FAMILY FORMATION AMONG SOUTH AFRICAN YOUTH: THE ROLE OF HIV AND SOCIO-DEMOGRAPHIC FACTORS

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DECLARATION

I, **Paballo Mataboge**, declare that this research report encompasses my original work. All the secondary material has been acknowledged and referenced according to the American Psychological Association (APA) referencing style. This research paper is being submitted to the Faculty of Humanities for a Master's Degree in Health Demography. Furthermore, to the best of my knowledge, this work has never been submitted to other universities for any other degree or examination purposes.

Signature:

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ACRONYMS AND ABBREVIATIONS

ART	Antiretroviral Therapy
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immune Deficiency Syndrome
UNAIDS	Joint United Nations Programme on HIV and AIDS
UNICEF	United Nations International Children's Emergency Fund
SSA	Sub-Saharan Africa
Stats SA	Statistics South Africa
PrEP	Pre-Exposure Prophylaxis
PMTCT	Prevention of Mother-to-Child Transmission
MTCT	Mother-to-Child Transmission
SANAC	South African National AIDS Council
PLWH	People Living with HIV
WHO	World Health Organization
PSU	Primary Sampling Unit
DSU	Dwelling Unit
MLR	Multinomial Regression Model

ABSTRACT

BACKGROUND: In South Africa, the number of civil unions dropped from 186,522 in 2008 to 135,458 in 2017, while cohabitation and premarital childbearing have been on the rise. Research has found that female employment and education, cultural beliefs, place of residence and contraceptive use are some of the factors that are associated with family formation among youth in South Africa. However, given that young women aged 15-24 years are at heightened risk of HIV transmission in South Africa, little is known about how the pandemic affects the ability of youth to form families. Furthermore, literature in South Africa, has compared the fertility intentions of HIV Positive and HIV Negative women, however, it has not looked at family formation in its entirety. Therefore, this study examined the association between socio-demographic factors, HIV status and family formation among youth in South Africa.

DATA AND METHODS: This study utilised secondary data which was acquired from the 2016 South African Demographic and Health Survey. The 2016 Demographic and Health Survey is a survey that included a sample of 8,514 females aged 15-49 years. The study population, however, consists of youth aged 15-34 years in 2016. Therefore, the study had a weighted sample size of 2 357 women aged 15-34 years, of which 1 913 were HIV negative and 444 were HIV positive.

The dependent variable in this study was family formation and it had four categories, namely, single and without children, single and with children, married and without children and married and with children. On the other hand, the independent variables were, HIV status, respondent's age, place of residence, population group, highest level of education, employment status, household wealth index, told about family planning, pregnancy intention and condom use. The data was analysed in STATA version 15, and it was done in two phases. The first phase included a descriptive of the variables in the study, presented through a series of graphs and frequency tables. In the second phase, multinomial regression models were used to assess the association between socio-demographic factors, HIV status and family formation among youth in South Africa. The Multinomial Regression Models consisted of five models. Model 1 assessed the association between HIV status and Family formation. Model 2 assessed the effects of Model 1 and demographic factors. Model 3 assessed the effects of Model 2 and socio-economic factors. Lastly, Model 4 assessed the effects of model 3, and family planning and proximate factors.

RESULTS: Among the HIV Negative youth, 17.88% were single and without children, 44.84% were single and with children, 4.12% were married and without children, while 33.15% were

married and with children. Among the HIV Positive youth, 19.26% were single and without children, 46.78% were single and with children, 3.93% were married and without children, and 30.86% were married and with children. This therefore indicates that there were marginal differences in the family formation patterns of HIV Negative and HIV Positive youth in South Africa. After controlling for the socio-demographic characteristics, the regression analysis showed that HIV Positive youth had a 1.29 [CI: 0.673-2.473] times higher risk of being single and with children, compared to HIV Negative youth. The relative risk of being married and without children was 0.57 [CI: 0.197-1.667] times lower for HIV Positive youth as compared to HIV Negative youth. Lastly, the relative risk of being married and with children was 1.09 [CI: 0.483-2.444] times higher for HIV positive youth. However, HIV status was not significantly associated with family formation. The relative risk of being single and with children was significantly associated with respondent's age [RRR=5.26, CI: 3.920-7.057] population group [RRR=3.14, CI: 1.413-6.984] and an unintended pregnancy [RRR=14.43, CI: 2.245-92.688]. The relative of being married and without children was significantly associated with the respondent's age [RRR=2.89, CI: 1.952-4.280], rural residence [RRR=0.31, CI: 0.155-0.631], rich household wealth index [RRR=0.35, CI: 0.156-0.767] and condom use [RRR=0.20, CI: 0.096-0.434]. Lastly, the relative risk of being married and with children was significantly associated with the respondent's age [RRR=10.03, CI: 7.127-14.135], rural residence [RRR=0.50, CI: 0.309-0.800], and condom use [RRR=0.44, CI: 0.270-0.728].

CONCLUSION AND RECCOMENDATION: The overall inference that was drawn from this study is that there are marginal differences in the family formation patterns of HIV Positive and HIV Negative youth in South Africa. This therefore suggests that HIV Positive youth are forming families that are similar to that of their HIV Negative peers. Furthermore, HIV status was not a significant predictor of family formation. This can be attributed to the increased access to ART, which has been found to decrease the risk of sexual and mother-to-children-transmission (MTCT) of HIV. However, unintended pregnancies were found to be significantly associated with family formation. This raises concerns of possible HIV transmission. Therefore, the National Contraception and Family Planning Policy needs to ensure that there is a proper integration of contraception and family planning services, with HIV and MTCT prevention services. Lastly, the Health Sector HIV Prevention Strategy of 2016, needs to integrate HIV services into their framework.

KEY WORDS: Family formation, HIV status, Youth, South Africa

CHAPTER ONE

INTRODUCTION

1.1 Background

In 2017, it was estimated that 36.9 million people were living with HIV globally (Joint United Nations Programme on HIV and AIDS [UNAIDS], 2018). Each day, there were approximately 4,900 new incidences of HIV, while on average 2,500 people died from AIDS as a result of inadequate access to prevention and treatment services (United Nations International Children's Emergency Fund [UNICEF], 2018). Nonetheless, there have been considerable improvements in increasing the survival rate of people living with HIV (PLWH). With the introduction to, and increased access to antiretroviral therapy (ART), there has been a considerable decline in the number of deaths due to AIDS-related causes globally (UNAIDS, 2018). These deaths declined from 1.9 million in 2004 to 940 000 in 2017 (UNICEF, 2018)

However, despite the introduction of, and increased access to ART, the HIV pandemic remains a public health issue in sub-Saharan Africa (SSA). Moreover, there are regional differences in the prevalence of the pandemic. In Southern and Eastern Africa, the number of PLWH increased from 13.9 million in the year 2000 to 19.6 million in 2017 (UNAIDS, 2017). While, in Central and Western Africa, the number of PLWH increased from 5.8 million in the year 2000 to 6.1 million in 2017 (UNAIDS, 2017). Furthermore, in 2017 the countries with the highest HIV prevalence were found in Southern Africa, and these were Eswatini, Botswana, Lesotho and South Africa (UNAIDS, 2018). In 2017, 27.20% of the population in Eswatini were estimated to be living with HIV, 21.90% in Botswana, 25% in Lesotho, and 19% in South Africa (UNAIDS, 2018). However, in absolute numbers, South Africa had the highest HIV prevalence in the world, accounting for 7.52 million PLWH (Statistics South Africa [Stats SA], 2017).

Since the realisation that the HIV epidemic is transmitted through heterosexual and homosexual intercourse, the primary prevention methods included; consistent condom use, monogamous sexual intercourse with an individual who has an HIV negative status, abstinence and late sexual debut (Dellar, Dlamini & Karim, 2015). However, in recent years, there have been advances in HIV prevention treatment, mainly seen by the introduction of Pre-Exposure Prophylaxis (PrEP) (Bekker, Gill & Wallace, 2015). PrEP is an oral treatment which involves the administration of a

single or double ARV agent, to HIV negative individuals who may be exposed to the infection (Bekker, Gill & Wallace, 2015). This treatment has decreased the risk of HIV transmission and has allowed individuals to get into healthy serodiscordant relationships (Mashaphu & Burns, 2017). It has been established that the intake of PrEP by the HIV negative partner in the aforementioned type of relationship reduces HIV transmission by 75% (Baeton et al., 2012). Furthermore, research has also found that the effective intake of ART by the HIV positive individual, leads to viral load suppression, and once undetectable, the HI virus cannot be transmitted to the HIV negative partner (Cohen et al., 2011).

Additionally, the implementation of the Prevention of Mother-to-Child Transmission (PMTCT) program has prevented the MTCT of HIV during pregnancy and breastfeeding, it supports safe childbearing practices, and also provides virological testing after birth and during breastfeeding of children exposed to the HI virus (UNAIDS, 2018). As a result of this program, between 2010 and 2018 1.4 million HIV infections among children were prevented (UNAIDS, 2018). However, little is known about the ability of HIV positive individuals to form families amidst all the advancements in HIV prevention treatment.

Family formation is defined as the processes of parenthood, marriage, and cohabitation (Manning, 2015). The impact of HIV on family formation, union dissolution and fertility were anticipated (Hosegood, 2009). However, understanding the relationship between HIV and these demographic processes has been difficult in SSA because fertility and marriage rates had already begun to decline before the emergence of the HIV pandemic (Locoh, 1998 as cited in Hosegood, 2009). In SSA, fertility began to decline from the late 1980s, and this was accompanied by an increase in cohabitation and premarital childbearing in Southern Africa (Bongaarts & Caterline, 2013; Clark, Poulin & Kohler, 2017). Data from 1990-2015 in Nigeria (Western Africa), Zambia (Southern Africa) and Kenya (Eastern Africa) has shown that female headed households have increased over the years, while extended family households have decreased (Haregu, Beguy & Ezeh, 2015). Furthermore, single parent and single person households have increased, so has the age at first marriage and the proportion of people cohabiting (Haregu, Beguy & Ezeh, 2015). Lastly, the number of unmarried women has also increased over the years, of which led to the decline in fertility (Haregu, Beguy & Ezeh, 2015). Furthermore, the Statistics South Africa 2017 report on marriages and divorces highlighted that the number of registered civil marriages continuously declined between the years 2000 and 2017 (Stats SA, 2017). Specifically, there were 186,522 marriages recorded in 2008, and this number declined to 135,458 in 2017 (Stats SA, 2017). Additionally, the number of customary marriages also decreased from 2,588 in 2008 to 3,978 in

2016 (Stats SA, 2017). Overall, with regards to civil marriages, the highest number of brides were in the age group 25-29 years (26.4%), while the highest number of bridegrooms were aged 30-34 years (23.0%) (Stats SA, 2017). With regards to customary marriage, the highest number of brides were aged 20-24 years (22.5%) while the highest number of bridegrooms were aged 25-29 years (19.6%) (Stats SA, 2017). According to literature, factors that have delayed or lead to the decline in family formation among young people include but are not limited to; the education and employment of women, seeking security, gender equity and effective contraception (Marchetta & Sahn, 2016; Mills, Rindfuss, McDonald & Te Velde, 2011; Lehohla, 2015). However, given the high prevalence of HIV in South Africa, it is important that research assess whether the pandemic is contributing to these changes.

1.2 Problem Statement

The SSA region is undergoing the second demographic transition, which is characterised by delays in marriage and childbearing, increased cohabitation and union dissolution, and the increase in contraceptive access and effectiveness (Odimegwu, 2017).

The HIV pandemic has affected the family institution as a functioning system (Iwelumnor, Airhihenbuwa, Okoror, Brown & BeLue, 2012). Research has shown that HIV may lead to economic loss for affected families, as they may need to sell family assets in order to buy medication for infected individuals (Katapa, 2004). In a study that was conducted in South Africa, it was found that members who came from HIV and AIDS affected households had incomes and expenditures that were 14%-16% lower than that of members from unaffected households (Bachmann & Booysen, 2003). The pandemic has also led to the loss of income and job security in South African households (Bachmann & Booysen, 2003). Additionally, HIV has led to the orphaning of many young children. In South Africa, more than 2 million children are orphans due to AIDS-related illnesses (UNICEF, 2016), and are usually raised by their grandparents, extended family members, siblings, foster care, while others are moved to orphanages (Breckenridge, Black-Hughes, Rautenbach & Mckinley, 2019)

When narrowing the focus to youth in South Africa, this group has been identified as being at heightened risk of HIV transmission. In 2016, young women aged 15-24 years contributed to 37% of all new HIV infections in South Africa (South African National AIDS Council [SANAC], 2017). Factors that have led to increased infections among this group include; transactional sex,

sexual partnerships between young girls/women and older men (Kilburn et al., 2018; Maughan-Brown et al., 2018), and low condom use (UNAIDS, 2016) among others. Additionally, infected youth usually face social stigma, discrimination, isolation, depression and low self-esteem (Eller et al., 2014; Swendeman, Rotheram-Borus, Comulada, Weiss & Ramos, 2006), of which may prevent them from having a healthy transition into adulthood.

Stigma is defined as the presence of negative attitudes and beliefs, in which individuals who belong to a certain group are devalued or seen as socially undesirable due to attributes and behaviours that are deemed to be different (Goffman, 2009). Stigma is a damaging phenomenon and PLWH experience it from their families, and communities at large (Turan et al., 2017). Additionally, stigma also negatively affects the health outcomes of PLWH, and may lead to non-medical adherence, lower hospital/clinic visit adherence, increased risk of depression and a decline in their overall quality of life (Katz et al., 2013; Sweeney & Vanable, 2016; Turan et al., 2017; Vanable, Carey, Blair & Littlewood, 2006). Lastly, social stigma has been found to affect the emotions, cognition and behaviour of PLWH (Turan et al., 2017).

In 35% of the countries in the world which have data on HIV and discrimination, it was found that over 50% of the people had reported having discriminated against PLWH (UNAIDS, 2015). Discrimination and the violation of human rights remain present in healthcare settings as well and may prevent people from accessing healthcare services and enjoying quality healthcare (UNAIDS, 2017). In some cases, PLWH face social exclusion; while others face erosion of their rights, poor treatment in education and work settings, and psychological damage (Grossman & Stangl, 2013). This therefore, limits their access to HIV testing and other HIV services and in some cases, affects their desire to have children and form families (Katz et.al., 2013). PLWH also face barriers to childbearing and forming families and these include; stigma, lack of support from the healthcare providers, lack of knowledge on safer conception methods, the fear of HIV transmission and the lack of negotiating power for safer sex (Beyeza-Kashesya et.al., 2009; Gogna, Pecheny, Ibarlucía, Manzelli, & López, 2009; Gombachika, Chirwa, Malata, Sundby & Fjeld, 2013; Kawale et.al., 2014). Research has also shown that for some, HIV status is important in making decisions about unions (Anglewicz & Reniers, 2014).

When looking at HIV and family formation, research has shown that HIV and AIDS increases the risks of union dissolution and instability (Boerma et al., 2002), and leads to a downward trend in the fertility of infected women, but does not have a big effect on the fertility levels of the population in countries with high prevalence rates (Heuveline, 2004). These studies, however,

were conducted before the approval of PrEP and the mass rollout of ART. Contrary to Boerma et al (2002) and Heuvelines' (2004) findings, studies in South Africa have shown that childbearing aspirations are high among men and women receiving HIV treatment, and increase with treatment duration and improvements in health status (Adler, Abar, Bennie, Sadeghi & Bekker, 2017; Cooper, Mantell, Moodley & Mall., 2009; Myer, Morroni & Rebe, 2007). Nonetheless, little is known about how HIV affects the ability of individuals to form families. Additionally, given that young women aged 15-24 years have been identified as a group at heightened risk of HIV transmission, there is a need for studies that will look at their ability to form families in a context of high HIV prevalence. As such, this research study will assess the relationship between socio-demographic factors, HIV status and family formation among youth in South Africa.

1.3 Justification

Families are the environments in which the material and emotional needs of individuals are met (Callan, 2014). They play an important role in ensuring social cohesion, socialisation of children and the wellbeing of its members (White, 2000). Furthermore, families also provide care for the vulnerable members in society (Callan, 2014). As such, it is important that youth form families, including those who are HIV positive.

Key events that mark a transition into adulthood such as; marriage and childbearing have been postponed, while cohabitation and the dissolution of unions are on the rise globally (Cherlin, 2010).Specifically in SSA, marriage was once an event that took place in early adulthood; however, it is currently undergoing a transition. Retrospectively, in the last 25 years age at first marriage has risen in this region (Bongaarts, Mensch & Blanc, 2016; as cited in Clark, Koski & Smith-Greenway, 2017). In countries like Botswana, Namibia and South Africa, the mean age at first marriage for women is above 25 years (Garenne, 2004; as cited in Clark, Koski & Smith-Greenway, 2017), while East African and West African countries still have a mean age at first marriage that is as low as 17-20 years (Garenne, 2004; as cited in Clark, Koski & Smith-Greenway, 2017). Furthermore, there have been significant changes in the living arrangements of unmarried persons, with couples living together without being married legally (Sassler, 2004).

There are several factors that have led to the postponement of family formation and the overall decline in marriage rates. At the individual level, these factors include socioeconomic, cultural and political factors such as, the education and employment of women, religion and cultural beliefs, and the availability of suitable marriage partners (Kumar & Danabalan, 2006; Isla, 2009; as cited

by Yaya & Amoateng, 2016). At the macro level these factors include urbanisation, migration, and legislation among others (Dommermuth et.al., 2017; Ezra, 2003; Goldshcheider, 2013; Kradval, 2002; Martine, Alves, Cavenaghi, 2013). Furthermore, other factors that have contributed to the decline in marriage rates are the rise in premarital sex, cohabitation, and premarital childbearing (Muraco & Curran 2019). However, given that there is high prevalence of HIV among female youth in South Africa, previous research has been limited in that it has not looked at HIV as a possible factor that has led to the delay in family formation among youth.

