (7.1%) and Asians (3.7%). However, as the number of children increased, Black women had more children than Coloureds, Whites or Asians. For example, more black women had given birth to four or more children than Coloureds, Whites or Asians.

These results are consistent with what is expected probably because of the higher fertility among blacks and the predominantly black sample in this study most of who could have started childbearing early. It is also likely that apart from regulating their childbearing by use of contraceptives, the small sample size of Whites and Asians could have biased the results. The results show that race is statistically significantly associated with the number of CEB in this study sample with $\chi^2=34.4$ and $p=0.018$.

Table 6.5 also presents differential in CEB by childhood place of residence of the women. The table shows that at all levels of CEB, women who lived in urban areas in childhood had fewer children than women who lived in rural areas in childhood. While 23.7% of the women who lived in urban areas in childhood reported they had no children, only 14.8% of the women who lived in rural areas in childhood reported they had no children. The proportions reporting having one child is 34.3% in urban areas compared to 27.6% in rural areas; the proportion reporting having two children is 23.7% in urban areas compared to 27.9 in rural areas; and the proportion reporting having three and four or more children is 13.5% and 4.8% in urban areas compared to 17.6% and 12.1% in rural areas respectively. The result shows that childhood place

of residence and CEB are statistically significantly associated with $\chi^2=17.7$ and $p=0.001$.

Furthermore, differential in CEB by level of education is presented in Table 6.5. The table shows that CEB varied with the level of education indicating that the number of CEB decreased with higher levels of education which has been observed in a previous study (Ayiga and Lwanga, 2014). This is the expected pattern because education is an important predictor of fertility level and affects the level of fertility in three ways. Firstly, more educated women stay longer in school which enables them to delay the age at onset of childbearing, thereby contributing to lowering their fertility. Secondly, education imparts values, norms and aspirations that are inconsistent with large family sizes and increases the use of contraceptives among educated women. Thirdly, more educated women are more likely to gain access to work outside the home which is incompatible with frequent childbearing. Table 6.5 shows that the majority of the women who had primary and no formal education (46.3%) had at least three children compared to only 13.8% and 14.2% of women who had secondary and tertiary education respectively. About 9.8%, 17.5% and 19.5% of the women with no/primary, secondary and tertiary education had never given birth respectively. The results show that education is significantly associated with CEB with $\chi^2=37.2$ and $p=0.000$.

Marriage is an important proximate determinant of fertility as it increases the risk of conception for married women. Although childbearing takes place among non-married women in South Africa, in the absence of contraception, married women bear more children than their unmarried counterparts (Amoateng, 2004; Bongaarts and Potter, 1983). As a result, early, enduring and universal marriage has been associated with high fertility. Differentials in CEB by marital status show that 48.1% of the women who have never married had no children compared to only 4.5% of ever married women. The reverse pattern was observed for two, three and four or more CEB. The percentage of women who had only one child is higher among never married women (33.5%) than ever married women (28.3%). As the number of CEB increased, the proportion of women ever married also increased to 32.6% for women with two children before declining to 21.2% and 13.3% for women with three and four or more children respectively. Conversely, the proportion of never married women decreased to 12.4% among women with two children, 4.9% among women with three children and 1.1% among women with four or more children. The result indicates a significant relationship between marital status and CEB with $\chi^2=198.8$; $p=0.000$.

Occupation is also one of the most important determinants of fertility mainly because fertility declines as income rises. Higher income increases the demand for quality rather than quantity of children (Becker, 1981). It has been noticed in this study that female employment is associated with fertility as the majority of the women employed in both informal and formal sectors reported fewer CEB. As expected, the majority of students had no children (45.8%) compared to 8.3% and 4.3% of the women working in the informal

Table 6.6 **Differentials in in children ever born by selected socioeconomic characteristic of women**

Socioeconomic characteristics	Children ever born					Total	X ²
	0	1	2	3	4+		
Racial groups							
Blacks	16.5	32.1	24.1	9.5	17.9	474	24.3; p=0.018
Coloureds	10.8	21.5	43.1	10.8	13.8	65	
Asian	3.7	40.7	48.1	3.7	3.7	27	
Whites	7.1	42.9	28.6	7.1	14.3	14	
Childhood place of residence							
Urban	23.7	34.3	23.7	13.5	4.8	207	17.7; p=0.001
Rural	14.8	27.6	27.9	17.6	12.1	398	
Neighbourhood socioeconomic status							
Richer	14.9	32.3	28.1	8.3	16.5	303	1.0; p=0.908
Poorer	15.2	53.6	26.7	10.5	17.0	277	
Level of education							
No/primary							37.2; p=0.000
Secondary	9.8	7.3	26.8	46.3	9.8	41	
Tertiary	17.5	29.3	28.6	13.8	10.8	297	
	19.5	34.1	24.0	14.2	8.2	267	
Marital Status							
Never married	48.1	33.5	12.4	4.9	1.1	185	198.8; p=0.000
Ever married	4.5	28.3	32.6	21.2	13.3	420	
Religion							
Christians	14.9	31.8	25.7	9.9	17.8	444	10.9; p=0.539
Traditionalists	19.2	28.3	31.3	9.1	13.1	99	
Others	8.1	37.8	37.8	2.7	16.5	37	
Occupation							
Student	45.8	38.0	12.7	1.8	1.8	166	186.6; p=0.000
Formal sector	4.3	14.8	32.2	29.6	10.2	115	
Informal sector	8.3	31.2	31.5	18.8	19.1	324	
Total	40.7	21.7	20.3	10.4	6.9	100.0	Total

and formal sectors respectively. Women with two children comprised of only 12.7% among students, 32.2% among women who work in the formal sector and 31.5% among informal sector workers respectively. For the women who had four or more children, only 1.8% are students compared to 10.2% and 19.1% who work in the formal and informal sectors respectively. The association between occupation and CEB is statistically significant with $\chi^2=186.2$; $p=0.000$.

Religion as a determinant of fertility has been at the forefront of demographic research. For example, Catholics have often been reported to have higher fertility than Protestants. Higher fertility amongst Catholics has been attributed to the prohibition of the use of modern contraceptives by Catholics. However, the pattern of fertility by religious groups in different countries is changing. For example, Zhang (2008) found that the fertility gap among religious groups has been decreasing in United States of America. Table 6.5 describes differentials in CEB among three religious namely Christians, Traditionalists and other minority religious groups. The table shows that nearly 18%, 18% and 8% of Christians, Traditionalists and other religious groups had no children respectively. Christians reported a slightly higher proportion of women with four or more children (17.8%) than other religious groups. However, the relationship between religion and CEB is not statistically associated.

6.6.3 Differentials in CEB by HIV variables

In Table 6.6 differentials in children ever born by HIV variables including attitudes to HIV testing, attitudes to HIV status disclosure to sexual partners, perceived risk of HIV infection in marriage and perceived risk of HIV transmission to children during childbearing are presented. The table shows that CEB is statistically not significantly associated with attitudes to HIV status disclosure ($p = 0.104$). However, CEB varies by the attitudes of the women to HIV status disclosure with 16.4% and 25.5% of the women with negative and positive attitudes to HIV status disclosure respectively reporting that they have not given birth. The proportion of women who gave birth to one, two, three and four or more children decreased with the increase in the number of children ever born for women with positive and negative attitudes to HIV testing. However, the proportion of women with two, three and four or more children is lower for women who reported negative attitudes to HIV Status disclosure to sexual partners

than women who reported positive attitudes to HIV status disclosure to sexual partners.

Table 6.6 also shows that the number of CEB varied by perceived risk of HIV infection in marriage. Nearly 23% of the women who perceived a high risk of HIV infection in marriage had no children compared to 14.2% among women who perceived a low or no risk of HIV infection in marriage. However, the proportion of women who had one, two, three and four or more children declined from about 29% to nearly 26%, 16% and 7% respectively among women who perceived high risk of HIV infection in marriage compared to 30.4%, 27%, 16.5% and nearly 12% respectively among women who perceived low or no risk of HIV infection in marriage. The results show that perceived risk of HIV infection in marriage and CEB are significantly associated with $X^2 = 10.9$ and $p = 0.031$.

Furthermore, Table 6.6 presents the differentials in perceived risk of HIV transmission to children during childbearing and the number of CEB. Previous studies showed that risk of HIV transmission is high during childbearing (Taha, 2011), but these studies did not show effect of perceived HIV risk of HIV transmission children on CEB. In this analysis it is hypothesized that “women who perceived high risk of HIV transmission to children during childbearing would have fewer children than women who perceived low risk or no risk of HIV transmission to children during childbearing.” The table shows that the proportion of women decreased with the number of CEB regardless of the perceived risk of HIV transmission to babies during childbearing. Nearly 20% and about 15% of the women who perceived no risk of HIV transmission and high risk of HIV transmission in childbearing respectively had no children. As the number of CEB increased from one, to two, three and four or more,

the proportion of women who perceived high risk of HIV transmission to children reduced from nearly 27% to 26%, 20% and 13% respectively. Conversely, the proportion of women who perceived low or no risk of HIV transmission to children during childbearing also reduced from 32.5% to about 27% among women with one and two children respectively before declining further to 13.3% and 7.2% among women who had given birth to three and four or more children respectively.

The results show that the proportion of women with two or more children was higher among women who perceived high risk of HIV transmission to children during childbearing. The results also show that number of CEB was statistically significantly associated with the perceived risk of HIV transmission to children during childbearing with $X^2 = 11.7$ and $p = 0.020$. Although variations in the number of CEB have been observed by attitudes to HIV testing, the two variables are not statistically associated at the bivariate level ($p = 0.139$).

Table 6.7 Differentials in children ever born by selected HIV characteristic of women

Socioeconomic characteristics	Children ever born					Total	X ²
	0	1	2	3	4+		
Attitudes to HIV testing							
Positive	19.0	29.5	25.7	15.4	10.3	525	6.9
Negative	10.0	32.5	31.3	21.3	5.0	80	p=0.139
Attitudes to HIV status disclosure to partner							
Positive	16.4	29.4	28.0	16.8	9.5	507	7.4;
Negative	25.5	32.7	18.4	13.3	10.2	98	p=0.104
Perceived risk to HIV infection in marriage							
High	22.7	29.2	25.8	15.8	6.5	260	10.7;
Low or none	14.2	30.4	27.0	16.5	11.9	345	p=0.030
Perceived risk of HIV transmission in childbearing							
High							
Low or none	15.4	26.7	25.6	19.8	12.5	273	9.6;
	19.9	32.5	27.1	13.3	7.2	332	p=0.046
Total	22.1	33.7	24.5	11.4	8.3	100.0	

6.7 Differentials in Mean Parity

In section 6.9, the differentials in mean parity (MP) by demographic, socioeconomic and HIV variables of the women are presented. Fertility as one of the three principal components of population dynamics is expected to be affected by the demographic and socioeconomic attributes of the women, and the prevailing large HIV pandemic in the Mahikeng Local Municipality.

