

**AN INVESTIGATION OF SOCIO-ECONOMIC DETERMINANTS
OF RISKY SEXUAL BEHAVIOUR IN ZAMBIA IN RELATION TO
HIV/AIDS VULNERABILITY: USING THE 2013/14 ZAMBIA
DEMOGRAPHIC AND HEALTH SURVEY**

by

LILLIAN NAKWALA NYIRENDA

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in Population Studies in the School of Built Environment and Development Studies,
College of Humanities, University of KwaZulu-Natal, Durban.**

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DECLARATION

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Abstract

Risky sexual behaviours such as using condoms inconsistently with multiple sexual partners have been highlighted as among the main drivers of HIV transmission. In light of public education campaigns, this paper investigated the demographic and socioeconomic factors associated with this risky sexual behaviour. Data for this analysis were derived from a sample of 14,773 men aged between 15 and 59 years who took part in the Demographic and Health Survey conducted in 2013-14 in Zambia. Risky sexual behaviour was defined as not using condoms consistently with all partners when the man had multiple partners in the last 12 months. All variables came from the men's questionnaire. HIV infection was determined using dried blood spots obtained from a finger prick. Weighted unadjusted and adjusted logistic regression models were used to analyse the relationship between socio-demographic and risky sexual behaviour in relation to HIV vulnerability. The study revealed that one in four men who were interviewed in the 2013-14 ZDHS reported engaging in risky sexual behaviour. Men who were married or living with partners (Adjusted Odds Ratio (aOR) 1.81, 95% Confidence Interval (CI) 1.45-2.25), reside in rural areas (aOR, 1.60, 95% CI 1.33-1.92), were away from their home for less than one month (aOR 1.46, 95% CI 1.28 -1.66) or more than one month (aOR 1.82, 95% CI 1.54 - 2.15), men in middle (aOR 1.27, 95% CI 1.05 - 1.55) or richer wealth quintiles (aOR 1.39, 95% CI 1.09 - 1.77), were more likely to engage in risky sexual behaviour. Furthermore, men with any type of occupation, men who use alcohol (aOR 3.05, 95% CI 2.55 - 3.66) and have been tested for HIV (aOR 1.16, 95% CI 0.99 - 1.35) were more likely to be HIV infected. The analysis in the study also highlighted that men with risky sexual behaviour, that is, had multiple partners and were inconsistent condom users, were less likely to be HIV infected (aOR 0.55, 95% CI 0.40 - 0.77). Risky sexual behaviour such as inconsistent condom use when the man had multiple partners is an important determinant of HIV infection. HIV/AIDS prevention programs in Zambia need to focus on educational strategies that can be used to reduce risky sexual behaviour among vulnerable men in order to prevent HIV acquisition.

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Abbreviations and acronyms

AIDS	Acquired Immunodeficiency Syndrome
aOR	Adjusted Odds Ratio
ART	Antiretroviral Therapy
CI	Confidence Interval
CSDH	Commission on Social Determinants of Health
DHS	Demographic and Health Survey
EAs	Enumeration areas
GDP	Gross Domestic Product
HIV	Human Immunodeficiency Virus
OR	Odds Ratio
SES	Socio-economic status
SSA	Sub-Saharan Africa
UNAIDS	United Nations Programme on HIV/AIDS
WHO	World Health Organization
ZDHS	Zambia Demographic and Health Survey

Chapter 1: INTRODUCTION

This chapter gives a general overview of HIV in sub-Saharan African countries and the significance of risky sexual behaviour in influencing the spread of HIV infection. In addition the chapter contains the problem statement, justification for the study, theoretical frame work, aim and objectives of the study and lastly the outline of the dissertation.

1.1 Background of the Study

The HIV/AIDS epidemic, which is highly prevalent in sub-Saharan Africa (SSA), is a major public health concern as it affects human and economic development (UNAIDS and WHO, 2009). In SSA approximately 68% of people resident in this region are highly affected with HIV/AIDS (UNAIDS, 2013). Globally, most of the countries with the highest adult HIV prevalence rates are found in SSA.

Approximately, one quarter of the adult population of Swaziland (25.3%), Botswana (24.8%) and Lesotho (23.6%) were estimated to be HIV positive. While, South Africa (17.8%), Zimbabwe (14.3%) and Zambia (13.5%) have lower estimated adult HIV prevalence, these rates are still among the highest in the world (Asiedu, Asiedu and Owusu, 2012).

With a population of 12.2 million and an estimated HIV prevalence of 13.5%, Zambia is amongst the countries in the world with a high epidemic of HIV. The majority of those infected acquired the infection through unprotected heterosexual sex (Central Statistical Office et. al., 2015). Despite the decline in HIV infection rates from 15.6% in 2001, the HIV prevalence is still high in Zambia (Central Statistical Office et. al., 2015) . In the recent past years, there has been considerable effort in understanding the main drivers of the HIV pandemic such as non-use of condoms and having multiples sexual partners. Sexual behaviour change has been described

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as key to declines in HIV infection rates (Fortson, 2008; Glick and Sahn, 2008; Kayeyi et. al., 2013).

Behavioural factors such as having multiple sexual partners increase the risk of HIV infection. An increase in the number of multiple sexual partnerships creates sexual networks, and vulnerability to HIV infection rises with the number of people in the sexual network, the frequency and nature of sexual act and duration of the sexual relationships (Dosekun and Fox, 2010; Fox and Fidler, 2010; Leclerc-Madlala, 2008; Tanser et. al., 2011). In addition, low and inconsistent condom use with multiple partners increases the probability of exposure to HIV infection (Glick, 2007; Leclerc-Madlala, 2008).

Sexual behavioural change is a significant determinant in reducing the transmission of HIV. However, in order for such a change to be facilitated there is a need to understand some of the socioeconomic and demographic factors that influence men's non-use of condom when a man has multiple sexual partners. In Zambia, there is general universal knowledge of HIV/AIDS infection, but many people have not utilised this knowledge to practise safer sex such as consistent condom use with multiple partners (Central Statistical Office et. al., 2015). It is important therefore, to know whether socioeconomic and demographic characteristics such as education, occupation, wealth status, marital status, mobility and place of residence are associated with risky sexual behaviour such as inconsistent condom use with multiple partners which is one of the key agents in the transmission of HIV/AIDS (Glick and Sahn, 2008).

1.2 Problem Statement

Sexual behaviour plays a vital role in the fight against HIV infection. In SSA, risky sexual practises, in particular inconsistent condom use with multiple partners, have

been cited as the major catalyst in the spread of HIV/AIDS (Malhotra and Yang, 2011; Nshindano and Maharaj, 2008; Sandøy, Dzikedzeke and Fylkesnes, 2010; Uthman, 2010). Uthman (2010:07) asserted that *“although the nature of the causes and transmission of HIV/AIDS is complicated due to many biological, social, cultural and economic factors, the HIV/AIDS crisis is to a large extent a crisis of sexual behaviour.”* This implies that lack of sustained behavioural change increases the risk of infection with HIV/AIDS in SSA. In Zambia, behaviour change has been an important factor in the fight against HIV, but in order for such a change to be facilitated there is a need to understand some of the socioeconomic and demographic determinants that influence men’s risky sexual behaviour.

Socioeconomic status (SES) is seen as one of the significant factors in HIV/AIDS infection as it is widely acknowledged that one’s SES influences one’s likelihood of being infected by HIV (Wabiri and Taffa, 2013). Vulnerability to HIV infection is not only limited to people of low SES but also to people of high SES, although the poor may be more vulnerable because they lack necessary resources for subsistence (Bingenheimer, 2007; Wabiri and Taffa, 2013). Since HIV infection in Zambia is predominantly through heterosexual contact, curbing it requires understanding how more distal social determinants, such as the social and economic inequities increases people’s vulnerability to HIV.

Evidence from SSA suggests there is an association between SES of individuals and risky sexual behaviours in different settings (Awusabo-Asare and Annim, 2008; Mishra et. al., 2007). Consistent with this literature, Mbirimtengerenji (2007) in his study using an example of 20 countries in sub-Saharan African region indicated that at the global or national levels, countries or regions with low SES had higher rates of HIV prevalence. For example, globally, SSA region has the lowest GDP and the highest HIV prevalence rates (Mbirimtengerenji, 2007). Paradoxically within the SSA countries, the rates of HIV prevalence are higher in urban areas that are wealthier than rural areas (Bingenheimer, 2007; Dintwa, 2012; Fortson, 2008). Even at a

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macro level the HIV prevalence rates are higher in countries like South Africa and Botswana than relatively poorer countries like Zambia in the region (Fortson, 2008; Fox, 2010; Hajizadeh et. al., 2014). However at micro (individual) level socio-economic status and HIV infection has been described as positively related with increasing levels of wealth (Gillespie, Kadiyala and Greener, 2007; Shelton, Cassell and Adetunji, 2005).

Some studies argue that lack of socioeconomic resources is linked to the practice of risky sexual behaviours such as non-use of condom and having multiple sexual partners which increases one's vulnerability to HIV (Gillespie, Kadiyala and Greener, 2007; Hallman, 2004; Silas, 2013). While, other studies have stressed that being wealthy can increase the incidence of unsafe sexual activities due to one's greater disposable income with ability of attracting more partners and spatial mobility (Fortson, 2008; Fox, 2010; Hajizadeh et. al., 2014; Hargreaves et. al., 2007).

However, the association of SES and HIV within SSA is very complex as recent studies have indicated that it is socioeconomic inequality that may influence the increased risk of HIV infection (Fox, 2012; Hargreaves, Davey and White, 2012) . Fox (2010) argues that most countries which have rapidly growing or highest rate of HIV infection in SSA are among the countries with high economic inequality rates between the poorest and the wealthiest. Therefore, in order to develop better targeted HIV prevention programs, recognition of structural factors that influence the risk of HIV infection is imperative.

1.3 Objectives of the study

1.3.1 General objective

The general objective of this study was to investigate the effect of socio-demographic factors on the association of risky sexual behaviour (using condom inconsistently when a man has more than one partner) and HIV status among men in Zambia.

1.3.2 Specific objectives

The objectives of the study were to:

1. Investigate the association between demographic factors and risky sexual behaviours.
2. Examine the association between socioeconomic status and risky sexual behaviours.
3. Explore the association of risky sexual behaviour and HIV status controlling for demographic and socioeconomic factors.

1.4 Research questions

The key questions used in this study were:

1. What was the association between risky sexual behaviour and demographic characteristics such as place of residence, age, and marital status?
2. What was the association between socioeconomic status (education, occupation, household wealth) and risky sexual behaviour?
3. What was the association between risky sexual behaviours and HIV status?
4. What was the association between risky sexual behaviour and HIV status when controlling for demographic characteristics and socioeconomic status?

1.5 Context and justification of the Study

Zambia a land locked country with an estimated population of 13.1 million has 40% of its population concentrated in a few urban areas (Central Statistical Office, 2012). Zambia has seen some significant socio-economic development with an estimated 7.2% (2012) real GDP growth rate of 4.8% between 2002 and 2005 (World Factbook, 2014). Despite Zambia's economic growth in the recent past , it is

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still among the poorest developing countries (UNDP, 2011). This is reflected in its low human development index ranking of 164 out of 187 countries, with a Gini index of about 57.5, with about a third of the people who are not able to meet their basic needs (World Bank, 2013).

According to the Zambia Living Conditions Monitoring Survey 2010, 78% of people living in rural areas are poor compared to 28% of urban residents. Unemployment which is a contributory factor to high levels of poverty was estimated at 67% and almost 80% of people make their living through the informal sector, mainly by subsistence farming (Central Statistical Office, 2011). *“In the Zambian context, poverty is defined as lack of access to income, employment opportunities, and entitlements, including freely determined consumption of goods and services, shelter, and other basic needs”* (Central Statistical Office, 2011:89). It is against this background that the study is anticipated to determine whether SES has a bearing in the practice of people’s HIV self-protective or risky sexual behaviours such as non-use of condom with multiple sexual partners in relation to HIV vulnerability. Although, there is a significant evidence on the decrease of HIV prevalence in Zambia, men’s HIV prevalence in Zambia has stabilised at high levels from 12.9% in 2001 to 11.3% in 2013 (Central Statistical Office et. al., 2015). This study seeks to provide important insights to policy makers on the association of SES and inconsistent use of condom with multiple sexual partners among men in Zambia in relation to HIV/AIDS vulnerability.

Furthermore, evidence from research on the interaction of SES, risky sexual behaviour and vulnerability to HIV is mixed (Wojcicki, 2005). Although there were positive association of socioeconomic factors such as wealth, education, income, occupation and consequent HIV reduction in early studies conducted in SSA, as the disease has progressed this relationship may be changing (Gillespie, Kadiyala and Greener, 2007; Hajizadeh et. al., 2014). The socioeconomic determinants of risky sexual behaviour and their potential implication on HIV transmission as the HIV

epidemic has advanced post wide spread availability of HIV treatment is still not fully understood.

1.6 Theoretical framework

This study will be framed within the World Health Organization (WHO) Commission on Social Determinants of Health (CSDH) conceptual framework (WHO, 2010). The WHO's CSDH conceptual framework addresses the social, political and economic structures that contribute to population health outcomes. The social position of a person in a society shapes ones' health outcome (Marmot, 2004). This conceptual framework acknowledges that inequalities in health are determined by unequal systematic distribution of resources, power and income in society (WHO, 2010).