Young women aged 15-24 years, have been identified as being at a higher risk of HIV transmission in South Africa (SANAC, 2017). Childbearing decisions among HIV positive women are affected by concerns of availability of family planning methods, sexual transmission of HIV, fear of maternal mortality, social stigma and discrimination, and the fear of MTCT (Adler et.al., 2017). In a study which examined the contraceptive practices among HIV positive women on ART attending a clinic in South Africa, the researchers found that 95% of the participants were using contraception (Oni, Ross & Van der Linde, 2013). Of these, 61.3% were using condoms, 20% were using injectable contraceptives, 19.7% were abstaining, 4.5% were using intrauterine contraceptive device, 2.2% were using the pill and 0.7% were using coitus interruptus (Oni, Ross & Van der Linde, 2013). The factors that were associated with the use of contraception were; knowledge of HIV status (72.8%), health worker advice (20.9%) and insistence by their partner (8.2%) (Oni, Ross & Van der Linde, 2013). Furthermore, 31% of the women fell pregnant while on ART, and of these, 56.2% said that their pregnancy was unintended, while the remaining 43.8% wanted to fall pregnant because of their partner's insistence, desire for a child, wanting to hide their HIV status, not wanting to die childless, and the death of their previous child (Oni, Ross & Van der Linde, 2013). In June 2011, the South African HIV Clinicians Society published guidelines for safer conception among People Living With HIV (PLWH) in resource constrained settings (Bekker et.al., 2011). Furthermore, the promotion of fertility planning for PLWH was incorporated in the 2012 National fertility planning guidelines (Cooper et al., 2015). However, as a result of the lack of effective planning, widespread implementation has not been achieved in South Africa. Additionally, most service providers are not aware of recent policies and promoted strategies for dealing with couples affected by HIV (Davies, Mathews, Crankshaw, Cooper & Schwartz, 2017). As such, this may affect the ability of HIV positive youth in forming families and experiencing a healthy transition into adulthood.

This study will therefore inform the *National Contraception, Fertility Planning Policy*, on the need to achieve widespread implementation of their guidelines. The *National Contraception, Fertility Planning Policy*, addresses contraception and family planning (Department of Health [DoH], 2012). It also addresses the needs of women living with HIV and those at risk of HIV, through the integration of contraception and family planning along with HIV, maternal health and adolescent services (DoH, 2012). This study will also inform the *Health Sector HIV Prevention Strategy of 2016* for the need to include family planning services in their framework, and to combine test-and-treat and safer conception training so that service providers can be well equipped to provide counsel and support the fertility goals of their clients. This strategy aims to provide a framework for the provision of HIV prevention services provided by the Department of Health, primarily to reduce the incidence of HIV (Department of Health, 2016). It also aims to prioritize HIV prevention treatment and scale up the implementation of combination based HIV prevention, and to monitor and track progress (DoH, 2016). This strategy uses biomedical, behavioural and structural classes of prevention, to respond to the needs of their audience (DoH, 2016). It also provides treatment on the individual, couple, community and societal levels (DoH, 2016). Lastly, Goal 3 of the Sustainable Development Goals is to promote good health and wellbeing for all. It aspires to end epidemics like Aids, Tuberculosis and other communicable diseases by 2030. It also aims to provide universal coverage, which is accompanied by access to safe and effective medicines. It is therefore vital that South Africa achieves this goal, because health and wellbeing play a role in family formation. Additionally, healthy individuals will also give birth to healthy infants, as result raise them to be healthy children, thus also decreasing infant and child mortality. Ultimately, healthy children are most likely to transition into adulthood, thus increasing the likelihood of them contributing to the growth and development of the country's economy.

1.4 Research Questions

1.4.1 Main Research Question

What are the levels of, and relationship between Socio-demographic factors, HIV status and family formation among youth in South Africa in 2016?

1.4.2 Sub research questions

1. What are the types and levels of family formation among youth in South Africa?
2. What is the relationship between Socio-demographic factors, HIV status and family formation among youth in South Africa?

1.5 Research Objectives

1.5.1 Main Objective

To examine the levels and the relationship between Socio-demographic factors, HIV status, and family formation among youth in South Africa in 2016.

1.5.2 Sub-objectives

1. To describe the types and levels of family formation among youth in South Africa, by HIV status.
2. To examine the relationship between HIV status, socio-demographic factors and family formation among youth in South Africa.

1.6 Hypotheses

1. H0: There are no differences in the types and levels of family formation among youth in South Africa, by HIV status.
   H1: There are differences in the types and levels of family formation among youth in South Africa, by HIV status.

2. H0: There is no association between HIV status and family formation.

   H1: There is an association between HIV status and family formation.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Literature review

This chapter presents the review of literature and the theoretical framework that underpins this study. Literature used in this study was collected from Google scholar, the University of the Witwatersrand online library, PubMed and research reports. Furthermore, access to the literature was granted through the University of the Witwatersrand. Key words included in the literature review search included; "HIV status and family formation", "HIV status and childbearing", "socio-demographic determinants of family formation", "socio-demographic determinants of marriage" and "socio-demographic determinants of childbearing".

There were numerous studies which looked at the subject in question, however only the relevant studies were included in the literature review. Particularly, studies were included in the review if they assessed the socio-demographic factors that are associated with family formation, childbearing or marriage. Additionally, studies were included in the review if they examined the association between HIV status and family formation, childbearing or marriage.

This chapter has five sub-headings, which are; "The transition in family formation", "Demographic determinants of family formation", "Socio-economic determinants of family formation", "Family planning, ART, PMTCT and Family Formation among People living with HIV" and "Deficiencies in literature". The reviewed literature is further presented in a tabular formation in Appendix A.

2.1.1 Transition in Family formation

In recent years, there have been changes in the patterns of marriage and family formation globally and, South Africa is not an exception (Posel & Casale, 2009; Cherlin, 2010; Billari & Liefbroer, 2010). These changes have been characterised by delays in family formation, increasing cohabitation, declining marriage rates and an increase in union dissolutions (Moore & Govender, 2013). Literature shows that factors that determine family formation include, but are not limited to; education, employment, religious affiliation, place of residence, age and wealth index amongst others (Amoateng & Heaton, 2007; Isla, 2009 as cited by Yaya and Amoateng, 2016). These factors will be reviewed in the section below.

2.1.2 Demographic Factors and Family formation

Age is a demographic factor that is associated with numerous health outcomes, and family formation is one of them. In terms of global comparisons, SSA still stands out for the youngest age at first marriage (Hertrich, 2017). In 2010, the median age at first marriage was at 21.2 years for women, which was 1.4 years earlier than in Asia (Hertrich, 2017). It was also earlier than that of developed countries, of which stood between 25-28 years Hertrich, 2017).

Literature in Uganda has pointed out that, between 2006 and 2016, the total fertility rate (TFR) declined from 7.2 children per woman in 2006 to 5.8 children per woman in 2016 (Ariho & Kabagenyi, 2020). This decline in the TFR was due to delayed sexual debut, especially among young women aged 20+ years (Ariho & Kabagenyi, 2020). Delayed sexual debut leads to the delayed risk of childbearing, thus influencing the fertility levels of women (Ariho & Kabagenyi, 2020). These findings are consistent with those of an earlier study that was conducted in Namibia. The researchers found that age at first birth remained the same between 1992 and 2006, however, age at first marriage continued to increase during this period (Indongo & Pazvakawambwa, 2012). As a result, the postponement of marriage increased the chances that a woman will be childless or have fewer children (Indongo & Pazvakawambwa, 2012). In Rwanda, literature has also established that among ever married, cohabiting and never married women, low fertility is associated with late sexual debut among other factors (Ndahindwa et al., 2014).

Variations on fertility and marriage rates have also been observed among different population groups in the same country (Plamuleni, Kalule-Sabiti & Makawine, 2007). Such differences are however, a reflection of the imbalances in social and economic development in that society. These imbalances express themselves in the quality of and access to education, health, infrastructure, industrialisation and employment among others (Plamuleni, Kalule-Sabiti & Makawine, 2007).

In the United States (US), literature has established that age at first birth has increased for all races and ethnic groups, however, Black and Hispanic populations enter parenthood earlier than the White population (Hamilton & Ventura, 2012). Therefore highlighting that race and ethnicity influence time of family formation. In another study conducted in the US, Carlson (2015), pointed out that there are racial differences in preference, expectations, timing and sequence of family formation. As compared to the Hispanic and White populations, Blacks had lower marriage preference and when they did prefer to get married, it was usually at an older age (Carlson, 2015). Lastly, both blacks and Hispanics expected children more often and at a much younger age than the White population (Carlson, 2015). These findings are in line with an earlier study which found

that; Black and Hispanic populations are more likely to have teen births, premarital childbearing and unintended pregnancies (Sweenay & Raley, 2014).

Udjo (2001), pointed out that African and Coloured populations in South Africa marry at a much later age. However, the data used in this study was from the census of 1996, which suggests that there may have been changes over the past two decades. Literature in South Africa has also established that fertility is generally higher among Black African and Coloured populations, and is lower among white Indian/Asian and White populations (Sibanda & Ziburi as cited in Stats SA, 2007). Additionally, Zwang and Garenne (2008), pointed out that in South Africa, premarital childbearing is high among Black and Coloured populations, and is high in both rural and urban areas. This, therefore, suggests that even though African and Coloured populations marry at an older age, they form families relatively earlier than White and Indian/Asian populations.

Furthermore, place of residence is considered to be a determinant of family formation and studies have found differences in urban/rural family formation patterns. Ezra (2003) conducted a study in Southern Ethiopia which looked at factors associated with marriage and family formation. Upon analysis, the researcher found that age at first marriage was related to urban-rural residence (Ezra, 2003). Particularly, young girls from urban areas were less likely to get married before 18 years, as compared to their peers from rural areas (Ezra, 2003).

Kalule-Sabiti and colleagues (2007), established that in countries like South Africa, where urban orientated development is strong, urban-rural residence becomes a factor that defines the influence of other socioeconomic factors on nuptiality (Kalule-Sabiti, Palamuleni, Makiwane & Amoateng, 2007). For instance, where one lives will determine the quality of education they receive, employment opportunities available to them, and their quality of life (Kalule-Sabiti, Palamuleni, Makiwane & Amoateng, 2007).Therefore, as compared to their peers from rural areas, women who live in urban areas are most likely to receive better education, which results in better employment prospects and opportunities (Kalule-Sabiti, Palamuleni, Makiwane & Amoateng, 2007). This, therefore means, they are also less likely to experience pressure to get married, and hence they have lower marriage rates (Kalule-Sabiti, Palamuleni, Makiwane & Amoateng, 2007).

2.1.3 Socio-economic Factors and Family formation

A negative relationship between education and fertility has been observed in the literature. According to theory, education raises a woman's income and therefore, they may choose to have fewer offspring of higher quality (Becker, 1960). Additionally, education may better equip a

woman to make informed decisions about her health and fertility (Grossman, 1997). Hwang and Ha Lee (2014), conducted a study which examined the association between women's education and their timing and level of fertility. The findings revealed that a higher level of education among women tends to delay childbearing and family formation (Hwang & Ha Lee, 2014). This is because the level of education increases a woman's social status and it induces employment which then delays childbearing and rearing (Hwang & Ha Lee, 2014). The findings also revealed that as the level of education increases, the cost of childbearing and rearing also increases (Hwang & Ha lee, 2014). These findings are in line with an earlier study which was conducted by Perelli-Harris (2008). The study focused on the influence of education on family formation during the period of political, social and economic change in the Ukraine (Perelli-Harris, 2008). The results from the study revealed that; since the transformation period, there has been a decline in first marriage and second birth rates (Perelli-Harris, 2008). Furthermore, women with higher education had higher first marriage rates, and lower second child rates (Perelli-Harris, 2008). During the Soviet period in the Ukraine, highly educated women who were married had higher first birth rates as compared to uneducated women (Perelli-Harris, 2008). However, after independence, there was a negative relationship between education and childbearing (Perelli-Harris, 2008).

Mahanta (2016), assessed the association between education and fertility in a tribal society in India. The results from the multiple regression analysis revealed that; for both the wife and the husband, as the number of years spent in schooling increased, the number of live births decreased (Mahanta, 2016). It was also found that, as the number of years spent in education increased, age at first marriage also increased (Mahanta, 2016). Therefore, the delayed entry into marriage decreased the number of children women had (Mahanta, 2016).

One of the significant changes that have occurred in Sub-Saharan Africa over the past two decades has been the increase in access to education, specifically among females. In 1990, 19% of males were enrolled in secondary school, while the percentage stood at 10% for females (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2015). However, in 2002, this number rose to 29% among males and 23% among females (UNESCO, 2015). Literature in Kenya has pointed out that highly educated women are more likely to delay marriage as compared to their peers with lower education (Ikamari, 2005). Furthermore, premarital sexual activity and premarital childbearing have been found to be associated with education (Ikamari, 2005). Level of education at the community level has also been found to affect childbearing. Using DHS data from 22 countries in SSA, Kravdal (2002) looked at education and fertility in SSA. The results revealed

that community education influences the fertility of both uneducated and better educated women, but more strongly the fertility of the latter (Kravdal, 2002).

Research has also shown that there is a negative relationship between wealth and fertility (Lutz & Samir, 2011). For instance, when looking at population level measures, countries with high GDP and HDI generally have lower fertility rates (Myrskyla et.al., 2009).There was a study conducted in 49 countries among females aged 20-24 years and, the findings from the study revealed that 40% of females from impoverished households were exposed to early marriage across all 49 countries (Jain & Kurz, 2007). These findings were supported by Davis et.al., (2013) and Axinn et.al., (1992), who found that poverty is associated with early family formation. Furthermore, females from poor households are more likely to enter marriage at an early marriage as compared to their peers from affluent households (Davis, Postless & Rosa, 2013). This is usually a strategy to reduce the household poverty and the economic burden placed by the female on her family (Levine, 2008).

Furthermore, childbearing is one of the factors that affect women's labour force participation (Brewster & Rindfuss, 2000). This is because mothers who choose to enter the labour market must balance between work and family roles (Brewster & Rindfuss, 2000). Although mothers get maternity leave, childbearing may affect their job security, resulting in women having fewer children or delaying childbearing and family formation. In a study which looked at family formation and labour force participation in France, the Netherlands and Hungary, it was found that there is a positive relationship between high education and maternal employment (Wood et al., 2016). Furthermore, the results revealed that there is a negative relationship between childbearing and employment among women with medium and high levels of education (Wood et al., 2016).

A study was conducted Dakar (Senegal) and Lomé (Togo), which looked at the impact of female employment on fertility (Beguy, 2009). In Lomé, it was found that women who had paid employment or were undergoing some sort of training were less likely to have children as compared to women who were self-employed (Beguy, 2009). Women with waged employment were 27% less likely to have children as compared to those who were self-employed (Beguy, 2009). Furthermore, being a student or apprentice was found to be associated with the delay in next childbirth (Beguy, 2009). However, there was no association between economic inactivity and childbearing in Lomé, and this is because most women were economically active (Beguy, 2009). Contrary to Lomé, in Dakar no association was found between female employment, human capital and giving birth (Beguy, 2009).

Furthermore, a study was conducted in rural Senegal, which examined the association between female employment and fertility (Van den Broeck & Maertens, 2015). Upon analysis of the results, the researchers found that employment reduces the number of children per woman, while poverty was found to increase the number of children per woman (Van den Broeck & Maertens, 2015). Furthermore, they also found that the ability of female employment in reducing fertility was as strong for poor women as was for non-poor women (Van den Broeck & Maertens, 2015). However, it was stronger for illiterate women, as compared to literate women (Van den Broeck & Maertens, 2015). Thus showing that employment is a key instrument in empowering poor and illiterate women in Senegal (Van den Broeck & Maertens, 2015).

2.1.4 Family planning, ART, PMTCT and Family Formation among People living with HIV

Family planning programmes give women information and access to contraceptives (Bongaarts, 2011). They also help women prevent childbearing until one is ready to have a child. In a study by Moodley et al., (2014), it was found that most of the healthcare providers in their study had limited clinical knowledge of safer conception methods for HIV positive individuals (Moodley et al., 2014). This therefore constrained them from effectively counselling their clients and making them fully aware of their reproductive rights (Moodley et al., 2014).

Myer and colleagues (2007), examined the determinants of fertility among HIV positive men and women in South Africa. Upon analysis of the results, the researchers found that males were most likely to report fertility desires (Myer, Morroni & Rebe, 2007). Furthermore, fertility intentions were associated with time on ART among females (Myer, Morroni & Rebe, 2007). Cooper et.al. (2009) conducted a cross-sectional study which looked at the fertility intentions and associated healthcare needs of men and women living with HIV in Cape Town, South Africa. The results of the study revealed that; 55% of women and 43% of men were not planning to have children, while 45% and 57% of women and men respectively were open to the possibility of having children (Cooper et al., 2009). This according to the investigators highlights the need for reproductive planning counselling for PLWH in order to meet their diverse reproductive needs (Cooper et al., 2009). The findings also showed that child adoption was not a favoured option for PLWH who desired children (Cooper et al., 2009). Furthermore, 11% of the women in the study had been pregnant since their diagnosis, and all of these were unintended pregnancies.