6.7.1 Differentials in MP by demographic variables

In this section differentials in Mean Parity (MP) are described by selected demographic factors including age group of women, age at sexual debut, age at first birth and contraceptive use. Figure 6.6 and Table 6.8 present differentials in MP by age group of the women. The data in the figure and table shows that overall MP was 1.80. As expected, MP increased with increase in the age group of the women. MP increased from 0.6 in the 15-19 age groups to 4.1 in the 45-49 years age group. A

trend line fitted in Figure 6.4 shows that MP is significantly associated with age group of the women with $R^2 = 0.980$. Differentials in MP also show that MP is significantly different for women in the different age groups at $X^2=453.6$, $p=0.000$.

Table 6.8 Differentials in MP by demographic variables

Demographic characteristics	Number of women	Mean Parity	X^2
Age group			
15-19	92	0.6	453.6, $p=0.000$
20-24	132	0.8	
25-29	118	1.5	
30-34	87	2.0	
35-39	67	3.0	
40-44	57	3.6	
45-49	52	4.0	
Age at first sex			
Never had sex	25	-	28.1, $p=0.000$
<18	248	1.59	
18+	332	2.09	
Age at first birth			
Never gave birth	113	-	18.6, $p=0.046$
<18	177	2.03	
18-24	243	2.33	
25+	72	2.19	
Number of children desired			
0	59	0.56	264.9, $p=0.000$
1	101	1.19	
2	250	1.70	
3	77	2.35	
4+	118	2.81	
Previous contraceptive use			
Ever used	509	1.84	24.0, $p=0.000$
Never used	95	1.64	
Total	605	1.80	

Figure 6.6 Mean parity of the women by age group

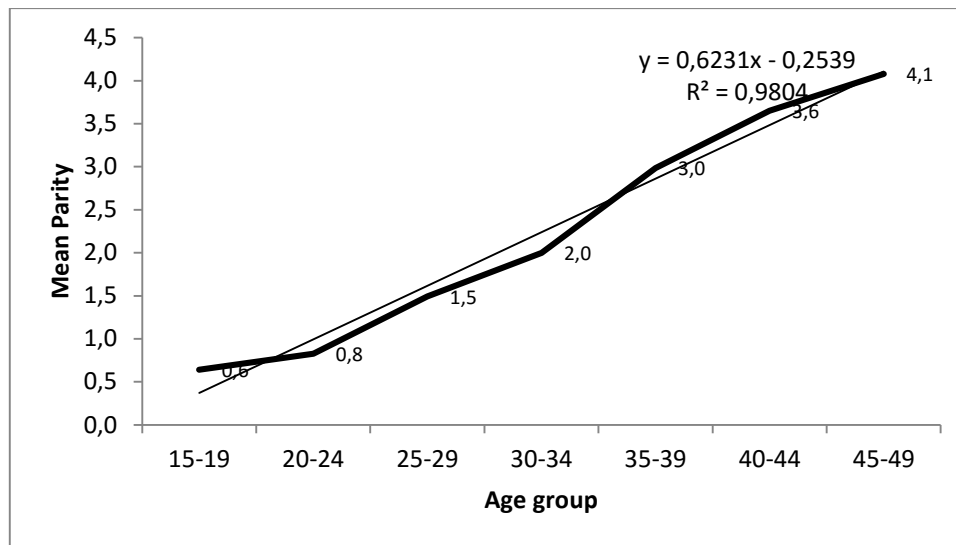


Table 6.8 also presents differentials in MP by age at sexual debut. The table shows that MP increased with increase in age at sexual debut. MP increased from 1.56 among women who were less than 18 years at sexual debut to 2.09 among women who were 18 years or older at sexual debut. Differentials in MP also show that MP is significantly different for women in the different age groups at $X^2=453.6$, $p=0.000$. Differentials in MP shows that MP is significantly different for women in the different ages at sexual debut with at $X^2=28.1$, $p=0.000$. The result suggests that women who had not had sex did not bear children.

Furthermore, Table 6.8 presents results on the differentials in MP by age at first birth. The table shows that although the difference in MP by age at first birth was small, the MP was lower at 2.02 for women who had their first birth at less than 18 years, followed by 2.3 and 2.19 for women who had their first birth at 18-24 and 25 years or older respectively. The results show that the differentials in MP for women who had the first birth at different ages is significantly different with $X^2=18.6$ and $p=0.046$. The results appear to support the view that most women who had their first birth at a young

age did not have additional children until much later, which could explain the lower MP among women who had the first birth at less than 18 years of age.

Furthermore, the differential in MP was examined by the number of children desired. The result presented in Table 6.8 shows that MP increased monotonically with increase in the number of children desired. The table shows that MP increased from 0.56 among women who desired no children to 2.81 among women who desired for or more children. The table shows that the differentials in MP is significantly different for women in the different groups of children desired with $X^2=264.9$, $p=0.000$.

Regarding contraceptive use status, the data presented in Table 6.8 shows that MP of the women was higher at 1.84 for women who reported that they ever used contraceptives compared to 1.64 for women who never used contraceptives. However, this result is surprising as contraception is expected to lower fertility. It is possible that the women who said they ever used contraceptives probably did so before they started childbearing. Differentials in MP is significantly different for women who ever used and never used contraception with $X^2=24.0$ and $p=0.000$.

6.7.2 Differentials in MP by socioeconomic variables

Fertility transition in South Africa is believed to have started in all racial groups before the end of apartheid. This was made possible by the introduction and widespread adoption of family planning methods introduced during apartheid (Chimere-Dan, 1993). However, in recent years, fertility decline among black Africans has continued at a faster rate influenced by several factors including the increasing opportunities for education, employment and urbanisation.

In this study differential in MP by the racial groups of the study population is examined and the results are presented in Table 6.9. The table shows that mean parity (MP) is higher at 1.83 among blacks followed by Coloureds at 1.75, 1.61 among Asians and for Whites, MP is 1.36. The results are consistent with the general fertility situation in the South Africa, which revealed that fertility is higher among blacks than the other racial groups. However, despite this finding at 1.8, fertility is below replacement level which is much lower than expected among this black population. This could be attributed to its predominantly urban settings. Urban fertility in South Africa is strongly influenced by rapidly changing family structures where women continue to take much of the responsibility for childcare forcing them to adopt contraceptives as a method to control their fertility. This is augmented by efforts to improve the status of women through education, employment and increasing the autonomy of black women. Additionally, the majority of urban women who are single parents also have very low fertility. The results show that differentials in MP by race is statistically significant with $X^2= 27.0$ and $p=0.028$.

Evidence from most countries, including those in sub-Saharan Africa, show that MP is influenced by neighbourhood socioeconomic status during childhood and adulthood. These studies have shown that women who lived in rural neighbourhoods in childhood and those currently living in richer socioeconomic neighbourhoods in adulthood have higher fertility than women who lived in poor socioeconomic neighbourhoods (Cohen, 1993; Adewuyi, 1990). Table 6.8 presents data on the differentials in MP by childhood place of residence and neighbourhood socioeconomic conditions. The table shows that MP is 1.58 and 1.920 for women who lived in urban areas and rural areas in childhood respectively. The differentials in MP by childhood place of residence is statistically significant with $X^2= 19.5$ and

$p=0.002$. Women raised in urban areas are more likely to be better educated, adopt urban attitudes and livelihood systems early in life which could contribute in lowering the number of children they give birth to.

The differential in MP has also been examined by richer and poorer neighbourhood socioeconomic status. The results show that MP is 1.80 among women in the richer socioeconomic neighbourhoods compared to 1.81 among women in the poorer socioeconomic neighbourhoods. The results show that there is no difference in MP between the two groups of women in Mahikeng Local Municipality. The similarity could also be explained by the urban setting of the women. The urban conditions could also exert a fertility brake on the poorer women as they may not be able to care for many children.

Furthermore, the MP varies by the educational attainment of women, with women in the lowest education bracket of no or primary education having higher MP than women in the highest education bracket, tertiary education. The result presented in Table 6.8 show that as the level of education increases, MP reduces, which is consistent with previous studies including countries in sub-Saharan Africa (Basu, 2011; Mpoup and Saha, 1998). The same study by Mpoup and Saha (1998) found that, with only a few exceptions, such as Cameroon, the Central African Republic, and Madagascar, TFR reduces as the level of education of women increased in most countries in sub-Saharan Africa. In this study, the results presented in Table 6.9 show that as the level of education increased, the MP reduced from 2.95 among women with no or primary education to 1.78 among women with secondary education and 1.65 among women with tertiary education. The results show that MP is statistically different for women in different educational groups with $X^2= 46.1$ and $p=0.000$.

Table 6.9 also presents differentials in MP by marital status of the women. Recent evidence from various studies suggests that South Africa has one of the highest median age at first marriage and low marriage rates (Ayiga and Rampagane, 2013; Palamuleni, 2010), yet age at marriage and marriage rate are important proximate determinants of fertility in the absence of contraception. In a country like South Africa, where contraceptive use rate is also high and estimated at over 60%, the combined effect of high median age at first marriage, low marriage rate and high CPR would substantially lower fertility rate. The result on the differentials in MP by marital status shows that as expected, MP is low among the never married women at 1.22 and higher at 2.98 among the ever married women. As expected the high CPR could have contributed to the lower MP even among the ever married.

