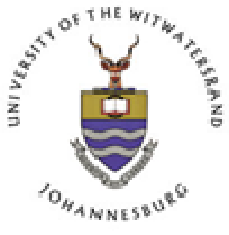

The determinants of multiple sexual partnerships among men in Zimbabwe

By

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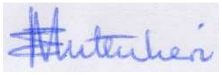
A research report submitted to the Faculty of Health sciences, University of the Witwatersrand, Johannesburg, in partial fulfillment of the requirements for the degree of Master of Science in Medicine in Epidemiology and Biostatistics

30th MAY 2012

DECLARATION

I, Enard Mutenheri, declare that this research report is my own work. It is being submitted for the degree of Master of Science in Medicine in the field of Epidemiology and Biostatistics in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

Signature……  ……..

Date …….30th MAY 2012……..

ABSTRACT

Introduction

The burden of HIV/AIDS is higher in the sub-Saharan region and multiple sexual partnerships are among the sexual behaviors that put people at risk of HIV transmission. The main aim of this study was to determine the prevalence and associated demographic, socio-economic and behavioral factors of multiple sexual partnerships among men in Zimbabwe.

Materials and Methods

This was an analytical cross-sectional study that used data from the Zimbabwe Demographic Health Survey 2005-06. Negative binomial regressions were fitted to identify factors associated with multiple sexual partnerships among men in Zimbabwe.

Results

The prevalence of multiple sexual partnerships was 13.5 %, 12.9%, and 11.2% among the formerly, never and currently married men respectively. Among the formerly married men, the risk factors significantly associated with multiple sexual partnerships included access to newspapers (RR= 1.28; 95% CI:1.02 , 1.60). Formerly married men aged 35-44 years had lower risk of engaging in multiple sex partnerships (RR = 0.59, 95%CI: 0.42, 0.83) than the other age groups. Relative to formerly married men in Manicaland, formerly married men in Mashonaland East region had lower risks of having more sexual partners. Age at first intercourse and sexual attitude were also significantly associated with multiple sexual partnerships among the formerly married men

Among the never married men, the risk factors associated with multiple sexual partnerships included employment status (RR = 1.33%; 95%CI: 1.17, 1.52), Watching TV (RR = 1.33%; 95%CI: 1.05, 1.69) and sexual attitude (RR = 1.37%; 95% CI: 1.05, 1.79).

Relative to never married men in Manicaland, the never married men in Mashonaland East and Mashonaland West had lower risks of having multiple sexual partners.

Among the married men, the risk factors associated with multiple sexual partnerships included first intercourse at the age of 19 years or below (RR = 1.07%; 95% CI: 1.04, 1.11) and sexual attitude (RR = 1.16%; 95% CI: 1.09, 1.23). Protective factors included higher level of education (RR = 0.87%; 95% CI: 0.77, 0.98), being 35-44 (RR = 0.94%; 95% CI: 0.89, 0.99) or 45-54 years old (RR = 0.93%; 95% CI: 0.88, 0.99) and being from Mashonaland East (RR= 0.89%; 95%CI: 0.85, 0.93) region.

Discussion and Conclusions

The results show that after adjusting for potential confounders in the multivariate negative binomial regression analysis; age, geographical region, education, working status, frequency of reading newspapers/magazines/TV, age at first intercourse and sexual attitude remained significantly associated with MSP. However, the extent to which each of these factors was associated with multiple sex partnership varied among marital status groups, therefore HIV/AIDS intervention programs should be designed accordingly.

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Chapter One: Introduction

1.1 General introduction

This chapter gives a general overview of the burden of HIV/AIDS in Southern Africa and the importance of multiple sexual partnerships (MSP) in influencing the spread of HIV infection. In addition, the chapter contains statement of the problem, justification for the study, aim and objectives of the study, and literature review.

1.2 Background information

According to the most recent estimates, HIV/AIDS prevalence is highest in the sub-Saharan African region. It is estimated that 33.4 million people worldwide are living with HIV and 67% of these people live in sub-Saharan Africa (UNAIDS, 2010). In Zimbabwe, the first HIV/AIDS case was reported in 1985 and by the end of the 1980s the prevalence of HIV/AIDS was 10%. It peaked at 36% between 1995 and 1997, but declined to 13.6 % in 2010. It is also estimated that at the end of 2010 in Zimbabwe, 1.3 million people were living with HIV, 140 000 people have died of HIV/AIDS and there were 1 million orphans due to HIV/AIDS (UNAIDS, 2010).

Over the years, considerable effort has been expended on understanding HIV transmission and main drivers of the HIV pandemic (Lurie and Rosenthal, 2009). It has been suggested that the main mode of HIV transmission is heterosexual sex (Ahlburg, *et al.*, 1997 ; Buve *et al.*, 2002) and that the main drivers of HIV infection in sub-Saharan Africa are multiple and concurrent partnerships, and, low prevalence of condom use and male circumcision (Halperin and Epstein, 2007 ; Mah and Halperin, 2010). In Zimbabwe, Lopman *et al.* (2007) reported that the number of sexual partners was a significant predictor of HIV incidence infection. Thus, reduction of

multiple and concurrent partnerships among men and women have been earmarked as the key priority intervention to reduce incidence of HIV in sub-Saharan Africa (Halperin and Epstein, 2007). Therefore, recently there has been an increasing interest in understanding multiple sexual partnerships (MSP) among sexually active adolescents and adults (Masatu, *et al.*, 2007; Benefo, 2007). In particular, much attention has been given to the study of prevalence and determinants of MSP (Santelli, *et al.*, 1998; Kimuna and Djamba, 2005 ; Kongnyuy, *et al.*, 2006).

1.3 Statement of the problem

Although, there is a growing literature on the influence of socio-economic factors on sexual behavior, very few studies (Santelli, *et al.*, 1998; Kongnyuy *et al.* 2006 ; Madise *et al.* 2007) have recognized that sexual behavior in response to socio-economic factors may significantly differ across marital status. Most of the studies that have examined the association of socio-economic factors and MSP have used dummy variables to capture the influence of marital status on sexual behavior. However, as stated by Yamanda and Yamanda (1985), the use of dummy variables may not adequately capture the differences in the sexual behavior between married and unmarried individuals. Under such circumstances, Madise *et al.* (2007) has recommended separate regression models for each group and this approach was taken by Uchudi *et al.* (2010) who estimated separate regression models for married and never married individuals but excluded formerly married individuals. Thus, so far, differences in sexual behavior in response to socio-economic factors across marital status have not been adequately addressed.

In addition, the previous studies that investigated the prevalence and determinants of multiple sex partnerships did not pay much attention on the nature of MSP, the dependent variable. Most of the published studies in this area have dichotomized the number of sex partners variable and used logistic regression to examine factors associated with having multiple sex partners (Santelli, *et al.*, 1998; Kimuna and Djamba, 2005 ; Kongnyuy, *et al.*, 2006).

However, Uchidi *et al.* (2010) argued that each additional sex partner puts an individual at some incremental risk of exposure to HIV infection. Thus dichotomizing the number of sex partners variable implies that an individual with two sex partners faces the same level of risk of HIV infection as someone with ten sexual partners (Elhai, *et al.*, 2008) and this categorization may lead to loss of rich information (Slymen *et al.*, 2006 ; Elhai, *et al.*, 2008). Therefore, treating the number of sex partners as a count variable in the empirical analysis of factors associated with having multiple sex partners makes count regression modeling quite attractive. For these reasons, the current study was designed to address these two issues by examining factors associated with having multiple sex partners separately for formerly married, never married and currently married men in Zimbabwe and treating the number of sexual partners as a count variable.

1.4 Justification for the study

This study, by determining the prevalence and determinants of multiple sexual partnerships among men in Zimbabwe, will contribute to the ongoing debate about understanding factors that are associated with HIV/AIDS risk sexual behaviors of men. Therefore, the results from this study will be useful to health educators as a basis for designing interventions for multiple sexual partnerships reduction among men.

1.5 Aim of the study

The aim of this study was to determine the prevalence and associated demographic, socio-economic and behavioral factors of multiple sexual partnerships among men aged 15-54 years in Zimbabwe.