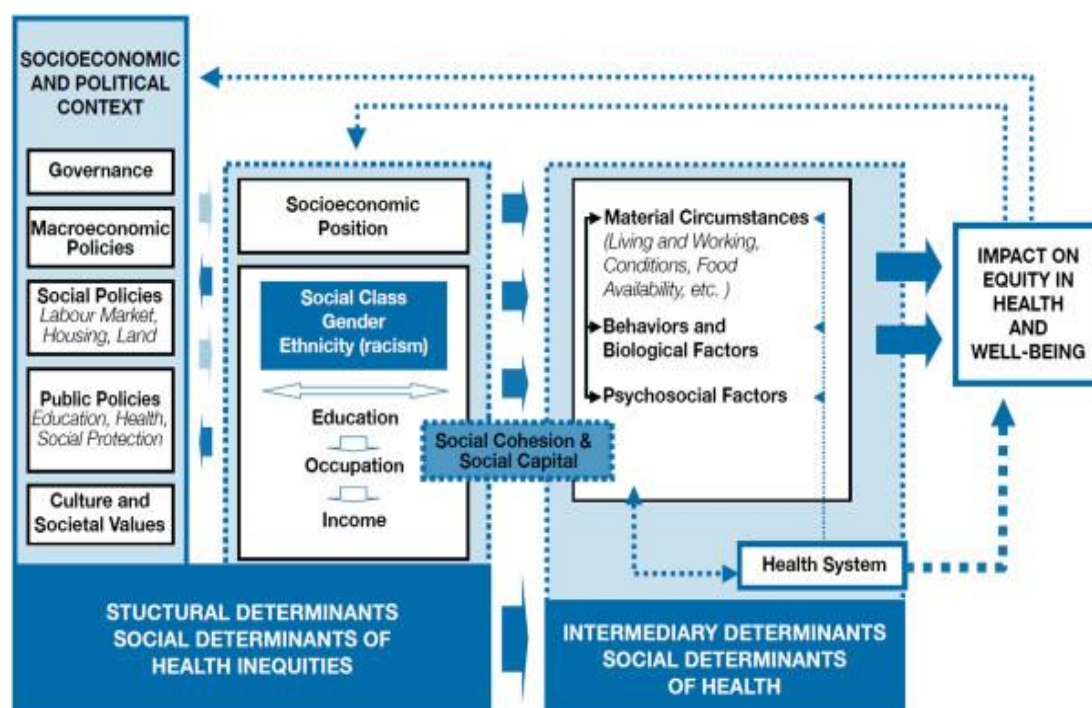


Figure 1-1: WHO Commission on Social Determinants of Health Conceptual Framework

Source: (WHO, 2010). A conceptual framework for action on the Social Determinants of Health: Social determinants of health discussion paper 2

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According to the WHO report, the social determinants of health are defined as *“the circumstances, in which people are born, grow up, live, work, and age, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics”* (WHO, 2008:04). The health inequities seen within and among countries including Zambia are mostly shaped by the social determinants of health influenced mainly by policy choices (Raphael, 2006). The health inequities are brought about by different socioeconomic and structural factors such as education, income, social cohesion and social capital that influence how people are exposed to risk, how people access and use resources and services which then impact differently on their wellbeing (Halfon, Larson and Russ, 2010; Marmot, 2005; Mikkonen and Raphael, 2010). Thus, the use of social determinant of health framework in this study brings out a lens through which to view different socioeconomic as well as structural factors that add negatively or positively to the well-being of men in Zambia.

The structural determinants of health inequalities comprises of *“an individual’s socioeconomic position and the social stratification of people according to income, education, occupation, social class, gender and race”* (Hargreaves et. al., 2015:67). These structural determinants of health inequalities are connected to a set of intermediary determinants of health (materials circumstances, biological factors, behaviours and psychological factors, and the health system) that form unequal health outcomes (WHO, 2010).

In the WHO’s CSDH conceptual framework the health system occupy a contested place as the intermediary determinant of health for its role in mediating improved health outcomes and reducing people’s health disparities (WHO, 2011). The WHO’s CSDH conceptual framework is prominent from other social determinant conceptual frameworks as it gives much emphasis on the inequalities in the structural determinants of health (WHO, 2011). The WHO’s CSDH conceptual framework posits that structural determinants of health inequalities within

societies predispose high levels of social inequities and inequalities in the health of individuals (Halfon, Larson and Russ, 2010).

This study as depicted in Figure 1-2 draws insights from the WHO's CSDH conceptual framework to understand the socio-demographic determinants of risky sexual behaviours among men in Zambia in relation to their vulnerability to HIV. Research evidence makes clear that socioeconomic status is significant in influencing health disparities (Marmot, 2004).

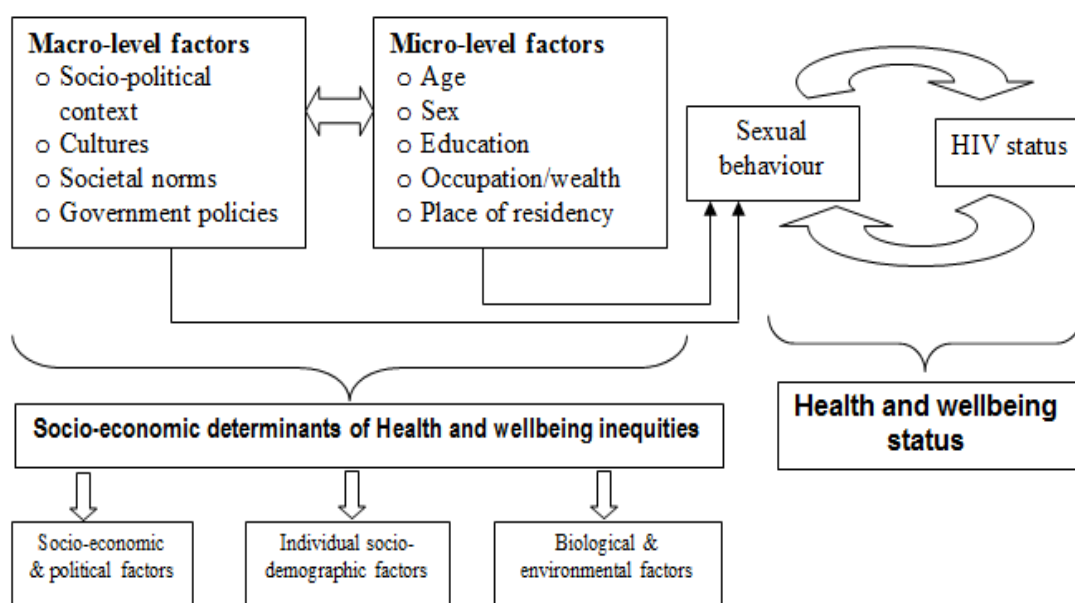


Figure 1-2: Conceptual framework for socio-economic determinates of Sexual behaviour and HIV risk

Source: Adapted from the Socio-determinants of health framework (WHO, 2010)

Risky sexual behaviours and vulnerability to HIV are intricately linked to structural determinants of health. The structural determinants such as education, income, occupation, socioeconomic status, place of residence are some of the conditioning factors that can hinder or facilitate the ability of an individual to avoid increased risk to HIV infection. These structural social determinants operate in the processes

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of the socioeconomic and political setting. The socioeconomic and political setting influences one's socioeconomic position, which usually give rise to a context of sexual behaviours that can increase an individual's exposure to HIV or compromises a person's ability to protect his or herself from HIV infection.

Although, some unsafe sexual behavioural practises can be as a result of an individual's free choice, others are beyond people's control and could only be avoided by addressing the inequalities in the social determinants of health. HIV is a disease which is embedded in the social and economic disparities. Therefore, social and structural interventions that aim at addressing disparities in education, wealth, employment and health services are needed to address the root causes of people's vulnerability to HIV (Perry, 1998).

1.7 Dissertation outline

This dissertation is organised into five chapters. The present Chapter one presents an introduction articulating the problem statement, study justification, theoretical framework and objectives of the study. Chapter two contains a review of the literature related to the demographic and socioeconomic factors related to risky sexual behaviour and HIV/AIDS vulnerability. The third chapter describes the methodology and methods of analysis that were used in the study. The fourth chapter presents the results on the socio-economic determinants of risky sexual behaviour among men in Zambia in relation to HIV/AIDS vulnerability. Finally, the fifth chapter provides a discussion, recommendations and the conclusions from findings obtained from this study.

Chapter 2: LITERATURE REVIEW

2.1 Introduction

This chapter will elucidate the literature on the relationship between risky sexual behaviour, socioeconomic status and HIV vulnerability. Demographic and other behavioural determinants of risky sexual behaviour are also reviewed.

2.2 Risky sexual behaviour and HIV

Although, the HIV epidemic in the SSA region is dynamic and it varies from one country to another (UNAIDS, 2013), in the region HIV infection is predominantly contracted through unprotected sexual intercourse. Thus understanding sexual behaviour is crucial to reducing the transmission of HIV (Mmbaga, 2013; Sandøy et. al., 2007; Uchudi, Magadi and Mostazir, 2012). The socioeconomic status (SES), risky sexual behaviour and HIV/AIDS linkage has received much attention in research studies especially in SSA. However, evidence from these studies has produced diverse views (Fox, 2012; Gillespie, Kadiyala and Greener, 2007; Hajizadeh et. al., 2014; Hargreaves, Davey and White, 2012; Mbirimtengerenji, 2007; Mishra et. al., 2007; Msisha et. al., 2008; Parkhurst, 2010), which will be reviewed in this chapter.

Consistent condom use with multiple partners is one of the most important preventative measures in the reduction of HIV transmission (Chimbindi et. al., 2010; Davidoff-Gorea, Luke and Wawire, 2011; Fylkesnes et. al., 2001; Hallman, 2004). In this study, risky sexual behaviour among men is defined as inconsistent condom use at last sex with any sexual partner when the man has more than one sexual partner. Several studies in SSA have suggested that inconsistent condom use with multiple sexual partners plays a critical role in the continued spread of HIV (Berhan and Berhan, 2013; Heeren et. al., 2014; Leclerc-Madlala, 2009; Slaymaker and Buckner, 2004). Studies indicate that the consistent and correct use of condoms with multiple partners is about 90% effective against the transmission of HIV (Davidoff-Gorea, Luke and Wawire, 2011). Halperin and Epstein (2004)

contrasted the extremely high HIV prevalence rates in East and Southern Africa to the persistently low HIV prevalence in Western Africa and Asia, arguing a major contributory factor to this difference is the higher likelihood of men in East and Southern Africa to have typically two or three concurrent sexual partners for months or even years. Halperin and Epstein (2004) further argued that condom use in casual relationship tended to be greater than the use of condoms in longer term concurrent relationships. As individuals in longer term relationships do not normally regard themselves to be at high risk of HIV infection. In Zambia, since HIV infection is predominantly through unprotected sexual contact, consistent condom use with multiple partners is therefore likely to impact much on the risk for HIV spread.

2.3 Socioeconomic determinants of risky sexual behaviour and HIV vulnerability

Risky sexual behaviours and HIV vulnerability has been documented to be influenced by different socio-economic, behavioural and demographic factors. Among these socio-economic, demographic and behavioural factors to be discussed in this chapter are: wealth, occupation, education, age, marital status, place of residence, mobility, alcohol use and circumcision.

2.3.1 Household wealth

Household wealth is emerging as a major factor in explaining the relationship between SES and HIV vulnerability in many studies. Studies on the relationship between wealth or poverty on one hand and risky sexual behaviour or HIV infection on the other hand present conflicting results. Some studies that have used wealth as a proxy for SES indicate that one's higher SES can reduce the risk of HIV acquisition (de Walque, 2006; Fox, 2010; Kasirye, 2012; Kongnyuy et. al., 2006; Mishra et. al., 2007; Msisha et. al., 2008). However other studies have indicated particularly in the early phase of the epidemic, that wealthier individuals were more at high risk of HIV infection due to having multiple partners and

unsafe sexual practices. But as the effect of HIV/AIDS became clearer as the epidemic evolved, wealthy individuals were able to access prevention messages and were in a position to practice safer sexual behaviours (Fenton, 2004; Fox, 2010; Shelton, Cassell and Adetunji, 2005; Wabiri and Taffa, 2013).

Examining the 2003 Demographic and Health Survey from Tanzania with a sample of 7515 sexually active adults, Msisha et. al., (2008) found that people with a higher wealth index had higher HIV prevalence than people who were poor even after adjusting for mediating factors such as age, marital status, occupation, gender, education and place of residence. Msisha et. al., (2008) further noted that wealthier men were more likely to be infected with HIV because they tend to have sexual relationships with multiple partners. Similarly, Magidi and Desta (2011), in their analysis of DHS data from 2003-2008 for 20 countries observed similar findings, where high HIV prevalence was reported among individuals in middle or richer households. Another study done by Kongnyuy et al., (2006) using a 2004 DHS data set among sexually active men aged between 15-59 years in Cameroon established that men who were wealthy had a higher prevalence of HIV (6.6%) compared to poor men (2.4%). Early sexual debut, multiple partnership and lack of condom use were risk behaviour indicators of higher prevalence of HIV among wealthy men.

An analysis of Mishra et al., (2007) in their study using DHS data from eight SSA countries which was conducted between 2003 and 2005 among adults aged 15–49 years, also demonstrated that individuals who were wealthy in all the countries had higher HIV prevalence than individuals who were poor. And *“in most cases, HIV prevalence increased monotonically with household wealth status”* (Mishra et. al., 2007:27). Shelton, Cassel and Adetunji (2005) argues that an increase in household wealth usually influences risky sexual behaviours such as multiple sexual partnerships because risky sexual behaviour is traded off with economic gains. Thus, *“having multiple partners may be because of a women’s economic dependence on men or achieving upward mobility, while for men it is a demonstration of their sexual prowess and social status”* (Fox 2010:19).