Table 6.9 Differentials in MP by socioeconomic characteristics

Socioeconomic characteristics	Number of women	Mean Parity	χ^2
Racial groups			
Blacks	496	1.83	27.0, p=0.028
Coloureds	69	1.75	
Asian	28	1.61	
White	14	1.36	
Childhood place of residence			
Urban	207	1.58	19.5, p=0.002
Rural	398	1.95	
Neighbourhood socioeconomic status			
Richer	314	1.80	2.3, p=0.793
Poorer	291	1.81	
Level of education			
No/primary	41	2.95	46.1, p=0.000
Secondary	297	1.73	
Tertiary	267	1.65	
Marital Status			
Never married	403	1.22	209.0, p=0.000
Ever married	202	2.98	
Religion			
Christian	463	1.84	7.9, p=0.635
Traditional	100	1.74	
Others	42	1.60	
Occupation			
Student	166	0.75	185, p=0.000
Formal sector	115	2.62	
Informal sector	324	2.09	
Total	605	1.80	

Furthermore, a number of studies have found that the level of fertility varies by the occupational or employment differences of women (El-Ghannam, 2005). These studies have found that women working in paid and professional sectors have lower fertility than women working in the informal sector (agricultural or casual labour) (Arowolo, 1977). In this study, differentials in MP by the occupation of women categorised as student, working in the formal sector and working in the informal sector were examined and the result is presented in Table 6.9.

The table shows as expected, that MP is lower at only 0.75 among students compared to women working in the formal and informal sectors with MP of 2.62 and 2.05 respectively. The differentials in MP by occupational groups is statistically significant with $X^2= 185.0$ and $p=0.000$. The very low MP among students is expected because being a student is not readily compatible with childbearing. Additionally, educational and career goals of students could increase uptake of contraceptives which could lead to lower MP in this group of women. Conversely, the very low income and poorer socioeconomic conditions experienced by informal sector workers than those in formal sector in Mahikeng could indirectly lead to lower the fertility among informal sector workers compared to formal sector workers.

6.7.2 Differentials in MP by HIV variables

The differentials in MP by HIV related variables are presented in Table 6.10. The variables are by attitudes to HIV testing, attitude to HIV status disclosure to sexual partners if infected, perceived risk of HIV infection in marriage and perceived risk of HIV transmission to children during childbearing. At the individual level, a number of factors may contribute to the MP in the context of HIV mostly through reduced fecundability. A review by Zaba and Gregson (1998) based on empirical studies suggests that HIV reduces fertility through a number of mechanisms including reduced frequency of sexual activity by individuals who are infected or believed they are at risk of HIV infection; existence of HIV co-infection with other STIs which may affect the reproductive efficacy of people infected or psychologically may impact on persons who believe they are at risk of HIV infection or transmission; and fetal loss especially among women who are infected.

Table 6.10 presents differentials in MP by HIV testing attitudes of the women. The table shows that women with positive HIV testing attitudes have a higher MP (1.89) than women who have a negative attitude to HIV testing (1.79).

The table also presents differentials in MP by attitudes to positive HIV status disclosure. The table shows that MP varies by attitudes to HIV status disclosure. The table shows that MP is slightly higher among women with positive attitudes (1.84) to HIV status disclosure to sexual partners than women with negative attitude to HIV status disclosure to sexual partners (1.61). However, the results show that HIV testing attitudes and attitudes to HIV positive status disclosure and MP are not significantly different in this population of women ($p = 0.186$).

Additionally, Table 6.9 shows that MP varies by perceived risk of HIV infection in marriage. The table shows that MP is lower (1.60) among women who perceived a high risk of HIV infection in marriage than women who perceived a low or no risk of HIV infection in marriage (1.96). Differentials in MP by perceived risk of HIV infection in marriage are statistically significant with $X^2 = 13.5.0$ and $p = 0.018$ for women who perceived high and low risk of HIV infection in marriage.

Furthermore, in this study the effect of perceived risk of HIV transmission to children during childbearing on MP was examined and the result is presented in Table 6.9 showing that women who perceived the risk of HIV transmission to children during childbearing to be high had a higher MP of 1.94 than women who perceived the risk of HIV transmission to children during childbirth to be low at 1.66. Differentials in MP by

perceived risk of HIV transmission to children during childbearing are statistically significant with $X^2= 11.1$ and $p=0.048$

Table 6.10 Differentials in MP by HIV related variables of women

Socioeconomic variables	Number of women	Mean Parity	X^2
Attitudes to HIV testing			
Positive	525	1.84	7.8, $p=0.186$
Negative	80	1.79	
Attitudes to HIV status disclosure to partner			
Positive	507	1.84	8.2, $p=0.144$
Negative	98	1.61	
Perceived risk to HIV infection in marriage			
High	260	1.60	13.5, $p=0.018$
Low or not at all	345	1.96	
Perceived risk of HIV transmission in childbearing			
High	273	1.94	11.1, $p=0.048$
Low or not at all	332	1.66	
Total	605	1.80	

6.8 Predictors of current fertility

The binary logistic regression model was used to predict the factors influencing the level of lifetime fertility among women aged 15-49 years. Lifetime fertility was measured using Children Ever Born (CEB). Lifetime fertility was regarded as low if the women had 2 CEB or less which was coded “1” and was regarded as having given birth to fewer children and used as the event category. Conversely, lifetime fertility was regarded as high if the women had given birth to 3 or more CEB and was recorded “0” and used as the reference category in this analysis. Four models were used to identify the significant predictors of lifetime fertility.

Model 1 predicted the demographic factors influencing lifetime fertility. The model included four variables namely age group of the women, age at sexual debut, age at first birth and contraceptive use status. The model fitness was assessed by using the Omnibus Test for Model Coefficient which revealed $X^2=122$ and $p=0.000$ indicating that the model was a good fit.

The results of Model 1 are presented in Table 6.10. The table shows that compared to women aged 35 years or older, women in the 25-34 years age group are nearly (OR) 4 times ($p<0.0001$) significantly more likely to have given birth to less than 3 (three) children and therefore have low lifetime fertility than women aged 35 years or older.

Additionally, Model 1 shows that the women are significantly more likely to have had low lifetime fertility (fewer CEB) if they had sexual debut at 18 years or older (OR=1.59, $p<0.05$) than if they are less than 18 years at sexual debut; and had the first birth at 18-24 years of age (OR=3.84, $p<0.05$) than if they had the first birth at less than 18 years of age. The hypothesis that “women who had sexual debut at 18 years or older have fewer children than women who were less than 18 years at sexual debut” was therefore accepted. The finding suggests that although many women in the study population initiate sexual activity at a young age, it does not necessarily lead to higher fertility in this study population. It is also consistent with the view that women who initiate sexual activity at young ages and give birth at young ages due to unwanted pregnancies do not have more children soon thereafter. They take up contraceptives as a means of preventing more unwanted pregnancies. The above conclusion is also consistent with the higher likelihood of fewer CEB among women in the age group 25-34 and women who had the

first birth at 18-24 years of age. Contraceptive use status did not appear to affect lifetime fertility in this population probably because of the widespread use of contraceptives.

Table 6.11 Model 1: Logistic regression results of Odds Ratios showing the demographic predictors of giving birth to less than 3 children by women aged 15-49 years

Selected covariates	OR	CI
Age group		
<25	0.81	0.22-2.93
25-34	3.87****	2.99-6.87
35+	1.00	
Age at first sex		
<18	1.00	
18+	1.59**	1.74-3.39
Age at first birth		
<18	2.54	0.67-9.57
18-24	3.84*	1.08-13.59
25+	1.00	
Contraceptive use		
Never used	1.00	
Ever used	0.89	0.29-2.73

Key: * - <0.05; ** - <0.01; *** - <0.001; **** - <0.0001

In Model 2 socioeconomic predictors of lifetime fertility are examined. The variables included in the model are racial groups, marital status, religion, childhood place of residence, neighbourhood socioeconomic status, level of education and occupation. The model fitness was assessed by using the Omnibus Test for Model Coefficient which revealed $X^2=141.9$ and $p=0.000$ indicating that the model is a good fit. The results are presented in Table 6.11 showing that women are more likely to have had less than 3 children and therefore lower lifetime fertility if they are never married ($OR=0.26$, $p<0.002$) than if they are ever married; if they lived in urban areas in childhood ($OR=1.62$, $p<0.049$) than if they lived in rural areas in childhood; and if they had tertiary education ($OR=4.24$, $p<0.000$) and secondary education ($OR=1.64$, $p=0.043$) than if they had no/primary education. Students ($OR=1.21$, $p=0.010$) and formal sector ($OR=3.28$,

p=0.000) workers are also significantly more likely to have given birth to fewer than 3 children than informal sector workers.

Table 6.12 Model 2: Logistic regression results of Odds Ratios showing the socioeconomic predictors of giving birth to less than 3 children by women aged 15-49 years

Selected covariates	OR	CI
Racial group		
Black	2.19	0.55-8.77
Coloured	1.40	0.31-6.24
Asian	0.25	0.03-1.89
Whites	1.00	
Marital status		
Never married	1.26**	0.11-0.60
Ever married	1.00	
Childhood place of residence		
Urban	1.62*	0.98-2.87
Rural	1.00	
Neighbourhood socioeconomic status		
Richer	0.90	0.56-1.42
Poorer	1.00	
Level of education		
No/primary	1.00	
Secondary	1.64*	1.01-2.67
Tertiary	4.787***	2.24-10.56
Occupation		
Student	1.20**	0.06-0.68
Forma sector	3.28***	1.96-5.48
Informal sector	1.00	

Key: * - <0.05; ** - <0.01; *** - <0.001; **** - <0.0001

However, race and neighbourhood socioeconomic status are not significant predictors of giving birth to less than three children in this study population.

Model 3 predicted the HIV related variables of CEB. In the model attitudes to HIV testing, attitudes to HIV status disclosure, perception of risk of HIV infection in marriage and perception of HIV transmission to children during childbearing are analysed. The main objective of the model is to test the hypothesis that “women who perceive high risk of HIV transmission to children during childbearing give birth to fewer children than

women who perceive low risk of HIV transmission to children during childbearing”. The Omnibus Test for Model Coefficient shows that $\chi^2=15.56$ and $p=0.003$, which indicated that the model is a good fit.

The results in table 6.13 shows that attitudes to HIV testing and HIV status disclosures to sexual partners are not significant predictors of giving birth to less than three children in this population of women. However, the results show that the women are significantly more likely to have had fewer than 3 CEB by 58% and 48% ($OR=0.42$ and $p<0.022$) and ($OR=0.52$ and $p=0.000$) if they perceived that the risk of HIV infection in marriage and HIV transmission to children during child bearing is high. The above finding suggests that women’s of perception of the risk of HIV infection and transmission could contribute in influencing level of fertility in high HIV prevalence settings.