1.6 Study objectives

Using data from the Zimbabwean Demographic Health Survey, 2005-2006

1. To describe the demographic, socio-economic and behavioral characteristics of men who participated in the 2005-2006 Zimbabwe Demographic Health Survey.
2. To determine the prevalence of multiple sexual partnerships among men in relation to selected socio-economic characteristics
3. To identify factors associated with multiple sexual partnerships among men stratified by marital status.

1.7 Literature review

Multiple sexual partnerships are among the sexual behaviors that put people at risk of HIV transmission. Others include the early onset of sexual activity, unprotected sex, multiple concurrent sex partners, and commercial sex (Kongnyuy, *et al.*, 2006). Several risk factors associated with multiple sexual partnerships have been identified as alcohol use, education and the main protective factors for high-risk sexual behaviors have also been identified as religion, religious affiliation and delaying sexual debut (Hill *et al.*, 2004; Kongnyuy *et al.*, 2006 and Uchudi *et al.*, 2010). However, to date there has been little agreement on the relative importance

of each of these factors. In this section, the likely impacts of the most important socio-economic and behavioral characteristics on MSP behavior are discussed.

There is consensus that alcohol use facilitates engagement in high-risk sexual behavior. Kongnyuy and Wiysonge (2007) using data from 2004 Cameroon Demographic and Health Survey concluded that alcohol use increased the probability of having extramarital sex. These findings are supported by Uthman and Kongnyuy (2008) who reported that Nigerian women who drank alcohol were more likely to have multiple concurrent sex partners. Fisher *et al.* (2007) carried out a systematic review and meta-analysis of African studies and reported that alcohol users were more likely to be HIV-positive implying that alcohol users are more likely to engage in risky sexual behavior.

Education as a mechanism of enhancing human capital skills has been regarded as one of the most powerful protective factors against risky sexual behavior (Uchudi et al., 2010). People who lack human capital skills are more likely to engage in risky sexual behavior; therefore increasing human capital skills can greatly reduce the likelihood of involvement in risky sexual behavior. It is generally accepted that formal education is one way of enhancing human capital development skills, hence people who are more educated are less likely than their less educated counterparts to engage in multiple sexual behavior. Furthermore, health education can also be acquired informally through the media, health promotion programs and campaigns (Uchudi *et al.*, 2010). Newspapers, radios and television may play an important role in health awareness and prevention of risky sexual behavior.

However, there is no clear association between education and risky sexual behavior. Three studies in Zambia, Cameroon and Brazil have shown that men with at least primary school education, were more likely to engage in extramarital activities (Benefo, 2007; Kongnyuy and Wiysonge, 2007; Hill, *et al.*., 2004). However, other studies in sub-Saharan Africa, Finland and Estonia showed the opposite; that formal education and exposure to media for both males and females reduced the likelihood of involvement in multiple sex partnerships (Uchudi *et al.*., 2010; Nikula *et al.* 2009). Another Zambian study, showed no association between education and extramarital partnerships (Kimuna and Djamba, 2005).

With regard to employment status, multiple sexual partnerships have also been attributed to physical separation between husband and wife due to work (Poudel *et al.*, 2004; Dube and Sachingongu, 2008). Therefore males who have a paid job are likely to have multiple sex partners especially if the job requires travelling (e.g. migrant laborers and truck drivers), because of the temporary separation from their spouses. Santelli, *et al.* (1998) reported that among women aged 15-44 years in USA, working outside the home was one of the risk factors for having multiple sex partners in the previous month.

Religion can be considered as one of the most powerful institutions controlling sexual behavior (Sinha, *et al*., 2007). Bingenheimer (2010, p.3) stated that “churches have contributed to the spread in Africa of an ideology that equates personal respectability and success with behavioral adherence to a moral code that proscribes premarital sex, extramarital sex and polygamy”. Similarly in Islam, extramarital sex and premarital sex are considered major sins (Shirazi and Morowatisharifabad, 2008). Youths who regularly attended worship services and religious youth

gatherings were shown to be less likely to engage in sexual activities (Sinha, *et al*., 2007). Among the adolescents and young adults, religiosity significantly decreased rates of voluntary sexual debut, frequency of sexual intercourse and the number of sexual partners for those who were sexually experienced (Haglund and Fehring, 2009).

In another study, family religiosity was negatively associated with adolescent sexual activity and the number of sexual partners (Manlove *et al*., 2008). However, Christian Tanzanian adolescents, aged 10-19 years were found to be twice more likely than their non-Christian counterparts to have had MSP and unprotected sex (Masatu, *et al*., 2009). Among Cameroonian men, religion was not significantly associated with extramarital sex (Kongnyuy and Wiysonge, 2007) and comparing religions, Christians were more likely than Muslims to have had multiple lifetime sex partners (Kongnyuy, *et al*., 2006). In another study, there was a significant difference in the risky sexual behavior among Christians affiliated to different denominations; with Evangelicals being less likely than Catholics to have had extramarital sex (Hill, *et al*., 2004).

Although a few studies have taken age at first intercourse as an outcome variable (Masatu *et al.*, 2009), most studies have used this variable to explain multiple sexual behaviors among different populations (Santelli, *et al.*, 1998; Hill *et al.* 2004; Kongnyuy *et al.*, 2006). Uchudi *et al.* (2010, p.13) stated that "early sexual activity leads to a long period of premarital sexual activity during which partner changes are relatively common, resulting in development of higher risk sexual orientation". The empirical literature has consistently found that first intercourse at a young age is associated with increased risk of engaging in multiple sexual partnerships. However, the cut-off point for age at first intercourse is not clear from the empirical literature. The cut-off points

for age at first intercourse range from 13 to 17 years (Santelli, *et al.*, 1998; Hill *et al.*, 2004; Kongnyuy *et al.*, 2006; Masatu *et al.*, 2009 ; Uchudi *et al.*, 2010)

Culture has emerged as an important factor in explaining sexual behaviors in many societies. An example is the African culture that permits polygamy and condones males' promiscuity because there is a general belief that men's sexual drives cannot be controlled (Shelton, 2009). The proxy measures for culture which have been mainly used in the empirical literature are; place of residence (rural/urban), geographical regions, race and ethnicity. Although, living in an urban area has been associated with an increased risk of engaging in extramarital sex (Benefo, 2007), most studies did not find any significant difference in sexual behavior of urban and rural residents (Kimuna and Djamba 2005; Maise *et al.*, 2007; Kongnyuy and Wiysonge, 2007 ; Uchudi *et al.*, 2010). Differences in sexual behaviours between geographical regions have also been demonstrated (Hill *et al.*, 2004; Kimuna and Djamba, 2005; Kongnyuy and Wiysonge, 2007). In addition, sexual attitude towards extramarital and causal sex has been hypothesized to be associated with both ethnicity and multiple sexual partnerships (Ahrold and Meston, 2008).

Previous research suggests that marital status is a significant predictor of multiple sexual partnerships (Santelli, *et al.*, 1998; Kongnyuy *et al.* 2006; Madise *et al.* 2007). Although, Kongnyuy *et al.* (2006) reported that being married increased the risk of engaging in extramarital sex among Cameroonian men, most studies found marriage to be a protective factor from involvement in multiple sex partnerships (Santelli, *et al.* 1998; Madise *et al.* 2007; Hill *et al.* 2004).

However, Uchudi *et al.* (2010) used a different approach all together. Instead of including marital status as a predictor variable in the regression model, they ran separate regression models for married and unmarried participants in addition to a model combining both married and unmarried participants. The rationale is that association between each predictor and multiple sexual behaviors differs by marital status. This is a reasonable argument since the results from Uchudi *et al.* (2010) study show that the associations are different for some of the variables in terms of both significance and size of the coefficients. However, Uchudi *et al.* (2010) study was not exhaustive since they excluded widowed/divorced/separated participants. It is very important to investigate how the sexual behavior of the formerly married men or women compare with that of never and currently married men or women.