Nattabi et al., (2009) conducted a systematic review on factors influencing fertility desires and intention of people living with HIV. When looking at the effects of PMTCT and ART programmes

on the fertility desires of people living with HIV, it was found that; PMTCT and ART programmes have a positive impact on the reproductive choices of people living with HIV (Cooper et al., 2007 as cited by Nattabi et al., 2009). Knowledge of the effect of PMTCT on infant health among men led to increased inclination to want children as compared to women (Cooper et al., 2007 as cited by Nattabi et al., 2009). On the other hand, for women, the availability of PMTCT in combination with ART influenced their reproductive intentions (Cooper et al., 2007 as cited by Nattabi et al., 2009).

However, over the years there have been changes in the childbearing intentions of HIV positive women. There was a study conducted in Soweto which looked at the childbearing intentions of HIV positive women aged 18 to 44 years by use of antiretroviral therapy (Kaida et al., 2011). Upon analysis of the results, the researchers found that 68% of the HIV negative women reported intention to have children. When looking at HIV positive women, 31% of those on HAART reported intention to have children, while 29% of the HAART naïve women reported intent to have children (Kaida, 2011). Furthermore in the adjusted model, HIV positive women were 1.60 times less likely to report childbearing compared to HIV negative women (Kaida, 2011). On the other hand, in a study by Adler et.al (2017), the researchers found that among adolescents aged 17-21 in South Africa, childbearing intentions were high for both HIV positive and HIV negative women (Adler, Abar, Bennie, Sadeghi & Bekker, 2017). Additionally, there was no difference found in the childbearing intention of HIV positive adolescents on ART, versus those who were not on ART (Adler, Abar, Bennie, Sadeghi & Bekker, 2017).

In a longitudinal study which looked at the fertility intentions of prenatal and postpartum HIV positive women receiving primary care in selected health care centres in Mpumalanga, during their prenatal and postpartum periods (Peltzer et al., 2018). The researchers found that less than one third of the women in the study wanted to have more children (Pelzer et al., 2018). While, younger age and having no or fewer children was associated with intentions to conceive in the future (Peltzer et al., 2018). In Malawi, Garver et al. (2019), found an increase in childbearing among PLWHA between the years 2009 and 2016. This was the period in which access to ART improved (Garver et al., 2019). Additionally, the researchers also found that, while there were childbearing differences by HIV status in 2009, these differences were eroded by 2015 (Garver et al., 2019).

Furthermore, the HIV pandemic has changed the nature of unions in SSA. As the pandemic began and continued to spread from high-risk populations to the general population, individuals faced the risk of transmission from their spouses or cohabiting partners (Clark, Bruce & Dude, 2006 as

cited in Anglewicz & Reniers, 2014). Anglewicz & Reniers (2014), examined the association between HIV status, gender and marriage among adults in Rural Malawi. The results from the study revealed that, unions where the wife is HIV positive were 3 times more likely to end in divorce (Anglewicz & Reniers, 2014). Additionally, the odds of remarriage among HIV positive women were 50% lower than that of HIV negative women (Anglewicz & Reniers, 2014). Similar results were found for male participants, however the association was not significant (Anglewicz & Reniers, 2014). Lastly, the researchers also found that a woman's HIV status is a significant predictor of whether she gets into a union or not (Anglewicz & Reniers, 2014). However, similar results were not found among male participants (Anglewicz & Reniers, 2014). Guen (2019), found that, among SSA migrants who live in Paris, females, women were more likely to experience a union breakup after being diagnosed with HIV. Furthermore, In a study which looked at marriage, widowhood, divorce and HIV risk among women in SSA, the researchers found that widowed women were most likely to be HIV positive, compared to never married women (Tenkorang, 2014).

2.1.5 Deficiencies in Literature

Literature has looked at the childbearing intentions of HIV positive women, and has shown that there have been changes in the childbearing intentions of HIV positive women in South Africa. Furthermore, most studies have focused on childbearing intentions and the effect of HIV status on unions, however, they have not looked at family formation as including childbearing and union formation. Additionally, most studies in South Africa looked at adolescents or females living with HIV. However, given the high prevalence of HIV among female youth in South Africa, little is known about how the pandemic affects their ability to form families. Lastly, there has been paucity in studies that have looked at socio-demographic factors that affect the family formation patterns of young women in South Africa. Therefore this research will, examine the relationship between socio-demographic factors, HIV status and family formation among youth in South Africa in 2016.

2.2 Theoretical Framework

The theoretical framework used in this study is the *"Proximate determinants conceptual framework for factors affecting the risk of sexual transmission of HIV"* (Boerma & Weir, 2005). This framework was adapted from Bongaarts (1978) proximate determinants of fertility. It explains the sequence at the population level, in which the social, economic and environmental factors lead

to exposure, transmission, infection, disease and ultimately death (Boerma & Weir, 2005). Additionally, it links the social and environmental systems to biological systems (Boerma & Weir, 2005). According to the model, the sociocultural, socioeconomic and demographic determinants, and program characteristics (condom promotion, counselling and testing, harm reduction, safe sex education, family planning) influence the proximate determinants (coital frequency, abstinence, blood transfusion, condom use, biological susceptibility, ART treatment), of which have biological and behavioural components (Boerma & Weir, 2005). The proximate determinants then directly influence the biological determinants (exposure to virus, efficiency of transmission, infectivity) (Boerma & Weir, 2005). These then affect the rate of new infections, which determines the prevalence of the infection and ultimately leads to disease or premature death (Boerma & Weir, 2005).

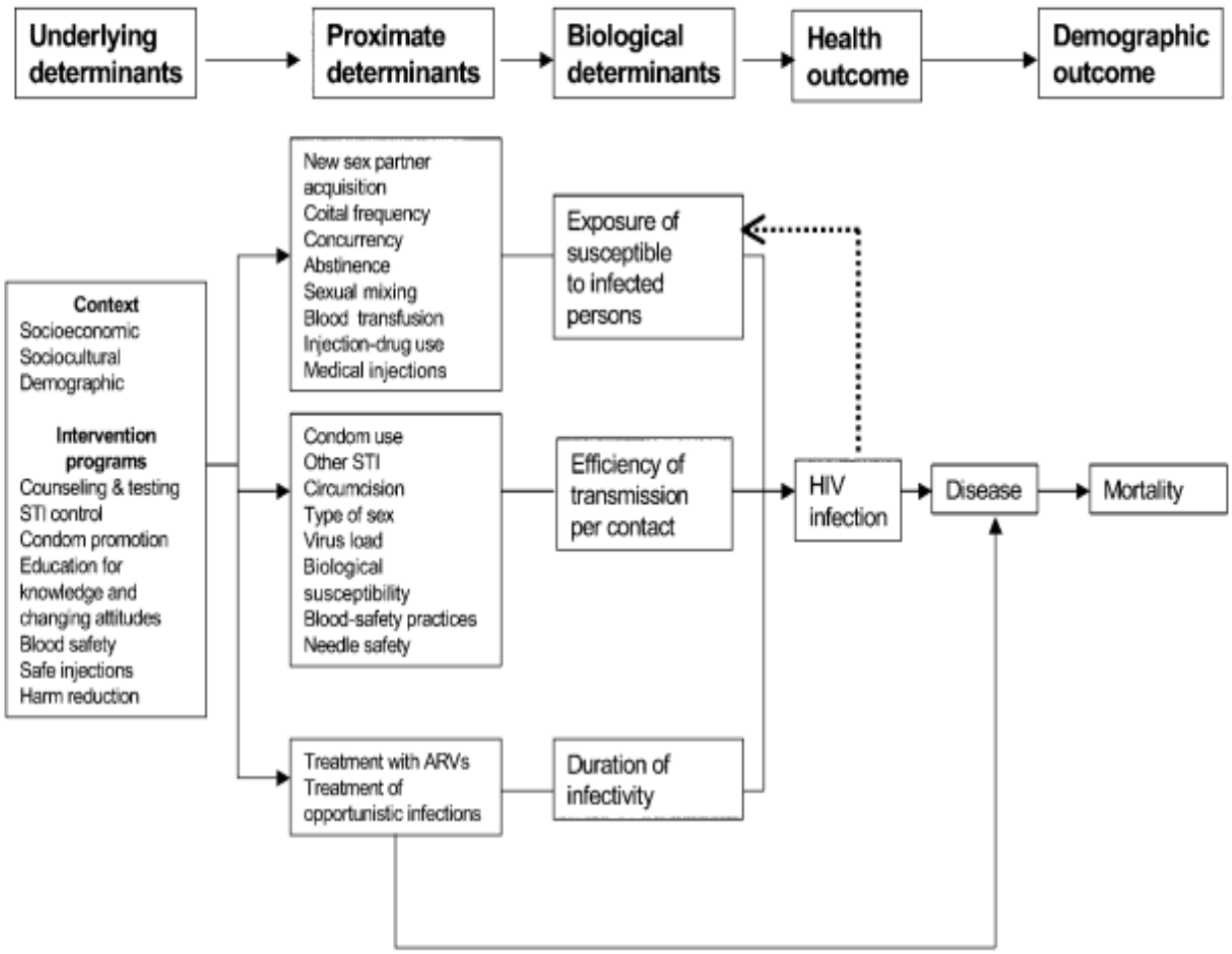

Figure 2.1: Proximate determinants framework for factors affecting the risk of sexual transmission of HIV (Boerma & Weir, 2005).

2.3 Conceptual Framework

The conceptual framework used in this study was derived from the "Proximate determinants framework for factors affecting the risk of HIV transmission. This conceptual framework explains the sequence in which underlying determinants, proximate determinants and health determinants affect demographic outcomes. According to the adapted conceptual framework, socio-demographic factors (age, place of residence, population group) socio-economic factors (highest level of education, employment status, household wealth index) and family planning factors (family planning and pregnancy intention), act through proximate determinants (condom use) to affect HIV status. HIV status, which is the health determinant in this study, directly influences demographics outcomes of which in this study is family formation. Furthermore, as shown in the figure 2.2 below, underlying determinants can also directly affect family formation and so can the proximate determinants (can determine if you have children or not). Therefore resulting in three pathways that lead to family formation.

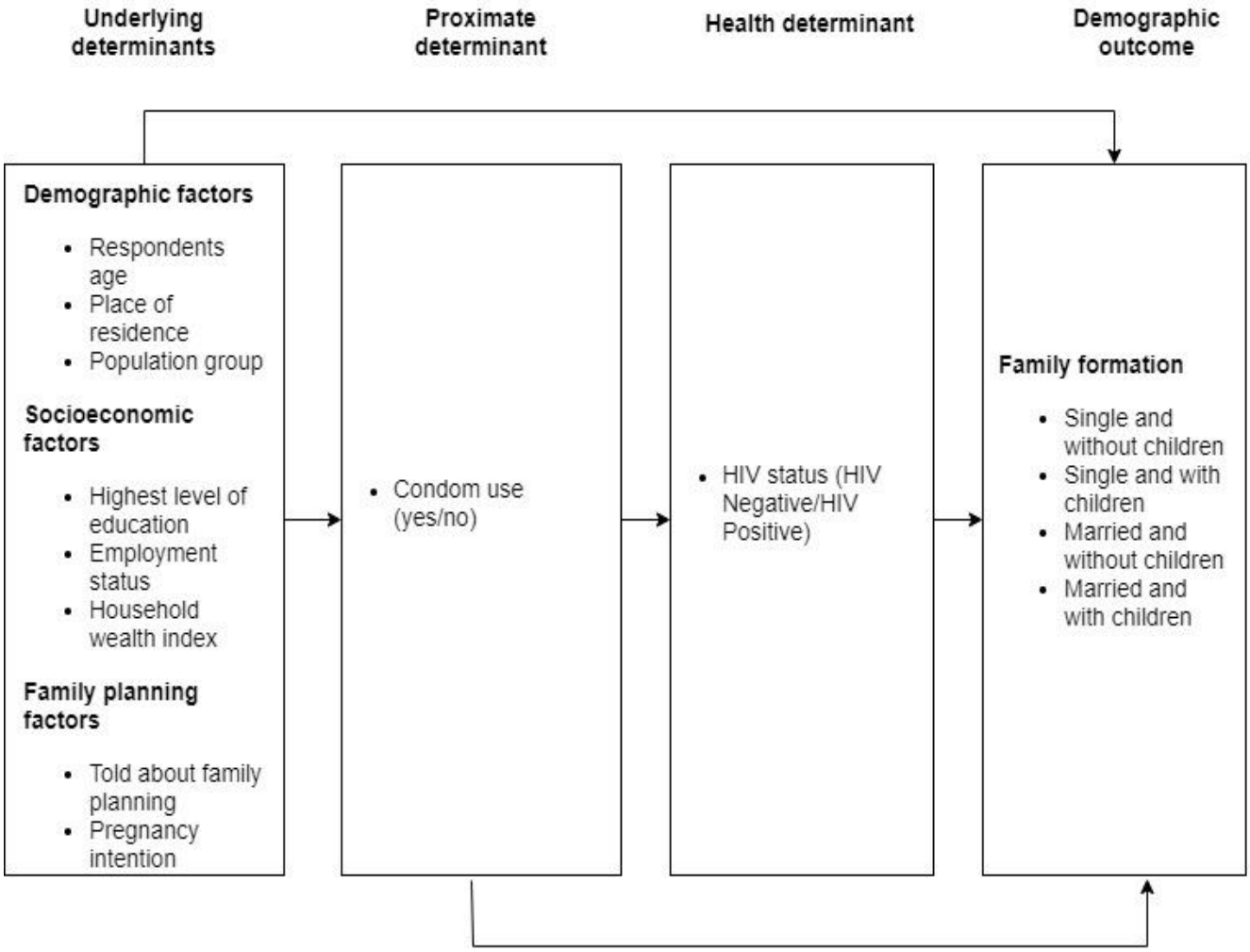

Figure 2.2: Conceptual Framework adapted from the Proximate determinants framework for factors affecting the risk of sexual transmission of HIV (Boerma & Weir, 2005).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter describes the data and methods used in this study. It will focus mainly on the description of the study area, the study design, data source, study population and sample size, sampling design, questionnaire design, definitions of variables, ethical considerations, data management, data analysis plan, as well as model fit tests.

3.2 Description of study area

The area of focus in this study is South Africa. South Africa is situated on the bottom end of Southern Africa, and its neighbouring countries are; Lesotho, Swaziland, Zimbabwe, Botswana and Namibia. The country is divided into nine provinces; Gauteng, North West, Limpopo, Free State, Mpumalanga, Northern Cape, Western Cape, Eastern Cape and KwaZulu-Natal.

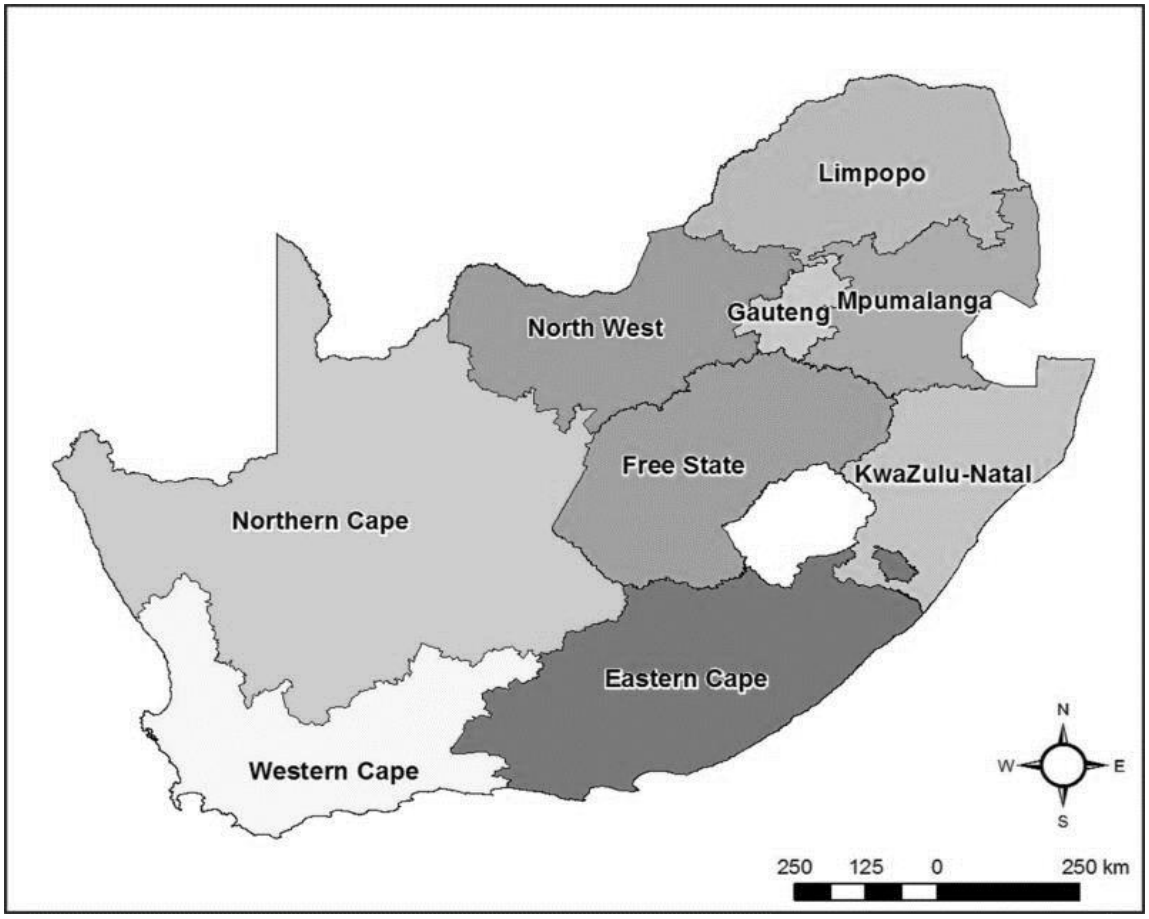

Figure 3.1: Map of South Africa with its nine provinces (Norval & Wright, 2017)

According to the 2019 mid-year population estimates, the estimated population size in South Africa is 58.7 million (Stats SA, 2019). Gauteng province has the largest population with approximately 15.2 million people (25.8%) living in the province (Stats SA, 2019). Conversely, the Northern Cape has the smallest population, accounting for approximately 1.26 million (2.2%) of the South African population (Stats SA, 2019). The Black African population is in majority accounting for 80.7% of the population, followed by the Coloured population (8.8%), White population (7.9%) and the Indian/Asian population accounting for 2.6% of the population (Stats SA, 2019). South Africa has a youthful population, with youth aged 15-34 years accounting for 35.1% of the population. About 28.8% of the population is aged 0-14 years, while 9.0% are older than 60 years (Stats SA, 2019).