2.3.2 Occupation

Occupation is another proxy of higher SES related to risky sexual behaviour and HIV infection. Those engaged in highly mobile occupations such as migrant labourers, mine workers, and truck drivers are at increased risk of HIV (Wojcicki, 2005). The mobility of these occupations exposes men to larger sexual networks providing them with more opportunities to engage in casual sexual relationships. According to a study by Paz-Soldan et. al., (2007) in rural Malawi using data from 2000 Malawi Pregnancy and STI Risk Perception and Avoidance Study, men who were in occupations of higher status such as businessmen and fishermen were found to be more likely to have a high number of sexual partners compared to men who had no paid occupation. However the positive relationship among SES and HIV diminishes when mediating factors like education, male circumcision, place of residence, condom use are taken into consideration.

Fenton (2004) in his study on HIV prevention through poverty reduction argued that poverty, lack of education and not having access to necessary information and services increases the HIV infection risk among people of low SES. Silas (2013) in his study using the 2010 DHS for Tanzania indicated that poverty was among the underlying key causes of HIV infection. Silas (2013) further indicated that poorer men reported a high likelihood of paying for sex and less condom use compared to wealthier men. However, in contrast to studies cited earlier (Paz-Soldan et. al., 2007; Wojcicki, 2005) on the relationship between occupation as a proxy for higher SES and risk of being infected with HIV, Msisha et. al., (2008) in his study showed that men without any type of occupation were more likely to be infected with HIV. In another study by Hargreaves et al., (2007) among a rural cohort in South Africa conducted between 2001-2004, men who were migrants reported to have more multiple sexual partners than those who were not engaged in migrant work. They further indicated that migrants were at high risk of having non-marital partners. Msisha et. al., (2008) argued that unemployment caused men to be mobile in the search for work and as a result they were able to practise risky sexual behaviours such as having multiple partners and inconsistent condom use. These studies, therefore, suggest people of lower SES are vulnerable to a higher probability of HIV infection.

2.3.3 Education

Education as a proxy of SES is one of the most studied determinants of risky sexual behaviour. However, just as for wealth and occupation, there are some conflicting findings on the association between education, risky sexual behaviour and consequent HIV infection. In the initial stages of the HIV epidemic, better educated individuals and those with a higher SES were associated with a high risk of HIV infection (de Walque et. al., 2005). The explanation for this was that educated individuals and those of higher SES had a greater disposable income and were more likely to be mobile, which in turn increased their opportunities to have multiple sexual partners (Beegle and de Walque, 2009; Glick and Sahn, 2008; Kasirye, 2012). More recently, Berhan and Berhan (2013) in their meta-analysis study using DHS data for the period 2003-2009 from 21 SSA countries and five from outside Africa, indicated that the prevalence of HIV in countries with very high HIV prevalence rates was nearly twice as high in men with lower education than in men with higher education.

However, in the course of the HIV epidemic other studies have found a reduction in HIV infection among better educated persons and those with a higher SES as a result of the adoption of safer sexual behaviour (Bärnighausen et. al., 2007; de Walque et. al., 2005; Michelo, Sandøy and Fylkesnes, 2006). A cohort study done by de Walque et al., (2005) in rural Uganda which was conducted between 1989 and 2000, postulates that there was a large pay off in the reduction of HIV due to increased educational attainment. They asserted that in the 1990s, there was a positive association between HIV and levels of schooling for men and women older than 17 years. However, by 2000, the risk of HIV/AIDS infection lowered among men and women with higher levels of education. The use of condoms was found to have increased among the educated individuals during the study period. Similarly, Bärnighausen et. al., (2007) reported that for each added grade in the level of schooling, the risk of HIV acquisition declined by 7%. This was based on population-based longitudinal data (2003–2005) on 3325 adults in rural KwaZulu-Natal. A study

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conducted in Zambia by Michelo, Sandøy and Fylkesnes (2006) from 1995 to 2003 also found a significant decrease in the risk of HIV infection among men and women with higher levels of education compared to those with lower education level. An increase in the use of condoms and a significant decrease in multiple sexual partnerships were noted to be greater among men and women with higher levels of education in Zambia.

However, there have been contradictory findings on the relationship between education and risk of HIV infection sometimes even when the same data sets have been analysed. Using DHS data from 2003 for Ghana, Kenya, Tanzania, Burkina Faso and 2004 for Cameroon, Fortson (2008) found that higher educational attainment and high socioeconomic status of individuals was associated with high increase of HIV infection rates. After controlling for age, sex, and place of residence, Fortson indicated that men and women with about six years of schooling were found to have a 50% higher likelihood of HIV infection. Premarital sex was noted to be the influencing factor in the risk of HIV infection in adults with higher level of schooling compared to adults with no schooling. However, using the same dataset, de Walque (2009) reported that there was no positive relationship between education and HIV status after incorporating an additional control of marital status.

Similarly, Asiedu, Asiedu and Owusu, (2012), using 2006 DHS data for Swaziland and Zimbabwe and 2004 for Malawi and Lesotho, reported mixed findings on the association of education and HIV infection in these countries. Asiedu, Asiedu and Owusu, (2012) found a negative association of education and HIV infection in Zimbabwe and Swaziland, a positive association in the probability of HIV infection in Malawi and no association in Lesotho. de Walque (2009) argues that although level of education attainment is associated with knowledge about HIV infection and it can therefore influence an individual to adopt protective sexual behaviour such as condom use, risky sexual behaviours such as lack of abstinence and infidelity among partners can confound the association between education attainment and HIV infection risk.

2.4 Demographic determinants of risky sexual behaviour and HIV status

2.4.1 Marital status

Since HIV infection is contracted mainly by sexual contact among partners, marital status is another important factor in understanding patterns of HIV vulnerability (Mishra and Bignami-Van Assche, 2009). In SSA regions, high HIV infection has been shown to be influenced by sociocultural practices such as wife inheritance, sexual cleansing and polygyny or having extramarital relationships which have been in practise for decades (Bingenheimer, 2010; Caldwell et. al., 1999; Kimuna and Djamba, 2005; Leclerc-Madlala, 2009) . Hargreaves and Glynn (2002: 80) argues that “*cultural background does not determine behaviour but it does provide the social framework for making decisions.*” For instance, men who engage in multiple sexual partnerships are tolerated due to the belief that these men are economically empowered and have stronger sexual prowess than other men. This behaviour is however not tolerated in women (Bingenheimer, 2010; Caldwell et. al., 1999; Dintwa, 2012; Kimuna and Djamba, 2005; Leclerc-Madlala, 2009; Uchudi, Magadi and Mostazir, 2012). In addition, gender inequalities in sexual relationships decrease women’s negotiating power to practice safer sex like use of condoms and hence exacerbate the spread of HIV infection (Davidoff-Gorea, Luke and Wawire, 2011; Leclerc-Madlala, 2008; Ramjee and Daniels, 2013).

A study done by Glynn, Carael and Auvert (2001) conducted in Kisumu (Kenya) and Ndola (Zambia) with an overall high prevalence of HIV showed that marriage was among the risk factors in the transmission of HIV. They further indicated that people in long term marital relationships have a high HIV prevalence compared to those who were not married. Unprotected sexual relationships outside marriage and the lack of condom use between couples in the marriage were determining factors in the spread of HIV transmission in marriage. People in a stable relationship usually consider themselves at low risk of HIV infection which can result in low condom use. In addition, the desire for couples to have children raises the risk of HIV infection (Kaiser et. al., 2011). However, Bärnighausen et. al.,

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(2008) in their study which was done in rural KwaZulu-Natal in South Africa based on a cohort study found that unmarried people had twice the risk of HIV infection than married people after confounding for sex, age, place of residence and employment status among other factors. Higher frequency of partner change and prolonged premarital sex among unmarried people puts them at a high HIV risk of infection (Bongaarts, 2007).

2.4.2 Age

Age is an important factor in explaining a person's risk to HIV infection. Some studies have indicated that a person's sexual activity is related to their age (de Walque, 2006; Marston et. al., 2009; Uchudi, Magadi and Mostazir, 2012). Uchudi, Magadi and Mostazir (2012:13) suggested that *"early sexual activity leads to a long period of premarital sexual activity during which partner changes are relatively common."* This implies that early sexual initiation increases likelihood of frequency and duration of sexual activities. As a result people that start having sex at younger ages are at risk of HIV infection due to a longer period of time in which they are sexually active and the greater likelihood of a higher number of lifetime partners (Marston et. al., 2009; McGrath et. al., 2009). Whereas, the older age group are usually more at risk of HIV infection because they normally have a high socioeconomic status that attracts risky sex such as multiple partners than the young age group. The HIV infection risk among young people is thought to be associated with sexual experimentation and lack of access and adequate information on condom use (Uchudi, Magadi and Mostazir, 2012).

2.4.3 Place of residence

Place of residence is another demographic determinant which is also linked to HIV infection transmission. In some studies urban areas are reported to have a higher HIV prevalence than rural areas. Magadi and Desta,(2011) using DHS data from 20 SSA countries conducted during 2003-2008 demonstrated that individuals living in urban areas were more at risk of HIV infection compared to individuals living in rural areas. Magadi and Desta,(2011) asserted that premarital sex and having multiple partners were associated with an increased HIV infection in urban residents. Similarly, Coburn, Okano and

Blower, (2013) using 2009 DHS data from Lesotho reaffirmed that HIV prevalence was high in urban than in rural areas of Lesotho. Barninghausen et. al., (2007) using the longitudinal study done in KwaZulu-Natal, South Africa asserted that there was an increase of about 65% of HIV sero conversion in urban residence compared to those in rural areas.

Empirically, urban areas tend to have relatively better resources such as education and health services compared to rural areas. Due to availability of resources such as having access to condoms, greater exposure to information on media and preventative information on HIV infection, some studies have indicated that people who reside in urban areas are more likely to be knowledgeable about HIV/AIDS prevention thus they are able to exhibit safer sexual behaviour than rural resident (Fylkesnes et. al., 2001; Katz, 2006; Kayeyi et. al., 2013). As such it is thought that the current higher prevalence of HIV infection in urban areas will start to shift to rural areas due to lack of resources compared to urban areas (Coburn, Okano and Blower, 2013).

2.4.4 Mobility

In most regions in Africa, mobile people are more at risk of HIV infection than those who are not mobile (Hargreaves et. al., 2007). High unemployment experienced especially in many SSA countries, tend to compel men to be mobile in search for employment especially from rural to urban areas. This disrupts family and social life which in turn increases the prevalence of unsafe sexual relationships such as having multiple sexual partners (Mbirimtengerenji, 2007; Msisha et. al., 2008). Mobility is not innately risky per se but the separation from primary partners increases the likelihood of acquiring additional partners in the new location. More often the social networking of mobile population generates an opportunity for sexual networking which greatly increases the potential for exposure to HIV infection (Lagarde et. al., 2003). Thus, people who are engaged in occupations that involve travelling such as truck drivers and fishermen are likely to have multiple sexual partners attributed to temporal separation from their partners.

2.5 Other behavioural factors

2.5.1 Alcohol

Alcohol use has been recognised in many studies as among the risk factors in the transmission of HIV infection. In SSA where HIV infection is highest in the world, alcohol consumption in larger quantities has been found to influence increased HIV prevalence rates (Kalichman et. al., 2007; WHO, 2005). Studies on alcohol use and HIV infection in SSA indicated that alcohol use especially among heavy drinkers placed them at high risk of HIV infection than non-users (Fisher, Bang and Kapiga, 2007; Pithey and Parry, 2009). This was done using a descriptive systematic review of studies in SSA. A population-based survey in Botswana indicated that unprotected sex, multiple partners and paying for sex were risk factors in the transmission of HIV among men who drank alcohol (Weiser et. al., 2006). Kongnyuy et al., (2006) in their study in Cameroon using 2004 DHS data indicated that men who drank alcohol were found to be associated with increased likelihood of having extramarital sex. A longitudinal study conducted between 1994 and 2002 in Rakai, Uganda, revealed that alcohol use before sex was related to high risk of HIV infection, and the use of alcohol was significantly related to having unprotected sex and having multiple partnerships (Zablotska et. al., 2006).

2.5.2 Circumcision

In most SSA countries, male circumcision has increasingly been considered as one of the more effective strategy in the prevention of HIV infection. A number of studies have indicated a significant negative association between male circumcision and HIV prevalence in a general population in most regions (Auvert et. al., 2001; Gebremedhin, 2010; Londish and Murray, 2008). This partly explains the differences in HIV prevalence rates which are low in West African countries where male circumcision is highly practised compared to East and Central African countries (Ferry et al 2001). This is supported by a study done by Gebremedhin (2010) which was done using 18 DHS in SSA to assess the impact of male circumcision on HIV infection and STIs. The outcome of the study indicated that there was

a strong correlation between male circumcision and the reduction in the risk of HIV infection. Thus male circumcision was considered as an effective way in which the wide transmission of HIV can be reduced. These results are consistent with the three randomized controlled clinical trials which were conducted in “Orange Farm South Africa, (Auvert et. al., 2005), Kisumu Kenya (Bailey et. al., 2007) and Rakai Uganda (Gray et. al., 2007) to test the effectiveness of male circumcision and HIV prevention in SSA. The results of the studies indicated a significant reduction of 51–60% in the risk of HIV infection among circumcised men” (Londish and Murray, 2008:1247).

However, the spread of HIV infection can only reduce when men who are circumcised continue to adopt safer sexual practises such as consistent condom use. There is a perception that since male circumcision can reduce the risk of infection with HIV, individuals tend to have a false sense of security (Peltzer et. al., 2011), which could offset safer sexual practises such as condom use as well as making many men to have a number of multiple sexual partners (Kalichman et. al., 2007; Pinkerton, 2001; Westercamp and Bailey, 2006). A South African National survey on HIV/AIDS which was done in 2009 indicated that about 15% of individuals (male and female) had a false belief that sexual intercourse without a condom was safe when an individual was circumcised (South African National survey, 2010).