Chapter Two: Methodology

2.1 Introduction

This chapter describes the methods that were used to collect and analyze the data used in this study. The study design is explained first, then followed by a presentation of sampling strategy, study population, sample size, study variables, statistical methods of data analysis and ethics approval.

2.2 Study design

This is an analytical cross-sectional study, based on secondary data drawn from the 2005-2006 Zimbabwe Demographic and Health Survey (ZDHS). The main purpose of the ZDHS sample was to provide estimates for population and health indicators at the national and provincial levels (Central Statistical Office, Harare, 2006).

2.2.1 Sampling strategy

The Zimbabwe Demographic and Health Survey stratification was based on the 10 provinces (Manicaland, Mashonaland East, Mashonaland West, Mashonaland Central, Midlands, Masvingo, Matebeleland North, Matebeleland South, Bulawayo and Harare). One urban stratum was formed each for Bulawayo and Harare, while each of the remaining eight provinces was further divided into four strata according to land use: communal lands, large-scale commercial farming areas, urban and semi-urban areas, and small scale commercial farming areas and resettlement areas. Thus a total of 34 strata were formed. The sampling design was carried out in two stages. The first stage sampling units were enumeration areas and the second stage sampling

units were households. In total, 1200 enumeration areas were selected with probability proportional to the size; the size being the number of households enumerated in the 2002 census. The random sampling technique was used to select households. People living in institutional households (e.g. army barracks, hospitals, police camps, boarding schools) were excluded. The details of the ZDHS sample design are described elsewhere (Central Statistical Office, Harare, 2006)

The ZDHS used three questionnaires, namely the Household Questionnaire, the Women's Questionnaire, and the Men's Questionnaire, to collect data on health, sexual, marital and household characteristics from a nationally representative sample of women aged 15-49 years and men aged 15-54 years. This study used the men's questionnaire to extract demographic, socio-economic and behavioral characteristics of all men who participated in the ZDHS.

2.2.2 Study population

The study population comprised of men aged 15-54 years, who were either permanent members of selected households or visitors present in the selected households a night before the day of the survey. Thus, the Men's Questionnaire is the only source of the data for this study.

2.2.3 Sample size

The ZDHS collected information from a nationally representative sample of 7,175 males aged 15-54 years. The sample was divided into 3 marital status categories; never married, currently married and formerly married. The currently married category comprised the officially married (n = 3,178) or cohabiting (n = 189) men, and thus making a total of 3,367. The formerly married

category comprised the divorced, separated or widowed men. In this category, 264 reported that they were either divorced or separated, while 89 reported that they were widowed. Thus, a total of 353 men were classified under the formerly married category and the remaining 3,455 were classified under the never married category. Never married males who reported that they were not sexually experienced (n = 1,853) were discarded such that the final sample of 5,381 sexually active men was used for the study.

2.3 Study variables

2.3.1 Outcome variable

The outcome variable used in this study was derived from data collected on the number of sex partners, including wife, in the past twelve months prior to the survey. This variable was used as a proxy for multiple sexual partnerships. For use in the analytical analysis, the multiple sexual partnerships variable was treated as a count variable taking values from 0 to 21was recoded as both a binary variable and count variable. However, very few participants (n = 32) reported more than three partners in the past twelve months prior to the survey; therefore the variable was also recoded to take values from 0 up to a maximum of 3 for use in the descriptive analysis. Furthermore, the multiple sexual partnerships variable was recoded as a dichotomous variable, taking a value of “1” if a man reported two or more sex partners in the past twelve months prior to the survey and “0” for no or one partner. (Table 2.1).

Table 2.1. Definitions of outcome and demographic variables

Variable	Description	Code
Outcome variables		
Multiple sexual partnerships	Number of sex partners, including wife, in the past 12 months	0-21 in analytic analysis
Multiple sexual partnerships	Above variable collapsed categories	0-3 in descriptive analysis
Multiple sexual partnerships	Above variable collapsed categories	1= at least two 0 = none or one
Demographic factors		
Age (years)	Age of respondent	1= 15-24 2 = 25-34 3 = 35-44 4 = 45-54
Place of residence	Rural/Urban	1 = urban 2 = rural
Region	Geographical region of respondent	1 = Manicaland 2 = Mashonaland Central 3 = Mashonaland East 4 = Mashonaland West 5 = Matebeleland North 6 = Matebeleland South 7 = Midlands 8 = Masvingo 9 = Harare 10 = Bulawayo

2.3.2 Independent variables

The independent variables were selected from demographic, socio-economic, and behavioral factors hypothesized to be associated with multiple sexual partnerships.

Demographic factors

As shown in table 2.1, the demographic variables included in this study were age (categorical; 15-24, 25-34, 35-44 and 45-54). The other variables were geographical region (categorical; comprised of the 10 provinces in Zimbabwe) and place of residence (rural or urban).

Socio-economic factors

This study included four variables characterizing socio-economic status of the men (Table 2.2). These variables were; whether a participant has been away from home for more than a month in the last 12 months prior to the interview (away from home; yes =1, no = 0), education (categorical variable; none, primary, secondary and higher) , whether the participant has worked in the last 12 months prior to the interview (working status; yes =1, no = 0) and access to media (measured by frequency of reading newspapers or magazines, listening to radio and watching television). Access to media was used as a categorical variable (not at all, less than once a week, at least once a week, almost every day).

Table 2.2. Definitions of socio-economic variables

Variable	Description	Code
Away from home	Away from home for more than one month	0 = no 1 = yes
Education	Educational attainment	0 = no education 1= primary 2 = secondary 4 = higher
Working status	Has worked in last 12 months prior to interview	0 = No 1 = Worked in last 12 months 2 = Currently working
Access to media	Frequency of reading newspaper or magazine	0 = Not at all 1 = Less than once a week 2 = At least once a week 3 = Almost every day
	Frequency of listening to radio	0 = Not at all 1 = Less than once a week 2 = At least once a week 3 = Almost every day
	Frequency of watching television	0 = Not at all 1 = Less than once a week 2 = At least once a week 3 = Almost every day

Behavioral characteristics

Table 2.3 shows the measures of the behavioral variables included in this study. Religion was classified according to whether the participant was a Christian or not, and the frequency of religious services attendance was also recoded.

Table 2.3 Definitions of behavioral variables

Variable	Description	Coding
Religious factors		
Religion	Christian	0 = Non-Christian 1 = Christian
Religious Service attendance	Number of religious services attended in last month	1-31
	Above variable collapsed categories	0 = none 1= 1-3 (less frequent) 2 = 4 or more (more frequent)
Marital status		0 = never married 1 = currently married 2 = formerly married
Age at first intercourse (years)	Age at first intercourse	
	Early age at first intercourse	0 = if age at first intercourse ≥ 20 1 = if age at first intercourse ≤ 19
Sexual attitude	Husband has right to have sex with another women	0 = No 1 = Yes

The cut-off point for early age of first intercourse was based on the mean sexual debut (19 years) of the sexually experienced men who participated in the survey. Therefore early age of first intercourse was defined as ≤ 19 years. The other behavioral variables included in the study were marital status (formerly married, never married and currently married). Formerly married included divorced, separated or widowed and currently married included officially married and cohabiting men. Sexual attitude was defined according to whether the participant agreed with

the notion that “husband has right to have sex with other women”.

2.4 Statistical methods of data analysis

The ZDHS, as described above, has a complex sampling design, therefore the analyses took into account sampling weights, stratification and clustering nature of the data (using the svy Stata command). The analyses were done in three stages; descriptive, bivariate and multivariate. In the descriptive analysis stage, frequencies and percentages were used to describe the socio-economic characteristics of the men. Chi-square tests were performed to test for significant differences in the prevalence of multiple sexual partnerships among marital status categories.

The Negative Binomial Regression model

The outcome variable used in this study represents a count of the number of sexual partners for each individual *i* in a given time period and thus it takes discrete values with non-negative integer values. Linear regression methods for such count data are not appropriate (result in biased, inefficient and inconsistent estimates) since the fundamental assumptions of Ordinary Least Squares Method are violated (Winkelmann, 2000). The basic count data model is the Poisson regression model specified as follows;

$\Pr(y_i/\mu_i) = \frac{\exp(-\mu_i)\mu_i^{y_i}}{y_i!}$: (y = 0, 1 , 2 …….)