Furthermore, South Africa has the largest HIV pandemic in the World, accounting for 7.52 million people living with HIV globally (Stats SA, 2018). In 2016, young women aged 15-24 years contributed to 37% of all new HIV infections in South Africa (SANAC, 2017). Additionally, the total fertility rate was at 2.46 births per woman in 2016 (Stats SA, 2016), while the median age at first marriage for females was at 31 years in 2015 (Stats SA, 2016). Therefore this makes South Africa a well suited study area to examine the association between HIV and family formation among youth in South Africa.

3.3 Study design

This study is a cross-sectional study design. A cross-sectional study design is an observational study which measures the exposure and health outcomes of a given population in a defined geographical area, at one point in time (Setia, 2016). It utilized secondary survey data acquired from the South African Demographic and Health Surveys (SADHS) of 2016 of which was collected from 27 June 2016 to 4 November 2016 (SADHS, 2019), making it cross-sectional data. The SADHS was used because participants in the survey consented to taking an HIV test, therefore HIV status was not self-reported. This means that the number of young women living with HIV in this study was nationally representative.

3.4 Description of data source

The SADHS 2016 utilized a stratified two-stage cluster sample design, which was intended to gather national and regional statistics on the inhabitants of the country, as well as health pointers. In the first stage, a total of 750 primary sampling units (PSU) were selected (SADHS, 2019). In

the second stage of selection, a fixed number of 20 dwelling units (DUs) were selected per cluster (SADHS, 2019). All households in a selected DU were eligible for interviews. Additionally, all the households were eligible for interviews with the Household Questionnaire, and all women and men aged 15 and older who were either permanent residents of the selected households or visitors who stayed in the household the night before the survey, were eligible for individual interviews and for biomarker collection (SADHS, 2019). Women aged 15-49 and men aged 15-59 were eligible for the standard individual questionnaire, as well as a South Africa specific module on adult health (SADHS, 2019). Women aged 50 and older, and men aged 60 and older were eligible for a few sections of the individual questionnaire and the adult health module (SADHS, 2019). In addition, children aged 0-59 months were eligible for the biomarker collection. Furthermore, in all the households in the selected DUs, one woman aged 18 and older was selected for a module on domestic violence (SADHS, 2019). Lastly, for each child aged 0-5 years whose biological mother did not live in the household, a guardian was eligible to complete the Caregiver's Questionnaire (SADHS, 2019).

3.5 Study population and sample size

The study population consists of South African young women aged 15-34 years in 2016, who consented to taking an HIV test during the SADHS of 2016. The reason why this study focused on females aged 15-34 and not 15-24 is because, in South Africa, "youth" is defined as those aged 15-34 years (National Youth Policy, 2015). The weighted sample size is N=2 357 women aged 15-34 years, which consists of; n=1,913 females who tested HIV Negative and n=444 females who tested HIV Positive.

3.6 Questionnaire Design

Five questionnaires were used to collect data for the SADHS 2016. These included, the Household Questionnaire, the individual Woman's Questionnaire, the Individual Man's Questionnaire, the Caregiver's Questionnaire, and the Biomarker Questionnaire (SADHS, 2019). Based on the standard Demographic and Health Survey, the questionnaires were adapted to reflect the population dynamics and health issues relevant to South Africa (SADHS, 2019). This study utilized data generated through the Woman's Questionnaire and the Biomarkers Questionnaire. The Woman's questionnaire was used to collect information from eligible women aged 15-49 years, and was focused on topics like; background characteristics, birth history and child mortality,

family planning knowledge and usage, antenatal, delivery and postnatal care, fertility, marriage and sexual activity, adult health and knowledge of HIV/AIDS among others. The Biomarkers Questionnaire was used to collect data on biomarkers such as HIV, anaemia and HbA1c testing, as well as blood pressure measurements among others (SADHS, 2019).

For this study, the Woman's questionnaire included demographic and socioeconomic questions on age, population group, place of residence, birth history, marital status, level of education, employment status and wealth index. It also included sexual and reproductive health questions on condom use, pregnancy intention and family planning knowledge. Lastly, the Biomarkers Questionnaire included questions on HIV testing and results, of which were collected from the respondents by the nurses (SADHS, 2019)

3.7 Study variables

3.7.1 Definition of the dependent variable

The dependent variable in this study is Family Formation. The variable has four categories, namely, single and without children, single and with children, married and without children and married and with children. In the SADHS, participants were asked; "what is your current marital status?" The participants could select one of the following options: "never in union", "married", "living with partner", "widowed", "divorced" or "no longer living together/separated". Those who were categorised as being single included those who were single, widowed and separated. Those who were categorised as being married included those who were legally married and those who were cohabiting.

Table 3.1: Definition and categorisation of the outcome variable

Dependent Variable	Definition	Categorization
Family Formation	Single and without children (0) Single and with children (1) Married and without children (2) Married and with children (3)	Categorical

3.7.2 Definition of the independent variables

The independent variables utilised in this study are of a socio-demographic nature. These variables are; “respondents age”, “population group” , “place of residence”, “highest level of education”, “employment status”, “household wealth index”, “told about family planning”, “condom use” and “pregnancy intention”. The selection of these variables was guided by previous literature that was written by numerous scholars. Furthermore, these are the variables that have been found to influence family formation both in developed and developing countries.

3.7.2.1 Health variable (Main independent variable)

In terms of the construction of the variables, the variable “HIV status” has two categories which are “HIV negative” and “HIV positive”.

3.7.2.2 Demographic variables

“Respondents age” refers to the age of the female respondents in the study, and it was grouped into five-year age intervals. However, in the Multinomial Regression analyses, “respondent’s age” was analysed as a continuous variable. The “population group” variable initially comprised of four categories which were “African”, “Coloured”, “Asian/Indian” and “White”, however due to low observations among the “Coloured”, “Asian/Indian” and “White” populations, these were combined, creating a new category called “Other”. Therefore “population group” was re-categorised into two categories, namely, “African” coded as (2) and “Other” coded as (1). Place of residence was recoded to (1) urban and (2) rural.

3.7.2.3 Socio-economic variables

“Highest level of education” was initially coded as (0) No education, (1) Primary education, (2) Secondary education and (3) Higher education, however “no education” and “primary education” had very low observations, hence they were combined into one category. Therefore “highest level of education” has three categories of which are (1) “lower than secondary”, (2) “secondary” and (3) “higher”. The variable “household wealth index” initially had four categories of which were coded as: (1) poorest, (2) poorer, (3) middle, (4) richer and (5) richest. However, the “poorest” and “poor” were combined to create (1) poor, “richer” and “richest” were combined to create (3) rich, while (2) middle, was left as it was. The variable “employment status” was initially coded as (0) Not working, (1) professional/technical/managerial (2) clerical (3) agricultural (4) household and

domestic (5) services (6) skilled manual (7) unskilled manual. However, these were recoded into (1) unemployed and (2) employed.

3.7.2.4 Family planning variables

For the "pregnancy intention" variable, the respondents were asked about the pregnancy intention of their last child born in the last five years. This variable initially had three categories which were coded as; (0) wanted then, (1) wanted later and (2) wanted no more. However, for this study "pregnancy intention" was recoded to (1) intended, while "wanted later" and "wanted no more" were combined to form (2) unintended, and then there were missing values of which were categorised as (3) has no children. Lastly, "told about family planning" was recoded to (1) no and (2) yes.

3.7.2.4 Proximate variable

The proximate determinant in this study is condom use. For this variable, the respondents were asked whether they used a condom, during their last sexual intercourse with their most recent partner. This was recoded to (1) no and (2) yes.

Table 3.2: Definition and categorisation of independent variables

Independent Variables	Definition	Original Coding	Recoding	Categorization
Health Variable				
HIV status	Refers to whether the respondent tested negative or positive during the HIV test	HIV Negative (1) HIV Positive (2)	HIV Negative (1) HIV Positive (2)	Categorical
Demographic Variables				
Respondent's age	Refers to the respondent's current age in years.	15-19 (1) 20-24 (2) 25-29 (3) 30-34 (4)	15-19 (1) 20-24 (2) 25-29 (3) 30-35 (4)	Categorical
Population Group	Refers to either being Black/African, White, Coloured, or Indian/Asian	Black/African (1) White (2) Coloured (3) Indian/Asian (4)	Other (1) African (2)	Categorical
Place of Residence	Refers to whether the	Urban (1) Rural (2)	Urban (1) Rural (2)	Categorical

Independent Variables	Definition	Original Coding	Recoding	Categorization
	respondents live in a rural or urban area.			
Socio-economic Variables				
Level of Education	Refers to having either no education, primary, secondary or higher education	No education (0) Primary (1) Secondary (2) Higher (3)	Lower than secondary (1) Secondary (2) Higher (3)	Categorical
Employment status	Refers to being either employed or unemployed	Not working (0) Professional/technical /managerial (1) Clerical (2) Agricultural (3) Household and domestic (4) Services (5) Skilled manual (8) Unskilled manual (9)	Employed (1) Unemployed (2)	Binary
Household Wealth Index	Refers to being in the poor, middle or rich wealth index	Poorest (1) Poorer (2) Middle (3) Richer (4) Richest (5)	Poor (1) Middle (2) Rich (3)	Categorical
Family planning Variables				
Told about family planning	Refers to whether the respondent heard about family planning at the healthcare centre.	No (0) Yes (1)	No (1) Yes (2)	Binary
Pregnancy Intention	Refers to whether the respondents last pregnancy in the past five years was wanted then, wanted later or not wanted	Wanted then (1) Wanted later (2) Wanted no more (3)	Intended (1) Unintended (2)	Categorical
Proximate variable				
Condom use	Refers to whether the respondent used a condom during their last sexual intercourse with	No (0) Yes (1)	No (1) Yes (2)	Binary

Independent Variables	Definition	Original Coding	Recoding	Categorization
	their recent partner.			

3.8 Ethical issues

This study was conducted using secondary survey data that was acquired from the 2016 SADHS. The survey was conducted anonymously, therefore the identity, names and other personal information of the respondents were not revealed in the datasets. Furthermore, at the University of the Witwatersrand, if an individual is using secondary data or archives which do not involve human subjects, they are eligible for an ethics waiver, and hence an ethics waiver application was lodged for this study. The ethics waiver form was downloaded from under the resources tab on Sakai. This form was filled in and thereafter a hard copy of the filled in form was taken to my supervisor for a signature. Once all the necessary signatures were acquired, the form was scanned and uploaded on Sakai together with the 10-page research proposal. The ethics waiver form was submitted to the faculty, and once my application was approved, I received a School Protocol Number. My School Protocol Number is "WDEMG2019/07/15", and this number was added to my 10-page proposal and final Masters Research submissions.

3.9 Data Management

To access the Demographic and Health Survey (DHS) data the following link was used https://dhsprogram.com/data/dataset_admin/login_main,. A DHS account was then created, whereby access to the SADHS data was requested. Access to the data was granted after 24 hours, from there on a request for access to HIV data was sent which was accompanied by a motivation. After gaining access to the data, the individual women recode, and HIV test results recode were downloaded from the DHS site in Stata format. These were then analysed on a statistical software called Stata, version 15. There were observations missing in both the independent and dependent variables due to non-response, and as a result these missing observations were censored from the study.

3.10 Data Analysis

The examination of the 2016 SADHS was performed using Stata statistical software, version 15, and data analysis was addressed as follows:

3.10.1 Objective 1 was to describe the types and levels of family forms among youth in South Africa, by HIV status. The results of this objective were descriptive in nature and were presented using frequency tables and bar graphs.

Furthermore, a cross classification table was used to illustrate the association between family formation and all the variables in the study. The table had percentage distributions and 95% confidence intervals. It also had p-values and a Pearson chi-square number for each association measured. The p-values and Pearson chi-square values were obtained by running a Pearson chi-square test of association. The Pearson chi-square test of association is a cross classification table which is used to examine the relationship between variables (Bolboacă, Jäntschi, Sestraş, Sestraş & Pamfil, 2011). The test examined whether the observed pattern between the socio-demographic factors and the dependent variables was such that they were dependent on each other or not, with the level of significance set at 0.05.

3.10.2 Objective 2 was to examine the relationship between HIV status, socio-demographic factors and family formation among youth in South Africa. To answer this objective a Multinomial Logistic Regression (MLR) model was performed. A MLR was used to determine the probability of categorical membership in the dependent variable based on the presence of independent variables (Starkweather and Moske, 2011). This is an extension of the binary logistic regression which allows for more than two nominal categories in the dependent variable (Starkweather and Moske, 2011).

Below is the equation for the MLR (Abdul Hamid, Bee Wah, Xie & Seng Huat, 2018). To build the model, it was assumed that Y (Family formation) is the dependent variable with possible values of c (0, 1... c-1) and Y=0 is the reference category (Abdul Hamid, Bee Wah, Xie & Seng Huat, 2018), of which in this study were those who were "single and without children". Let $x = (x_{1,2} \ldots \ldots . x_n)$ be the independent variables. With regards to this study, these independent variables were; "respondents age", "population group", "place of residence", "highest level of education", "employment status", "household wealth", "told about family planning", "pregnancy intention" and "condom use". Therefore, the probabilities of each category of the dependent variable can be expressed as follows (Fagerland et al, 2008 and Hosmer et.al, 2013; as cited in Abdul Hamid, Bee Wah, Xie & Seng Huat, 2018).

$$P(Y=0|x) = \frac{1}{1+e^{g_1(x)+\cdots+g_{c-1}(x)}}$$

$$P(Y=1|x) = \frac{e^{g_1(x)}}{1+e^{g_1(x)+\cdots+g_{c-1}(x)}}$$

$$P(Y=c-1|x) = \frac{e^{g_{c-1}(x)}}{1+e^{g_1(x)+\cdots+g_{c-1}(x)}} \quad (1)$$

The logit function category (j) versus the baseline category can be expressed as follows:

$$g_j(x) = \ln\left[\frac{P(Y=j|x)}{P(Y=0|x)}\right] = \beta_{j0} + \beta_{j1}x_1 + \cdots + \beta_{jp}x_p \quad \text{For } j = 1, 2, \ldots, c-1. \quad (2)$$

For the independent observations, which is rep by (, y_i) = 1,2, … . n, let vector $\tilde{}i$ be a vector of c binary indicator variables $\tilde{y}ij$ and $\pi ij = P\ (y = j\ |x_i)$.To obtain the parameter estimates$\hat{B}$, the standard likelihood model can be used (Hamid et.al, 2018). Using the above formula, four different models were produced, of which included a combination of demographic, socio-economic, family planning and proximate factors. These models were used to assess the change in association and significance between the dependent and independent variables. They were also used to assess the effect of each group of variables on the association between HIV status and family formation. The models are described below.

Model 1: considered HIV status and the dependent variable.

Model 2: accounted for the effect of model 1, as well as demographic characteristics like "respondent's age", "population group" and "place of residence".

Model 3: accounted for the effect of model 2, as well as socio-economic characteristics like "highest level of education", "employment status", and "household wealth index".

Model 4: accounted for the effect of model 3, as well as family planning and proximate characteristics like "told about family planning", "pregnancy intention" and "condom use".

To interpret the results, Relative Risk Ratios (RRR) were used with RRR>1 indicating a higher risk, RRR<1 indicating a lower risk and RRR=1 indicating no risk difference (Abdul Hamid, Bee

Wah, Xie & Seng Huat, 2018). The significance was set at 0.05 and a 95% Confidence Interval (CI) was used. Furthermore, the data was weighted using "iweights" in order to ensure that the sample is reflective of the population from which it was selected, and to correct for sampling errors.

3.11 Testing for Model fit

An F-test was used to test for model fit. An F-test compares a reduced regression model with a full model (Christensen, 2003). Thereafter, it indicates whether the addition of the variables to the model increases its credibility or not (Christensen, 2003). Below is the formula for the test;

$$F = \frac{explained\ variation/(k-1)}{unexplained\ variation/(n-k)}$$

$$F = \frac{R^2/(k-1)}{(1-R^2)/(n-k)}$$

Where n= Number of total observations

k= Number of variables + 1 for intercept

The test hypothesis is as follows:

H0: The fit of the reduced model and full model is the same.