2.6 Summary of the chapter

Several studies have indicated a complex correlation between HIV infection and several socioeconomic, demographic and behavioural factors. Sexual behavioural factors such inconsistent condom use with multiple partners among men is considered as one of the most key factors in the spread of HIV infection. Sexual behaviour could be influenced positively or negatively by one’s socio-economic status (SES). For example, having a high SES can lead to an individual engaging in risky sexual behaviour such as being able to afford having multiple concurrent partners. On the other hand being wealthy could lead to an individual to have access to information about HIV infection and awareness of treatment.

Chapter 3: METHODOLOGY

3.1 Introduction

This chapter describes the methods that were used to collect and analyse the data used in this study. The chapter further looks at the study variables, statistical methods used to analyse data in this study and ethics approval.

3.2 Data Source

A secondary analysis of the most recent Demographic and Health Survey (DHS) conducted in 2013-14 in Zambia was undertaken to meet the study objectives. Demographic and Health Surveys are representative national surveys based on cross sectional data from household samples conducted in most developing countries (Corsi et. al., 2012). It is one of the largest programmes that was introduced by the USAIDS in 1984 (Corsi et. al., 2012), with the main aim of providing statistical data on health, HIV, socioeconomic status as well as demographic status of people.

The 2013-14 Zambia Demographic and Health Survey (ZDHS) is the fifth in a series of surveys. The first DHS was done in 1992, then 1996, 2001 and 2007 respectively (Central Statistical Office et. al., 2015). The aim of the 2013-14 ZDHS was to bring out up-to-date estimates for monitoring population and health situations (such as individual socioeconomic characteristics, HIV infection and several measures of risky sexual behaviours) in Zambia (Central Statistical Office et. al., 2015).

3.3 Sampling frame

The dataset from the population census that was done in 2010 in Zambia was used as the sampling frame for the 2013-14 ZDHS. The 2010 Zambia Population and Housing

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Census consisted of 25,631 enumeration areas (EAs) or clusters and 2,815,897 households. The enumeration area is a geographically delineated area which consist of about 130 households or 600 people which is demarcated as a census counting unit (Central Statistical Office et. al., 2015).

Zambia was stratified according to its ten provinces: Lusaka, Muchinga, Luapula, Copperbelt, Eastern, Western, Southern, Northern, North-Western and Central. Each province was further stratified into rural and urban areas. For the ZDHS sampling, each province was stratified into 20 sampling strata. *“A two-stage stratified cluster sampling design was carried out to select EAs in the first stage and households as the sampling unit in the second stage. About 320 EAs in urban areas and 417 EAs in rural areas were selected with probability proportional to size, the size being the population of the EA”* (Central Statistical Office et. al., 2015:115). All household were listed according to systematic sampling and 25 households in each cluster were selected totalling 18,052 households (Central Statistical Office et. al., 2015). A total of 16,209 households were occupied, of which 15, 950 households were interviewed successfully resulting in a 91% household response rate (Central Statistical Office et. al., 2015:234).

In addition, all eligible men who consented to the interview were asked to consent for voluntary HIV testing and a dried blood spot (DBS) was used for the determination of HIV status. If they agreed to be tested for HIV, home based counselling was done followed by a rapid diagnostic HIV tests. Men who tested HIV positive had their venous blood collected and processed in the field laboratory to determine their CD4 counts and results were provided to them. *“Overall, 87 percent of the ZDHS respondents who were eligible for HIV testing were both interviewed and tested. Testing coverage rates were higher among women than among men (90 percent and 84 percent, respectively).”* (Central Statistical Office et. al., 2015:234). Ethical clearance for the procedure of collecting blood samples, HIV testing and CD4 counts measurement was given and approved by the Tropical Diseases Research Centre (TDRC), the ICF international Ethical Review Committee.

3.4 Description of the independent and dependent variables

Table 3-1 gives the descriptive summary of the demographic, socioeconomic, behavioural, as well as outcome variables that are used in this study.

Table 3-1: Summary of the study variables

Name	Description	Type	Code
Outcome variables			
HIV status	Current HIV status	Binary	0 = Negative 1= Positive
Risky Sexual behavior	Condom use with multiple sexual partners including spouse in the last 12 months	Categorical	0= No partner 1= One partner 2= Multiple partners, consistent condom use 3= Multiple partners, inconsistent condom use
Demographic variables			
Age	Respondent's age in years	Categorical	15-24 25-34 35-44 45-54 55-59
Marital status	Current marital status	Categorical	0 = Never in union 1 = Married/living with partner 2=Divorced/widowed/separated
Place of Residence	Type of residence	Binary	0= Urban 1= Rural
Geographical region	Provinces	Categorical	Lusaka Central Copperbelt Eastern Luapula Muchinga Northern North Western Southern Western
Mobility	Away from home for more or less than one month in the last 12 months	Categorical	0 = Not Mobile 1 = Mobile <1 month 2 = Mobile >=1 month 3 = Missing

Name	Description	Type	Code
Socioeconomic variables			
Education	Educational attainment	Categorical	0 = No education 1 = Primary (incomplete/complete) 2 = Secondary (incomplete/complete) 4 = higher
Wealth	Household wealth index	Categorical	0 = Poorer 1 = Poorest 2 = Middle 3 = Richer 4 = Richest
Occupation	Respondent's current occupation group	Categorical	0 = Not working 1= Manual (Skill, unskilled) 2= Agriculture(self-employed/employee) 3 = Professional (technical/managerial/ clerical/sales) 4= Other
Behavioral variables			
Alcohol Use	If either the respondent or one of their partners was drunk at last sex in the last 12 months	Binary	0 = No 1 = Yes
Circumcision	Circumcised	Categorical	0 = No 1 = Yes 2 = Don't know/Missing
HIV testing	Ever tested for HIV	Binary	0 = No 1 = Yes
Life time partners	Number of partners in a life time	Continuous	

3.5 Outcome variables

3.5.1 HIV status

This variable looks at the men who tested HIV positive or negative in ZDHS 2013-14.

This measure is an indicator of HIV prevalence in the country.

3.5.2 Risky sexual behaviour

In this analysis, risky sexual behaviour among men is defined as inconsistent condom use at last sex with any sexual partner when the man had more than one sexual partner in the last 12 months. Further details on how this variable was derived are described below.

3.5.2.1 Inconsistent condom use with multiple sexual partners

In this study, risky sexual behaviour was derived from information on having multiple sexual partners and condom use in the last 12 months. In the ZDHS men were asked on the number of sexual partners, including spouse, in the past twelve months prior to the survey. We categorised responses to this question into: none; only one partner; and two or more partners. Survey participants were further asked about condom use at last sex with any of the 3 most recent partners in the last twelve months, with response options of yes/no for each partner. We defined consistent condom use as using a condom at last sex with all partners for men with more than one partner. Risky sexual behaviour was then coded as: respondents with no partner coded as 0; respondents with one partner were coded as 1, those with multiple partners and had used condoms consistently with all their partners were coded as 2 whereas those with multiple partners and had used condoms inconsistently with any of their partners were coded as 3. This variable allows us to observe the effect of inconsistent and consistent condom use with multiple sexual partners on the risk of HIV infection in the univariate and multivariate analysis model.

As mentioned in the literature review consistent condom use is an important protective measure in the fight against HIV infection. Men who have multiple partners and used condoms inconsistently with their partners are likely to be at high risk of HIV infection. The hypothesis behind this is that inconsistent condom use when a man has multiple sexual relationships poses an increased risk of HIV infection to both partners, despite the other partner being faithful (Bingenheimer, 2010; Leclerc-Madlala, 2009;

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Uchudi, Magadi and Mostazir, 2012). Furthermore, inconsistent condom use with multiple sexual partners is a risk factor for HIV infection, because for each additional partner in a sexual relationship increases one's potential exposure to and transmission of HIV infection (Uchudi, Magadi and Mostazir, 2012). Therefore we expect men with multiple partners who inconsistently used condoms with any of their multiple partners to be at high risk of HIV infection.

3.6 Independent variables

3.6.1 Socioeconomic variables

Education: this is the key variable that measures the socioeconomic characteristics of an individual. As demonstrated in many studies in the literature review, high educational attainment of an individual is related with low levels of risky sexual behaviour. One may hypothesize that a person with high level of education is associated with greater knowledge of the causes and protective measures against the spread of HIV and hence lowers their risk of HIV infection. The variable was classified as stated in the table above.

Household wealth: this variable is derived from the measure of household ownership of assets and measures the socioeconomic wellbeing of an individual. Wealthier men tend to be more knowledgeable about HIV transmission and have better access to health care; hence they are able to practise safer sex methods than men who are poor. The household wealth index is constructed using household ownership information on selected assets such as having a television, housing materials, sanitation, bicycle, access to clean water which are related with an individual's household wealth status. The differentiation of household wealth ownership is constructed using Principal component analysis (PCA).

Occupation: occupation is a categorical variable with nine different categories. In order to simplify analysis for this study, this variable was collapsed to four categories; not working, manual occupation, men working in agricultural sector and professional as shown in Table 3-1.

3.6.2 Demographic variables

Age: this is an important variable used to give a comparison of risky sexual behaviour among men's different age groups. Age was recoded into five-year age bands.

Marital status: This variable looks at men's marital status in the study. Since the contraction of HIV infection is usually through sexual contact among partners, marital status is significant in understanding pattern of HIV infection by looking at current and previous sexual relationships among men (de Walque, 2009; Mishra and Bignami-Van Assche, 2009).

Place of residence: this variable looks at how rural and urban areas are associated with risky sexual behaviour and HIV vulnerability among men in Zambia. Urban residence is highly likely to predict high risky sexual behaviour due to increasing opportunities such as education and wealth. Rural residence was coded as 0 and urban resident was coded as 1.

Geographical Region: this variable was stratified according to ten provinces found in Zambia. This variable is important as it gives the distribution of HIV infection among men according to different regions in Zambia.

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Mobility: in this study mobility is defined as men who have been away for more than one month or less than one month in the last 12 months and those who have not moved away from home are considered not to be mobile. Men who are mobile are more likely to be at high risk of HIV infection due to increasing sexual networks that influences the spread of HIV infection.

3.6.3 Behavioural variables

Alcohol use: Alcohol use has previously been associated with increased risk of HIV infection in many studies. Alcohol use has a disinhibiting effect that may cause individuals not to use condoms or to use them incorrectly (Zablotska et. al., 2006). Therefore, men who drank or their partners were drunk during last sex are predicted to be more likely to be infected with HIV.

Circumcision: this variable looks at the circumcision status among men. As indicated in some studies it is hypothesised that uncircumcised men are at high risk of HIV infection than those that are circumcised.

HIV testing: this variable is significant because it reveals the general behavioural pattern related to vulnerability of HIV infection. Which in turn may give a reflection on how well informed individuals are in terms of HIV risk status. Not only current HIV status, but previous HIV testing will also be included in the analysis.

Life time partners: this variable looks at the number of lifetime sexual partners a man has ever had. This variable was categorised for up to six life time partners. An increase in the number of life time partners increases one's potential exposure to HIV infection.

3.7 Statistical methods of data analysis

This study examines the association of socioeconomic, demographic, behavioural factors and HIV infection among men in Zambia. This study used three stages of analysis: descriptive, univariate and multivariate. In the descriptive analysis, frequencies, percentages and confidence intervals (95% CI) were used to describe the prevalence of HIV status and risky sexual behaviour according to socioeconomic and demographic characteristic of men in the study. In order to test the statistically significant differences in study variables, Chi-square tests were used. Univariate and multivariate logistic regression were used to examine the strength of the relationships of variables in the study. The univariate logistic regression was run by fitting unadjusted logistic regression models to examine the association of risky sexual behaviour and HIV status on each independent variable. The results obtain from the unadjusted logistic regression model were then used to build up the multivariate logistic regression models.

The study used STATA, version 13 software in the analysis. Considering the complex sampling design and non-response from the participants, sampling weights using Stata software (*svy*) commands were used.

Ethics approval

This study used secondary data analysis obtained from the 2013-14 Zambia Demographic and Health Survey data sets. The permission to use the data set was granted by DHS programme, Macro International USA. This study was approved by the University of KwaZulu-Natal Research Ethics Committee.

Chapter 4: RESULTS

4.1 Introduction

This chapter presents results on socioeconomic and demographic factors that influence risky sexual behaviours of men and contribute to men's vulnerability to HIV infection. The unit of analysis of this study is individual men 14, 773 aged between 15 and 59 years who participated in the 2013-14 Zambia DHS. Descriptive analyses, univariate and multivariate logistic regression statistics are presented in this chapter.

4.2 Description of socio-demographic characteristics of study participants

Table 4-1 shows the weighted distribution of socioeconomic and demographic characteristic of men who participated in the 2013-14 Zambia DHS. A high number of men had at least some formal education with the majority having secondary (47.9%) and primary (40.3%) education. Only a relatively small percentage (3.8%) were without any education. Almost half (47.5%) of the men who participated in the ZDHS were resident in households from the richer and richest household wealth quintiles. Almost one fifth (18.9%) of the men surveyed were resident in households from the middle wealth quintile and 33.3% of men were resident in the poorer and poorest households. With regards to occupation, two fifths (40.0%) were working in the agricultural sector, 19.9% were working as professionals, and 16.4% were working as unskilled or skilled manual labour. Almost one fifth (19.0%) reported that they were not working.