Where $\mu_i = E(y_i/x_i) = \exp(x_i\beta)$

However, the Poisson regression model fits well if the following assumptions are valid;

(i) Observations are independent

(ii) Homogeneity of μ

(iii) Conditional mean is equal to the conditional variance

[equi-dispersion $i.e. Var(y) = E(y) = \mu$].

In practice the variance may be significantly greater (over-dispersion) or less (under-dispersion) than the mean (Famoye, 1995 and Ullah, *et al.*, 2009). Over-dispersion and under-dispersion lead to biased estimated standard errors.

A Negative Binomial Regression model overcomes some of the problems arising from the use of a Poisson regression model. The Negative Binomial regression lifts the independence of observation assumptions, and incorporates observed and unobserved heterogeneity into the conditional mean (Winkelmann, 2000). The Negative Binomial Model is specified as follows:

$$Pr(y_i/x_i) = \frac{\Gamma(y_i + v_i)}{y_i!\,\Gamma(v_i)}\left(\frac{v_i}{v_i + \mu_i}\right)^{v_i}\left(\frac{\mu_i}{v_i + \mu_i}\right)^{y_i}$$

Where $E(y_i/x_i) = exp(x_i\beta + \varepsilon_i) = \mu_i$

and $Var(y_i/x) = \mu_i\left(1 + \frac{\mu_i}{\alpha^{-1}}\right) = \mu_i(1 + \alpha\mu_i) = \mu_i + \alpha\mu_i^2$ (assuming that v = α^{-1})

In the bivariate analysis, a negative binomial regression model was estimated to assess the relationship between the number of sexual partners and each of the selected demographic, socio-economic and behavioral characteristics. Unadjusted relative risk ratios and their confidence levels at 95% were estimated and variables were retained in the model, if the association was significant at the 10 % level.

Finally, in the multivariate analysis, a negative binomial regression model was used to determine the factors independently associated with multiple sexual partnerships at the 5% level of significance. Adjusted relative risk ratios and their confidence levels at 95% were estimated.

2.5 Ethics approval

The University of Witwatersrand Committee for Research on Human Subjects approved the study. The protocol number is M110531. Permission to use the ZDHS dataset was granted by Macro International USA.

Chapter Three: Results

3.1 Introduction

This chapter presents results of the study. The prevalence and factors associated with multiple sexual partnerships among men in Zimbabwe are described in detail below. Analytical statistics for bivariate and multivariate analyses are all presented in this chapter.

3.2 Description of study participants

Table 3.1 describes the demographic characteristics of study participants. A total of 5,381 men were included in the analyses. The overall mean age was 31 (SD = 9.98). Figure 1 shows the distribution of ZDHS participants in each province. More than half (58.2 %) of the participants were residing in urban areas. A greater proportion of the men were from the Harare (18.5%) and Midlands (13.7%) provinces while the smallest proportion (3.9%) was from Matebeleland South.

The number of participants without formal education was 124(1.7%). The majority of participants had some primary (29.5%), secondary (63.3%) or tertiary education (5.5%). The majority (82.3 %) of the men had worked in the previous 12 months. About 33% reported that they had been away from their families for more than a month. Radio was the most common means of access to the media with 65.4% of the participants listening to the radio at least once a week. This was followed by Watching TV (44%) and reading of newspapers and magazines (41.5%).

Table 3.1 Distribution of Demographic, Socio-economic and Behavioral characteristics of the study participants

Characteristic	**Number**[1]	**Percentage**
Total	**5381**	**100**
Demographic characteristics		
Age (mean= 31; SD=9.98)		
15-24	1636	30.4
25-34	1901	35.3
35-44	1125	20.9
45-54	719	13.4
Residence		
Rural	3135	41.8
Urban	2246	58.2
Province		
Manicaland	561	10.4
Mashonaland Central	559	10.4
Mashonaland East	422	7.8
Mashonaland West	578	10.7
Matebeleland North	347	6.5
Matebeleland South	212	3.9
Midlands	738	13.7
Masvingo	583	10.8
Harare	997	18.5
Bulawayo	385	7.3
Socio-economic characteristics		
Education		
None	124	1.7
Primary	2113	29.5
Secondary	4541	63.3
Higher	397	5.5
Away from home		
Yes	1046	33.3
No	2097	66.7
Working status		
No	951	17.7
Yes	4428	82.3
Newspaper reading		
None	1977	36.7
Less than once a week	1170	21.8
At least once a week	1348	25.1
Almost every day	882	16.4

[1] weighted counts

Table 3.1 continued----------

Characteristic	**Number**[2]	**Percentage**
Listening to radio		
None	1161	21.6
Less than once a week	698	13.0
At least once a week	931	17.3
Almost every day	2587	48.1
Watching TV		
None	2360	43.9
Less than once a week	651	12.1
At least once a week	717	13.4
Almost every day	1646	30.6
Behavioral characteristics		
Religion		
Non-Christians	2001	37.3
Christians	3371	62.8
Religious service attendance		
None	1021	26.4
Less frequent	1150	29.7
More frequent	1699	43.9
Marital status		
Never married	1612	30.0
Currently married	3419	63.5
Formerly married	350	6.5
Age at first intercourse		
≤19 years	2214	41.8
≥20 years	3078	58.2
Sexual attitude		
No	4729	87.9
Yes	648	12.1

[2] weighted counts

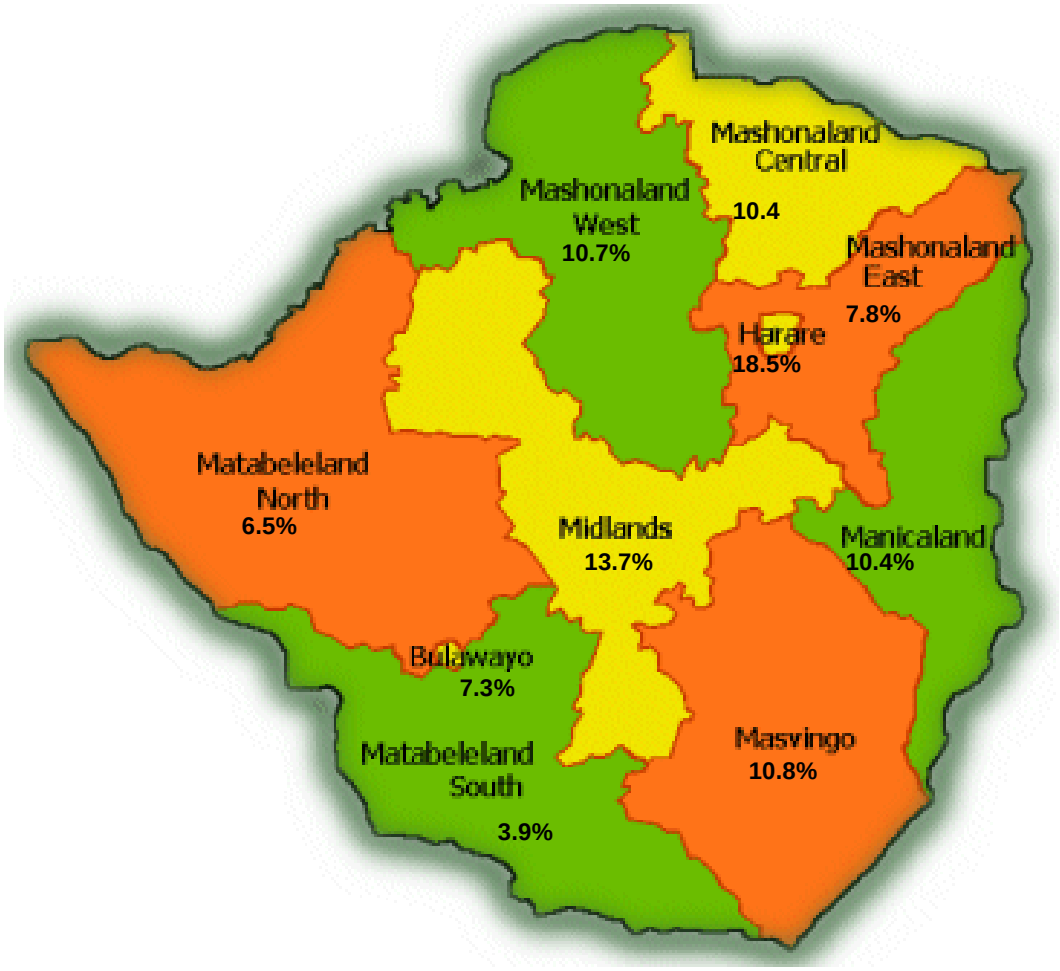

Figure 1 Provinces of Zimbabwe showing distribution of ZDHS participants in each province

About 63% of the participants were Christians. Of those who attended religious services, 43.9% attended more than 4 times a week and 29.7% attended less frequently. The majority of the participants were married (63.5%), and 6.5% were formerly married. The mean age of first intercourse was 19.2 years with ages ranging from 8 to 43 years (Table 3.1). Eighty eight percent of the men disagreed with the idea of engaging in extramarital sex.