H1: The fit of the reduced model is significantly less compared to the full model

Therefore, using the F-test, this study examined which regression model had independent variables that reliably predicted the dependent variable, with the level of significance set at 0.05.

3.12 Testing for Multicollinearity

Multicollinearity between the independent variables was also assessed to ensure that there are no correlations between the independent variables. Multicollinearity is defined as the presence of correlation between independent variables (Starkweather and Moske, 2011). It increases the standard errors of which then results in some variables appearing statistically insignificant, where else they are statistically significant (Starkweather and Moske, 2011). In this study, Multicollinearity was assessed by running the "vif" command on Stata 15. The command gave out the Variance Inflation Factor (VIF) for all the independent variables. A VIF equal to 1 indicated the absence of multicollinearity, a VIF between 5 and 10 indicated the presence of high correlations between the independent variables, while a VIF greater than 10 indicated the presence of

multicollinearity (Starkweather and Moske, 2011). Furthermore, a correlation matrix was also run using the command "pwcorr", to assess whether there were any variables that were highly correlated (See APPENDIX B).

CHAPTER FOUR

RESULTS

The objectives of this study were to describe the types and levels of family forms among youth in South Africa by HIV status, and to examine the relationship between socio-demographic factors, HIV status and family formation among youth in South Africa. In this section, results are shown according to each sub-objective.

4.1 Examining the types and levels of family formation among youth in South Africa by HIV status

4.1.1 Levels and types of family forms

Figure 4.1 below illustrates that 18.14% of the young women were single and without children, 45.21% were single and with children, 3.93% were married and without children, while 32.72% were married and with children. Therefore, most young women were single and with children, followed by the married and with children and the single without children categories. Lastly, the category with the lowest distribution was the married and without children.

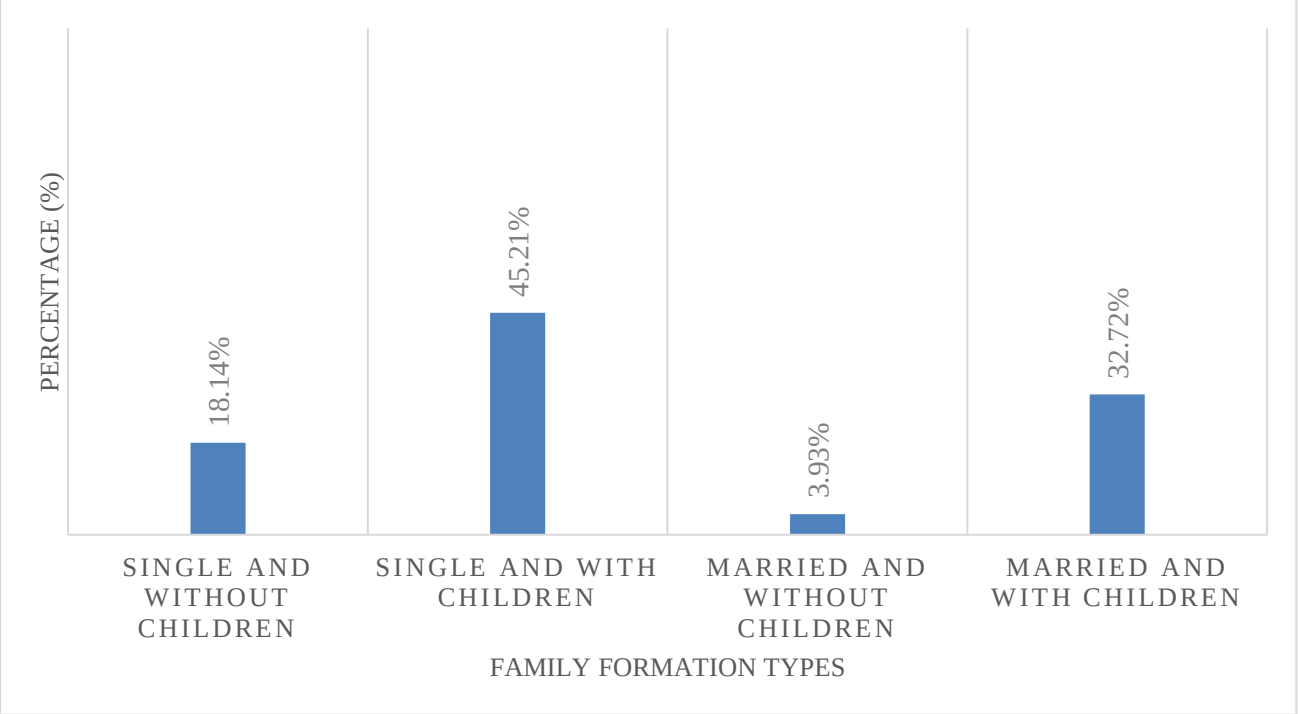

Figure 4.1: Bar graph showing the percentage distributions of family types among youth in South Africa (N=2,357).

4.1.2 Characteristics of the study population

The profile of the study population is presented on **Table 4.1**. The results from the 2016 SADHS shows that; 80.44% of the young women aged 15-34 years were HIV Negative, while 19.56% were HIV Positive. Furthermore, 12.60% of the study participants were aged 15-19, 26.22% were aged 20-24 years, 32.63% were aged 25-29 years and 28.55% were aged 30-34years. Majority of the population was African (91.43%). 67.50% of the study population lived in an urban area, while 32.50% lived in a rural area. Less than one tenth of the study population had lower than secondary education (7.09%), just over one over one tenth had higher education, while 81.16% had secondary education. One third of the young women were employed, while 67% were unemployed. Additionally, 41.24% of youth were from poor households, 21.04% were from middle households, while 37.72% were from rich households. Just over half of the young women had been told about family planning at the health facility (51.17%), while 48.84% had not been told about it. With

regards to pregnancy intention of the last child, 24.57% reported that their last child was intended, 32.50% were unintended, while 42.94% had not had children yet. Lastly, 52.86% of the study participants reported not having used a condom during their last sexual intercourse, while 47.14% reported having used a condom.

Table 4.1: Characteristics of the study population (N=2,357)

Characteristics	Frequency Distribution (N=2,357)	Percentage distribution (%)
Health Factor		
HIV status		
HIV Negative	1,913	80.44%
HIV Positive	444	19.56%
Demographic Factors		
Age groups		
15-19	297	12.60%
20-24	618	26.22%
25-29	769	32.63%
30-34	673	28.55%
Population group		
Other	202	8.57%
African	2,155	91.43%
Place of residence		
Urban	1,591	67.50%
Rural	766	32.50%
Socio-Economic Factors		
Highest level of education		
Primary or less	167	7.09%
Secondary Education	1,913	81.16%
Higher Education	277	11.75%
Employment status		
Unemployed	1,590	67%
Employed	767	33%
Household wealth		
Poor	972	41.24%

Characteristics	Frequency Distribution (N=2,357)	Percentage distribution (%)
Middle	496	21.04%
Rich	889	37.72%
Family Planning Factors		
Heard about family planning		
No	1,151	48.83%
Yes	1,206	51.17%
Pregnancy intention		
Unintended	579	24.57%
Intended	766	32.50%
No children	1,012	42.94%
Proximate Factor		
Condom use		
Not	1,246	52.86%
Yes	1,111	47.14%
Total	**2,357**	**100%**

4.1.3 Family formation by HIV status

Figure 4.2 illustrates the percentage distribution of different family types by HIV status. There are marginal differences in the family formation patterns of HIV Negative and HIV Positive youth. Among the HIV Negative youth, 17.88% were single and without children, 44.84% were single and with children, 4.12% were married and without children, while 33.15% were married and with children. Among the HIV positive young women, 19.26% were single and without children, 46.78% were single and with children, 3.93% were married and without children, and 30.86% were married and with children. Additionally, from the Pearson chi-square analysis, HIV status was not found to be significantly associated with family formation (Pearson= 2.2216; p-value=0.6941).

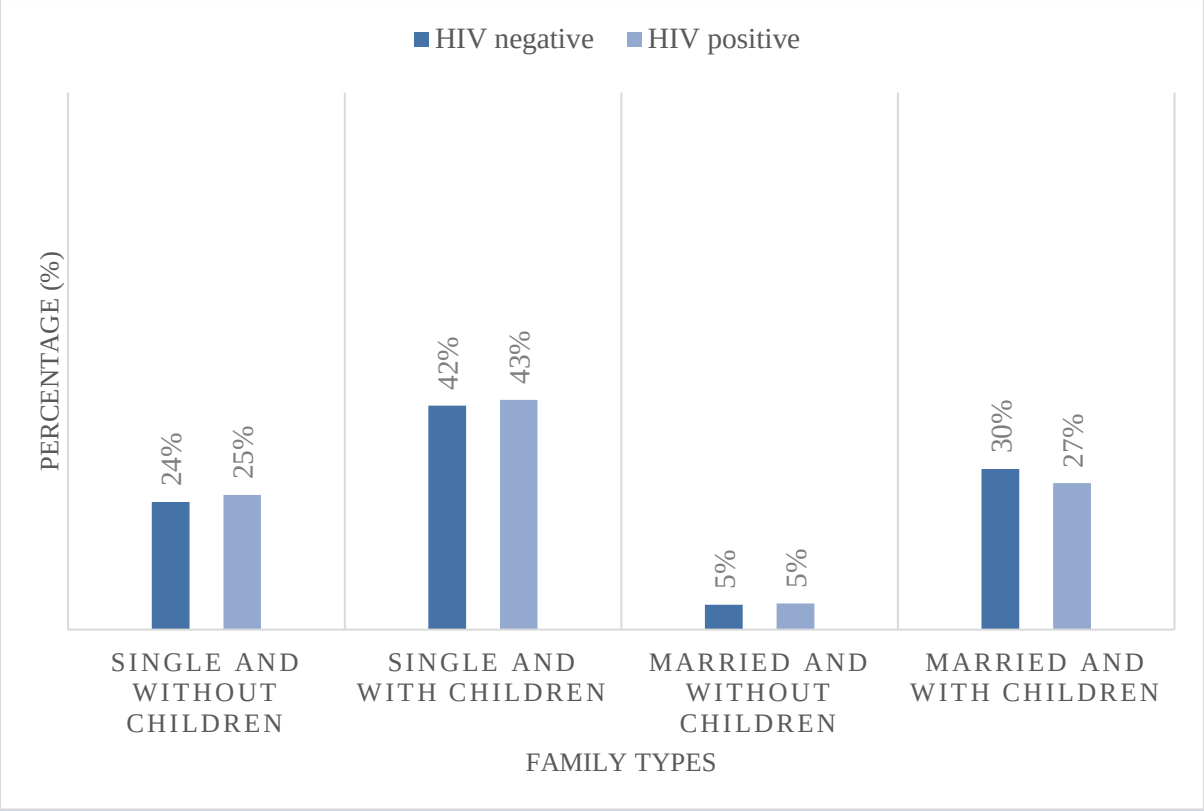

Figure 4.2: Bar graph showing the percentage distribution of the different family types by HIV status (N=2,357)

4.1.4 Characteristics of the respondents against family formation

Table 4.2 below, illustrates the percentage distributions and 95% confidence intervals of selected variables by family form. It also shows the p-value of each socio-demographic factor and its Pearson chi-square value. With regards to age, 41.93% of those that were single and without children were aged 15-19 years, 36.81% were 20-24 years, 15.03% were 25-29 years, while 6.24% were aged 30-34 years. Among those that were single and with children, most were aged 25-29 years (38.72%), followed by those aged 20-24 years (28.91%), 30-34 years (23.10%) and 15-19 years (9.28%). Among those that were married and without children, most were aged 20-24 years (35.89%), followed by those aged 30-34 years (32.85%), 25-29 years (25.27%) and those aged 15-19 years (5.98%). Lastly, 1.76% of those that were married and with children were aged 15-19 years, 15.51% were aged 20-24 years, 34.88% were aged 25-29 years and 47.85% were aged 30-34 years.

Among those that were single and without children, 92.44% were African, while 7.56% were from other population groups (White, Indian, Asian and Coloured). 95.71% of those that were single and with children were African, while 4.29% were from other population groups. Among those that were married and without children, 68.30% were African versus 31.70% of the other population groups. Lastly, 87.76% of those that were married and with children were African and 12.24% were from other population groups. Furthermore, among those that were single and without children, 68.88% lived in an urban area, while 36.12% lived in a rural area. 61.38% of the youth that were single and with children lived in an urban area, while 38.62% were from a rural area. Among those that were married and without children, 86.66% lived an urban area and 13.34% lived in a rural area. Lastly, 75.70% of the youth that were married and with children lived in an urban area, while 24.30% lived in a rural area.

With regards to education, 5.86% of those that were single and without children had lower than secondary education, 81.20% had secondary education and 12.94% had higher education. Among those that were single and with children, most had secondary education (84.50%), followed by those with higher education (9.28%) and those with lower than secondary education (6.22%). Among those that were married and without children, 7.26% had lower than secondary education, two-thirds had secondary education and 26.17% had higher education. Lastly, 8.94% of those that were married and with children had lower than secondary education, 78.33% had secondary education and 12.73% had higher education.

With regards to employment, 79.92% of youth that were single and without children were unemployed, while 20.08% were employed. Among those who were single and with children, 67.63% were employed and almost a third were employed (32.37%). Among those who were married and without children, 60.08% were unemployed while 39.92% were employed. Lastly, 61.21% of those that were married and with children were unemployed, while 38.79% were employed. Furthermore, among those that were single and without children, most were from poor households (43.33%), followed by those from rich households (38.38%) and those from middle wealth households (18.30%). Among those that were single and with children, 39.89% were from poor households, 20.82% were from middle wealth households and 38.38% were from rich households. 55.40% of youth that were married and without children were from poor households, 25.04% were from middle wealth households and 19.55% were from rich households. Lastly, 40.25% of youth that were married and with children were from poor households, 22.41% were from middle wealth households, while 37.34% were from rich households. With regards to family planning, 45.93% of youth who were single and without children had not been told about family

planning at the health facility, while 54.07% had been told about family planning. Among those that were single and with children, 50.39% had never been told about family planning at the health facility, while 49.61% had been told about family planning. Among those that were married and without children, 58.65% had not been told about family planning at the health facility, while only 41.35% were told about family planning. Lastly, among those that were married and with children, 47.14% had not been told about family planning at the health facility, while just over half (52.86%) had been told about family planning.

With regards to the pregnancy intention of the last child born in the five years prior to the survey, 1.30% of those that were single and without children reported that their last pregnancy was intended, 0.41% reported that it was not intended while 98.29% had no children. Among those that were single and with children, 22.59% reported that their last pregnancy was intended, 50.54% reported that it was unintended. Among those that were married and without children, 6.31 reported that their last pregnancy was intended, 1.63% said that it was not intended while 92.06% had no children in the last five years. Among those that were married and with children, 42.31% reported that their last pregnancy was intended and 29.11% reported that it was not intended, while 28.58% did not have a child in the five years prior to the survey.

With regards to condom use, 37.40% of those that were single and without children did not use a condom during their last sexual intercourse while 62.60% did use a condom. 43.35% of those that were single and with children had not used a condom during their last sexual intercourse, while 56.56% did use a condom. Additionally, among those that were married and without children, 77.02% did not use a condom during their last sexual intercourse while 22.98% did use a condom. Lastly, 71.74% of those that were married and with children did not use a condom during their last sexual intercourse while 28.26% did use a condom. Overall, the factors that were significantly associated with family formation ($p<0.05$) were; respondents age, place of residence, population group, highest level of education, employment status, condom use and pregnancy intention.

