THE ASSOCIATION BETWEEN ALCOHOL CONSUMPTION AND HIGH RISK SEXUAL BEHAVIOUR IN THE SOUTH AFRICAN ADULT POPULATION.

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DECLARATION

I, Olufunmilayo Fawole, declare that this research report is my work. It is being submitted for the degree of MSc (Med) in the field of Epidemiology & Biostatistics in the University of The Witswatersrand, Johannesburg. It has not been submitted before any degree or examination at this or any other University.

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DEDICATION

To “The boys”- Ayodamope and Bolutife Fawole.

ABSTRACT

Background: South Africa is one of the countries with the highest Human Immunodeficiency Virus (*HIV*) prevalence in the world. The main mode of transmission in South Africa is via heterosexual intercourse. Thus there is the need to identify factors associated with *HIV* high risk sexual behaviour to inform future intervention programmes.

Objective: To determine the association between alcohol consumption and high risk sexual behaviour in South African adults in 2006.

Methods: Secondary data analysis of cross sectional study involving 1544 adult males and females, between 16-65 years interviewed in the Soul City National Survey. A multi-stage, stratified and clustered probability sampling technique was used. Univariate and multivariate analysis was done using student t test, chi square test and logistic regression models.

Results: The prevalence of alcohol consumption in the week prior to the survey was 24.4% (95%CI: 22.2-26.6). The prevalence of heavy episodic drinking in last one month was 17.5% (95%CI: 15.5-19.4). There was an association between broad socioeconomic conditions and sexual behaviour particularly age, sex and race ($P<0.05$). The mean age at sexual debut was 17.13 (SD 2.61) years in the males and 17.91 (2.45 SD) years in females ($P<0.001$). Of the sexually active respondents, 12.7% and 4.2% of the men and women respectively had multiple partners currently ($P<0.001$). Generally consistent condom use was more in men although, only 10.3% of the men and 5.6% of the women used the condoms consistently with their casual partners ($P=0.28$). Multivariate regression showed that alcohol use predicted having multiple partners (AOR 2.37; 95%CI 1.19-4.69 and AOR 4.15; 95%CI 1.37-11.97) for moderate and problem drinkers respectively. Also, heavy episodic drinking predicted having multiple partners by three times (AOR 3.21; 95%CI 1.69-6.39). There was a significant dose response relationship

for having multiple partners (P<0.05). As regards unprotected sexual intercourse, although not significant, female drinkers were found to be protected from inconsistent condom use with a casual partner. Male drinkers on the other hand, were found to be at a higher risk of having unprotected sex with casual partners. Perceptions of susceptibility to *HIV* (AOR 0.31; 95%CI 0.17-0.56), and alcohol related harm (AOR 0.17; 95%CI; 0.22-0.71) influenced consistent condom use with casual partners. Also regards gender differences, women who drank alcohol (AOR 9.68; 95%CI 1.31-17.45 vs. 1.17; 0.28-4.89) or were heavy episodic drinkers (AOR 4.45; 95%CI 1.46-3.55 vs. 2.43; 1.03-5.92) had a higher probability of having multiple partners than men.

Conclusion: There is a strong association between risky alcohol use and high risk sexual behaviours. *HIV* prevention programmes need to address reduction in alcohol intake and changes in drinking pattern. Further research to disentangle the relationship between condom use and alcohol use is needed.