Table 6.13 Model 3: Logistic regression results of Odds Ratios showing the HIV related predictors of giving birth to less than 3 children by women aged 15-49 years

Selected covariates	OR	CI
Attitudes to HIV testing		
Positive	1.00	
Negative	0.88	0.52-1.56
Attitudes to HIV status Disclosure		
Positive	1.00	
Negative	1.05	0.62-1.79
Perceived risks of HIV infection in marriage		
High	0.42*	
Low/none	1.00	1.06-2.32
Perceived risks of HIV transmission during childbearing		
High	0.52*****	0.35-0.75
Low/none	1.00	
Key: * - <0.05; ** - <0.01; *** - <0.001; **** - <0.0001		

Model 4 is used to identify the significant predictors of giving birth to less than 3 children in the study population after controlling for the effects of all selected covariates respectively. This was done by including all the variables that significantly predicted giving birth to less than 3 children in Models 1, 2 and 3. The model also aimed at testing the hypothesis stated in Model 2 and Model 4. The results presented in Table 6.14 show that the women are more likely to have given birth to less than 3 children if they had sexual debut at 18 years or older. However, the results show that the effect of having sexual debut at 18 years or older is attenuated by 36% to OR=1.23, ($p<0.035$) after controlling for the effects of other covariates.

Table 6.14 also shows that the women are more likely to have given birth to less than 3 children if they lived in urban areas in childhood (OR=1.20, $p=0.041$). The effect of urban childhood residence on giving birth to less than 3 children was attenuated by 42% after controlling for other covariates. Other variables found to predict giving birth to less than 3 children are having tertiary education and working in the formal sector.

Table 6.14 Model 4: Logistic regression results of Odds Ratios showing the predictors of giving birth to less than 3 children by women aged 15-49 years

Selected covariates	OR	CI
Age group		
<25	0.83	0.20-3.35
25-34	4.80	1.32-7.39
35+	1.00	
Age at first sex		
<18	1.00	
18+	1.23*	0.54-0.99
Age at first birth		
<18	1.87	0.42-8.23
18-24	3.17	0.78-12.82
25+	1.00	
Marital status		
Never married	3.55***	1.83-6.89
Ever married	1.00	
Childhood place of residence		
Urban	1.20*	0.35-0.87
Rural	1.00	
Level of education		
No/primary	1.00	
Secondary	0.96	0.39-2.39
Tertiary	5.58***	2.53-19.05
Occupation		
Student	1.15	0.89-1.56
Forma sector	2.24*	1.11-4.62
Informal sector	1.00	
Perceived risks of HIV infection in marriage		
High		
Low or none	0.64	0.77-2.47
	1.00	
Perceived risks of HIV transmission during childbearing		
High	0.75	0.42-1.33
Low not at all	1.00	

Key: * - <0.05; ** - <0.01; *** - <0.001; **** - <0.0001

The result of Model 4 show that having tertiary education is 5.6 time (p=0.000) significantly more likely to explain giving birth to less than 3 children. Also working in the formal sector is 2.24 (p=0.028) times significantly more likely to explain giving birth to less than 3 children. Result in table 6.14 show that the effect of having tertiary education on CEB increased by 8% while that of working in the formal sector on CEB was attenuated by more than 100% after controlling for the effects of other covariates.

6.9 Summary

The results presented in chapter six show that the level of lifetime fertility measured by CEB is low in this study population. The low lifetime fertility is predicted by a number of factors including age at sexual debut of 18 years or older; being never married; having tertiary education; and working in the formal sector. The low number of CEB by the above groups of women could also have been attributed to the high prevalence of contraceptive use among the women.

The above finding agrees with a number of other studies in sub-Saharan Africa which found that fertility is generally lower in urban areas, among never married women and among women with secondary and tertiary education. However, none of the HIV related variables were found to contribute to lower number of CEB. This suggests that HIV may not be factored in the calculus of childbearing decisions in this population, which in itself is a risk factor for HIV infection in a population where HIV prevalence is already large and generalized.

However, the above findings could have been affected by the reporting of data on a number of variables that could contribute to systematic biases in estimating lifetime fertility. These include the quality of reporting data on age at sexual debut, age at first birth, children ever born and current marital status of the women. The lack of data on the HIV status of the women also impacts on the conclusions of the effect of HIV on CEB.

Chapter 7

Summary of findings, discussions, conclusions and recommendations

7.0 Introduction.

Union formation and childbearing are important demographic events in the family. In this regard the HIV and AIDS pandemic has been hypothesized to impact negatively on family formation, stability and fertility. It has been argued that marriage rates and fertility levels are declining independently of HIV and AIDS as a process of normal development brought about by rising educational levels, the availability of modern contraceptive methods, changes in the status of women, changing marital patterns and the increasing economic burden of children. However, in this study it is hypothesized that in large HIV and AIDS pandemics, “marriage rates are expected to decrease” and “fertility levels are expected to decline” due to the impact of HIV and AIDS on marriage patterns and fertility in the general population.

This means that in absolute terms, fewer women will get married or marriage will be delayed or disrupted and fewer children will be born because of the reduction in the size of the population in active reproduction due to two processes: the size of the reproductive population could be reduced in the long term because of marriage transitions characterised by decline in marriage rates, delayed age at marriage and marital instability due to HIV-AIDS-related fears; and a decline in the reproductive age groups due to Aids mortality. The above two conditions could ultimately contribute to declining fertility as fewer children could be born. The timing of entry into marriage has long been recognised as an important dimension of fertility behaviour. Marriage marks the beginning of regular exposure to the risks of pregnancy and childbearing, helping explain variations in fertility patterns across societies. More recently, marital patterns have emerged as an important

factor in the HIV and AIDS pandemic. As the prevalence rate of HIV in rural South Africa increased over the past twenty years, marital rate has declined, marriage has been delayed and marital dissolution has increased.

Marriage is an important determinant of sanctioned sexual activity and therefore could increase the risk of transmission and acquisition of HIV and AIDS (Boerma et al, 2002; Clark, 2004). In most sub-Saharan Africa including South Africa, traditionally marriage for women was characterised by a young age; marrying older men; and women derive their social recognition and economic security by being married and therefore remained subordinate and dependent on their husbands (Gregson et al., 2002). Anecdotal evidence suggests that HIV is now one of the factors influencing changes in marriage patterns in countries where its prevalence is high because of its effect on postponement of age at marriage and the decline in the marriage rate as a result of the perceived risk of marital transmission of HIV and AIDS (Bongaarts, 2006; Mukiza-Gapere and Ntozi, 1995). A recent report in Uganda suggested that marriage has become a major source of the new wave of HIV transmission and acquisition in that country (Uganda AIDS Commission, 2009), which could greatly contribute to changes in marriage patterns.

In South Africa, early and universal marriage was also observed until recently (Budlender et al., 2004; Makiwane, 2004). Divorce, especially among the black African population was low and cohabitation was discouraged. Premarital and extramarital childbearing were also discouraged. However, recent trends have indicated that the prevalence of women not marrying and marital dissolution have increased in South Africa (Palamuleni et al. 2007; Udjo, 1996; StatsSA, 2006, 2009, 2010, 2011), indicating that the institution of

marriage is in transition. In the North West province, the marriage transition is characterised by increasing proportion of women remaining single, delaying marriage, increasing rate of marital dissolution and increasing proportion of women in cohabitation. A plausible, but yet little investigated cause of the changes in marital patterns and fertility could be attributed to HIV. In this study it is hypothesized that HIV and AIDS attitudes and perceptions are significant predictors of marriage patterns and fertility in Mahikeng Local Municipality. Other factors that could influence marital patterns are socioeconomic and demographic factors.

The aim of the study was to examine marriage dynamics and fertility in the era of HIV and AIDS in Mahikeng Local Municipality in the North West province of South Africa. To do so the following specific objectives were investigated:

- i. to examine patterns of marriage and identify the predictors influencing marriage patterns;
- ii. to estimate levels and identify correlates of the timing of age at marriage; and
- iii. to estimate levels, differentials and predictors of lifetime fertility.

7.1 Data and methods

This was a quantitative study which used data collected from women aged 15-49 years of age to assess their knowledge, attitudes, perceptions and behaviour on marriage and fertility in the era of HIV and AIDS. The study used the cross-sectional descriptive study design to collect retrospective and current status data from Mahikeng Local Municipality in 2010. A multi-stage sampling design was used to select the eligible respondents in the study area. In total 605 women were included in the study, and were distributed in both urban and rural wards of Mahikeng Local Municipality.

Different methods of analysis were employed in the three analytical chapters.

- i. In chapter four the Chi-square statistics was used to assess the association between marital patterns and the individual demographic, socioeconomic and HIV and AIDS related variables of the women. The binary logistic regression model was used at the multivariate level to identify the significant predictors of marriage rate. The multivariate analysis comprised of four models. Model 1 identified the significant predictors of socioeconomic factors; Model 2 identified the significant predictors of demographic factors; Model 3 was used to identify the significant factors among selected HIV variables; and Model 4 was used to identify any significant variables after controlling for all covariates simultaneously.
- ii. In chapter five, the Chi-square and the Kaplan-Meier survival method were used to estimate differentials in the median age at first marriage for women with different demographic, socioeconomic and HIV related variables and the Cox Proportional Hazard Model was used to identify the significant risk factors of the timing of marriage. Model 1 identified the significant predictors of socioeconomic factors; Model 2 identified the significant predictors of demographic factors; Model 3 was used to identify the significant factors among selected HIV variables; and Model 4 was used to identify any significant variables after controlling for all covariates in Models 1, 2 and 3 simultaneously.
- iii. In chapter six, data on children ever born was used to examine differentials in lifetime fertility. The chi-square statistic was used to examine differentials of women by CEB and Total Fertility Rate at the bivariate level. Additionally, the Total Fertility Rate was also estimated using Parity Progression Ratio as a

measure of the current fertility. The predictors of low lifetime fertility were identified using binary logistic regression at the multivariate level using four models. Model 1 identified the significant predictors of socioeconomic factors; Model 2 identified the significant predictors of demographic factors; Model 3 was used to identify the significant factors among selected HIV variables; and Model 4 was used to identify any significant variables after controlling for all covariates in Models 1, 2 and 3 simultaneously.