3.3 Comparison of prevalence of multiple sexual partnerships among men in relation to selected risk factors

3.3.1 Demographic characteristics

As shown in Table 3.2, nearly 12% of the participants had two or more sexual partners in the previous 12 months (11.9 %, 95% CI: 10.7- 13.2). Significant differences in the prevalence of multiple sexual partnerships were observed across age and region.

Table 3.2: Prevalence of multiple sexual partnerships among men in relation to selected demographic factors

Characteristic	Freq	% reporting multiple partners (i.e. more than one partner in the past 12 months prior to interview date), 95% CI	p-value
All men	**602**	**11.86 (10.7 , 13.2)**	
Age group			<0.001
15-24	209	14.5 (12.2 , 17.2)	
25-34	239	12.7 (11.1 , 14.6)	
35-44	92	8.9 (6.8 , 11.5)	
45-54	62	8.2 (6.3 , 10.7)	
Residence			0.955
Rural	388	11.9 (10.5 , 13.4)	
Urban	214	11.8 (9.8 , 14.2)	
Region			0.002
Manicaland	72	14.1 (11.4 , 17.3)	
Mashonaland Central	74	13.9 (11.5 , 16.7)	
Mashonaland East	13	3.6 (2.2 , 5.7)	
Mashonaland West	65	13.6 (10.9 , 16.9)	
Matebeleland North	54	11.7 (7.7 , 17.4)	
Midlands	78	11.2 (7.4 , 16.5)	
Masvingo	95	16.7 (14.2 , 19.6)	
Harare	95	12.5 (9.2, 16.7)	
Bulawayo	51	10.2 (7.1 , 14.4)	

The prevalence of MSP in the last 12 months significantly decreased with age ($p < 0.001$). Across the regions, Masvingo (16.7%; 95% CI, 13.8 , 19.9), Manicaland (14.1%: 95% CI, 11.4 , 17.3%), Mashonaland Central (13.9%; 95% CI, 11.5 , 16.7) and Mashonaland West (13.6%; 95% CI, 10.9 , 16.7) had the highest proportions of sexually active men with multiple sex partners while Mashonaland East (3.6%; 95% CI, 2.2 , 5.7) had the lowest proportion of men with multiple sex partners ($p < 0.001$).

3.3.2 Socio-economic characteristics

Table 3.3: Prevalence of multiple sexual partnerships among men in relation to selected socio-economic factors

Characteristic	Freq	% reporting multiple partners, 95% CI	p-value
Education			0.080
None	17	17.5 (10.3 , 28.2)	
Primary	128	11.8 (9.5 , 14.6)	
Secondary	212	11.3 (9.5 , 13.4)	
Higher	13	6.1 (3.2 , 11.6)	
Away from home			0.620
Yes	162	15.8 (12.7 , 18.4)	
No	276	14.8 (13.0 , 16.8)	
Working status			0.010
No	82	8.8 (6.8 , 11.3)	
Yes	519	12.5 (11.2 , 14.0)	
Newspaper reading			0.358
None	231	10.9 (9.3 , 12.9)	
Less than once a week	147	13.6 (11.4 , 16.3)	
At least once a week	137	11.6 (9.8 , 13.8)	
Almost every day	87	12.1 (10.7 , 13.2)	
Listening to radio			0.149
None	127	9.9 (8.1 , 12.0)	
Less than once a week	97	14.2 (11.3 , 17.6)	
At least once a week	121	12.8 (10.4 , 15.7)	
Almost every day	255	11.8 (9.9 , 13.9)	
Watching TV			0.001
None	279	11.0 (9.4 , 12.8)	
Less than once a week	89	17.5 (13.8 , 22.1)	
At least once a week	91	13.7 (10.9 , 17.0)	
Almost every day	143	10.2 (8.5 , 12.2)	

As shown in table 3.3, the prevalence of multiple sexual partnerships did not significantly differ by education status (p = 0.080). There were significantly more men with multiple sex partners who were employed compared to men who were not employed (12.5% versus 8.8%, p = 0.010). The prevalence of multiple sexual partnerships significantly differed by access to televisions (p = 0.001)

3.3.3 Behavioral characteristics

Table 3.4: Prevalence of multiple sexual partnerships among men in relation to selected behavioral factors

Characteristic	Freq	% reporting multiple partners (i.e. more than one partner in the past 12 months prior to interview date), 95% CI	p-value
Religion			0.034
Christians	339	10.9(9.39 , 12.63)	
Non-Christians	262	13.5(11.79 , 15.4)	
Religious service attendance			0.001
None	128	14.1 (11.5 , 17.2)	
Less frequent	137	13.1 (10.7 , 15.9)	
More frequent	148	8.6 (7.0 , 10.6)	
Marital status			0.294
Never married	186	12.9 (10.8 , 15.3)	
Currently married	370	11.2(9.8 , 12.9)	
Formerly married	46	13.5(10.0 , 17.8)	
Age at first intercourse			<0.001
≥ 20	160	7.5 (6.3 , 9.0)	
≤ 19	437	15.2 (13.6 , 17.0)	
sexual attitude			<0.001
No	469	10.2 (9.2 , 11.3)	
Yes	133	24.1 (19.7 , 29.2)	

Table 3.4 shows that, the prevalence of multiple sex partners was significantly higher among non-Christians than among Christians (13.5% versus 10.9%, p = 0.034). The prevalence of multiple sexual partnerships was significantly lower among those who attended religious

services more frequently than among those who attended religious services less frequently (8.6 versus 13.1%) and among those who did not attend any religious service (8.6% versus 14.1%), ($p = 0.001$).

The prevalence of multiple sex partnerships was significantly higher among men who had first intercourse at the age of 19 years or below than men who had first intercourse at the age of 20 years or more (15.2 % versus 7.5 %, $p < 0.001$). The prevalence of multiple sexual partnerships was significantly higher among men who supported the notion of multiple sex partnerships than men who did not support the notion of multiple sex partners (24.1% versus 10.2%, $p < 0.001$).

3.3.5 Multiple sex partnerships by marital status

The proportion of the participants who reported two or more partners was not significantly different across the three marital statuses ($p = 0.294$).

Table 3.5 Number of sex partners in previous 12 months, according to marital status

Number of sex partners	Formerly married %	Never married %	Currently married %	All men %
0	33.8(28.5, 39.6)	34.5(31.4, 37.6)	1.0(0.7, 1.6)	13.2(12.1, 14.4)
1	52.7(47.1, 58.2)	52.6(49.7, 55.6)	87.7(86.1, 89.2)	75.0(73.5, 76.33)
2	8.9(6.3 , 12.4)	10.2(8.5 , 12.1)	10.0(8.6 , 11.5)	10.0(8.9 , 11.2)
≥ 3	4.6(2.6 , 7.7)	2.7(1.8 , 4.1)	1.3(0.9 , 1.8)	1.9(1.5 , 2.4)
Mean	0.8522727	0.8417761	1.123438	1.020704
Variance	0.707459	0.951796	0.292107	0.536092
Minimum	0	0	0	0
Maximum	6	13	21	21

As shown in Table 3.5, the number of sexual partners among the participants ranged from 0 to 21. The number of sexual partners varied across the three groups; the number of sexual partners ranged from 0 to 6 among the formerly married, from 0 to 13 among the never married and from 0 to 21 among the married men.