Table 4.2: Characteristics of the respondents against family formation among youth in South Africa, 2016 (N=2,357)

Characteristics	Single and without children Percentages [95% CI]	Single and with children Percentages [95% CI]	Married and without children Percentages [95% CI]	Married and with children Percentages [95% CI]	p-value	Pearson chi-square
Demographic Factors						
Respondents current age						
15-19	41.93 [37.33-46.67]	9.28 [7.67-11.17]	5.98 [2.61-13.12]	1.76 [1.03-2.97]	p<0.05	672.32
20-24	36.81 [32.36-41.49]	28.91 [26.26-31.71]	35.89 [26.75-46.19]	15.51[13.12-18.24]		
25-29	15.03 [11.94-18.74]	38.72 [35.83-41.68]	25.27 [17.43-35.15]	34.88 [31.59-38.32]		
30-34	6.24 [4.30-8.97]	23.10 [20.66-25.73]	32.85 [24.03-43.08]	47.85 [44.34-51.39]		
Population Group						
Other	7.56 [5.40-10.48]	4.29 [3.22-5.69]	31.70 [23.00-41.89]	12.24 [10.11-14.75]	p<0.05	101.33
African	92.44 [89.52-94.60]	95.71 [94.31-96.78]	68.30 [58.11-77.00]	87.76 [85.25-89.89]		
Place of residence						
Urban	63.88 [59.20-68.30]	61.38 [58.42-64.26]	86.66 [78.05-92.23]	75.70 [72.54-78.60]	p<0.05	59.90
Rural	36.12 [31.70-40.80]	38.62[35.74-41.58]	13.34 [7.77-21.95]	24.30 [21.40-27.46]		
Socio-Economic Factors						
Highest level of education						
Lower than secondary	5.86 [3.99-8.54]	6.22 [4.92-7.84]	7.26 [3.43-14.71]	8.94 [7.12-11.17]	p<0.05	33.27
Secondary	81.20 [77.20-84.63]	84.50 [82.20-86.55]	66.57 [56.33-75.46]	78.33 [75.28-81.10]		
Higher	12.94 [10.07-16.47]	9.28 [7.67-11.17]	26.17 [18.19-36.10]	12.73 [10.55-15.27]		
Employment status						
Unemployed	79.92 [75.85-83.46]	67.63 [64.76-70.38]	60.08 [49.76-69.57]	61.21 [57.72-64.60]	p<0.05	45.95
Employed	20.08 [16.54-24.15]	32.37 [29.62-35.24]	39.92 [30.43-50.24]	38.79 [35.40-42.28]		
Household wealth index						
Poor household	43.33 [38.70-48.08]	39.89 [36.99-42.87]	55.40 [45.14-65.23]	40.25 [36.84-43.76]	p>0.05	17.3088

Characteristics	Single and without children Percentages [95% CI]	Single and with children Percentages [95% CI]	Married and without children Percentages [95% CI]	Married and with children Percentages [95% CI]	p-value	Pearson chi-square
Middle household	18.30 [14.91-22.26]	20.82 [18.49-23.37]	25.04 [17.23-34.90]	22.41 [19.60-25.49]		
Rich household	38.38 [33.88-43.09]	39.28 [36.39-42.25]	19.55 [12.66-28.95]	37.34 [33.99-40.82]		
Family Planning Factors						
Heard about Family Planning						
No	45.93 [41.25-50.68]	50.39 [47.39-53.39]	58.65 [48.34-68.26]	47.14 [43.63-50.67]	p>0.05	6.8914
Yes	54.07 [49.32-58.75]	49.61 [46.61-52.61]	41.35 [31.74-51.66]	52.86 [49.33-56.37]		
Pregnancy intention						
Intended	1.30 [0.57-2.96]	22.59 [20.18-25.20]	6.31 [2.82-13.53]	42.31 [38.86-45.83]	p<0.05	931.10
Unintended	0.41 [0.09-1.78]	50.54 [47.53-53.53]	1.63 [0.33-7.71]	29.11 [26.01-32.42]		
No children	98.29% [96.51-99.17]	26.87 [24.29-29.62]	92.06 [84.46-96.12]	28.58 [25.50-31.88]		
Proximate Factor						
Condom use						
Did not use a condom	37.40 [32.93-42.09]	43.35 [40.40-46.35]	77.02 [67.32-84.51]	71.74 [68.45-74.81]	p<0.05	210.31
Did use a condom	62.60 [57.91-67.07]	56.56 [53.65-59.60]	22.98 [15.49-32.68]	28.26 [25.19-31.55]		

4.2 Examining the relationship between Socio-Demographic Factors, HIV and Family Formation among Youth in South Africa (2016).

Table 4.4 below are four Multinomial Regression Models showing the association between Socio-Demographic factors, HIV status and family formation. Model 1 examined the association between HIV status and Family formation. Model 2 accounted for the effects of Model 1, as well as demographic factors. Model 3 accounted for the effect of Model 2, as well as socio-economic factors. Model 4 is a full model, which accounted for the effects of Model 3, and family planning and proximate factors. Presented on the table are both the Relative Risk Ratios (RRR) and 95% Confidence Interval.

4.2.1 Model 1

The relative risk of single and with children versus single and without children was 0.97 [CI: 0.709-1.323] times lower for HIV Positive youth as compared to HIV Negative youth. The relative risk of being married and without children was 0.70 [CI: 0.303-1.599] times lower for HIV Positive youth as compared to HIV Negative youth. Lastly, the relative risk of being married and with children was 0.86 [CI: 0.595-1.255] times lower for HIV positive youth. However, HIV status was not significantly associated with family formation.

4.2.2 Model 2

Model 2 assessed the association between HIV status and family formation, while controlling for demographic factors. HIV Positive youth had a 1.01 [CI: 0.718-1.412] times higher risk of being single and with children as compared to those who were HIV Negative. Furthermore, the relative risk of being single and with children significantly increased by a factor of 2.96 [CI: 2.448-3.572] per one unit increase in age. Africans had a significantly higher relative risk [RRR: 2.02, CI: 1.022-3.983] of being single and with children, versus non-Africans. Lastly, the results further revealed that place of residence was not significantly associated with the risk of being single and with children ($p>0.05$).

With regards to the risk of being married and without children, HIV Positive youth had a 22% [CI: 0.313-1.958] lower relative risk as compared to those who were HIV Negative. This association was however not significant. The relative risk of being married and without children significantly increased by a factor of 3.13 [CI: 2.250-4.352] per one unit increase in age. Youth that lived in

rural areas [RRR: 0.40, CI: 0.206-0.763] had a significantly lower relative risk of being married and without children as compared to those who lived in an urban area. African youth had a 0.26 [CI: 0.118-0.563] times lower relative risk of being married and without children, as compared to non-Africans. This association was found to be significant.

The relative risk of being married and with children versus being single and without children was 7% [CI: 0.581-1.476] lower for HIV Positive youth as compared to those who were HIV Negative. However, this association was not significant. The relative risk of being married and with children significantly increased by a factor of 5.86 [CI: 4.725-7.276] per one unit increase in age. Lastly, youth that lived in rural areas [RRR: 0.64, CI: 0.471-0.883] had a significantly lower relative risk of being married and with children. However, population group was not found to be significantly associated with the risk of being married and with children ($p>0.05$).

4.2.3 Model 3

Model 3 assessed the association between HIV status and Family formation, while controlling for demographic and socio-economic factors. HIV Positive youth had a 0.98 [CI: 0.692-1.398] times lower relative risk of being single and with children as compared to HIV Negative youth. This association was however not significant. The relative risk of being single and with children significantly increased by a factor of 3.09 [CI: 2.519-3.779] per one unit increase in age. Furthermore, the relative risk of being single and with children versus single without children was 1.02 [CI: 0.524-1.965] times higher for youth with secondary education. Conversely, it was significantly lower for those with higher education [RRR: 0.46, CI: 0.208-1.002]. The results further reveal that, place of residence, population group, secondary education, employment status and household wealth index were not significantly associated with the relative risk of being single and with children ($p>0.05$).

With regards to the risk of being married and without children, HIV Positive youth had a 0.74 [CI: 0.292-1.887] times lower relative risk as compared to HIV Negative youth. The relative risk of being married and without children significantly increased by a factor of 3.27 [CI: 2.285-4.690] per one unit increase in age. Youth living in rural areas [RRR: 0.39, CI: 0.204-0.758] had a significantly lower risk of being married and without children. Furthermore, Africans had a 73% [CI: 0.120-0.608] lower relative risk of being married and without children compared to non-Africans, and this was a significant association. Furthermore, youth from middle wealth

households had a 1.13 [CI: 0.523-2.448] times higher relative risk of being married and without children. Conversely, youth from rich households [RRR: 0.40, CI: 0.196-0.825] had a significantly lower risk of being married and without children. Lastly, highest level of education, employment status and middle wealth household were not significantly associated with the risk of being married and without children ($p>0.05$).

With regards to the risk of being married and with children, HIV Positive youth had a 0.89 [CI: 0.550-1.430] times lower relative risk as compared to HIV Negative youth. This association was however not significant. The relative risk of being married and with children significantly increased by a factor of 6.17 [CI: 4.876-7.811] per one unit increase in age. The relative risk of being married and with children versus single and without children was significantly lower for youth living in rural areas [RRR: 0.61, CI: 0.446-0.825], versus those living in urban areas. Youth with secondary education had a 34% [CI: 0.304-1.418] lower risk of being married and with children as compared to those with lower than secondary education. Additionally, youth with higher education [RRR: 0.35, CI: 0.137-0.900] had a significantly lower relative risk of being married and with children. The results further reveal that, population group, secondary education, employment status, and household wealth index were not significantly associated with the risk of being married and with children ($p>0.05$).

4.2.4 Model 4

Model 4 assessed the association between HIV status and family formation, while controlling for the effects of Model 3, and family planning and proximate factors. The relative risk of being single and with children versus being single and without children was 1.29 [CI: 0.673-2.473] times higher for HIV Positive youth versus those who were HIV Negative. The association between HIV status and the risk of being single and with children was however not significant. The relative risk of being single and with children significantly increased by a factor of 5.26 [CI: 3.920-7.057] per one unit increase in age. African youth had a 3.14 [CI: 1.413-6.984] times higher risk of being single and with children, and this was a significant association. Furthermore, youth who had unintended pregnancies [RRR: 14.43, CI: 2.245-92.688] had a significantly higher relative risk of being single and with children, as compared those who had intended pregnancies. Lastly, place of residence, highest level of education, employment status, household wealth index, family planning and condom use were not significantly associated with the risk of being single and with children ($p>0.05$).

With regards to the risk of being married and without children, HIV Positive youth had a 0.57 [CI: 0.197-1.667] times lower relative risk as compared to those who were HIV Negative. HIV status was however not significantly associated with the risk of being married and without children. The relative risk of being married and without children significantly increased by a factor of 2.89 [CI: 1.952-4.280] per one unit increase in age. Youth who lived in rural areas [RRR: 0.31, CI: 0.155-0.631] had a significantly lower relative risk of being married and without children. The relative risk of being married and without children was 1.30 [CI: 0.592-2.856] times higher for youth from middle wealth households, as compared to those from poor households. However, it was significantly lower for those who came from rich households [RRR: 0.35, CI: 0.156-0.767]. Youth who reported having used a condom during their last sexual intercourse [RRR: 0.20, CI: 0.096-0.434] had a significantly lower relative risk of being married and without children, versus those who did not. Lastly, the results further reveal that, population group, highest level of education, employment status, middle household wealth index, family planning and pregnancy intention were not significantly associated with the risk of being married and without children ($p>0.05$).

With regards to the risk of being married and with children, HIV Positive youth had a 1.09 [CI: 0.483-2.444] times higher relative risk than HIV Negative youth. However, this association was not significant. The relative risk of being married and with children significantly increased by a factor of 10.03 [7.127-14.135] per one unit increase in age. Youth who lived in rural areas had a 50% [CI: 0.309-0.800] significantly lower relative risk of being married and with children. Furthermore, those who did not use a condom during their last sexual intercourse [RRR: 0.44, CI: 0.270-0.728] had a significantly lower relative risk of being married and with children, as compared to those who reported having not used a condom. Lastly, the results also revealed that population group, highest level of education, employment status, household wealth index, family planning and pregnancy intention were not significantly associated with the relative risk of being married and with children ($p>0.05$

Table 4.3: Association between socio-demographic factors, HIV status and family formation among youth in South Africa, 2016

	Model 1	Model 2	Model 3	Model 4
Single and without children (RC)				
Single and with children				
HIV Status				
HIV negative	RC	RC	RC	RC
HIV positive	0.97 [0.709-1.323]	1.01 [0.718-1.412]	0.98 [0.692-1.398]	1.29 [0.673-2.473]
Respondents Age		2.96* [2.448-3.572]	3.09* [2.519-3.779]	5.26* [3.920-7.057]
Place of residence				
Urban		RC	RC	RC
Rural		1.16 [0.890-1.522]	1.12 [0.862-1.464]	1.04 [0.680-1.593]
Population group				
Other		RC	RC	RC
African		2.02* [1.022-3.983]	1.89 [0.961-3.710]	3.14* [1.413-6.984]
Highest level of education				
Lower than secondary			RC	RC
Secondary			1.02 [0.524-1.965]	1.11 [0.362-3.412]
Higher			0.46* [0.208-1.002]	0.37 [0.103-1.340]
Employment Status				
Unemployed			RC	RC
Employed			1.04 [0.717-1.509]	1.52 [0.891-2.594]
Household wealth index				
Poor			RC	RC

	Model 1	Model 2	Model 3	Model 4
Single and without children (RC)				
Middle			1.09 [0.745-1.600]	1.07 [0.622-1.837]
Rich			0.93 [0.671-1.298]	0.92 [0.558-1.507]
Family planning				
Not told about it at health facility				RC
Told about it at health facility				0.82 [0.500-1.347]
Pregnancy intention				
Intended				RC
Unintended				14.43* [2.245-92.688]
No children				0.00* [0.002-0.021]
Condom use				
No				RC
Yes				1.41 [0.909-2.188]
Married and without children				
HIV Status				
HIV negative	RC	RC	RC	RC
HIV positive	0.70 [0.303-1.599]	0.78 [0.313-1.958]	0.74 [0.292-1.887]	0.57 [0.197-1.667]
Respondents age		3.13* [2.250-4.352]	3.27* [2.285-4.690]	2.89* [1.952-4.280]
Place of residence				
Urban		RC	RC	RC
Rural		0.40* [0.206-0.763]	0.39* [0.204-0.758]	0.31* [0.155-0.631]
Population group				
Other		RC	RC	RC
African		0.26* [0.118-0.563]	0.27* [0.120-0.608]	0.48 [0.210-1.077]
Highest level of education				

	Model 1	Model 2	Model 3	Model 4
Single and without children (RC)				
Lower than secondary			RC	RC
Secondary			0.63 [0.221-1.780]	0.69 [0.215-2.207]
Higher			0.70 [0.207-2.377]	0.66 [0.158-2.783]
Employment status				
Unemployed			RC	RC
Employed			0.84 [0.390-1.791]	0.94 [0.382-2.299]
Household wealth index				
Poor			RC	RC
Middle			1.13 [0.523-2.448]	1.30 [0.592-2.856]
Rich			0.40* [0.196-0.825]	0.35* [0.156-0.767]
Family planning				
Told about it				RC
Not told about it				0.67 [0.337-1.322]
Pregnancy intention				
Intended				RC
Unintended				1.27 [0.094-17.34]
No children				0.22 [0.031-1.519]
Condom use				
No				RC
Yes				0.20* [0.096-0.434]
Married and with children				
HIV Status				
HIV negative	RC	RC	RC	RC
HIV positive	0.86 [0.595-1.255]	0.93 [0.581-1.476]	0.89 [0.550-1.430]	1.09 [0.483-2.444]

	Model 1	Model 2	Model 3	Model 4
Single and without children (RC)				
Respondents age		5.86* [4.725-7.276]	6.17* [4.876-7.811]	10.03* [7.127-14.135]
Place of residence				
Urban		RC	RC	RC
Rural		0.64* [0.471-0.883]	0.61* [0.446-0.825]	0.50* [0.309-0.800]
Population group				
Other		RC	RC	RC
African		0.85 [0.440-1.642]	0.78 [0.403-1.513]	1.47 [0.666-3.264]
Highest level of education				
Lower than secondary			RC	RC
Secondary			0.66 [0.304-1.418]	0.86 [0.248-2.962]
Higher			0.35* [0.137-0.900]	0.32 [0.077-1.310]
Employment status				
Unemployed			RC	RC
Employed			0.90 [0.588-1.391]	1.32 [0.757-2.293]
Wealth index				
Poor			RC	RC
Middle			1.17 [0.752-1.818]	1.33 [0.756-2.322]
Rich			0.90 [0.594-1.356]	0.87 [0.491-1.529]
Family planning				
Not told about it				RC
Told about it				0.97 [0.578-1.619]
Intended				RC
Unintended				5.72 [0.847-38.668]
No children				0.00* [0.001-0.024]

	Model 1	Model 2	Model 3	Model 4
Single and without children (RC)				
Condom use				
No				RC
Yes				0.44* [0.270-0.728]
Sample size	**2,357**	**2,357**	**2,357**	**2,357**
Design df	**497**	**497**	**497**	**497**
F	**F(3, 495)=0.38**	**F(12, 486)=26.72**	**F(27, 471)=13.59**	**F(39, 459)=12.49**
Prob > F	**0.7654**	**0.0000**	**0.0000**	**0.0000**

RC=Reference Category

Significance=p<0.05

4.3 Model fit test

From Model 1, the F-statistic was not significant ($p>0.05$), therefore HIV status was not a reliable predictor of family formation. Conversely, from Model 2, 3, and 4 the F-statistic test was significant ($p<0.05$), therefore the independent variables on these models reliably predicted the dependent variable. This model therefore rejected the null and accepted the alternative hypothesis, which stated that; the fit of the reduced model is significantly less, compared to the full model.

4.4 Hypothesis testing

To test the first hypothesis, a Pearson chi-square test was used.

H0: There are no differences in the types and levels of family formation among youth in South Africa, by HIV status.

H1: There are differences in the types and levels of family formation among youth in South Africa, by HIV status.'

Assuming: Significance level: $\alpha = 0.05$

The p-value for the association between HIV status and family formation was more than 0.05 therefore, this study accepted the null hypothesis and concluded that there are no differences in the types and levels of family formation among youth in South Africa, by HIV status.

To test the second hypothesis, the adjusted Multinomial Logistic Regression Model was used.

H0: There is no association between HIV status and Family formation among youth in South Africa.

H1: There is an association between HIV status and Family formation among youth in South Africa.

Assuming: Significance level: $\alpha = 0.05$

Given that for all family formation categories the p-value for HIV status was more than 0.05, this study accepted the null hypothesis and concluded that there was no association between HIV status and Family formation among youth in South Africa in 2016.

CHAPTER FIVE

DISCUSSION

This study assessed two objectives. It first described the types and levels of family forms among youth in South Africa by HIV status. The second objective examined the relationship between HIV status, socio-demographic factors and family formation among youth in South Africa.