7.2 Summary of main findings

7.2.1 Marriage patterns, differentials and predictors

- i. The marriage rate in Mahikeng Local Municipality is only 33.4% which is low compared to other local municipalities. The marriage rate is also consistent with recent marriage trends in South Africa.
- ii. Although black women are less likely than women of other racial groups to have been married, being black is not a significant predictor of marriage rate.
- iii. The neighbourhood socioeconomic status of the women is a significant predictor of the lower marriage rate. Women in the poorer socioeconomic neighbourhood are significantly less likely to be married. This finding means that the hypothesis “women in the richer socioeconomic neighbourhoods are more likely to marry later than women in the poorer socioeconomic neighbourhood” is accepted.
- iv. The women were also more likely to be ever married if they had no/primary education than if they had tertiary education.
- v. The women who worked in the formal sector are significantly more likely to be ever married than those working in the informal sector.

- vi. Furthermore, age cohort of the women, age at first birth and the number of children desired are also significant predictors of being ever married.
- vii. Women who have given birth to three and four or more children are more likely to be ever married.
- viii. Women who perceived the risk of HIV infection in marriage to be low or none are significantly more likely to be married. This finding suggests that indeed HIV risk perception affects marriage decisions in this population. The finding also proves that women who perceive high risk of HIV infection in marriage are less likely to be married than women who perceive low risk of HIV infection. In this regard the alternative hypothesis “women who perceive low risk of HIV infection in marriage are likely to be ever married than women who perceive high risk of HIV infection in marriage” is accepted.
- ix. Ever use of contraceptives is a less likely predictor of marriage rate. Women who ever used contraceptives are significantly less likely to be ever married.

7.2.2 Correlates of the timing of age at first marriage

- i. Rural childhood place of residence and neighbourhood socioeconomic status are significant risk factors of timing of marriage. The results show that the hypothesis that “women in the richer socioeconomic neighbourhoods are more likely to have waited longer to be married than women in the poorer socioeconomic neighbourhood” has been confirmed.
- ii. The women are significantly more likely to have married earlier if they had no/primary education.

- iii. Women who worked in the formal sector and worked in the informal sector are more likely to have been married earlier than students. The results also confirm the view that belonging to the age group 35 years or older significantly increased the risk of early married in this population.
- iv. The perceived low risk of HIV infection in marriage is a significant predictor of early marriage. Women who perceived a low risk of HIV infection in marriage, married earlier than women who perceived a high risk of HIV infection in marriage. Based on this result, we accept the alternative hypothesis that “women who perceived the risk of HIV infection in marriage to be low or none married earlier than women who perceived the risk of HIV infection in marriage to be high.”
- v. The results also show that perceived high risk of transmitting HIV to children during childbearing is a risk factor that delayed the timing of marriage.
- vi. Other HIV variables, namely attitude to HIV testing and attitude to HIV status disclosure to partners are not significant risk factors of timing of marriage after controlling for the effects of all other covariates.

7.2.3 Fertility levels, differentials and predictors

- i. Women are more likely to have given birth to less than 3 children if they had sexual debut at 18 years or older. In this regard, we accept the hypothesis that “women who had sexual debut at 18 years or older have fewer children than women who were less than 18 years at sexual debut.”

- ii. The women are more likely to have given birth to less than 3 children if they lived in rural areas in childhood than if they lived in urban areas in childhood.
- iii. Women with tertiary education are more likely to have given birth to less than 3 children than women with no/primary education.
- iv. Working in the formal sector is significantly more likely to explain giving birth to less than 3 children than working in the informal sector.
- v. However, attitude to HIV testing, attitude to HIV status disclosure, perception of risk of HIV infection in marriage and perception of risk of HIV transmission to children in childbearing are significant predictors of giving birth to less than 3 children.

7.3 Discussions of results and conclusions

The discussion of the study results have been sectionalized according to the three chapters. This chapter discusses marriage patterns and its differentials followed by correlates of age at first marriage and concludes with fertility levels, differentials and predictors in Mahikeng Local Municipality.

7.3.1 Marriage rate, differentials and predictors

Marriage is the principal and widely accepted condition for intimate sexual union, family formation and childbearing. Marriage, in the absence of contraception, has been identified as one of the main proximate determinants of fertility. A young age at marriage and longer duration of marriage is expected to lead to a higher individual as well as societal fertility (Bongaarts and Potter, 1983). Marriage in the Sub Saharan African context,

including South Africa, was early and universal. However this has started to change in South Africa since the early 1990s and is now characterised by late age at marriage, declining marriage rate and increasing rate of marriage dissolution mostly through divorce.

This study found that the proportion of ever married women was 33.4%. The main predictors of being ever married, also referred in this study as the marriage rate in the Mahikeng Local Municipality at the multivariate level are childhood place of residence, neighbourhood socioeconomic status, level of education, occupation, age groups of women, age at first birth, desired number of children, number of children ever born, HIV testing attitudes and perceived risk of HIV infection in marriage.

Previous studies on racial differences in marriage in South Africa revealed that marriage rate is lower among black women compared to other races (Hosegood et al 2009; Budlender et al, 2004), which has also been observed in the current study. These studies attributed the low marriage rate among blacks to the historical restrictions imposed by apartheid in respect to family movement, residence and employment. In this study, although bivariate and multivariate results in Model 1 appear to be consistent with the above studies, the multivariate results in Model 4 on the effect of being black on marriage rate is not significant in Mahikeng Local Municipality. However, the previous findings that marriage rate is declining at a faster rate among blacks than other races has been observed in Mahikeng Local Municipality by this study.

The abolition of apartheid system of residence and movement appear to have increased changes in black marriage patterns created under apartheid. Apart from the apartheid

migration patterns which increased spousal separation among blacks, the increasing access to education and employment for black women in the post-apartheid era could have contributed to the further decline in marriage rate of black women. This is mostly due to the changes in the marriage market associated with the declining number of eligible men for marriage by the ever increasing economically independent population of black women. This phenomenon has come to be known as the marriage squeeze (Lichter et al., 1992). The increasing costs of marriage in the form of bride price (*“lobola”*) could also contribute to the continued marriage squeeze as most men are engaged in low paid and inferior occupations and could not meet the requirements for (*“lobola”*)(Hunter, 2004). It could also be a result of marginalization of black single mothers from the marriage market due to the stigma associated with premarital childbearing (Calves, 1999) and poverty to which black women are subjected to, especially in urban areas (Wilson, 1987).

The level of education has been identified as one of the most important factors influencing marriage rate the world over. This is because it affects age at first marriage, marriage dissolution and remarriages. Evidence in sub-Saharan Africa on the importance of level of education on age at first marriage and marriage dissolution is plenty (Stillwell et al, 2009; Kalule-Sabiti et al., 2007). All these studies show that lack of education and low education is associated with a young age at marriage and universal marriage. Consistent with the literature reviewed, this study found that women with primary or no education were more likely to be ever married compared to women with tertiary level of education. The effect of no or primary education on marriage rate was found to be consistent with another study by Isen and Stevenson (2010) who found that women with tertiary education who were born in the last 20 years of the 19th century remained unmarried at

the age of 50 years and accounted for more than 30% of the non-marriage rate. Within South Africa, a similar study found that women with lower education were more likely to have been married than women with grades 12 or higher education (Posal and Casale, 2009).

The findings at last multivariate level show that neighbourhood socioeconomic status is a significant predictor of the marriage rate. The finding supports a previous study which found that socioeconomic differences predicted marriage rate. Women in the poorer socioeconomic neighbourhoods are less likely to be ever married. The finding that marriage rates are higher among the women who lived in rural areas in childhood is consistent with previous study (Ikamari, 2005). These findings are also consistent with finding of a generally higher marriage rate in rural areas of sub-Saharan Africa (Adepoju and Wariara, 1997; Ayot, 1979). The early age at marriage and universal marriages in most rural sub-Saharan African countries is attributed to the strong disapproval of premarital sexual intercourse and childbearing, which are risks associated with delay in age at marriage (Kalule-Sabiti et al., 2007).

However, the increasing process of modernization and other forces of social change, which have led to the adoption of lifestyles and attitudes that delay marriage and tolerate extra marital childbearing, has increased, mostly in urban areas of sub-Saharan Africa. These practices have been noted to be much higher in South Africa, where the majority of the population is now urbanised and could therefore have contributed to the increasing non-marriage rate especially among disadvantaged women living in poor socioeconomic neighbourhoods (Wilson, 1987).

The increasing participation of women in the labour force has been identified as one of the factors leading to the adoption of western values and attitudes towards marriage characterised by monogamous marriage system, late marriages, individual choice of marriage partner and increase in marital dissolution. In this study, we found that women working in the formal sector occupations are more likely to be ever married than women working in the informal sector. The finding in this study is consistent with observations by Garenne (2004) in which income, which is a function of employment, was found to be an important net predictor of delayed marriage. Another study (Gustafsson and Worku, undated) argued that the low supply or lack of high quality marriageable men in South Africa due to low education and inferior occupations among black men may have contributed to the declining marriage rate among women. This is likely to be attributed to the greater level of employability and income associated with formal sector employments leading to greater independence for women. Another study by Nancy and Kaivan (2003) found that the urbanisation process contributed to lower marriage rates through the increased effects on employment and non-marital sexual activity.

The study found that the probability of being ever married among women in the 35 years or older age group is higher and significant than in the younger age groups even after controlling for the effects of all other covariates. The finding is consistent with two previous studies in South Africa (Ayiga and Rampagane, 2013; Udjo, 2001). Women in the older age groups are more likely to be married because most of these women could have married when age at marriage was still lower. Early age at marriage for women in the older age group is expected because marrying young was normative, the women could

have not attend schooling or attended lower level education and were probably not employed (Garenne, 2014) and thus depended on their spouses.

Furthermore, the study found that women who desired to have 3 or more children are more likely to be ever married than women who desired fewer than 3 children. Additionally, women who have given birth to three and four or more children are ever married compared to those who had no or fewer children. A previous study found that the desired number of children has been declining in South Africa regardless of the marital status of women (Feyisetan and Bankole (2002). However, as expected and observed in another study (Westoff, 2010) never married women desired fewer children and gave birth to fewer children than ever married women. This is an indication that despite the occurrence of non-marital childbearing, desiring higher number of children and giving birth to a higher number of children is still a preserve in marriage. A possible reason for the higher marriage rate among women who desire and give birth to more children is the increasing cost of child care (Jones et al., 2008), which has been associated with marriage and remarriages among women who are previously single, divorced or widowed.