Seventy-five percent of the participants, reported 1 partner and 13.2% reported no sexual activity in the past 12 months. The prevalence of abstinence was 34.5% among the never married, 33.8% among the formerly married and 1% among the married. Nearly 5% of the formerly married, 2.7% of the never married and 1.3% of the married men reported 3 or more sexual partners [$F(1.97, 362.13)$; $p < 0.001$].

3.4 The determinants of multiple sexual partnerships among a sample of Zimbabwean men

3.4.1 Bivariate negative binomial regression analysis

The negative binomial regression model was used to calculate relative risks and 95% confidence intervals for the risk factors (Table 3.6). Region was the only factor that was significantly associated with multiple sex partnerships among the three marital status groups.

Age, education, age at first intercourse and sexual attitude were significantly associated with MSP among the formerly and currently married men. Among the formerly married men; residence and newspaper reading were significantly associated with MSP. Among the never married men; working status and Watching TV were significantly associated with MSP.

In addition to these, away from home (among formerly and currently married men), sexual attitude (among never married) were significant at 10% level and were also included in the multivariate negative binomial regression analyses;

Table 3.6: Bivariate negative binomial regression analysis of factors associated with multiple sexual partnerships in the last 12 months

Characteristics	Formerly married RR(95% CI)	Never married RR(95% CI)	Currently married RR(95% CI)
Demographic factors			
Age			
15-24	1.00	1.00	1.00
25-34	0.91 (0.67 , 1.24)	0.90 (0.77 , 1.06)	0.96 (0.91 , 1.01)
35-44	0.49 (0.35 , 0.69)***	0.54 (0.27 , 1.08)	0.92 (0.87 , 0.97)***
45-54	0.49 (0.25 , 0.62)***	0.71 (0.38 , 1.35)	0.91 (0.87 , 0.97)***
Residence.			
Urban	1.00	1.00	1.00
Rural	0.76 (0.61 , 0.97)**	1.11 (0.93 , 1.31)	1.01 (0.98 , 1.05)
Region			
Manicaland	1.00	1.00	1.00
Mashonaland Central	0.70 (0.45 , 1.08)*	1.24 (0.80 , 1.90)	1.00 (0.94 , 1.07)
Mashonaland East	0.52 (0.36 , 0.74)***	0.67 (0.51 , 0.90)***	0.90 (0.86 , 0.95)***
Mashonaland West	0.89 (0.62 , 1.27)	0.81 (0.60 , 1.08)	1.02 (0.96 , 1.08)
Matebeleland North	0.85 (0.59 , 1.23)	1.04 (0.85 , 1.28)	1.01 (0.93 , 1.09)
Midlands	0.77 (0.50 , 1.19)	0.93 (0.65 , 1.32)	0.98 (0.92 , 1.05)
Masvingo	1.17 (0.66 , 2.07)	1.31 (1.02 , 1.68)**	1.04 (0.95 , 1.14)
Harare	1.01 (0.68 , 1.50)	0.81 (0.63 , 1.03)*	0.99 (0.93, 1.05)
Bulawayo	0.96 (0.68 , 1.37)	0.99 (0.79 , 1.24)	0.96 (0.91 , 1.01)
Socio-economic factors			
Education			
None	1.00	1.00	1.00
Primary	2.28 (0.79 , 6.54)	1.35 (0.70 , 2.61)	0.90 (0.82 , 1.00)**
Secondary	2.92 (1.02 , 8.35)**	1.64 (0.84 , 3.22)	0.89 (0.77 , 1.02)*
Higher	2.66 (0.69 , 10.34)	1.11 (0.57 , 2.18)	0.86 (0.77 , 0.96)***
Away from home			
No	1.00	1.00	1.00
Yes	1.22 (0.95 , 1.55)*	1.14 (0.86 , 1.51)	1.03 (0.95 , 1.10)*
Working status			
No	1.00	1.00	1.00
Yes	1.13 (0.85 , 1.51)	1.34 (1.12 , 1.59)***	1.03 (0.98 , 1.09)
Newspaper reading			
None	1.00	1.00	1.00
Less than once a week	1.47 (1.16 , 1.88)***	1.07 (0.77 , 1.49)	1.03 (0.98 , 1.09)
At least once a week	1.43 (1.09 , 1.89)***	1.08 (0.90 , 1.31)	0.99 (0.95 , 1.03)
Almost everyday	1.79 (1.14 , 2.81)***	0.91 (0.74 , 1.12)	0.99 (0.94 , 1.04)

Table 3.6 continued……

Characteristics	Formerly married RR(95% CI)	Never married RR(95% CI)	Currently married RR(95% CI)
Watching TV			
None	1.00	1.00	1.00
Less than once a week	1.23 (0.95 , 1.59)	1.29 (0.85 , 1.94)	1.03 (0.97 , 1.10)
At least once a week	0.95 (0.70 , 1.27)	1.30 (1.01 , 1.68)**	0.99 (0.94 , 1.04)
Almost everyday	1.25 (0.87 , 1.81)	0.88 (0.75 , 1.03)	0.98 (0.94 , 1.03)
Behavioral factors			
Age at first intercourse			
≥20	1.00	1.00	1.00
≤ 19	1.47 (1.46 , 1.48)***	1.18 (0.95 , 1.47)	1.09 (1.05 , 1.12)***
Sexual attitude			
No	1.00	1.00	1.00
Yes	1.61 (1.21 , 2.13)***	1.36 (1.0 , 1.85)*	1.18 (1.11 , 1.25)***

Coefficients are relative risks. *p < 0.10, **p < 0.05, ***p < 0.01

3.4.2 Multivariate negative binomial regression analysis of factors associated with multiple sexual partnerships

In multivariate analysis (Table 3.7) the following factors were significantly associated with MSP; age, region, education, working status, newspaper reading, Watching TV, age at first intercourse and sexual attitude and details of the results are presented below.

Demographic factors

Age and region were the only demographic factors which were significantly associated with MSP. Age was associated with MSP among formerly and currently married men. Among the formerly married men, the risk of MSP was higher in men aged 15-24 compared with either men aged 35-44 (RR = 0.59%; 95%CI: 0.42, 0.83) or men aged 45-54 (RR = 0.48%; 95%CI: 0.29, 0.79).

Table 3.7: Multivariate negative binomial regression results for factors associated with multiple sexual partnerships in the last 12 months

	Formerly married RR(95% CI)	Never married RR(95% CI)	Currently married RR(95% CI)
Demographic factors			
Age			
15-24	1.00		1.00
25-34	1.06 (0.76 , 1.45)		0.98 (0.93, 1.03)
35-44	0.59 (0.42 , 0.83)***		0.94 (0.89 , 0.99)**
45-54	0.48 (0.29 , 0.79)***		0.93 (0.88 , 0.99)**
Region			
Manicaland	1.00	1.00	1.00
Mashonaland Central	0.68 (0.44 , 1.05)	1.10 (0.76 , 1.59)	0.98 (0.92 , 1.05)
Mashonaland East	0.52 (0.39 , 0.71)***	0.65 (0.49 , 0.87)***	0.89 (0.85, 0.93)***
Mashonaland West	0.88 (0.64 , 1.22)	0.73 (0.56 , 0.96)**	1.00 (0.94 , 1.06)
Matebeleland North	0.95 (0.67 , 1.36)	1.13 (0.92 , 1.38)	0.99 (0.92 , 1.06)
Midlands	0.89 (0.63 , 1.28)	0.90 (0.63 , 1.29)	0.99 (0.93 , 1.05)
Masvingo	1.39 (0.79 , 2.42)	1.27 (1.00, 1.61)*	1.05 (0.96 , 1.16)
Harare	0.83 (0.56 , 1.23)	0.79 (0.61 , 1.01)*	0.98 (0.92 , 1.03)
Bulawayo	0.82 (0.60 , 1.11)	1.01 (0.80 , 1.27)	0.97 (0.91 , 1.02)
Socio-economic characteristics			
Education			
None	1.00		1.00
Primary	1.15 (0.39 , 3.33)		0.91 (0.82 , 1.02)
Secondary	1.22 (0.42 , 3.56)		0.89 (0.77 , 1.03)
Higher	0.86 (0.24 , 3.16)		0.87 (0.77 , 0.98)**
Away from home			
No	1.00		
Yes	1.04 (0.76 , 1.44)		
Working status			
No		1.00	
Yes		1.33 (1.17 , 1.52)***	

Table 3.7 continued……..