The majority of men reported that they were married or living together (55.1%) followed by those who were never married (40.6%). Only a small proportion reported to be widowed, divorced or separated (4.3%). Most of the Zambia 2013-14 DHS male participants were aged 15-24 years (38.4%), with only a small proportion (3.5%) of men aged 55-59 years. The majority of respondents resided in rural areas (54%),

whilst 46% resided in urban areas. The highest proportion of men surveyed was from Lusaka province (20.6%), and lowest proportion from North-Western province (4.1%).

In terms of mobility, slightly over one quarter of men (26.7%) reported to have been away from home for less than one month; 14.9% of men were away for more than one month; whilst the majority of men (58.3%) did not make any movement away from home. A large proportion of men (78.3%) were not circumcised. With regards to alcohol use, only a small proportion (8.5%) of men or their partners were drunk with alcohol during last sex in the last 12 months. There was a high number of reported lifetime sex partners with nearly a quarter of the men surveyed reporting having 6 or more lifetime partners. Only 12% reported that they had had only one lifetime partner.

Table 4-1: Distribution of socioeconomic and demographic and HIV risk related characteristics of men, 2013-14 Zambia DHS

Population size= 147730	Percent (%)
AGE	
15-24	38.4
25-34	26.2
35-44	20.6
45-54	11.3
55-59	3.5
MARITAL STATUS	
Never in Union	40.6
Married/Living with Partner	55.1
Widowed/Divorced/separated	4.3
PLACE OF RESIDENCE	
Urban	46.1
Rural	54.0
PROVINCE	
Central	8.5
Copperbelt	17.7
Eastern	12.6
Luapula	6.3
Lusaka	20.6
Muchinga	5.2
Northern	7.1
North Western	4.1
Southern	12.9
Western	5.0

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Population size= 147730	Percent (%)
MOBILITY	
Not mobile	58.3
Mobile < 1month	26.7
Mobile >1month	15.0
Missing	0.1
EDUCATION	
None	3.8
Primary	40.3
Secondary	47.9
Higher	8.0
WEALTH	
Poorest	15.0
Poorer	18.3
Middle	18.9
Richer	23.0
Richest	24.9
OCCUPATION	
Not working	19.0
Manual (skilled/unskilled)	16.4
Agriculture	40.0
Professional	20.0
Other	4.3
Missing	0.5
ALCOHOL USE	
No	91.5
Yes	8.5
CIRCUMCISION	
No	78.3
Yes	21.6
Don't know/missing	0.1
EVER BEEN TESTED FOR HIV	
No	36.0
Yes	64.0
LIFE TIME PARTNERS	
1	11.6
2	14.4
3	14.1
4	11.0
5	9.6
6	24.2
Don't know	0.7
Missing	14.6

Weighted counts

4.3 Sexual behaviour and HIV status of the respondents

The weighted population using the overall sampling weights of men who participated in the ZDHS 2013 was 147 730, of whom 60% (95% confidence interval (CI) 58.8% - 61.1%) reported that they did not have a sexual partner in the last 12 months.

Whereas, 12.9% (95% CI 12.1% - 13.7%) reported that they had only one partner and 2.7% (95% CI 2.4% - 3.1%) reported that they had multiple partners in the last 12 months but had used condoms consistently with all partners. Almost a quarter 24.4% (95% CI 23.5% - 25.4%) of men surveyed reported they had multiple sexual partners and used condom inconsistently with all partners.

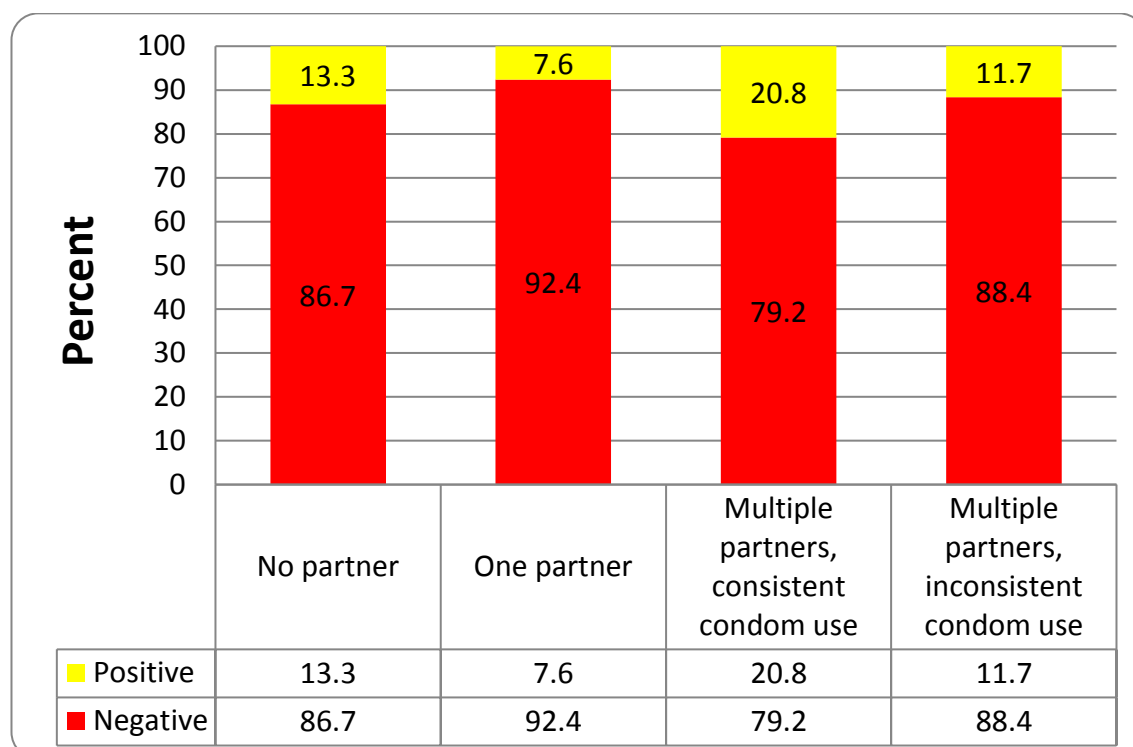


Figure 4-1: HIV status by sexual partnership patterns among men, 2013-14 ZDHS

Using the HIV sampling weights, 11.6% (n=16932) of the Zambian men were HIV positive. Just a little over 88% (n=125944) were HIV negative. As shown in **Figure 4-1**, the prevalence of HIV infection was highest (20.8%) among men who reported having multiple partners but used condoms consistently with all partners, compared to 11.6% HIV prevalence among men with multiple partners but used condoms inconsistently. These differences were statistically significant (p-value <0.001).

4.4 Description of risky sexual behaviour by selected characteristics

Table 4-2 shows how risky sexual behaviour (derived from number of partners and condom use at last sex in last 12 months) of men varies by socioeconomic, demographic and other behavioural risk factors. Men between the ages of 25-34 years (16.2%) and 35-44 years (17.6%) reported that they had used condoms inconsistently with multiple sexual partners. With regards to marital status, a fairly high percentage of currently married men (17.4%) and those who were widowed, divorced or separated (12.5%) did not use condom consistently with their multiple partners compared to those who were never married (6.9%). Significant differences in the use of condom with multiple partners were observed across place of residence and province. The prevalence of inconsistent condom use with multiple partners among men was higher in rural (16.4%) than urban areas (8.9%). Predominantly rural provinces like Southern (22.6%) and Western (21.6%) had significantly higher proportion of inconsistent condom use among men with multiple partners relative to urban provinces like the Copperbelt (7.7%) and Lusaka (8.3%).

Table 4-2, further shows that percentage of men with multiple partners and inconsistently used condoms decreased with an increase in the level of educational attainment. With regards to wealth, men in the poorer wealth quintile (16.3%) and those in a middle wealth quintile (15.9%) did not use condoms consistently with multiple partners compared to the richer (12.3%) and the richest (7.8%) quintiles. Men who were employed were more likely to report that they used condoms inconsistently with multiple partners; with men in agricultural occupations (16.2%) showing the highest percentage of inconsistent condom use with multiple partners compared to only (4.4%) among men not working.

The majority of men who reported to have been away from home used condoms inconsistently with multiple partners compared with men who were not mobile. Notably, inconsistent condom use with multiple partners increased with an increased

duration away from home. A slightly higher proportion of uncircumcised men used condoms inconsistently with multiple partners than circumcised men. Inconsistent condom use with multiple partners was high among men (28.8%) who were drunk or their partner was drunk during last sex compared to those who were not drunk (11.5%). Men (13.9%) who reported to have ever tested for HIV were less likely to report using a condom consistently with multiple partners compared to men (9.4%) who never tested for HIV. The prevalence of inconsistent condom use with multiple partners significantly increased with increasing lifetime partners.

Table 4-2: Description of risky sexual behaviour by selected socio-economic and demographic factors, 2013-14, Zambia DHS

Risky sexual behaviour	No partner	One partner	Multiple partner with consistent condom use	Multiple partner with inconsistent condom use	p-value
	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]	
Pop size n (%)	36,023 (24.4)	88,493 (60.0)	4,014 (2.7)	19,074 (12.9)	
AGE					<0.001
15-24	53.2 [51.4,54.9]	36.2 [34.5,38.0]	2.9 [2.4,3.5]	7.7 [6.8,8.7]	
25-34	7.9 [6.9,9.2]	72.2 [70.4,74.0]	3.6 [3.0, 4.5]	16.2 [14.9,17.7]	
35-44	4.9 [4.0,6.1]	75.1 [73.1,76.9]	2.4 [1.9,3.2]	17.6 [15.9,19.4]	
45-54	6.0 [4.8,7.5]	78.6 [75.81,81.1]	1.1 [.6146,1.8]	14.4 [12.2,16.9]	
55-59	6.1 [4.3,8.6]	79.9 [75.52,83.7]	0.7 [0.2,2.3]	13.3 [10.2,17.2]	
MARITAL STATUS					<0.001
Never in union	55.3 [53.5,57.0]	32.0 [32.4,35.6]	3.8 [3.1,4.5]	6.9 [6.2,7.8]	
Married/Living with partner	0.9 [0.7,1.2]	79.8 [78.5,81.0]	1.9 [1.6,2.3]	17.4 [16.2,18.6]	
Widow/Divorced /Separated	33.7 [29.5,38.2]	51.0 [46.9,55.2]	2.8 [1.6,4.8]	12.5 [9.7,15.8]	
PLACE OF RESIDENCE					<0.001
Urban	30.3 [28.6,32.0]	57.8 [56.0,59.5]	3.0 [2.5,3.7]	8.9 [8.1,9.8]	
Rural	19.4 [18.4,20.4]	61.8 [60.3,63.3]	2.4 [2.1,2.9]	16.4 [15.2,17.6]	

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Risky sexual behaviour	No partner	One partner	Multiple partner with consistent condom use	Multiple partner with inconsistent condom use	p-value
	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]	
Pop size n (%)	36,023 (24.4)	88,493 (60.0)	4,014 (2.7)	19,074 (12.9)	
PROVINCE					<0.001
Lusaka	29.5 [26.7,32.4]	58.8 [55.9,61.7]	3.4 [2.4,4.7]	8.3 [7.0,9.9]	
Central	25.0 [22.2,27.9]	61.1 [56.9,65.2]	2.9 [2.1,4.2]	11.0 [8.8,13.7]	
Copperbelt	33.6 [30.8,36.5]	56.8 [53.9,59.6]	2.0 [1.3,2.9]	7.7 [6.4,9.2]	
Eastern	18.3 [16.5,20.2]	60.7 [58.1,63.2]	3.5 [2.7,4.5]	17.5 [15.0,20.4]	
Luapula	16.8 [14.1,20.0]	71.8 [68.2,75.0]	0.9 [.47, 1.6]	10.6 [8.5,13.1]	
Muchinga	28.7 [25.9,31.7]	57.8 [54.1,61.3]	1.3 [.8,2.1]	12.2 [10.0,14.9]	
Northern	20.2 [18.0,22.5]	64.6 [62.0,67.1]	1.6 [1.0,2.4]	13.7 [11.5,16.3]	
North Western	18.5 [16.2,21.0]	69.4 [66.2,72.5]	1.6 [1.0,2.4]	10.6 [8.4,13.3]	
Southern	20.8 [18.6,23.1]	53.2 [49.7, 56.7]	3.5 [2.6, 4.7]	22.6 [19. 9,25.5]	
Western	11.0 [9.1,13.3]	62.7 [59.0,66.2]	4.7 [3.5,6.2]	21.6 [18.4,25.2]	
Mobility					<0.001
Not Mobile	30.3 [29.0,31.6]	58.1 [56.7, 59.5]	1.9 [1.5,2.3]	9.7 [9.0,10.5]	
Mobile <1month	13.5 [12.0,15.1]	66.1 [64.1,67.9]	3.6 [3.0,4.3]	16.9 [15.5,18.4]	
Mobile >1month	21.2 [18.8,23.8]	56.2 [53.4,59.03]	4.4 [3.4,5.7]	18.2 [16.1,20.5]	
SOCIOECONOMIC FACTORS					
Educational level					<0.001
None	13.5 [10.4,17.3]	69.2 [64.43,73.6]	2.1 [1.1,3.9]	15.3 [11.8,19.6]	
Primary	20.6 [19.5,21.9]	62.1 [60.4,63.6]	2.3 [1.9,2.8]	15.0 [13.8,16.2]	
Secondary	29.8 [28.2,31.5]	55.8 [54.2,57.4]	2.7 [2.307,3.2]	11.7 [10.6,12.8]	
Higher	16.2 [13.7,19.0]	69.8 [66.4,73.0]	4.9 [3.3,7.3]	9.1 [7.2,11.5]	