Positive attitude to HIV testing and perception of risk of HIV is increasingly becoming an important factor in marriage decisions. In this study, the effect of attitude to HIV testing and HIV status disclosure on marriage were examined. The study found that there was a significant association between HIV testing attitudes and marriage rate in Model 3, but not in Model 4. The results show that women with positive attitudes to HIV testing are more likely to have been ever married compared to women with negative attitude to HIV testing. A number of previous studies have found poor attitude to HIV testing, especially of sexual partners (Tshweneagae et al., 2015; Maman et al., 2001).

The lower likelihood of being ever married by women with negative attitude to HIV testing is consistent with expectation. Women who know they are HIV positive could be unwilling to get married as they may be required to disclose their HIV status or take a couple HIV tests during which their HIV status could be disclosed. Married women were found less likely to disclose their HIV positive status to their partners for various reasons. However, HIV and AIDS related stigma arising from fear, shame and misconception are some of the main factors influencing poor attitude to disclosure of HIV positive status to sexual partners (Yang, et al., 2006; Orisakwe et al., 2012). Additionally, violence against women and marital dissolution has been found by previous studies to contribute greatly to poor attitudes to HIV status disclosure (Decker et al, 2004; Glelen et al, 2000), which could make many HIV positive individuals and individuals who suspect they are HIV positive to shun marriage.

Although there is sufficient evidence to suggest that the risk of HIV infection in marriage is real and prevalent, this study has not found sufficient literature on the effect of perception of risk of HIV infection in marriage on marriage rate. Several studies have found that perception of risk is strongly related to an increase in self-protective behaviour which could include premarital HIV testing and marital use of condom (Magadi et al, 2001). However, some individuals who perceive themselves to be at risk of HIV infection may find themselves powerless in instituting appropriate protective behaviours in marriage and therefore choose divorce (Grant and Hampejsek, 2014) or remain single.

In this study the findings show that perception of high risk of HIV infection in married reduced the marriage rate. This finding is contrary to another study which found that the perceived risk of HIV infection is high among single individuals (Maharaj, 2004), which

is also valid because of a higher lifetime number of sexual partners and the risk of engaging in multiple concurrent sexual partnership. However, a number of other studies have shown that the risk of marital infection of HIV is higher than among never married sexually active individuals (Clark, 2004; Caraël, Ali & Cleland, 2001). A study in Uganda suggested that marital transmission of HIV is prevalent in that country and could contribute to the increasing incidence of HIV infections in Uganda (Uganda AIDS Commission, 2009). This is attributed to the known fact that while condom use is likely to be higher among never married sexually active individuals, it is known to be quite low in marriage, making it difficult for women to institute a self-protection behaviour even though they are aware of the risk of HIV infection. The risk of HIV infection in marriage is further exacerbated by childbearing in marriage. In this study there is evidence that women who perceived the risk of HIV infection to be high in marriage are less likely to have ever been married.

7.3.2 Correlates of the timing of age at marriage

Age at first marriage is an important predictor of fertility, maternal morbidity and mortality and childhood mortality in sub-Saharan Africa (Guilbert, 2013; Garenne, 2004). It undermines gender equality and empowerment of women through lack of or low education which deprives women from attaining their full potential and participating effectively in development activities (Action Health Incorporated, 2011). The timing of marriage in a large HIV pandemic is also an important factor in understanding the sexual and Mother to Child transmission of HIV. Compared to the rest of sub-Saharan Africa, South Africa has the largest HIV and AIDS pandemic and the most advance form of marriage transition reflected in the increasing incidence of divorce, decreasing marriage

rate and most importantly delay in age at first marriage (Ayiga and Rampagane, 2013). In this regard, examining the correlates of the timing of age at first marriage in Mahikeng Local Municipality where HIV is generalized, contributed to understanding the correlates of age at first marriage. The study found that the median age at first marriage is 24 years, indicating that compared to some countries with large HIV pandemic such as Uganda, Zambia and Mozambique, marriage in the Mahikeng Local Municipality is delayed, but lower than previous estimates for the North West province (Palamuleni, 2011). The delay in age at marriage in South Africa has been attributed to the modernizing influences of education, urbanization and participation in the monetized economy (Garenne, 2004). But the impact of neighbourhood socioeconomic status, age at first birth and perceived risk of HIV infection in marriage has not been systematically examined. This study therefore examined three hypotheses: “women in the richer socioeconomic neighbourhoods are more likely to marry later than women in the poorer socioeconomic neighbourhood”; “women who have the first birth at <18 years are more likely to marry earlier than women who have the first birth at 18 years or older; and “women who perceive high risk of HIV infection in marriage marry later than women who perceive low or no risk of HIV infection in marriage.”

The study found that women living in the richer socioeconomic neighbourhoods delayed marriage to older ages. The finding is consistent with another study (Biddecom and Bakilana, 2003) which found that women in richer socioeconomic groups married later than women in the poorer socioeconomic groups. This has been attributed to the participation in education, employment in the monetized labour market and urbanization of women in the higher socioeconomic groups, which appear to have changed traditional

values of marriage leading to delayed age at marriage. Additionally, the marriage market theory (Lichter et al., 1992; Blossfeld and Timm, 2003) which suggests that failure to find suitable men to marry could also explain the delay in age at marriage that has been observed especially among black women in higher socioeconomic groups. The increasing tolerance of premarital childbearing among more affluent women could also explain postponement of marriage for women in the richer socioeconomic status.

The study also found that women who lived in rural areas in childhood are significantly at an elevated risk of marrying earlier than women who lived in urban areas in childhood. This finding is consistent with previous studies in sub-Saharan Africa (Tadesse and Headey, 2012; Omondi and Ayiemba, 2005) which attributed delayed age at first marriage among women who lived in urban areas in childhood to modern values that encourage later marriage, lack of kin influence on marriage decisions and control over sexual behaviour (Singh and Samara, 1996). Additionally, the opportunity that comes with higher education and employment associated with urban areas enables women who grow up in urban areas to adopt lifestyle and livelihoods that give them more independence from men (Cochrane, 1979).

The study found that women who had the first birth at 20 years or older delayed marriage to an older age which is consistent with two other previous studies (Ayiga and Rampagane, 2013; Gumu and Mace, 2013). A study by Subaiya and Johnson (2008) also found that the interval between age at first marriage and age at first birth increased with older age at first sex which they attributed to the higher education and urban residence of women who give birth at older ages. This finding suggests that older age at marriage for

women who had the first birth at an older age could be associated with higher education which empowers women to have access to and uptake of contraception which increased age at first birth.

Furthermore, the study found that compared to women who perceived low risk of HIV infection in marriage, age at first marriage was less likely for women who perceived high risk of HIV infection in marriage. This suggests that women know of the risk of HIV infection in marriage and take it into account in marriage decisions. This finding is inconsistent with the previously held view that early age at marriage increased the risk of HIV infection for women (Case and Paxson, 2013; Clark et al., 2006). The higher risk of HIV infection for young women in marriage was attributed to marrying older men who probably could have been infected with HIV already and lack of control over their sexuality, including decision to engage in protected sex, due to power imbalances in marriage (Nyamhanga and Frumence, 2014).

The argument that young age at marriage increased risk of HIV infection for women is inconsistent with the belief that marriage protects girls from non-marital sex which could lead to unintended pregnancy and sexually transmitted infections including HIV (Nour, 2006). However, the finding does not prove that delayed age at marriage could increase the risk of HIV infection as marriage reduces the number of lifetime sexual partners, which is a known risk of HIV infection (Bongaarts, 2007).

Conversely, the researcher found that the perception that the risk of HIV transmission was high during childbearing is a significant risk factor for delayed age at marriage in this population. This finding indicates that women who perceived that the risk of HIV

transmission to children is high in childbearing are more likely to have married at older ages than women who perceived otherwise. The perceived high risk of HIV transmission to babies during childbearing agrees with the observation of higher prevalence of HIV infection in babies of young women who acquire the infection at delivery and during breastfeeding (Nour, 2006). In this regard, our study suggests that women are aware of the HIV risks associated with a young age at childbearing. An earlier study in South Africa found a high risk of Mother to Child Transmission of HIV and poor maternal outcomes among adolescent women (Fatti et al., 2014). However, this perception is contradicted by the relatively high prevalence of premarital childbearing in South Africa, most of which occur among adolescent girls. It is therefore plausible that the delayed age at marriage for women who perceived high risk of HIV infection in childbearing could be due to the expectation that childbearing being a central aspect of married life could increase their risk of MTCT mainly due to the already perceived high risk of HIV infection in marriage.

Among the control factors, current age group was found to be a significant predictor of age at first marriage in this population. Women aged 35 years or older were married earlier than women in the 15-19 year age group. This finding is consistent with another study by Adebawale et al. (2012) who found that compared to women in the younger age cohort, women in the older age groups married earlier. The finding is consistent with a previous study which found that the post-apartheid generation married later, although a large number of the women are involved in cohabitation, which was low among older women at the same age (Elena and Rajen, 2013; Palamuleni, 2011). The post-apartheid economic, education, employment and settlement transformation has greatly contributed

in empowering the younger generation of women with opportunities which has contributed to the advancement of age at marriage and fertility transitions among black women through the marriage markets effects. The theory suggests that much of the decision to remain single by women, including those with experience of premarital childbearing, is the low supply of marriageable men by the increasing population of educated and more independent men (Lichter et al., 1992).

7.3.3 Fertility levels, differentials and predictors

Fertility is one of the key components of demographic change. Understanding the patterns of fertility in a society can reveal fertility behavior and understand the predictors of fertility. Fertility estimates are among the most widely used indicators for assessing socioeconomic development in developing countries. This is why countries watch their fertility rates with keen interest in order to determine whether the trend is moving in the desired direction or not. However, in much of the developed world where fertility is now at historic low, these same statistics are examined for signs of an upturn in fertility back to the replacement level needed to prevent further reduction in population size.

In South Africa, there has been a reduction in the level of fertility but the estimate varies across provinces and municipalities in the country. In Mahikeng Municipality, the level, differentials and predictors of fertility remain unknown. Therefore, estimating, examining the differentials and predictors of fertility in the context of the high HIV prevalence in Mahikeng Local Municipality is desirable as it could provide a basis for developing and implementing development programmes.

CEB was used as a measure of lifetime fertility in the municipality in this study. Overall, the Mean number of CEB is estimated at nearly 2 children, which is low, but consistent with what is happening in any urban area in South Africa. As expected, CEB increased with age of the women. This is expected as older women have experienced longer exposure to the risk of childbearing than younger women. The finding is consistent with those of previous studies on fertility (Adebowale et al., 2011; Gyimah, 2002).