	Formerly married RR(95% CI)	Never married RR(95% CI)	Currently married RR(95% CI)
Newspaper reading			
None	1.00		
Less than once a week	1.28 (1.02 , 1.60)**		
At least once a week	1.29 (0.96 , 1.74)		
Almost everyday	1.48 (0.98 , 2.23)		
Watching TV			
None		1.00	
Less than once a week		1.29 (0.92 , 1.79)	
At least once a week		1.33 (1.05 , 1.69)**	
Almost everyday		1.01 (0.85 , 1.21)	
Behavior characteristics			
Age at first intercourse			
≥20	1.00		1.00
≤ 19	1.31(1.03 , 1.66)**		1.07 (1.04,1.11)***
Sexual attitude			
No	1.00	1.00	1.00
Yes	1.53(1.22 , 1.92)***	1.37 (1.05 , 1.79)**	1.16(1.09, 1.23)***

***, ** and *significant at 1%, 5% and 10% level respectively

Among the currently married men, the risk of MSP was about 6% higher in men aged 15-24 compared with either men aged 35-44 (RR = 0.94%; 95%CI: 0.89, 0.99) or men aged 45-54 (RR = 0.93%; 95%CI: 0.88, 0.99). There were regional variations in MSP among the three marital status groups. Overall, men in Mashonaland East had less risk of MSP compared with men in Manicaland. Among the never married, men in Mashonaland West had 27% lower risk of MSP, compared with men in Manicaland (RR = 0.73%; 95%CI: 0.56, 0.96).

Socio-economic factors

Education was associated with MSP among the currently married men only. Currently married men with at least tertiary education had a 13% lower risk of MSP compared with their counterparts who had no formal education (RR = 0.87%; 95% CI: 0.77, 0.98).

Among the never married, employed men had 33% increased risk of having more sexual partners compared with those who were not employed (RR = 1.33%; 95%CI: 1.17, 1.52). Newspaper reading was associated with MSP among the formerly married men only. Generally, MSP risk increased with frequency of reading newspapers. The MSP risk among formerly married men was 28% higher for men with access to newspapers daily (RR = 1.28%; 95%CI: 1.02, 1.60) compared with their counterparts with no access to newspapers. Among the never married, watching TV was associated with multiple sexual partnerships. Men who had access to a television for at least once per week had 33% increased risk of having MSP compared with those who had no access to Television at all (RR = 1.33%; 95% CI: 1.05 , 1.69)

Behavioral factors

Age at first intercourse was significantly associated with MSP among the formerly and currently married men. Formerly married men who had first intercourse at the age of 19 or below had 31% higher risk of MSP compared with those who had first intercourse at the age of 20 or above (RR = 1.33%; 95% CI: 1.03, 1.66). Sexual attitude was associated with MSP among the three marital status groups. formerly married men who accepted multiple sexual partner behavior had a 53% increased risk of MSP compared with those who did not accept multiple sexual partner behavior (RR = 1.53%; 95% CI: 1.22, 1.92).

Chapter Four: Discussion

This chapter provides a discussion of findings of the study about the prevalence and associated factors of multiple sexual partnerships among men aged 15-54 years in Zimbabwe in relation to the literature. The limitations of the study are also proposed

4.1 Prevalence of multiple sex partnerships

This study has shown that 11.86% of sexually active Zimbabwean men had multiple sexual partners during the time of the survey. This MSP prevalence is; however, lower than what has been reported in previous studies done in Zimbabwe. For example, Meekers's (2003) study found that 67.1% of the men aged 20-35 had multiple sexual partners. In another study, Lopman *et al.* (2007) reported MSP prevalence of 22.8% among males aged 17-54 years and a recent study by Mavhu, *et al.* (2011) reported MSP prevalence of 37.1 % among men aged 18-44 years. This observed difference can be explained by the limitations of the previous studies which were based on non-representative samples. Meekers (2003) studied relatively young males who were employed, on the other hand, Lopman *et al.* (2007) studied men from one province (Manicaland), while Mavhu, *et al.* (2011) studied males from four rural districts. However, the current study, used data collected from a nationally representative sample of males. The results have indicated that MSP prevalence significantly decreased with increasing age ($p < 0.001$). This characteristic has been reported by Olayinka *et al.* (2000) who determined the MSP prevalence among a sample of men residing in Harare. Further analysis (qualitative approach) is needed to establish why MSP prevalence decreases with increasing age.

Whether, marriage is a protective or risk factor of MSP among men has received considerable attention in the literature. Kongnyuy *et al.* (2006) reported a lower MSP prevalence among

unmarried men compared with formerly and married men in Cameroon. Uchudi *et al.* (2010), however showed mixed findings with higher prevalences in Kenya, Lesotho and Swaziland but lower prevalences in Mali, Niger, Senegal, Sierra Leone and Zambia. A qualitative study carried out at a university in Zimbabwe by Chireshe and Chireshe (2011) found that monogamous marriages may not necessarily protect individuals from risk of MSP. The results from the current study indicated that MSP prevalence was 13.5% among the formerly married, 12.9% among the never married and 11.2 % among the married men. However this observed difference was not statistically significant ($p = 0.294$). A possible explanation for the observed differences between countries could be due to the differences in socio-cultural practices across countries. In some countries premarital sex is highly discouraged but no controls are put in place to limit extramarital sex.

4.2 Factors associated with multiple sexual partnerships

The results of the study identified two demographic, four socio-economic and two behavioral characteristics that were significantly associated with multiple sexual partnerships among men and these results are discussed below.

In the multivariate negative binomial regression analysis, the following factors remained significantly associated with MSP; demographic factors: (age, province), socioeconomic factors: (education, working status, frequency of reading newspapers, Watching TV) and behavioral factors: (age at first intercourse and sexual attitude). However, the extent to which each of these factors was associated with multiple sex partnership significantly varied across the three different groups; namely the formerly, never and married men and thus justifying the use of disaggregated data

4.2.1 Demographic factors

Age

In the multivariate negative binomial regression analysis, age was found to be significantly associated with MSP among formerly and currently married men. The results indicated that the younger men are at a higher risk of MSP. Thus young formerly and currently married men are at a higher risk of HIV infection (Lopman, *et al.*, 2007; Do and Meekers, 2009). The relationship between MSP and age among men has been identified by others using logistic regression analyses (Kimuna and Djamba, 2005; Kongnyuy and Wiysonge, 2006; Nikula, et al., 2009).

Region

The study found regional differences in MSP among the formerly, never and currently married men. Across the three marital status groups, living in Mashonaland East was associated with a lower likelihood of engaging in MSP. This may be explained by the differences in the cultural practices among the provinces (Kimuna and Djamba, 2005). These findings confirm that socio-cultural practices may play an important role in determining the sexual behavior of men (Kimuna and Djamba, 2005, Benefo, 2007; Sambisa *et al.*, 2009).

4.2.2 Socio-economic factors

Education

The study showed that married men with tertiary education had reduced risk of MSP compared with those without formal education. This association was, however, not observed among the formerly and never married men. This is consistent with notion that education, which is a form of human capital skills, greatly reduces the likelihood of involvement in risky sexual behavior (Nikula, *et al..*, 2009; Uchudi *et al..*, 2010).