Risky sexual behaviour	No partner	One partner	Multiple partner with consistent condom use	Multiple partner with inconsistent condom use	p-value
	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]	
Pop size n (%)	36,023 (24.4)	88,493 (60.0)	4,014 (2.7)	19,074 (12.9)	
Wealth					<0.001
Poorest	16.8 [15.2,18.6]	66.4 [64.2,68.5]	2.2 [1.7,3.0]	14.6 [13.0,16.4]	
Poorer	18.1 [16.7,19.6]	63.6 [61.5,65.7]	2.0 [1.5,2.7]	16.3 [14.7,2]	
Middle	21.0 [19.3,22.7]	61.0 [58.8,63.2]	2.1 [1.6,2.8]	15.9 [14.3,17.7]	
Richer	26.2 [24.0,28.5]	58.2 [55.7,60.6]	3.4 [2.6,4.5]	12.3 [10.8,13.9]	
Richest	34.6 [32.5,36.8]	54.2 [51.7,56.7]	3.3 [2.5,4.4]	7.8 [6.7,9.1]	
Occupation type					<0.001
Not working	64.1 [61.7,66.5]	29.3 [27.1,31.7]	2.1 [1.5,2.9]	4.4 [3.5,5.5]	
Manual (skilled & unskilled)	12.8 [11.0,14.8]	69.8 [67.1,72.4]	2.5 [1.8,3.5]	14.8 [12.8,17.1]	
Agriculture	16.1 [14.9,17.3]	65.2 [63.6,66.8]	2.6 [2.1,3.0]	16.2 [14.9,17.6]	
Profession	14.3 [12.8]	68.9 [66.8,71.0]	3.7 [2.9,4.8]	13.0 [11.7,14.5]	
Other	18.3 [14.7, 22.6]	66.1 [61.1,70.8]	3.4 [1.998,5.8]	12.1 [9.1,16.0]	
Missing	14.0 [7.5,24.6]	71.3 [57.0,82.4]	1.4 [0.3,5.7]	13.3 [5.7,28.2]	
OTHER RISKY FACTORS					
Alcohol use					<0.001
No	26.7 [25.7,27.7]	59.4 [58.2,60.6]	2.5 [2.1,2.8]	11.5 [10.7,12.3]	
Yes	0	65.7 [62.4,68.9]	5.5 [4.0,7.5]	28.8 [25.9,31.9]	
Circumcision					0.0015
No	24.0 [23.0,25.1]	60.2 [59.0, 61.4]	2.4 [2.096,2.8]	13.3 [12.5,14.3]	
Yes	25.8 [23.8,27.9]	59.1 [56.9,61.3]	3.7 [3.0,4.7]	11.4 [10.0,12.8]	
Ever tested for HIV					<0.001
No	41.8 [40.0,43.6]	46.9 [45.1,48.6]	2.0 [1.5,2.5]	9.4 [8.4,10.5]	
Yes	14.6 [13.6,15.7]	67.3 [65.9,68.7]	3.1 [2.7,3.6]	14.9 [13.9,16.0]	

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Risky sexual behaviour	No partner	One partner	Multiple partner with consistent condom use	Multiple partner with inconsistent condom use	p-value
	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]	
Pop size n (%)	36,023 (24.4)	88,493 (60.0)	4,014 (2.7)	19,074 (12.9)	
Life time partners					<0.001
1	34.4 [31.3,37.5]	65.6 [62.5,68.7]	0	0	
2	15.6 [13.6,17.8]	76.5 [74.0,78.8]	1.6 [1.1,2.4]	6.3 [5.1,7.7]	
3	9.4 [8.0,10.9]	77.6 [75.6,79.5]	2.3 [1.7,3.2]	10.7 [9.2,12.3]	
4	7.6 [6.1,9.4]	73.8 [71.0,76.4]	3.1 [2.1, 4.5]	15.6 [13.5,17.9]	
5	5.6 [4.2,7.3]	69.5 [66.4,72.4]	3.6 [2.6,5.1]	21.4 [18.7,24.3]	
6	3.8 [3.1,4.6]	62.7 [60.6,64.7]	6.0 [5.0,7.0]	27.5 [25.64,29.5]	
Don't know	7.8 [3.5, 16.5]	71.5 [60.4,80.5]	5.0 [1.8,13.0]	15.6 [9.244,25.2]	

*Figures in parenthesis are 95% confidence intervals

Unadjusted and adjusted likelihood of risky sexual behaviour

Table 4-3 shows the unadjusted and adjusted logistic regression analyses of socio-demographic and other behavioural factors of men who used condom inconsistently with multiple sexual partners in the last 12 months. For most variables associations observed in the unadjusted (univariate) models were maintained in the adjusted models. In the adjusted model the following variables were added: age group, marital status, place of residence, mobility, province, education, wealth, occupation, alcohol use, circumcision and ever tested for HIV.

In the adjusted model, married men were 81% more likely to have used condom inconsistently with their multiple partners compared to those who were single. Compared to Lusaka province, men from the predominantly rural provinces, Western and Southern provinces, were more than twice at risk of using condom inconsistently with multiple partners. In adjusted analyses, men who resided in rural areas were 60% more likely to have used condoms inconsistently with multiple partners compared to

men in urban areas. Compared to men who were not mobile, men who were away from home for less than a month were 46% more likely to have used condoms inconsistently with multiple partners, and those who were away for more than one month were 82% highly likely to have used condoms inconsistently. Furthermore, men in the middle and richer wealth quintiles were 27% and 39% high likely to report using condoms inconsistently with multiple partners compared to those in the poorest quintile. Compared to men who were not working, men with any type of occupation were significantly highly likely to report using condoms inconsistently with multiple partners. Alcohol use was associated with three-fold higher likelihood of using condom inconsistently. Among men who ever tested for HIV 16% were at high risk of using condoms inconsistently with multiple partners than men who had never been tested in the last 12 months.

Table 4-3: Odds of risky sexual behaviour by Socio-demographic and other behavioural factors, Zambia DHS 2013/2014

	Unadjusted				Adjusted			
	OR	p-value	[95% CI]		OR	p-value	[95% CI]	
Age group								
15-24 (Ref)	1.00				1.00			
25-34	2.32	<0.001	1.988	2.713	1.13	0.28	0.906	1.414
35-44	2.56	<0.001	2.173	3.011	1.09	0.45	0.868	1.377
45-54	2.02	<0.001	1.619	2.510	0.88	0.33	0.668	1.147
55-59	1.84	<0.001	1.322	2.562	0.84	0.36	0.580	1.220
Marital status								
Never in union (Ref)	1.00				1.00			
Married/Living with partner	2.82	<0.001	2.441	3.249	1.81	<0.001	1.454	2.251
Widow/Divorced /Separated	1.91	<0.001	1.422	2.561	1.34	0.11	0.935	1.930
Province								
Lusaka (Ref)	1.00							
Central	1.36	0.06	0.994	1.856	0.94	0.72	0.679	1.307
Copperbelt	0.91	0.51	0.697	1.199	0.81	0.14	0.620	1.067
Eastern	2.34	<0.001	1.795	3.047	1.82	<0.001	1.395	2.365
Luapula	1.30	0.10	0.953	1.766	0.96	0.81	0.688	1.338
Muchinga	1.53	0.01	1.136	2.060	1.03	0.88	0.738	1.425
Northern	1.75	<0.001	1.328	2.309	1.26	0.13	0.933	1.694
North-western	1.30	0.11	0.942	1.793	0.96	0.82	0.669	1.378
Southern	3.20	<0.001	2.499	4.103	2.26	<0.001	1.759	2.910

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	Unadjusted				Adjusted			
	OR	p-value	[95% CI]		OR	p-value	[95% CI]	
Western	3.03	<0.001	2.304	3.995	2.17	<0.001	1.614	2.928
Residence								
Urban (Ref)	1.00							
Rural	2.00	<0.001	1.744	2.302	1.60	<0.001	1.332	1.922
Mobility								
Not mobile(Ref)	1.00							
Mobile <1m	1.88	<0.001	1.655	2.137	1.46	<0.001	1.276	1.660
Mobile >=1m	2.06	<0.001	1.768	2.399	1.82	<0.001	1.544	2.148
Missing	2.43	0.25	0.538	10.936	2.02	0.32	0.498	8.215
Education								
None (Ref)	1.00				1.00			
Primary	0.98	0.87	0.719	1.323	1.10	0.55	0.812	1.477
Secondary	0.73	0.06	0.529	1.007	1.10	0.57	0.795	1.512
Higher	0.56	<0.001	0.374	0.827	0.75	0.20	0.488	1.159
Wealth								
Poorest (Ref)	1.00				1.00			
Poorer	1.14	0.11	0.973	1.331	1.15	0.09	0.977	1.365
Middle	1.11	0.26	0.926	1.327	1.27	0.01	1.049	1.545
Richer	0.82	0.05	0.672	0.996	1.39	0.01	1.088	1.774
Richest	0.50	<0.001	0.403	0.615	1.24	0.19	0.903	1.690
Occupation								
Not working (Ref)	1.00				1.00			
Manual (skilled/unskilled)	3.77	<0.001	2.835	5.005	2.15	<0.001	1.579	2.929
Agriculture	4.19	<0.001	3.264	5.366	1.81	<0.001	1.369	2.384
Professional	3.24	<0.001	2.475	4.235	1.89	<0.001	1.399	2.542
Other	2.99	<0.001	2.031	4.410	1.75	0.01	1.156	2.645
Missing	3.32	0.02	1.254	8.770	1.60	0.37	0.574	4.468
Alcohol use								
No (Ref)	1.00				1.00			
Yes	3.13	<0.001	2.651	3.688	3.05	<0.001	2.545	3.664
Circumcision								
No (Ref)	1.00				1.00			
Yes	0.83	0.02	0.717	0.965	1.11	0.21	0.941	1.318
Don't know/Missing								
Ever been tested								
No (Ref)	1.00				1.00			
Yes	1.69	<0.001	1.459	1.952	1.16	0.06	0.992	1.346

4.5 Description of HIV status of men by selected characteristics

Table 4-4 shows how HIV status of men varies by socioeconomic, demographic and other behavioural risk factors. HIV prevalence significantly increased with age; peaking at 19.5% among men between 45-54 years before slightly declining to 15.3% in the 55-59 age group. A higher proportion of men who reported to be widowed, divorced or separated were HIV positive (27.4%) than those who were married (14.8%) or never in union (6.2%). Urban resident men had twice significantly higher odds of HIV infection compared to rural resident men. In terms of geographical region, Copperbelt province (16.8%) showed a significantly highest HIV infection among the men, while Muchinga (6.2%) and North-western (6.1%) provinces had significantly lower HIV infection among men.

It is worth noting that HIV infection among men increased with an increase in both educational attainment and wealth status. Most of the men in occupation such as professional, agriculture and were at a significantly increased percentage of HIV infection compared to men who were unemployed. Mobility was insignificantly associated with HIV status, albeit a larger proportion of men who reported to be mobile had a high HIV prevalence than those who were not mobile. Men who reported that they had ever tested for HIV were significantly highly likely to be HIV positive than men who had not tested for HIV. With regards to circumcision, 12.2% of uncircumcised men were HIV positive while 10.5% of circumcised men were HIV infected. While 17.8% of men who reported that themselves or their partner had been drunk during last sex were reported to be HIV positive, compared to 11.3% among men who said that neither themselves nor their partners were drunk at last sex in the previous year. An increase in the number of life partners was associated with higher HIV rates; men who had six lifetime partners (17.9%) had the highest HIV infection than men with only one lifetime partner (5.8%).

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Table 4-4: HIV status by socio-demographic characteristics for men, 2013-2014 Zambia DHS

HIV Status	Negative	Positive	
Pop size n (%)	125944(88.1)	16932(11.9)	p-value
Age			<0.001
15-24	94.6 [93.5,95.5]	5.5 [4.51,6.5]	
25-34	88.0 [86.3,89.5]	12.0 [10.5,13.7]	
35-44	80.9 [78.9,82.7]	19.1 [17.3, 21.1]	
45-54	80.5 [77.7,83.0]	19.5 [17.0,22.3]	
55-59	84.7 [80.1,88.4]	15.3 [11.6,19.9]	
Marital status			<0.001
Never in union	93.8 [92.7,94.7]	6.2 [5.3,7.4]	
Married/Living with partner	85.2 [84.0, 86.3]	14.8 [13.7,16.0]	
Widow/Divorced/Separated	72.6 [68,76.7]	27.4 [23.3,32.0]	
Place of residence			
Urban	84.3 [82.5,85.9]	15.7 [14.2,17.5]	
Rural	91.5 [90.5,92.3]	8.5 [7.7,9.5]	
Geographical region			<0.001
Lusaka	86.1 [83.4,88.5]	13.9 [11.5,16.6]	
Central	89.7 [87.0,92.0]	10.3 [8.1,13.0]	
Copperbelt	83.2 [79.8,86.1]	16.8 [14.0,20.2]	
Eastern	91.9 [89.9,93.5]	8.1 [6.5,10.1]	
Luapula	89.8 [87.5,91.6]	10.3 [8.4,12.5]	
Muchinga	93.8 [91.5,95.5]	6.2 [4.505,8.5]	
Northern	89.5 [86.9, 91.7]	10.5 [8.3,13.1]	
North Western	93.9 [91.4,95.7]	6.1 [4.3,8.6]	
Southern	88.5 [86.5,90.3]	11.5 [9.7,13.5]	