5.1 Discussion of Objective 1: *"To examine the types and levels of family formation among youth in South Africa by HIV status"*

In this study, family formation had four categories and it was defined as; single and without children, single and with children, married and without children and, married and with children. As compared to HIV Negative youth, more HIV Positive youth were single and with children, with a difference of 1.93%. Furthermore, 4.12% of the HIV Negative youth were married and without children, versus 3.09% of the HIV Positive youth. Lastly, 33.15% of the HIV Negative youth were married and with children, versus 30.86% of the HIV Positive youth. These results show that there are only marginal differences in the family formation patterns of HIV Positive and HIV Negative youth, therefore highlighting that HIV Positive youth are forming families similarly to their HIV Negative peers. Additionally, not only are they getting married, they are also having children. These findings are both consistent with, yet also contradict earlier research. Adler et al (2017) found high levels of childbearing intentions among both HIV Positive and HIV Negative adolescents aged 18-21 years in South Africa. About 80% of the HIV Positive and 79% of the HIV Negative adolescents had childbearing intentions (Adler et al., 2017). Similar results have also been found in Nigeria, where PLWH were found to have a higher desire (68%) for having children and forming families (IIiyasu et al., 2019).

However, earlier studies found contradicting results. In a study which assessed the childbearing intentions of HIV Positive women aged 18-44 years in South Africa, Kaida et al. (2011), it was found that HIV Positive women were 60% times less likely to report intentions to have more or any children at all, as compared to HIV Negative women. Conversely, almost one third of the HIV positive women reported intentions to have children. These intentions significantly increased with younger age and a fewer number of living children. Furthermore, Cooper and colleagues (2009), found that in their study only 45% of the HIV positive women reported

fertility intentions, while 55% reported that they were not planning to have children. Some of the factors that lead to some participants avoiding pregnancy included fear of sexual and mother-to-child transmission, having previously infected an infant and community disapproval of childbearing among HIV Positive persons. This, therefore, suggests that there have been changes in the childbearing intentions of HIV Positive young women which can be attributed to the advancement in HIV treatment. Studies have shown that early initiation of ART reduces the risk of transmission among serodiscordant couples (Raynolds et.al., 2011; Cohen et.al., 2011). It has also shown that adherence to ART reduces the risk of mother-to-child transmission (Changomerana et al., 2018). This is because ART reduces the viral loads of PLWH, leading to a lower risk of vertical and sexual transmissions once the viral load is undetectable (Wekesa and Coast, 2014).

In Nigeria, Smith and Mbakwen (2007) found that, once their health had been restored by ART, marriage and childbearing desires among People living with HIV and AIDS (PLWHA) increased. Using longitudinal data from Malawi, Garver et al. (2019), found an increase in childbearing among PLWHA between the years 2009 and 2016. This was the period in which access to ART improved (Garver et al., 2019). Additionally, the researchers also found that the childbearing differences by HIV status that were detected in 2009, were eroded by 2015. Therefore suggesting that, there has been a broad acceptability of childbearing for both HIV Positive and Negative individuals (Garver, Trinitapoli & Yeatman, 2019). This also highlights the change in the social experiences of PLWHA, as ART has helped them construct lives that are similar to that of their HIV Negative peers (Smith & Mbakwem, 2007). Similarly, research has shown that stigma associated with childlessness has increased the childbearing intentions of PLWHA. This is because in contexts of high fertility, childlessness is sometimes considered to be a violation of societal norms (Balen & Bos, 2009; Cooper et al., 2007; Smith & Mbakwem, 2007)

5.2 Discussion of Objective 2**:** *"To examine the association between Socio-Demographic factors, HIV status and Family Formation among youth in South Africa."*

In the first model, the risk of being single and with children was lower among HIV Positive young women. However, after controlling for demographic, socioeconomic, family planning and proximate factors, the relative risk was higher than that of HIV Negative youth. In this study, young women who were defined as being single were those who were not in a relationship, or were widowed, separated or divorced. Therefore, this simply means that more

HIV Positive youth were single mothers as compared to HIV Negative youth. A possible explanation for this finding is that as compared to HIV Negative young women, more HIV Positive women in this study might be divorced, separated or widowed due to the virus. In a study which looked at marriage, widowhood, divorce and HIV risk among women in SSA, the researchers found that widowed women were most likely to be HIV positive compared to never married women (Tenkorang, 2014). However, there is a possibility that the women were infected after the death of their husband (Tenkorang, 2014). Additionally, in Zimbabwe and Tanzania, it was found that divorced women were more likely to be HIV Positive (Tenkorang, 2014). Guen (2019), found that among SSA migrants in Paris, women were most likely to experience union breakups after HIV diagnosis.

Scholars have also found that in some contexts, HIV status affects union formation. In a study which was conducted in Malawi, it was found that that HIV Positive status is associated with marriage and remarriage rates (Clark, Poulin & Kohler, 2009). Additionally, another study in Malawi found that HIV status determines who gets into unions and who does not (Anglewicz & Reniers, 2014). This, however, was only statistically significant for women (Anglewicz & Reniers, 2014).

Furthermore, in the first model HIV Positive young women had a lower risk of being married and without children as compared to HIV Negative young women, and this risk continued to decrease after controlling for demographic, socio-economic, family planning and proximate factors. Conversely, HIV Positive young women were at a higher risk of being married and with children versus those who were HIV Negative. Due to limitations in the data source used, the study could not tell if the HIV status came first or the marriage. However, studies have found that marriage increases the risk of HIV transmission. In a study conducted in rural Mpumalanga in South Africa among married and cohabiting women, it was found that women negotiated safer sex with their partners, however it was difficult for them to suggest using a condom (Madiba & Ngwenya, 2017). Factors that have been found to make negotiating for safer sex difficult for women include; patriarchal norms that are a barrier to women expressing their sexuality and playing a part in sexual decision making, and gender based violence (Duffy, 2005 as cited by Madiba & Ngwenya, 2017). Additionally, the men are usually older, and subscribe to cultural norms and beliefs that reinforce entitlement to sex (Mungeni, Pearson and Omar, 2012). Lastly, the suggestion of using a condom at times has been seen as a sign of lack of trust (Madiba & Ngwenya, 2017). Furthermore, in a study conducted in Tanzania, the researchers found that intra-marriage HIV incidence was 19 times higher than the incidence

amongst the general population. The seroconversions were also found to be higher among women, as compared to men (Colombe et al., 2019). Therefore suggesting that marriage is a risk factor for HIV transmission, especially for women.

Another reason for the high risk of being married and with children among HIV positive youth is the widespread view that childbearing is part of the identity of a married woman. In a study that was conducted among HIV positive women in Mozambique, the researchers found that; some participants believed that every married woman is supposed to have children as part of fulfilling their task as a spouse (Cuinhane, Roelens, Vanroelen, Quive & Coene, 2018). Some also believed that childbearing was a means to dignifying and expanding their husband's surname (Cuinhane et al., 2018). Conversely, some participants reported that due to health and financial concerns, they did not want any more children. However, their husbands wanted children and, therefore, they ended up having children (Cuinhane, Roelens, Vanroelen, Quives & Coene., 2018). The abovementioned highlights that social and cultural factors largely influence family formation, even among HIV Positive women.

Across all the models, the factors that were significantly associated with the risk of being single and with children were; respondent's age, African population and unintended pregnancies. The factors that were found to be significantly associated with being married and without children were; respondents age, rural residence, African population, rich household wealth index, and using a condom. Lastly, the factors that were significantly associated with the risk of being married and with children were; respondents age, rural residence, and using a condom.

In this study, youth who had secondary or higher education, were less likely to have formed any type of family, as compared to youth with less than secondary education. This is because duration spent in schooling can affect age at first marriage and at first birth (Hwang & Ha Lee, 2014). Those young women may choose to delay family formation in favour of career opportunities (Hwang & Ha Lee, 2014). Furthermore, this trend could be attributed to the need to establish oneself and be financially secure before taking on family and childbearing responsibilities (Hwang & Ha Lee, 2014). This association is consistent with a study by Perell-Harris (2006), who found that highly educated women in Ukraine delay childbearing. Ikamari (2013), found that in Kenya, an additional level in education significantly delays age at first marriage, indicating that a woman's educational attainment is a determinant of age at first marriage in Kenya. Literature has also found that women empowerment is associated with contraceptive use (Woldemicael, 2009), lower fertility (Hindin, 2000) and a delay in family

formation. Similar trends have also been evident among well educated women in South Africa, as they have experienced increasing childlessness and decreased fertility over time (Stats SA, 2018).

Furthermore, employed youth had an insignificantly higher risk of being single and with children, and married and with children. However, according to literature, women with an income have been found to have higher levels of childlessness, and this is because, as income increases, family formation becomes less important as compared to income (Neyer, Hoem & Andersson, 2017). Conversely, one can argue that, the risk of being single and with children might be higher among employed women, as these women might have had to find employment after childbearing, so that they can care and provide for their children.

Youth who live in rural areas where more likely to be single and without children, however they were less likely to be married and with children. These findings are surprising as literature in Ethiopia has found that young girls who live in urban areas are less likely to get married before 18 years as compared to their peers from rural areas (Ezra, 2003). Similarly, Kalule-Sabiti and colleagues have established that urban-rural residence defines the influence of other socioeconomic factors on nuptiality. Therefore, as compared to their peers from rural areas, women in urban areas are most likely to receive better education, which in most cases translates to better employment opportunities (Kalule-Sabiti, Palamuleni, Makiwane & Amoateng., 2007). They are, therefore, less likely to become pressured into getting married, and hence they have lower marriage rates (Kalule-Sabiti, Palamuleni, Makiwane & Amoateng, 2007). However, data from the Stats SA Community Survey, highlights that in 2016, there were more married people in urban areas as compared to rural areas (Stats SA, 2016). Approximately, 31.0% of the people living in urban areas were married, versus 22.8% living in rural areas (Stats SA, 2016). This therefore suggests that there have been changes in the urban/rural marriage differentials in South Africa.

The study also showed that African young women were more likely to be single and with children, and married and with children. These findings are consistent with earlier studies which established that, in South Africa, fertility is generally higher among Black African and Coloured populations, and is lower among Indian/Asian and White populations (Sibanda & Ziburi as cited in Stats SA, 2007). In 2011, Indian/Asian and White populations had a TFR of 1.7 and 1.8 respectively, while Black and Coloured women had TFR's of 2.82 and 2.57 respectively (Stats SA, 2018). Furthermore, Zwang and Garenne (2008), pointed out that in

South Africa, premarital childbearing is high among Black and Coloured populations, and is high in both rural and urban areas.

Furthermore, the results showed that unintended pregnancies were associated with the risk of being single and with children, and being married and with children. This shows that even though youth in South Africa are having children, most of them had unintended pregnancies. These findings are consistent with earlier studies which were done in South Africa, the United States and Brazil (Iyun et al., 2018; Sutton, Zhou & Frazier, 2018; Wittlin et al., 2018). In a study that was conducted by Iyun (2018) in South Africa, the researcher found that unintended pregnancies were higher among HIV positive women vs. HIV negative women. In a study conducted in the US, it was also found that nearly 80% of HIV positive women in their study had unintended pregnancies (Sutton et al., 2018). A study in South Africa found that physical abuse, lower socioeconomic status and the belief that one is their partners main girlfriend were factors associated with unplanned and unwanted pregnancies among young women (Christofides et.al., 2014). A study in Nepal found sexual abuse to be associated with unintended pregnancy among married women (Acharya, Paudel, & Silwal, 2019). Conversely, intimate partner violence has been found to expose women to unintended pregnancies and HIV infection (Breiding, Black & Ryan, 2008; Martin-de-Las-Heras, Velasco, de Dios Luna & Martin 2015).

HIV status was however not found to be a significantly associated with family formation, therefore this study accepts the null hypothesis. This as mentioned above, can be attributed to the expansion of ART which has been found to reduce the risk of sexual and horizontal transmissions, and therefore enabling HIV Positive youth to form families like their HIV Negative peers.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

The study described the family formation patterns of youth in South Africa. It also examined the association between socio-demographic factors, HIV status and family formation among youth in South Africa.

6.1 Conclusion

The overall inference drawn from this study was that there are marginal differences in the family formation patterns of HIV Positive and HIV Negative youth in South Africa. This, therefore, indicates that HIV Positive youth are forming families similarly to their HIV Negative peers. Furthermore, there have been changes in the family formation patterns of HIV positive youth. Before the mass roll-out of ART, their childbearing intentions were very low. However, in recent years, they have become similar to those of HIV Negative youth. These changes can be attributed to the increased access to ART which has been found to prevent both sexual and mother-to-child transmissions. This also shows an improvement in the perception of the virus and the ability of PLWH to have healthy relationships and families.

However, HIV status was not significantly associated with family formation. This shows that programs like AVERT, South Africa Partners and Soul City, which aim to promote widespread knowledge and understanding of HIV and AIDS, and provide support for those who are affected, have been successful. Conversely, unintended pregnancies were found to be very high and a significant predictor of family formation. This raises concerns because unintended pregnancies may predispose a young woman to HIV infection. Subsequently, this can increase the risk of MTCT especially if the young mother has not started ART or has a detectable viral load. Therefore, it is vital that HIV positive women are made aware of their sexual and reproductive health rights and safer conception methods available to them.

6.2 Recommendations

6.2.1 Recommendations for policy

Given that unintended pregnancies were significantly associated with the risk of being single and with children, the National Contraception and Family Planning Policy, needs to ensure that as stipulated in their policy; there is an appropriate integration of contraceptive and family

planning services with HIV and MTCT services. This will reduce unintended pregnancies, of which have been found to increase the risk of transmission, maternal mortality, and infant mortality. Furthermore, the Health Sector HIV Prevention Strategy of 2016, aims to provide a plan for a comprehensive package of HIV prevention services provided by the Department of Health, primarily to reduce the incidence of HIV (Department of Health, 2016). It also aims to prioritize HIV prevention treatment and scale up the implementation of combination-based HIV prevention, and to monitor and track progress (DoH, 2016). This strategy uses different classes of prevention interventions, namely, biomedical, behavioural, and structural, to respond to the needs of their audience (DoH, 2016). It also tailor's prevention treatment which focuses on the individual, couple, community, and societal level (DoH, 2016). It is therefore vital that the Health Sector HIV Prevention Strategy of 2016, integrates family planning services in their framework and the HIV services provided by the department of health. They should also provide test-and-treat training together with safer conception methods so that service providers are better equipped to educate PLWH on safer conception practices and support their fertility goals. In that way, they will be able to equip HIV Positive youth to prevent unwanted pregnancies. It will also ensure that HIV positive youth live sexually healthy lives and are aware of all the available contraceptive methods available to them. It will also ensure that they are aware of safer conception methods available to them once they have decided that they are ready to form a family. Lastly, this will also help with the achievement of Goal 3 of the Sustainable Development goals, which is to promote good health and wellbeing for all.

6.2.2 Recommendations for future research

Given that this study is cross-sectional in nature, future studies may need to explore the relationship between HIV status and Family formation using longitudinal data, in order to assess significant patterns over time. Furthermore, future studies need to explore whether ART is significantly associated with family formation. As awareness of these relationships can be critical in the implementation of policies that support HIV positive youth in their transition into adulthood and family formation. Literature may need to also look at partner characteristics as a potential determinant of family formation. Lastly, a qualitative study with in-depth interviews, can also be conducted to examine and understand the experiences of HIV positive youth in relation to forming families.

6.3 Limitations

Like any study, this study had limitations of its own. The study used cross-sectional data therefore the direction of association between the independent and dependent variables could not be assessed. Furthermore, the DHS has limited data and therefore, cultural factors that might be key determinants of family formation are not included in the survey. This shortcoming did not affect the results obtained in this study; however, previous literature has provided an indication of the possibility of culture being one of the important determinants of family formation, and therefore, further research is needed. Furthermore, partner characteristics are unknown and are a determinant of family formation that was not analysed in this study. Lastly, there was missing data, therefore the respondents with missing data were excluded from the analysis. This however did not affect the results of the study, as this was not a large number of respondents

6.4 Contributions to Research

This study has also made contributions to research. Most studies conducted in South Africa focused on the childbearing intentions of HIV positive adolescents or women in South Africa, and not necessarily family formation. Therefore, this study contributed to research by looking beyond childbearing intentions and focusing on family formation. Furthermore, the results have illustrated that HIV Positive youth are forming families and HIV status is not significantly associate with family formation. Therefore, suggesting that ART and programs that are aimed at HIV knowledge and understanding have been successful in helping HIV positive youth live normal lives. Lastly, this study has also informed policy on the need to integrate family planning and HIV services.

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APPENDIX A: Tabular presentation of some of the reviewed articles.

Title	Author and Year	Data source	Study Description	Method	Findings	Gaps
The effect of education on the timing of marriage in Kenya	Lawrence Ikamari, 2005	1998 Kenya Demographic and Health Survey	Level of Analysis: Individual level Study Setting: Kenya Study Population: Women age 15-49 Study Sample: 7881 women	Data analysed using the Cox hazard model and a Linear regression	Education has statistically significant delaying effect on marriage. Also, education is a determinant of a woman's age a first marriage. Increase in level of education decreases the probability of marriage. As compared to women with no education, the risk of marriage was 24% lower for women with primary education and 46% lower for women with secondary education. Furthermore, women who initiate sexual activity for the age of 20, most likely to get married early. Having pre-marital childbearing lowers the risk of marriage and it has a positive relationship with age at first marriage. Women from developed regions are less likely to get married early. Women	Future studies should examine the pathways and the interactions between the covariates as this was not measured in the current study. The study did not control for other socio-economic factors like; employment status and wealth index.