Although there is no single factor that explains fertility transition from high to low fertility, a few factors are quite obvious. Two of these are the age at sexual debut and age at first birth. In populations where age at sexual debut and age at first birth are low, the mean CEB is expected to be high. In this study, we found that the mean CEB is lower for women aged 18 years or older at sexual debut. The multivariate results also show that women who were 18 years or older at sexual debut were more likely to have given birth to less than 3 children. The higher age at sexual debut for the majority of the women in this study therefore suggest that overall age at first birth has also increased, which could have contributed to the low mean CEB for this population of women.

The finding in this study further shows that the median age at first birth is 20 years and the mean CEB is lower for women who had the first birth at 25 years or older. Although not significant, the multivariate results show that women who had the first birth at older ages are more likely to have given birth to less than 3 children. The lower mean CEB observed in this population for woman who had the first birth at older ages is consistent with observations from Ghana and some sub-Saharan African countries (Gyimah, 2002). The recent decline in fertility in parts of sub-Saharan Africa has largely been attributed

to the rising age at first birth (Kirk and Pillet, 1998). In the case of the Mahikeng Local Municipality, the higher age at first birth could be attributed to the higher uptake of contraception, which is generally widespread due to the easy access to contraceptives. The imputed role of contraception in this regard is consistent with what has been found in developed countries (Morgan and Rindfuss, 1999; Balakrishnan et al., 1988; Wineberg, 1988).

As expected, the study found that the mean CEB is higher for black women followed by Coloured women and low for Asian and Whites. This finding, despite the small number of Coloureds, Asians and Whites, is consistent with the results from previous studies conducted among South Africa women where blacks were reported to have higher fertility than the other races (Garenne and Joseph, 2002). However, further analysis at the multivariate level did not find any statistical association between being black or coloured and giving birth to 3 or more children. However, results in Model 2 agree with the conclusion that compared to other races, blacks are more likely to give birth to 3 or more children.

The study also found that women who lived in rural area during their childhood have a higher mean CEB than women in urban areas. The result also shows that women in urban areas were more likely than those who lived in rural areas in childhood to have given birth to less than 3 children. This finding suggests that women from rural areas carry along with them rural fertility values when they migrate to urban areas. Researchers have shown that rural-urban differential in fertility is largely a result of rural fertility values where having a large number of children is normative (Wasiu et al., 2011). Conversely,

the fertility of women who grow up in urban areas are influenced by the forces of urbanism which include the effect of education, individual level decision making on all aspects of life and more awareness about fertility reduction strategies in urban settings (Bbaale and Mpuga, 2011; Alaka, 2002).

The finding that women with secondary and tertiary education are less likely to have given birth to 3 or more children is expected and is consistent with previous studies (Cleland and Joesebnoy, 1996; Castro and Juarez, 1995). Giving birth to fewer children by women with tertiary education than women with no/primary education have been explained by three main processes: firstly women with secondary and tertiary education spent a long time in school, which contributes to increasing the age at first birth; secondly, education changes lifestyles that encourage small family sizes values including desiring fewer children and uptake of contraceptives (Bongaarts, 2010); and thirdly, higher incomes by educated women substitutes the need for labour and old age security which is the reasons why women with no/primary education demand many children (Caldwell, 1982). The timing of the first birth, lifestyle and small family values and the higher incomes resulting from education increases the intervals between births and allows women opportunities which have implications for their independence and social-status. In this regard, education appears to promote individual advancement for women. Education also encourages gender equality between men and women and enables women to make decisions in their own interest including fertility decisions, which could contribute to the lower fertility level among better educated women (Alaka, 2002).

The analysis found that women who work in the formal sector and students had a low mean CEB and were more likely to have given birth to less than 3 children. This finding is consistent with other studies (Shockaert, 2005; Rindfuss and Brewster, 1996). These studies observed that employment of women plays an important role in the variation in fertility levels. This variation has been attributed to the differential requirements in different work settings. Women who work in formal salaried, professional and regulated sector are likely to have fewer children as working in this sector is not readily compatible with the role of women as mothers (Joshi, 2002). Other factors such as the effect of education, which is a requirement for formal sector occupations, could also contribute to fewer CEB for women employed in the formal sector (Wasiu et al., 2011; Lakshmi and Bandyopadhyay, 1986). Although working in the informal sector in South African society contributes to empowering women more than in other sub-Saharan African settings, they still remain greatly in the control of cultural value systems which looks at childbearing as an important function for women. Participation in informal work is therefore used as a means of supplementing the incomes of husbands if married or social grants given to mostly single, widowed or divorced mothers.

Although premarital childbearing is common among black women in South Africa, the result show that ever married women have a higher mean CEB and are more likely to have given birth to 3 or more children than never married women. The result is consistent with many other studies in societies where marriage is no longer a precondition for childbearing (Wineberg, 1990). The finding shows that the number of children ever born is higher among ever married women than the unmarried. The results also show that women who were ever married were significantly more likely to have given birth to 3 or

more children indicating that although premarital and non-marital childbearing is common in South Africa, in this study population marriage remains the most important condition for higher fertility. Three conditions can explain the probability of having three or more children for ever married women. Firstly, ever married women are frequently at the risk of childbearing which could contribute to higher number of CEB; secondly ever married women are older and more likely to have lower education implying that they married early and started childbearing at an early age; and thirdly, ever married women are cultural and socially expected to have children and their married status affords them access to more social and economic resources necessary for more children (McLanahan, 1985).

There is so far no agreement on the effect of HIV infection on fertility of women. There are contradicting findings, some suggesting that HIV positive women and women who consider the risk of transmission of HIV infection to be high in childbearing would not want to bear children (Allen, 2005). The above argument has been corroborated at individual level among women who are HIV positive. However, at the population level no study has tested the effect of perception of HIV risk of HIV transmission to children on fertility. Another study found that HIV does not change the attitude of women in sub-Saharan Africa to childbearing (Casterline, 2002). In fact another study suggested that the threat of child mortality due to AIDS increased the desire for more children (Carvalho and Matthews 2006). The lack of impact of HIV on fertility was attributed to the cultural, economic and social importance of children in African society.

The result in this study appears to confirm that perceived risk of HIV infection in marriage and transmission during childbearing has no effect on childbearing decisions in this population. However, the results point to lower likelihood of giving birth to 3 or more children by women who have a positive attitude to HIV testing, a positive attitude to HIV status disclosure and women who perceived the risk of HIV infection to be high in marriage. Women who perceived the risk of transmitting HIV to children during childbearing also have a lower likelihood of giving birth to 3 or more children. At the moment, no clear explanation can be given by this study for the above findings. The fact that fertility of women was not examined by known HIV status of the women makes it rather impossible to explain why CEB is lower among women who perceived a high risk of HIV infection in marriage and transmission during childbearing. Nevertheless, concerns about the risk of HIV infection in marriage and HIV transmission during child bearing can have a negative effect on fertility. A further investigation of these effects is recommended.

7.4 Conclusions

South Africa has been experiencing a decline in marriage rates in all racial groups, but more significantly among black women. This has warranted the need to investigate factors contributing to the decline in marriage rates in South Africa. Evidence from elsewhere, especially in the developed countries suggest that the decline in marriage rate is driven by the marriage flight or marriage squeeze phenomenon as a result of poor quality of marriageable men as perceived by the better educated and working women. Other factors explaining declining and delayed age at marriage in these countries are urbanization and labour force participation of women.

In South Africa, marriage rates are also declining and age at marriage is on the increase. These changes are explained by the very same factors that have been observed in other countries that have adopted the western economic and social organisational models. However, the effect of HIV on the marriage rate and delayed age at marriage has not been empirically examined. Based on the results in chapters four and five, we can safely conclude that the marriage rate and age at marriage in Mahikeng Local Municipality are low and increasing respectively. These are attributed to a number of factors including socioeconomic, demographic and HIV and AIDS related factors. Key among these are race, urban place of childhood residence, working in the formal employment sector and having tertiary education, which have implications for worsening the marriage market situation for educated and high income women. Other factors are factors for the declining marriage rate and delayed age at marriage are being in the under 25 year age group and 25-34 year age group, lower number of children desired and lower number of children ever born, which are consistent with highly educated and gainfully employed women. The study has also demonstrated that HIV could contribute to the decline in the marriage rate. The results show that women with poor attitude to HIV testing and HIV status disclosure to sexual partners; and women who perceived the risk of HIV in marriage to be high, had lower marriage rates and delayed age at marriage.

Regarding the lifetime fertility, we conclude that the TFR in Mahikeng Local Municipality is lower than the provincial average for North West province. The lower lifetime fertility is attributed to the higher age at sexual debut and first birth, marital status and urban childhood place of residence. Other factors identified to contribute to the lower lifetime fertility are secondary and tertiary education, being a student and working in the

formal sector occupations. However, the no links between attitudes to HIV and risk perception of HIV have been identified in this study at the multivariate level. However, at the multivariate level for HIV related factors alone, we can conclude that perception of high risk of HIV infection in marriage and perception of HIV risk of HIV transmission to children during childbearing contributes to lower lifetime fertility of women in Mahikeng Local Municipality.

7.5 Recommendations

Changes in marriage patterns have had important effects on the declining fertility in general. HIV and AIDS has also affected marriage patterns and fertility outcomes in the South Africa especially through behavioural change. It is in these perspectives that the study recommends the following:

- i. HIV and AIDS was found to be threatening the institutions of marriage and the family. It is therefore recommended that efforts to reduce the perceived high risk of HIV infection in marriage must be pursued by promoting the “know your status” campaign and actualize HIV testing programme for all intending couples. Additionally, marital infidelity must be addressed by promoting faithfulness to one sexual partner as a strategy to reduce the risks of HIV infection in marriage. Reduction in the number of sexual partners by those not yet married should be promoted in order to reduce lifetime risk of high infection in the population.
- ii. Age at marriage in the study was found to be increasing. This should be maintained as the higher age at marriage has both health and social benefits for women. One of the social benefits is participation in higher education, which

unfortunately is increasingly becoming a challenge for women from underprivileged backgrounds. It is recommended that government should urgently review the education policy with the view of providing free secondary and higher education for all underprivileged youths.