HIV Status	Negative	Positive	
Pop size n (%)	125944(88.1)	16932(11.9)	p-value
Western	86.5 [83.6,89.0]	13.5 [11.1,16.4]	
Mobility			0.1665
Not Mobile	88.8 [87.7,89.9]	11.2 [10.2,12.3]	
Mobile <1 month	87.1 [85.4,88.7]	12.9 [11.4,14.6]	
Mobile >1 month	87.4 [85.3,89.3]	12.6 [10.7,14.7]	
Missing	82.6 [48.5,96.0]	17.4 [4.0,51.5]	
Educational level			0.001
None	89.1 [85.8,91.7]	10.9 [8.3,14.2]	
Primary	89.7 [88.4,90.8]	10.3 [9.2,11.6]	
Secondary	87.4 [86.0,88.6]	12.7 [11.4,14.0]	
Higher	84.6 [81.2,87.5]	15.4 [12.5,18.8]	
Household Wealth index			<0.001
Poorest	93.4 [92.1,94.6]	6.6 [5.4,7.9]	
Poorer	90.7 [89.3,92.0]	9.3 [8.0,10.7]	
Middle	89.8 [88.4,91.2]	10.2 [8.9,11.6]	
Richer	84.1 [82.2,85.8]	15.9 [14.2,17.8]	
Richest	85.5 [83.1,87.6]	14.5 [12.4,16.9]	
Occupation type			<0.001
Not working	93.4 [91.7,94.8]	6.6 [5.174,8.3]	
Manual (skilled/unskilled)	82.4 [79.9, 84.7]	17.6 [15.3,20.1]	
Agriculture	91.5 [90.5,92.4]	8.5 [7.6,9.5]	
Profession	82.1 [79.84,84.18]	17.9 [15.82,20.16]	
Other	84.3 [79.8,87.9]	15.8 [12.14,20.19]	
Missing	73.2 [57.0, 84.9]	26.8 [15.1,43.0]	

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HIV Status	Negative	Positive	p-value
Pop size n (%)	125944(88.1)	16932(11.9)	
Circumcision			0.0368
No	87.8 [86.8,88.7]	12.2 [11.3,13.2]	
Yes	89.5 [87.9,90.9]	10.5 [9.1,12.1]	
Don't know/Missing	100	0	
Alcohol use			<0.001
No	88.7 [87.8,89.6]	11.3 [10.4,12.2]	
Yes	82.1 [79.1,84.7]	17.9 [15.3,20.9]	
Ever tested for HIV			<0.001
No	92.7 [91.5,93.7]	7.3 [6.3,8.5]	
Yes	85.7 [84.5,86.8]	14.3 [13.3,15.5]	
Life time partner			<0.001
1	94.2 [92.1,95.72]	5.8 [4.3,7.9]	
2	90.7 [88.7,92.3]	9.3 [7.7,11.3]	
3	87.5 [85.5,89.3]	12.5 [10.7,14.5]	
4	87.0 [84.6,89.1]	13.0 [10.9,15.4]	
5	85.5 [83.0,87.7]	14.5 [12.3,17.0]	
6	82.1 [80.4,83.7]	17.9 [16.3,19.6]	
Don't know	75.5 [61.4,85.6]	24.5 [14.4,38.6]	
Missing	94.7 [93.1,95.9]	5.3 [4.102,6.9]	

**Weighted using HIV- sample weight *Percent (95% CI)*

4.6 Socio-demographic and economic factors associated with HIV

Table 4-5 shows the unadjusted and adjusted logistic regression analyses of socioeconomic and demographic factors related with being HIV positive among men in Zambia. Men in all age groups were significantly at high risk of HIV infection than men

in age group 15-24 years. Men in the age groups of 45-54 years had the highest odds of being infected with HIV compared with men aged between 15-24 years. Men who reported that they were widowed, divorced, separated or married were more likely to be HIV positive compared to men who were never in union. Compared to Lusaka province, men who resided in the Copperbelt (55%) and Western (63%) were significantly at high risk of HIV infection. Rural resident men were 27% at low risk of being infected with HIV than men in urban areas. Household wealth index was statistically significantly associated with HIV infection, with men from the higher household wealth index being at high risk of being infected with HIV than men in the poorest households

Table 4-5: Logistic regression analyses of socio-demographic and economic factors associated with HIV status in men, Zambia DHS 2013/2014

	Unadjusted				Adjusted			
	OR	P>t	[95% CI]		OR	P>t	[95% CI]	
Age group								
15-24 (Ref)	1.00				1.00			
25-34	2.38	<0.001	1.932	2.921	1.56	0.01	1.145	2.119
35-44	4.13	<0.001	3.295	5.168	2.57	<0.001	1.778	3.729
45-54	4.22	<0.001	3.409	5.235	2.76	<0.001	1.913	3.983
55-59	3.15	<0.001	2.191	4.521	2.28	<0.001	1.437	3.606
Marital status								
Never in union (Ref)	1.00				1.00			
Married/Living with partner	2.61	<0.001	2.193	3.106	1.40	0.05	1.002	1.966
Widow/Divorced /Separated	5.68	<0.001	4.322	7.468	2.25	<0.001	1.546	3.285
Province								
Lusaka (Ref)	1.00							
Central	0.71	0.05	0.505	0.997	1.19	0.32	0.844	1.685
Copperbelt	1.26	0.14	0.926	1.708	1.55	0.01	1.119	2.144
Eastern	0.55	<0.001	0.399	0.752	0.93	0.64	0.674	1.274
Luapula	0.71	0.03	0.522	0.962	1.25	0.21	0.886	1.755
Muchinga	0.41	<0.001	0.276	0.614	0.78	0.23	0.515	1.176
Northern	0.73	0.06	0.523	1.008	1.40	0.05	0.996	1.979
North Western	0.41	<0.001	0.266	0.620	0.73	0.19	0.460	1.163
Southern	0.81	0.13	0.607	1.068	1.24	0.16	0.921	1.679
Western	0.97	0.85	0.711	1.324	1.63	<0.001	1.171	2.278
Residence								
Urban (Ref)	1.00							

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	Unadjusted				Adjusted			
	OR	P>t	[95% CI]		OR	P>t	[95% CI]	
Rural	0.50	<0.001	0.421	0.592	0.73	<0.001	0.589	0.898
Mobility								
Not mobile (Ref)	1.0							
Mobile <1m	1.18	0.06	0.996	1.386	0.89	0.18	0.740	1.059
Mobile >=1m	1.14	0.20	0.933	1.397	1.06	0.60	0.857	1.305
Missing	1.68	0.53	0.330	8.495	1.69	0.54	0.320	8.888
Education								
None (Ref)	1.00				1.00			
Primary	0.94	0.70	0.676	1.301	0.86	0.41	0.601	1.233
Secondary	1.18	0.32	0.854	1.628	0.90	0.56	0.622	1.295
Higher	1.48	0.05	1.008	2.178	0.67	0.06	0.436	1.019
Wealth								
Poorest (Ref)	1.00				1.00			
Poorer	1.45	<0.001	1.144	1.850	1.35	0.02	1.060	1.723
Middle	1.61	<0.001	1.278	2.028	1.38	0.01	1.078	1.774
Richer	2.69	<0.001	2.116	3.425	1.88	<0.001	1.444	2.449
Richest	2.41	<0.001	1.842	3.164	1.79	<0.001	1.306	2.448
Occupation								
Not working (Ref)	1.00				1.00			
Manual (skilled/unskilled)	3.03	<0.001	2.285	4.023	1.18	0.33	0.846	1.644
Agriculture	1.32	0.05	1.000	1.743	0.80	0.15	0.596	1.082
Professional	3.09	<0.001	2.387	4.008	1.26	0.12	0.938	1.696
Other	2.65	<0.001	1.740	4.050	1.02	0.94	0.648	1.600
Missing	5.20	<0.001	2.589	10.449	3.28	<0.001	1.533	7.028

4.7 Socio-behavioural factors associated with HIV infection

Table 4-6 shows socio-behavioural risk factors associated with being HIV positive in Zambian men. In unadjusted analyses, men with only one partner in the last 12 months were 90% highly likely to be infected with HIV. However, after adjusting for socio-demographic and economic factors, men with only one partner had 27% less likelihood of being HIV infected. Similarly, in unadjusted analyses, men with multiple partners with inconsistent condom use in the last 12 months were 64% highly likely to be infected with HIV. But after controlling for socio-demographic and economic factors, men who reported to have used condom inconsistently with all their partners had 45% statistically significant less likelihood of being HIV infected. Meanwhile, circumcised men were 28% less likely to be HIV infected than men who were not circumcised. Men

who ever tested for HIV prior to the survey were at 56% higher likelihood of being HIV positive than men who never tested for HIV prior to the survey. Men with increased number of life partners were statistically significantly more likely to be infected with HIV. Men with six lifetime partners were three fold more likely to be HIV infected compared to men with only one partner.

Table 4-6: Logistic regression analyses of socio-behavioural factors associated with HIV status in men, Zambia DHS 2013/2014

	Unadjusted				Adjusted				
	OR	P>t	[95% CI]	OR	P>t	[95% CI]	OR	P>t	[95% CI]
No partner (Ref)	1.00				1.00				
One partner	1.90	<0.001	1.566	2.301	0.73	0.03	0.551	0.977	
Multiple partner with consistent condom use	3.26	<0.001	2.216	4.792	1.33	0.21	0.851	2.082	
Multiple partner with inconsistent condom use	1.64	<0.001	1.277	2.096	0.55	<0.001	0.396	0.773	
Alcohol use									
No (Ref)	1.00				1.00				
Yes	1.71	<0.001	1.411	2.077	1.20	0.08	0.981	1.478	
Circumcision									
No (Ref)	1.00				1.00				
Yes	0.84	0.03	0.721	0.980	0.72	<0.001	0.603	0.852	
Ever been tested									
No (Ref)	1.00				1.00				
Yes	2.11	<0.001	1.801	2.480	1.56	<0.001	1.300	1.869	
Lifetime partners									
1 (Ref)	1.00				1.00				
2	1.66	<0.001	1.182	2.331	1.40	0.05	0.996	1.969	
3	2.30	<0.001	1.612	3.291	1.89	<0.001	1.336	2.678	
4	2.41	<0.001	1.655	3.519	1.89	<0.001	1.319	2.702	
5	2.73	<0.001	1.926	3.879	2.06	<0.001	1.468	2.891	
6	3.51	<0.001	2.504	4.934	2.67	<0.001	1.919	3.702	
Don't know	5.25	<0.001	2.426	11.356	2.66	0.02	1.137	6.239	
Missing	0.91	0.59	0.641	1.289	1.42	0.12	0.916	2.204	

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4.1 Summary of the chapter

This chapter showed that men who reported to have multiple partners and did not use condom consistently with all partners had a less likelihood of being HIV infected than men who use condom consistently with all partners. Further, analyses indicated that, men who were mobile, were formerly married, were among the wealth quintile, had any type of occupation, use alcohol and had more than one lifetime partners were at highest risk of HIV infection.

Chapter 5: DISCUSSION

5.1 Introduction

This chapter provides a discussion of this study's findings on the socioeconomic determinants of risky sexual behavior and vulnerability to HIV infection among men in Zambia aged 15-59 years using data from the 2013-14 ZDHS. Using descriptive, univariate and multivariate logistic regression analyses, the social, demographic and behavioral factors that are associated with HIV infection were analyzed and are discussed here.

5.1.1 Socio-demographic and other behavioral factors associated with men's risky sexual behavior

Risky sexual behavior was defined in this study as not using a condom at last sex with at least one partner when the man had multiple partners (inconsistent condom use) in the last 12 months. Risky sexual behavior such as inconsistent condom use with multiple partners facilitates the spread of HIV transmission (Davidoff-Gorea, Luke and Wawire, 2011). One in four men interviewed during the 2013-14 ZDHS reported engaging in risky sexual behavior in the year preceding the interview.

Risky sexual behavior varies by socioeconomic variables. Men who were married or living with partners, reside in rural areas, reside in Eastern, Southern, and Western provinces, were away from home for more or less than one month, men in middle or richer wealth quintiles, men with any type of occupation, or used alcohol at last sex were significantly more likely to report using condoms inconsistently with their multiple partners.

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The high concentration of using condom inconsistently among married or cohabiting men (81%) could be related to cultural beliefs such as the man is perceived to own the wife after the payment of lobola (bride price) that discourage the effectiveness of safer sexual behaviors such as use of condom among married or cohabiting partners (Kimuna and Djamba, 2005). Drezin et al., (2007) argues that lack of condom use in marriage could be explained by the desire of couples to have children, and also the lack of trust and perceived infidelity related to condom use among married couples. Findings of this study are consistent with findings in other studies that also reported that HIV infection due to unprotected sex frequently occurs within marriage (Chomba, Allen and Kanweka, 2008; de Walque, 2007; Glynn, Carael and Auvert, 2001). Dunkle et al., (2008) in their study in urban Zambia and Rwanda indicated that slightly above half of new infections in Zambia occurred within marriage and cohabiting partners, mostly due to premarital and extramarital sexual activities. Thus in order to reduce the wide spread of HIV infection, there is a need to intensify voluntary HIV counselling and testing among married or cohabiting couples in Zambia in order to reduce HIV transmission that may occur within and outside marital unions.

Furthermore, risky sexual behavior such as inconsistent condom use among men in rural areas could be attributed to the information gap such as access to educational messages, awareness of HIV infection and marginalization in HIV/AIDS service delivery including access to condoms and HIV testing (Coburn, Okano and Blower, 2013; Wabiri and Taffa, 2013). It is worth noting that this inequality in educational messages and marginalization in HIV/AIDS service delivery among men in rural areas may in the long run lead to a high spread of HIV infection in rural areas in relation to urban areas in Zambia despite the current high HIV prevalence seen in urban areas. As findings of this study show, men who reside in Eastern, Southern and Western provinces which are predominantly rural areas are significantly at high risk of using condoms inconsistently with their multiple partners. This is likely to lead to higher HIV infections in rural areas in the coming years.