Working status

The study found a significant association between working and MSP among the never married men group only. Compared with men who were not working, those who were working in the previous 12 months before the survey had a 30% higher risk to have had MSP. A possible explanation for this finding is that having a paid job increases income which might be motivation to engage in risky sexual behavior (Kimuna and Djamba, 2005; Bingenheimer, 2010).

Newspaper/magazine reading

The study found a significant association between frequencies of reading newspapers and multiple sex partnerships among the formerly married men only which increased consistently with the frequencies of reading newspapers. Depending on the types of magazines and newspapers read, it is possible that the participants were reading material that carried messages encouraging risky behavior. For example, Uchudi *et al.* (2010) using pooled DHS data from 20 sub-Saharan Africa, reported that exposure to media for both males and females reduced the likelihood of involvement in multiple sex partnerships. A possible explanation for this difference in the findings may be due to the way the media variable was defined. Uchudi *et al.* (2010) defined access to media as having access to newspaper, radio or TV

Watching TV

A significant association between frequencies of watching TV and MSP was found among the never married men only. Those who watched TV at least once a week had an increased risk of MSP compared with their counterparts who did not have access to TV. However, there was no significant difference in MSP between those who did not have access to TV at all and those who had access for less than once a week or almost every day. This finding is very difficult to

interpret. However, it could be that those who watched TV at least once a week only did so if there were special programmes which encouraged sex and therefore missed on programmes that discouraged risky sexual behavior.

4.2.3 Behavioral factors

Age at first intercourse

The study found a significant association between age at first intercourse and multiple sex partnerships among the formerly and currently married men groups. Although the cut-off age at first intercourse (19 years) was outside the 13 to 17 years reported by many previous studies, the results are still consistent with what has been reported in the previous studies by Durbin *et al.*, (1993), Mnyika, *et al.*, (1997), Simeon, *et al.*, (1999), Pettifor *et al.*, (2004); Stevens-Watkins, *et al.*, (2011) who reported a positive association between early age of first intercourse and multiple sexual partnerships. Therefore these results can be used by health educators as the basis for discouraging sex at a very early age.

Sexual attitude

The results indicated that men who held the notion that males have a right to have extramarital sex had a higher risk of engaging in MSP. However, this risk was highest among the formerly married men. A study by Yan, *et al.*, (2009) found that multiple sex partner behavior acceptance was positively associated with MSP and thus supporting the findings of this study.

4.3 Non-significant variables

There were a number of factors though reported in the literature to be associated with MSP which were, however, not statistically significant in this study.

4.3.1 Demographic factors

Ethnicity

The study did not find an association between ethnicity and multiple sex partnership behavior. This finding contradicts previous research by Madise, *et al.* (2007), who reported significant differences in multiple sexual behaviors across ethnic groups in Burkina Faso, Ghana and Uganda. A possible explanation for the non-significance of ethnicity in the current study could be the use of language of interview as a proxy for ethnic group. It is likely that language of interview might not be a good proxy for ethnicity.

Place of Residence

Although, it has been hypothesized that men who live in urban areas are more likely to have multiple sex partners than their rural counterparts (Kimuna and Djamba, 2005), this study showed that the sexual behavior of men living in the rural areas is virtually the same as those who live in urban areas. This conforms to what has been established that the likelihood of HIV infection is similar among rural and urban residents (Zimbabwe National AIDS Council, 2010).

4.3.2 Socio-economic factors

Away from home

Being away from home for more than a month, was not significantly associated with MSP among the three marital status groups. This is in contrast to what has been reported by previous research. For example, Lydie, *et al.* (2004) reported that among a sample of unmarried men in Cameroon, away from home for more than a month was associated with multiple sexual

partnerships. Mitsunaga, *et al.*, (2005) also found that time away from home was associated with risk of extramarital sex. A possible explanation why temporary migrants are at higher risk of engaging in MSP is that being away from home is associated with increased freedom and decreased exposure to home communities' disapproval of MSP (Khobotlo *et al.*, 2009).

Listening to radio

The study did not find a significant association between frequencies of listening to radio and MSP behavior. Radio is the most accessible form of media, such that if access to radio was found to be associated with MSP behavior then this was going to be an effective tool for educating people on implications of engaging in risky sexual behavior. However, the findings from this study are consistent with the findings of Mitsunaga *et al.* (2005) who found no association between exposure to media and extramarital sex among Nigerian men.

4.3.3 Behavioral factors

Religious service attendance

The majority of the participants were Christians and almost half reported that they attended church services regularly. However, there was no association between frequency of service attendance and MSP. Previous studies showed that religious service attendance was significantly associated with fewer lifetime sex partners (Manlove *et al.*., 2008, Fehring, 2010; Gold *et al.*, 2010).

4.4 Limitations of the study

There are a number of limitations to be considered when interpreting the results from this study. First, this study is based on data collected in 2006 for the purpose of providing estimates for population and health indicators at the national and provincial levels, therefore the data are outdated and in some cases are not in the form that meets the researcher's requirements. For example the researcher could not properly capture the association between MSP and religious beliefs because data to compute religiosity score were not available. Thus, the use of secondary data has greatly limited the number of factors considered in this study.

Second, the cross-sectional nature of the data limits establishing causality between MSP and each of the factors. The third limitation is that the study relied on self reported risky sexual behavior which may be over reported or under reported because it is a very sensitive issue, especially among Christians. The fourth limitation is recall bias. Participants may have had problems in remembering the number of sexual partners, frequency of religious service attendance, frequency of reading newspapers, frequency of listening to radio, frequency of watching television, age at first intercourse and the number of times the participant had been away from home. The fifth limitation is about missing data on some of the variables. The missing data may have influenced the regression results.

Chapter Five: Conclusion and Recommendations

5.1 Conclusion

Multiple sexual partnerships are now widely considered as a key factor in accelerating HIV infection. This study showed that prevalence of multiple sexual partnerships in Zimbabwe is relatively high and one of the key findings of this study is that useful information is lost if multiple sex partnerships variable is dichotomized and dummy variables are used to capture effects of marital status. For example, the importance of demographic, socio-economic and behavioral factors in explaining MSP, in some cases, varies across the three marital status groups.

Among the formerly and currently married men, MSP were more common in the 15-34 age groups. The study found that age at first intercourse is very important in explaining MSP behavior among the formerly and currently married men. These men who had first intercourse at the age of 20 years or above, had a lower risk of having MSP than men who had first intercourse at the age of 19 years or below. Another interesting finding is the importance of male sexual attitude towards MSP behavior. Men who believed that extramarital sex was wrong had a lower risk of MSP than those who believed that it was right. The other important variables found to be associated with MSP are geographical regions (capturing cultural differences among men), education, working status, access to newspapers and Watching TV.

Urban residence, away from home, access to radio, frequency of service attendance, were not significantly associated with MSP, although they have been found to be significantly associated with MSP in the international literature.

5.2 Recommendations

The study has shown that the importance of demographic, socio-economic and behavioral factors in explaining MSP, in some cases, varies across the three marital status groups. Therefore it is recommended that further studies should be carried out to investigate why, for example, age at first intercourse is associated with MSP among the formerly and currently married men only and not in the other group.

The results indicated that among the formerly and currently married men, there is an important link between age and prevalence of MSP behavior. Therefore, it is recommended that public health interventions aimed at reducing the number of sexual partners should be targeted at the 15-34 age groups, since this is the age group with the highest multiple sex partnership prevalence. It is recommended that health educators should discourage early age sex initiation.

The study has also found that the multiple sexual behaviors of urban men were not significantly different from their rural counterparts. It is therefore recommended that health interventions programmes should also be available in rural areas rather than just concentrate in urban areas as they used to be. The results also show that more educated men had a lower risk than less educated men of engaging in MSP. It is therefore recommended that policies that encourage men to complete higher education should be implemented. The results show that access to media was associated with more sex partners and this was attributed to the content of the material in the media. Therefore it is recommended that further investigation into the issue of the content found in the Zimbabwean media and try to find ways of discouraging messages that motivate men to engage in risky sexual behavior.

The results indicated that men who believed that extramarital sex was wrong had a lower risk of MSP than those who believed that it was right. Therefore it is recommended that education campaigns aimed at changing this behavior should be designed and implemented.

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