- iii. Women in the poorer socioeconomic neighbourhoods are most affected by the low marriage rates and higher fertility. This suggests that the women are having children outside marriage which is a risk for intergenerational transfer of vulnerabilities. It is recommended that women in the poorer socioeconomic neighbourhoods should be empowered through education and participation in the monetized economic sector that has been found to reduce fertility in urban environments. Additionally, they should also be sensitized about uptake of contraceptives in order to reduce unwanted and mistimed childbearing essentially among young unmarried women.
- iv. To contribute to prevention of unwanted childbearing among the poorer women, their access to contraceptives should be improved by increasing investments in family planning awareness and services. Increasing access to sexual and reproductive health facilities and services should also be addressed.
- v. The proportion low marriage rate and delayed age at marriage has its downturn through the high rate of premarital and non-marital childbearing, which is common in the study area. This is mainly attributed to the loss of value and relevance of marriage and the family as an important formation in social

organisation. On the other hand, the number of divorces and widowhood are also on the increase thereby seriously undermining the institutions of marriage and the family as the pillar of social organisation and stability. Significant effort should therefore be made to recreate and stabilise the family as the cornerstone of societal morals and survival. This is because marriage and marriage stability is important for family formation, survival and socialisation of new members of society.

- vi. The majority of children were born outside marriage, the study recommends that women be encouraged to postpone age at first sex which appears to be early at 18 years so that age at first birth can also be postponed at least until marriage as a strategy to recreate moral and social values that are important for the responsible raising of future generations.

vii. **Recommendation for future research**

Although HIV and AIDS appears to contribute to changes in marriage patterns in this population, the mechanisms through which it operate has not been clearly identified. It is therefore recommended that further research to unlock the mechanisms through which HIV and AIDS impacts on the marriage rate, delayed age at marriage and fertility should be conducted. This is expected to contribute more knowledge for effective social programming of responses to the generalized HIV and AIDS pandemic in South Africa in general and North West province in particular.

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QUESTIONNAIRE

MARRIAGE DYNAMICS AND FERTILITY IN THE ERA OF HIV AND AIDS IN MAHIKENG LOCAL MUNICIPALITY OF THE NORH WEST PROVINVE, SOUTH AFRICA									
INSTRUCTIONS									
Dear participant, I am a student at the North West University, Mahikeng Campus. I am conducting a study that examines the relationship between marital patterns and fertility in the ear of HIV AND AIDS in the Mahikeng local municipality in North West Province. The main objectives in this study are to find out the perceptions, attitudes and behavioural change towards marriage and fertility in the Era of HIV AND AIDS in Mahikeng local municipality. I am kindly requesting you to take part in this study which is optional. Your response will be strictly kept confidential and will be used for academic purposes only and will not be given to any other person. You can refuse to answer any question and may stop the interview at any time.									
IDENTIFICATION									
Household no.									
Zone Number and/or name of residential area :									
Household street address/house or dwelling number: _____									
Name of the respondent :						Telephone No.:			
Type of household	1	Nuclear	2	Single	3	Extended Family	4	Co-habit	
INTERVIEWER VISITS									
		First visit		Second visit		Third visit		Total No. of visits:	
Date: YY/MM/DD									
Interviewer's name									
Result*									
Next visit:	Date								
	Time								
* Result codes:									
1	Completed								
2	Partly completed								
3	Refused (specify reason if any)								
4	Postponed								
5	Other (specify)								
EDITING AND CODING INFORMATION									
Field edited:									
Date:									
Coded by:									
Date:									
Captured by:									
Date:									

A. Background data on women

1. How old are you? Record age in completed year

2. When were you born?

3. What is your racial group
(i) Black African

- (ii) Coloured
- (iii) Asian
- (iv) White

4. What is your religion?

- (i) Catholic
- (ii) Protestant
- (iii) Other Christian denomination
- (iv) Muslim
- (v) Traditionalist
- (vi) Others

5. Have you ever been to school

- (i) Yes
- (ii) No

6. If yes, what is your highest level of education?

- (i) Primary
- (ii) Secondary
- (iii) Tertiary

7. What was your childhood place of residence?

- (i) Urban
- (ii) Rural

8. What is your current place of residence (classified as neighbourhood socioeconomic status)

- (i) Richest
- (ii) Richer
- (iii) Poorer
- (iv) Poorest

9. For how long have you lived in this neighbourhood. Report period of residence in years.

Number of years

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10. What is your current occupation?

- (i) Student

- (ii) Professional
- (iii) Service worker
- (iv) Employed in trading
- (v) Self employed in trading
- (vi) Self employed in farming
- (vii) Casual worker
- (viii) Domestic worker
- (ix) Housemaid
- (x) Not employed

B. Marriage

In this section I would like to ask you about marriage. Specifically I would like to know if you have ever married or not. If you have ever married please tell me about your age when you were first married and your current marital status.

11. Have you ever been married?

- (i) Yes
- (ii) No

12. If married, at what age were you first married? State age in completed years.

Age in years

13. If married, what is your current marital status?

- (i) Married
- (ii) Living together with a man as married
- (iii) Separated
- (iv) Divorced
- (v) Widowed

14. If separated/divorced/widowed, how old were when you separated/divorced/become widowed?

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15. If separated/divorced/widowed. Do you intent to remarry in future?

- (i) Yes
- (ii) No

16. If no. Why would you not remarry? Give at least one reason why you would not remarry.

- (i)
.....
- (ii)
.....
- (iii)
.....

17. If yes. Why would you remarry? Give at least one reason why you would remarry

- (i)
.....
- (ii)
.....
- (iii)
.....

C. Sex and Reproduction

In this section, I would like to ask you about your sexual behavior and all the children you have ever given birth and you would have wanted to give to before starting reproduction. This will include children you have given birth to by sex. I will also include children you have given birth to, but are no longer living with you or have already died.

18. Have you ever had sexual intercourse in your life?

- (i) Yes
- (ii) No

19. If yes, how old were you when you started having sex? Record age in completed years. If not known, record 98. Age at first sex

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20. Who was your first sexual partner?

- (i) Boy/man friend
- (ii) Husband
- (iii) Stranger
- (iv) Other related person

21. What was the circumstance at your first sex?

- (i) Wanted to have sex
- (ii) Coerced into having sex
- (iii) Was rapped
- (iv) Was drunk

22. Did you use a condom at that sexual intercourse occasion?

- (i) Yes
- (ii) No

23. If no why did you not use a condom? Give reasons for not using a condom.

- (i)
.....
- (ii)
.....
- (iii)
.....
- (iv)
.....

24. If yes, why did you use a condom on that occasion? Give reasons for condom use.

- (i)
.....
- (ii)
.....
- (iii)
.....
- (iv)
.....

25. Have you ever initiated condom use in your sexual relationships?

- (i) Yes
- (ii) No

26. Have you ever had a sexually transmitted disease?

- (i) Yes
- (ii) No

27. If you get a sexually transmitted infection including HIV would you tell your sexual partner?

- (i) Yes
- (ii) No

28. If Yes, why would you tell your sexual partner?

- (i)
.....
- (ii)
.....
- (iii)
.....

29. If no why would you not tell your sexual partner that you have an STI/HIV?

- (i)
.....
- (ii)
.....
- (iii)
.....

30. How many sexual partners have you ever had? Please record number

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31. Have you ever been pregnant?

- (i) Yes
- (ii) No

32. I yes, how old were you when you first became pregnant? Report age at first pregnancy in completed years.

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33. Have you ever given birth to a live baby?

- (i) Yes
- (ii) No

34. How old were you at your first birth? Record age in completed years.

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35. How many children have you ever given birth to? Record number of children ever born.

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36. How many of the children were bots? And How many of the children were girls?

Number of boys

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Number of girls

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37. Before starting to give birth, how many children did you want to give birth to?

Number of children

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Number of boys

--	--

Number of girls

--	--

Don't know (record 98),

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38. Of the children you have given birth to, how many are living with you and how many are living elsewhere?

Number living with you

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Number living elsewhere

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39. Of the children you have given birth to, how many have died?

Number of children dead

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D. HIV and AIDS

Now I would like to ask you about HIV and AIDS. Please tell me whether you have hear of the disease, know how the disease is transmitted and your attitudes and perceptions regarding HIV.

40. Have you ever heard of the disease HIV and AIDS?

(i) Yes

(ii) No

41. Have you ever known someone with HIV and AIDS? Or someone who died of HIV AND AIDS?

(i) Yes

(ii) No

42. How is HIV the virus that causes AIDS transmitted? Ask respondents to list at least 3 ways through which HIV may be transmitted.

(i)

(ii)

(iii)

(iv)

(v)

Record number of correct ways mentioned:

43. Do you know ways through which HIV transmission may be prevented?

(i) Yes

(ii) No

44. List at least 4 ways through which HIV may be transmitted.

(i)

.....

(ii)

.....

(iii)

.....

(iv)

.....

45. Can HIV infection be cured?

(i) Yes

(ii) No

46. What is your attitude to HIV testing?

(i) Positive

(ii) Negative

(iii) Not sure

47. Would you test for HIV?

- (i) Yes
- (ii) No
- (iii) Not sure

48. What is your attitude to disclosure of positive HIV status?

- (i) Positive
- (ii) Negative
- (iii) Not sure

49. Would you disclose your HIV status to your sexual partner if you were infected?

- (i) Yes
- (ii) No
- (iii) Not sure

50. What is your perception of the risk of HIV infection in marriage?

- (i) Very high
- (ii) High
- (iii) Low
- (iv) None

51. What is your perception of risk of HIV transmission to children during childbearing?

- (i) Very high
- (ii) High
- (iii) Low
- (iv) None

52. What are you personally doing to reduce your risk of HIV infection?

- (i) Abstain from sex
- (ii) Use condoms always during sex
- (iii) Have only one sexual partner
- (iv) Delay marriage
- (v) Do not want to get married

53. What are your main sources of HIV and AIDS information? List at least 3 important ones.

- (i)
- (ii)
- (iii)

54. The following are statements related to persons living with HIV AND AIDS.

Indicate your response on a scale ranging from 1 to 5 where 1=Strongly agree and 5 strongly disagree.

1	I will have sex with a HIV positive person	1	2	3	4	5
2	I will be in a relationship with a HIV positive person					
3	I would marry a HIV positive person					
4	The risk of contracting HIV in marriage are low					
5	I am scared of getting married because of HIV					
6	I am scared of having babies because of HIV					
7	The risk of transmitting HIV to babies is high					

We have come to the end of the interview

Thank you very much for participating in this study