Just like in many other sub-Saharan African countries, high unemployment experienced in Zambia tend to compel men from rural areas to be mobile in search for employment in urban areas. Mobility more often generates opportunities for men to practice unsafe sexual behavior such as having multiple partnerships due to disruption of family and social life (Lagarde et. al., 2003). For instance, the findings in a study which was done among men in Cameroon who were not married and had been away from their usual residence for more than a month were highly likely to have multiple sexual partnerships (Lydié et. al., 2004). Mitsunga et. al., (2005) also reported that mobility was associated with a likelihood of men engaging in extramarital sex.

Other findings of this study are that occupation, men in middle and richer wealth quintiles and the use of alcohol was significantly associated with inconsistent condom use among men. Men with any type of employment and men in middle and richer wealth quintiles usually tend to have more resources and income which attracts more sexual partners and this increases their likelihood of inconsistent condom use with multiple partners. The use of alcohol is also related to HIV infection as men who use alcohol tend to engage in riskier sexual behaviors. A study which was conducted in Cape Town by Simbayi et. al., (2012) postulates that the use of alcohol was highly associated with an individual having multiple sexual partners, as well as the inability of individuals to use condoms correctly and consistently.

5.1.2 Risky sexual behavior and being HIV positive in Zambian men

One in ten men tested for HIV as part of the 2013/14 ZDHS were HIV infected at the time of data collection. In this study, we expected individuals who had multiple partners and did not use condoms consistently with their partners to be at high risk of being infected with HIV. However, results from the study indicate that men with multiple sexual partners who used condoms inconsistently were 45% less likely to be HIV infected.

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The greater likelihood of being HIV positive among men who used condoms consistently may be related to prior knowledge of HIV status. Men who already knew they were HIV positive at the time of the survey may report consistent condom use as they are taught on risk reduction strategies during HIV pre- and post-test counselling. As stated in the literature, consistent use of condom is an effective preventative method against HIV infection and HIV infected persons are instructed to use condoms to protect their partners and prevent re-infections. As a result people who know they are HIV positive may report greater condom utilization in subsequent surveys (Shewamene et. al., 2015). This is related with some research studies that indicate a reduction over time in unprotected sexual behaviors among HIV infected individuals on antiretroviral treatment (ART) (Bunnell et. al., 2008; Dokubo et. al., 2014; Eisele et. al., 2009; Mwangi et. al., 2011; Venkatesh et. al., 2010). Therefore, the results in this study that HIV uninfected men were less likely to use condoms consistently despite having multiple partners serves as a reminder for an intensified effort towards men's safer sexual behavior education to protect them from potential future HIV infection.

Findings of this study further show that reported number of life-time partners was equally high among HIV-infected and HIV-uninfected men. That is, even though there is evidence of reported consistent condom use among men who are HIV positive, there is no decrease in the number of sexual life time partners among those that know their HIV status. This is consistent with results in Pearson et al (2011) in their study in Mozambique which indicated that increased sexual risk behaviors such as multiple partnerships was reported among individuals that had been on ART even though consistent condom use among them increased. The authors further explained that the fact that ART improves a person's health and longevity, this could enhance the potential for HIV-infected individuals to practice unsafe sexual behaviors which can lead to secondary HIV infection. Similarly, Peltzer and Ramalagan (2010) in their prospective cohort study of safer sexual behaviors among individuals who initiated

ART after one year in KwaZulu-Natal, South Africa also found a rise in condom use with no significant decline in the number of multiple sexual partners among those on ART.

Significant determinants of secondary HIV infection include: lower education, health beliefs and contentment of HIV treatment (Pearson et. al., 2011). Other behavioral factors such as stigma, alcohol use at last sex, lack of HIV status disclosure, lower ART adherence are highlighted to enhance risky sexual practices such as multiple partnership and lack of condom use with those partners. Therefore, findings in this study calls for intensified effort to enhance secondary prevention programs for men who are HIV positive. Furthermore, since the use of condoms consistently with multiple partners is an important factor in preventing reinfection among men with HIV and also prevention of HIV transmission to people who are not infected, there is a need for continued and intensified education on consistent condom use among men who are HIV positive in Zambia.

5.1.3 Socio-demographic and other behavioral factors associated with HIV infection

The other finding in the study reveals that wealthier men were at high risk of HIV infection. This finding is related to other studies in SSA which indicated that wealthier men's economic status makes it possible for them to have sexual relationships with multiple partners, engage in premarital sex and have sex with non-regular partners (Fox, 2010; Kongnyuy et. al., 2006; Mishra et. al., 2007; Msisha et. al., 2008). Although wealth is typically related with better understanding of HIV infection and condom use (Hajizadeh et. al., 2014), behavioral factors such as those mentioned above may have facilitated the high concentration of HIV infection among wealthier men in Zambia.

As indicated by other researchers, the other possible reason for high HIV infection in men in the wealthier quintile could be that wealthier men have better access to health

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care, better nutrition and are more likely to seek HIV treatment. This in turn improves their health and extends their survival relative to poor men (de Walque, 2006; Hajizadeh et. al., 2014; Nyirenda et. al., 2007; Shelton, Cassell and Adetunji, 2005). However, worth noting is the negative impact that may result on the SES of those individual that are HIV infected as the relationship of HIV infection and individual's SES is not static (Humphrey et. al., 2007). Thus HIV status as stated by Barninghausen et. al. (2007) is a factor that can determine the socioeconomic status of an individual. An individual's capacity to work and earn a living is normally compromised by AIDS related illness, which in turn decreases the individual's socioeconomic status (Negin et. al., 2016). For example since most HIV infection in Zambia is among the older age group (35-59), the period when men are most productive, HIV related illnesses have an immense impact on productivity, economic and financial capacity of an individual and their family. Furthermore, in Zambia where most people earn their living through agriculture and informal sector, adults with HIV/AIDS related illnesses severely compromises their productivity and household resources, as their functional capacity to work and earn a living for their families is reduced and they are more likely to be divorced or become widowed (Humphrey et. al., 2007; Nyirenda et. al., 2013).

After adjusting for other risk factors, findings in this study entails that education and occupations were not statistically significantly associated with HIV. The lack of association between education and the infection of HIV is related with some studies done in Zambia and other countries (Glynn et. al., 2004; Johnson and Way, 2006; Malhotra and Yang, 2011). It has been posited that as the epidemic of HIV matures the effect of education on the risk of HIV infection varies, as people who are educated are able to adopt safer sexual behavior than people with low education (Glynn et. al., 2004). The lack of association of occupation and subsequent HIV infection was not consistent with a study done in Tanzania by Msisha et. al., (2007), which showed that men who were not employed were more at risk of HIV infection. The authors thought this could have been as a result of an increased mobility among the unemployed as the search for employment typically meant a move from rural to urban areas.

Findings of this study also revealed that Copperbelt province which is predominantly urban had a significantly increased likelihood of HIV infection among men. This is consistent with other studies in sub-Saharan African which observed a similar pattern (Steenkamp et. al., 2014; Vinod et. al., 2009). The underlying factor may be due to many men that tend to migrate from rural areas to urban areas for employment, which in turn increases the risk of HIV infection in urban areas, as the migrants are more likely to engage in unsafe sexual practices such as extramarital behavior (Kimuna and Djamba, 2005). This reflects the high infection in the urbanized province like Copperbelt where migrant workers form a large labor force in the mining industries. Just like other countries in SSA, Zambia is undergoing a rapid urbanization with high population densities in particular areas of the cities, which in turn tend to facilitate the speedy spread of being infected with HIV. This may also reflect the relatively greater engagement in transactional sex in urban areas among women due to high levels of unemployment, lack of access to resources and poverty (Fox, 2010).

The results in the study also show that the Northern and Western provinces had a significantly increased HIV infection risk among men. High concentration of HIV infection in these predominantly rural provinces in Zambia is due to family disruption related to mobility of migrant workers who infect their rural partners with HIV as they return from work in urban areas. Meanwhile the HIV infection could also be from women who participate in unsafe sexual behavior while their partners are away (Kimuna and Djamba, 2005). The two provinces are also noted for high numbers of temporal migrants and visitors. The Northern Province is a major hub for fish trading. During the fishing season large numbers of fishmongers who are mainly women visit the province to order fish from predominantly fisher men. This combination of the fishmongers and fisher men is known to create a fertile ground for premarital and extramarital sexual activity and contributes to increased HIV risk in this province. On the other hand in Western Province annually there is the Kuomboka traditional

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ceremony that attracts thousands of local and international visitors leading to increased sexual activity and HIV infection risk.

Results in this study also show that age was positively significantly associated with HIV infection, with men aged 35-59 years having the highest likelihood of HIV infection. This is consistent with the estimates in Southern Africa indicating that HIV prevalence increases after the age of 15 years and with the risk of infection peaking among men aged thirty (Motala et. al., 2008). Increasing age is related with increasing likelihood of being infected with HIV, because with increasing age men tend to have an increasing number of lifetime partners which is a risk factor for HIV. In addition, household wealth is mostly associated with age (Hajizadeh et. al., 2014) hence older men are more likely to have a better socioeconomic wellbeing, longest duration of sexual activities, more than one lifetime partners, increasing their risk of being infected with HIV.

Findings in this study furthermore indicate that formerly married men (divorced/separates/widowed) were at highest risk of HIV infection. This is consistent with the study of de Walque (2009:223) who suggested that the *“likelihood of HIV infection among formerly married men may be due to the fact that divorced men may have separated from their wives because of HIV infection, while widowed men may have infected their wives, who have since died of AIDS.”*

In summary, risk of HIV infection was higher among those who had more life time partners, ever tested for HIV and uncircumcised men (Fisher, Bang and Kapiga, 2007; Gebremedhin, 2010; Msisha et. al., 2008; Venkatesh et. al., 2010; Zablotska et. al., 2006).

5.2 Limitations

The Demographic and Health Survey data are cross-sectional, therefore, cannot be used to determine causality. Thus in this study, the conclusions about the relationship between dependent and independent variables are limited to associations, not causal relationships. For example, since DHS data is cross-sectional it is not easy to determine the sequencing of events whether the risky sexual behavior was adopted before or after HIV infection (Mishra et. al., 2007).

The other limitation is based on the individual response bias dealing with sensitive issues related to sexual behavior; there are cases of response bias due to over or misreporting of men's involvement in sexual activities. Therefore, variables such as condom use and multiple partnerships suffer from social desirability effect; where individuals tend to portray a fairly favorable behavior (Mmbaga, 2013). Despite of these limitations, the analysis in this study is important as it examines the socioeconomic determinants of risky sexual behavior as well as vulnerability to HIV infection in Zambian men that has a significant factor in HIV prevention strategies.

5.3 Conclusion

Consistent condom use has been highlighted as one of the best barrier method in the fight against HIV infection. Although, the finding in the study indicated that men who used condoms inconsistently with their multiple sexual partners were more likely to be HIV-uninfected, using condom inconsistently with multiple partners remains a key factor in the spread of HIV infection. In addition, men who are married or living with partners, reside in rural areas, are mobile, men in middle or richer wealth quintiles, men with any type of occupation and use alcohol are at increased risk of HIV infection. The positive HIV status among men in Zambia gives an emphasis about the accumulation of lifetime risky sexual behaviour. The analyses in this study indicated that, men aged 25 years and above, are formerly married, are among the wealth

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quintile, and have more than one lifetime partners are at highest risk of HIV infection. Therefore, HIV/AIDS prevention programs in Zambia need to focus on educational strategies that can be used to reduce risky sexual behaviour among these categories of men to prevent HIV infection.

5.4 Recommendations

The recommendations from this study are that there is a great need for intervention programmes to target older men, in order to stem the tide against HIV infection. Many of the interventions on risky sexual behaviours and HIV prevention tend to target younger people forgetting the age disparities in most sexual relations in sub-Saharan Africa which could be as high as a 10-year age gap. Meaning a 25 year old man could have a sexual partner as young as 15 years. The continued high HIV prevalence in young girls could thus be as a result of not focusing prevention messages on men in general and older men in particular. Efforts to achieve less risky sexual behaviour change in men should be intensified.

Findings from this study show clear practices of risky sexual behaviour associated with occupational status and risk of HIV infection among men in Zambia. In particular men in agricultural occupations are at increased likelihood to be HIV infected. Targeted interventions to such occupational sub-groups are urgently needed. It remains unclear why men in such occupational groups are highly associated with HIV infection. Further research in these sub-groups using methodologies such as qualitative in-depth individual interviews and focus group discussions may be necessary for a nuanced understanding of sexual behaviours and HIV risk in agricultural occupation groups.

The rather paradoxical finding of men who are HIV positive being related with more likelihood of consistent condom use was attributed to potential effect of prior HIV infection knowledge and the concomitant risk reduction counselling that individuals receive at HIV testing. These data come from cross-sectional surveys making it difficult

to know whether the HIV positive individuals modified their behaviours after testing or it was simply a case of desirability bias when responding to the survey. Demographic and health surveys are run repeatedly, in the case of Zambia there have been as many as four panels of the survey. I recommend the implementers of the survey to consider longitudinal follow-up of particularly individuals who participate in the HIV module of the DHS. Longitudinal follow-up of individuals would enable for a true estimate of HIV incidence and to disentangle what comes first – HIV infection or consistent condom use. The DHS questionnaire could also be usefully expanded to probe in some detail the history of condom use not just at last sex or in the last 12 months.

The prevention basket currently contains abstaining from sexual encounters, being faithful to one sexual partner, using condom, and medical male circumcision. But until a safe and efficacious HIV vaccine is developed or HIV completely eliminated, having multiple partners and inconsistent condom use will continue to drive the HIV pandemic. Multi-pronged bio-medical, socio-economic and psychological HIV prevention strategies and programmes are required to decrease the risk of HIV infection among Zambian men and the general population.

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