Title	Author and Year	Data source	Study Description	Method	Findings	Gaps
					belonging to the Catholic and Protestant religions are more likely to get married at a younger age. Those born in rural areas had a higher risk of early marriage, however this only applied to women aged 15-29 and 40-49. Those who currently live in the rural area had a higher risk of early marriage, however this was only significant for those aged 30-39 years.	
Determinants of fertility in Rwanda in the context of a fertility transition: a secondary analysis of the 2010 Demographic and Health Survey.	Vedaste Ndahindwa, Collins Kamanzi, Muhammed Semakula, François Abalikumwe, Bethany Hedt-Gauthier, and Dana R Thomson, 2014	2010 Rwanda Demographic and Health Survey	Level of Analysis: Individual and household level Study Settings: Rwanda Study Population: Women aged 15-49 years who had at least one child Sample size: 8,309 ever married/cohabited women, and 1,220	Data was analysed using the Poisson regression model to model the number of children born to women in the study. Furthermore, a backward stepwise regression was used to identify the individual and household factors associated with fertility.	Among the ever married/cohabited women, fertility was significantly associated with unmet need for contraception, a desire for children, women's number of siblings, couples who wanted different numbers of children. While, low fertility was significantly associated with women's education, household wealth and delayed sexual debut.	The study used cross-sectional data, so it could not assess causality. Due to limitations in the data, the study was not able to examine the association with all the determinants of fertility.

Title	Author and Year	Data source	Study Description	Method	Findings	Gaps
			never married women		Among never married women, low fertility was associated with unmet need for contraception, delayed sexual debut, household wealth and women's education.	
Age at first marriages, age at first sex, family size preferences, contraception and change in fertilirt among women in Uganda: Analysis of the 2006-2016 period	Paulino Ariho and Allen Kabagenyi, 2020	2006 and 2016 Uganda Demographic and Health Survey	Level of analysis: Individual level Study setting: Uganda Study population: Women aged 15-49 who had ever had sex Population size:	To analyse the data, a Pearson chi-square test was used, ASFR and TFR calculations, and decomposition analysis.	Change in fertility behaviour was found to have the biggest effect on change in fertility between 2006 and 2016. After removing education and place of residence from the model, the behavioural component associated with age at first sex increased in terms of its contribution to the change in fertility, the component associated with age at first marriage and ideal family size was not found to be significant. Sexual behaviour of women aged 20+ contributed to 43.5% of the changes in Fertility. There was also an increase in the age at first marriage.	The study was only able to use data from two points in time. Therefore, future research needs to use data from a longer period of time in order to assess fertility transition. The study did not assess the effects of policy on fertility decline. The study used cross-sectional data and therefore, it was not able to assess causality.

Title	Author and Year	Data source	Study Description	Method	Findings	Gaps
					Furthermore, preferred family size was also found to have significantly contributed to the change in fertility. Contraceptive use was also found to be associated with 8.2% of the decline in fertility.	
Impact of Education on Fertility: Evidence from a Tribal Society in Assam, India	Amaejyoti Mahanata, 2016	Primary data collected through a multi-stage sampling design	Level of analysis: Individual level Study setting: Assam, India Study population: Women who had children Population size: 880 respondents	To analyse the data, three linear multiple regression models were used.	When both the husband and wife are educated, this reduces the number of children ever born. However, this effect was significant when the wife was more educated than the husband. Graduate level of education was found to be associated with replacement level fertility.	The study used data collected at one point in time (2008), therefore causality could not be assessed. The study only looked at education and not other factors that are associated with fertility.
Race, Ethnicity, and the Changing Context of Childbearing in the United States	Megan M. Sweeney, and R. Kelly Raley, 2015	Review of literature that has focused on race, ethnicity and the changing context of childbearing in the U.S.	Level of analysis: Individual level Study setting: United States Study population: Women who had children	Literature review	Completed family size is similar for white, black and Hispanic women. However, black and Hispanic women were more likely to have teen pregnancy, pre-marital childbearing, and unintended pregnancies. Furthermore, it was found that contraceptive use	Future research needs to look at the structural factors and institutions that place white women at a better position to attain their desired family size. Furthermore, there also needs to be an

Title	Author and Year	Data source	Study Description	Method	Findings	Gaps
					contributed to these ethnic differences.	examination of the social, economic determinants of contraceptive use among the different racial groups and among men and women.
Family Formation in Post-Soviet Ukraine: Changing Effects of Education in the Period of Rapid Social Change	Brienna Perelli-Harris, 2006	Ukrainian Longitudinal Monitoring Survey, of 2003	Level of analysis: Individual level Study setting: Ukraine Study population: Women aged 17-72 years who had at least one chid.	To analyse the data in the study, Discrete-Time Hazard models were used to assess the effect of education on first births, second births and first marriages.	Before the independence of Ukraine, highly educated women had first birth rates after controlling for school enrolment and marriage. However, after independence, highly educated women delayed childbearing. Furthermore, second birth rates and marriage rates declined. However, the effect of education on these events did not change.	The first birth model did not take into consideration women who had their first child after they were 28 years. Furthermore, the data does not allow for the analysis of complete birth histories, post-independence.
Changing childbearing Norms During an Era of ART Expansion in Malawi, 2009 to 2015	Sarah Garver, Jenny Trinitapoli and Sara Yeatman, 2019	Used data collected in 2009 and 2015, by the Tsogolo la Thanzi project. This is a longitudinal, population	Level of analysis: Individual level Study setting: Southern Malawi Study population: Women and men	Data was analysed using the Chi-square test of independence.	There was an increased support for childbearing for PLWH between 2009 and 2015. There was also a support for women having children with an HIV positive partner if she is	

Title	Author and Year	Data source	Study Description	Method	Findings	Gaps
		based study of young adults in Southern Malawi.	aged between 15 and 25 in 2009, and between 21 and 31 in 2015. Population size: 1,453 women, and 981 men		HIV positive, rather than negative.	
Childbearing intentions of HIV-Positive Women of Reproductive Age in Soweto, South Africa: The Influence of Expanding Access to HAART in an HIV Hyperendemic Setting	Angela Kaida, Fatima Laher, Steffanie A. Strathdee, Robert S. Hogg and Glenda Gray,	Survey data collected from the Perinantal HIV Research Unit in Soweto, between May to December 2007	Level of analysis: Individual level Study setting: Soweto, South Africa Study population: Women aged 18-44 years who were receiving care from the Perinatal HIV Research Unit in Soweto Population size: 674 women	Logistic regression analysis was used to assess the association between HIV status, HAART use and childbearing intentions.	31% of the HAART users reported intentions to have children, while 29% and 68% of the HAART naïve and HIV negative women reported intentions to have children. In the adjusted model, it was found that HIV Positive women were 60% less likely to report intentions to have children, as compared to HIV Negative women.	This study was conducted before the mass roll-out of ART in South Africa, therefore research needs to use recent data to see if the same patterns still exist.
Prevalence and Determinants	Landon Myer, Chelesea Morroni and Kevin Rebe, 2006	Primary survey data collected from August to	Level of analysis: Individual level	To analyse the data, a multivariate	In the multivariate analysis, males were more likely to report fertility desires.	The data used in this study is relatively old,

Title	Author and Year	Data source	Study Description	Method	Findings	Gaps
of Fertility Intentions of HIV-Infected Women and Men Receiving Antiretroviral Therapy in South Africa		November 2005	Study setting: South Africa Study population: Individuals attending public sector ART services and who had been receiving ART for at least one month. Population size: 311 individuals	regression model was used.	Additionally, other factors that were associated with fertility desires included; younger age, being in a relationship for less than five years, and a lesser number of children. Lastly, fertility desire was also associated with duration on ART among females.	therefore research can look at a similar topic using more recent data, so as to examine whether similar patterns still exist. Research also needs to look beyond fertility intentions and assess family formation.
Marriage, widowhood, divorce and HIV risk among women in sub-Saharan Africa	Eric Y. Tenkorang, 2014	Demographic and Health Surveys of Kenya, Malawi, Tanzania, Swaziland, Lesotho, Zambia and Zimbabwe. They also used the HIV biomarker data from the AIDs indicators survey.	Level of analysis: Individual level Study setting: Kenya, Malawi, Tanzania, Swaziland, Lesotho, Zambia and Zimbabwe. Study population: Women aged 15-49 years who had consented to taking the HIV test	Random-effects complementary log-log models were used to examine the association between marital status and HIV risks	As compared to never married women, widowed women were more likely to be HIV positive. In Lesotho and Zimbabwe, married women were more likely to be HIV positive, as compared to never married women. Furthermore, in Tanzania and Zimbabwe, divorced women had a higher risk of HIV infection.	The study used cross-sectional data, therefore, the researchers could not assess whether the divorce or HIV infection came first.

Title	Author and Year	Data source	Study Description	Method	Findings	Gaps
			Population size: 64,890 women			
Fertility Intentions and Reproductive Health Care Needs of People Living with HIV in Cape Town, South Africa: Implications for Integrating Reproductive Health and HIV care services	Diane D Cooper, Jennifer R Moodley, Virginia Zweigenthal and Linda-Gail Bekker, 2009	The study used data from a cross-sectional survey that was conducted between May and September 2006 at PMTCT, VTC, general HIV care and HAART services in two public sector health centres in Metropolitan Cape Town	Level of analysis: Individual level Study setting: Cape Town, South Africa Study population: Men and women living with HIV in Cape Town and aged above 18 years. Population size: 459 men and women	To analyse the data, the researchers calculated means and standard diviations, t-tests, rank-sum tests and chi-square tests. They also used an unconditional multiple logistic regression	The results revealed that, 55% of the women and 43% of the men were not planning to have children. While 45% of the women and 57% of the men were open to the possibility of having children. Intentions to have children were significantly associated with being male, have fewer children, residing in an informal settlement and being on ART. HAART was significantly associated with women's intention to have children.	The data used in this study is old, as a lot has changed with regards to HIV, between 2020 and 2009. The participants were sampled from healthcare centres, therefore the findings cannot be generalized to the whole population. The study only looked at fertility intentions and not family formation.
Childbearing intentions among sexually active HIV-infected and uninfected female adolescents in South Africa.	David H. Adler, Beau Abar, Thola Bennie Rokhsanna Sadeghi and Linda-Gail Bekker, 2017	Data was collected using a cross-sectional survey.	Level of analysis: Individual level Study setting: South Africa Study population: Sexually active HIV infected and HIV-uninfected female	The data was analysed using independent measure t-tests and X^2 test for independence	Childbearing intentions were high among both HIV infected and HIV uninfected women (80% and 79% respectively. Furthermore, no differences were found by ART status.	The sample size was relatively small, which raises questions of generalization ability. Self-reporting of intention, might not represent real intention. The study looked at fertility

Title	Author and Year	Data source	Study Description	Method	Findings	Gaps
			adolescents aged 17-21 years Population size: 100 adolescents			intentions and did not measure childbearing.
Fertility intentions of prenatal and postpartum HIV-positive women in primary care in Mpumalanga, South Africa: a longitudinal study	Karl Peltzer, Sibusiso Sifunda, Lissa N Mandell, Violeta J Rodriguez, Tae Kyoung Lee, Ryan Cook, Stephen M Weiss, Deborah L Jones, 2018	Data from an ongoing longitudinal clinic-randomized trial in 12 randomly selected community health centres in Mpumalanga.	Level of analysis: Individual level Study setting: Mpumalanga, South Africa Study population: HIV positive prenatal women, followed up to postpartum, who had partners. Population size: 699 HIV positive prenatal women	A binary regression model was used. Furthermore, time-invariant and time-variant characteristics were used on the models as control variables.	At baseline, 32.9% of the women indicated fertility intentions, however, at end line only 28% reported fertility intentions. In the model with time invariant baseline characteristics predicting fertility intention over time, the factors that were associated with the fertility intentions were; not having children, having a partner with unknown/HIV-negative status, and having disclosed their HIV status to their partner. In a model with time-varying covariates, the factors associated with fertility intensions included; decreased family planning knowledge, talking to a provider about a future	Only women who had partners were included in the study, therefore the findings cannot be generalized. Also, the study focused on women in Mpumalanga and not the whole of South Africa.

Title	Author and Year	Data source	Study Description	Method	Findings	Gaps
					pregnancy, and increased male involvement.	

APPENDIX B: Testing for Multicollinearity

Correlation matrix

	hiv_st~s	age2	popula~p	place_~e	educat~l	employ~s	househ~x
hiv_status	1.0000						
age2	-0.0137	1.0000					
population~p	-0.0008	-0.0692	1.0000				
place_of_r~e	-0.0008	-0.0458	0.2602	1.0000			
education_~l	-0.0551	0.0435	-0.0302	-0.0808	1.0000		
employment~s	-0.0397	0.3016	-0.1029	-0.0700	0.1675	1.0000	
household_~x	-0.0285	0.0277	0.0386	0.0444	-0.0599	-0.0134	1.0000
family_pla~g	-0.0203	-0.0037	-0.0164	0.0023	-0.0009	-0.0164	-0.0062
condom_use	-0.0006	-0.1118	0.1355	-0.0401	0.0656	-0.0398	-0.0116
pregnancy_~n	0.0294	-0.1439	-0.0025	-0.0123	0.0231	-0.0014	-0.0306
family_pla~g	-0.0203	-0.0037	-0.0164	0.0023	-0.0009	-0.0164	-0.0062

	family~g	condom~e	pregna~n	family~g
family_pla~g	1.0000			
condom_use	0.0543	1.0000		
pregnancy_~n	-0.0262	0.1454	1.0000	
family_pla~g	1.0000	0.0543	-0.0262	1.0000

Testing the Variance Factor

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. vif
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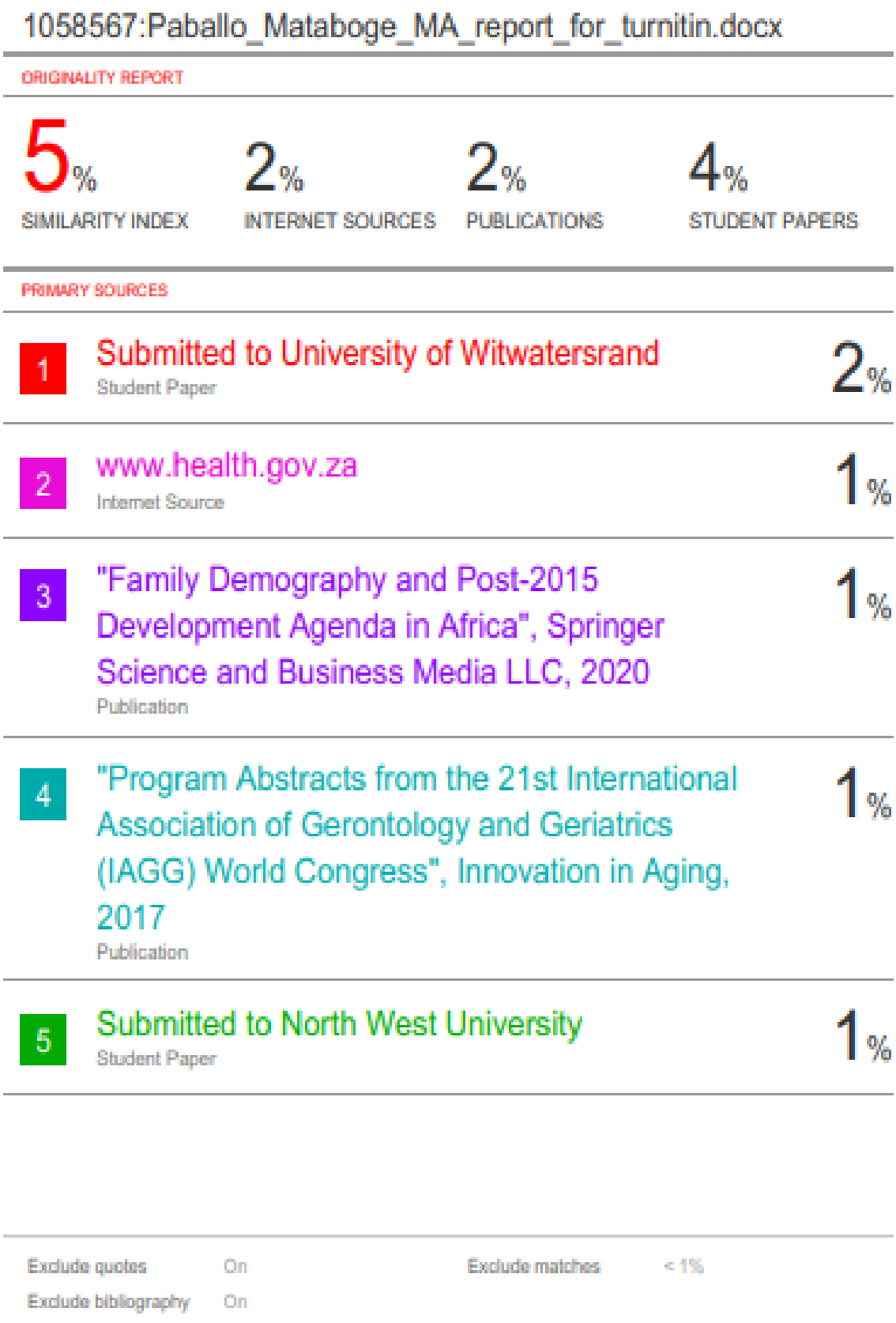
Variable	VIF	1/VIF
employment~s	1.14	0.875753
age2	1.14	0.879877
population~p	1.11	0.902370
place_of_r~e	1.09	0.919121
condom_use	1.06	0.939383
education_~l	1.05	0.956714
pregnancy_~n	1.04	0.957047
household_~x	1.01	0.991281
hiv_status	1.01	0.993641
family_pla~g	1.01	0.994409
Mean VIF	1.07	

APPENDIX C: Turnitin Report



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