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ABBREVIATIONS

HIV: Human Immunodeficiency Virus

AIDS: Acquired Immunodeficiency Virus

AOR: Adjusted Odds Ratio

AUDIT: Alcohol Use Disorder Test

CI: Confidence Interval

DALYs: Disability Adjusted Life Years

FCSW: Female commercial sex workers

LSI: Last Sexual Intercourse

OR: Odds Ratio

SADHS: South Africa demographic and health survey

SD: Standard Deviation

STIs: Sexually Transmitted Infection

UNAIDS: United Nations Joint Programme on HIV/AIDS

WHO: World Health Organization

1.0 CHAPTER ONE: INTRODUCTION

1.1 Background Information

South Africa is one of the countries with the highest *Human Immunodeficiency Virus* (*HIV*) prevalence in the world, with an estimated 18.3% of adults aged 15–49 years being infected [1]. According to UNAIDS/WHO at the end of 2007, about 5.5 million [4.9 million– 6.1 million] South Africans were living with HIV [1]. The *HIV* data collected at antenatal clinics, which is a crude reflection of the prevalence in the sexually active general population, found an *HIV* prevalence in pregnant women of 30% in 2005 and 29% in 2006 [2]. The Acturial Society of South Africa 2003 model predicts that the number of people living with AIDS will exceed 6 million by 2015, by which time around 5.4 million South Africans will have died of AIDS [3]. Prior research in Africa has demonstrated that alcohol use and abuse are associated with *HIV* high risk sexual behaviours [4-6] and sexually transmitted infections.[7] Sex under the influence of alcohol is associated with both increased *HIV* prevalence [8-10], and a greater likelihood of paying for sex. [5, 7, 9]

In an effort to reduce high risk sexual behaviour in South Africa and inform future programmes, the Soul City Institute for Health and Development conducted a national survey in the general adult population in October 2006. The study aimed to evaluate the impact of Soul City education programmes on sexual behaviour. Since its inception in 1992, the Soul City Institute has been carrying out health promotion activities aimed at impacting on society at the individual, community and socio-political levels. It provides edutainment to children and adults in South Africa by harnessing the power of the mass media and developing high quality education materials. Through drama and entertainment Soul City reaches more than 16 million South

Africans. [11] The Soul City Institute aims to impact on society at the individual, community and at socio-political levels. Thus base surveys are crucial to guide the implementation of programmes.

Following this survey, intervention programmes will be implemented to impart information on consequences of overindulgence in alcohol and impact on social norms, attitudes and practices on sexual health. Thus, individuals will be empowered to make healthy choices.[11] In the current study, secondary analysis was performed on the data from the 2006 national survey of the Soul City Institute.

1.2 Problem Statement

HIV is most commonly spread through unprotected sex with an infected partner. The heterosexual route is generally the predominant route of *HIV* transmission. *HIV* destroys immune system cells, leaving the infected person susceptible to other viruses and bacteria.[1] Although *HIV* education and prevention campaigns emphasize the importance of safe sex in reducing *HIV* transmission, people continue to become infected by having unprotected sex with either a casual partner, multiple sexual partners, or by paying for sex.[12, 13] Research in different populations suggests that heavy alcohol use is associated with risky sexual behaviours. [5, 9, 13] This is because alcohol reduces inhibitions, and diminishes risk perception. Some, studies have found that drinkers who believe alcohol consumption has positive effects on sexual performance tend to perceive fewer risks associated with unprotected sex and engage in a greater number of risky sexual behaviours than do those who do not have such beliefs;[14, 15] This association however has not been confirmed by other studies. [15, 16] Alcohol consumption was also found to be

associated with a greater likelihood of condom non use and improper use.[7] Drinking alcohol may further increase the risk of becoming infected with HIV through its suppressive effects on the immune system. [1]

1.3Justification

Alcohol abuse is the most common form of substance abuse in sub-Saharan Africa.[17, 18] Sub-Saharan Africa is where most *HIV* infections occur.[1, 12] Since risky sexual behaviors have been associated with *HIV*, risky behaviour is a modifiable risk factor [3, 12] Research to date has concentrated on the association between alcohol consumption and risky sex in clinic or venue-based samples. [4, 5, 8-10, 13, 14, 19] However, these populations may not be representative of the general population. Also, most of the research on this topic has been conducted in developed countries, and some in specific populations such as college drinkers [2,4, 14, 20] while others did not adequately control for alcohol consumption levels.[21] Finally, there are few data on whether the relationship between alcohol and risky sex is the same for different socio demographic groups. In this study, the potential role of alcohol in perpetuating the *HIV* epidemic is investigated by undertaking a population-based study on alcohol use and high-risk sexual behaviors in South Africa. This is one of the first national population based studies examining this relationship in South Africa.

1.4 Literature Review

1.4.1 Global Burden of Alcohol: Alcohol is a complex health and social issue. Considerable harm is done through its abuse, but in moderation it is an acceptable convention. In 2000, alcohol was responsible for 4% of the global burden of disease.[22] Alcohol consumption contributes to disease, injury, disability and premature death more than any other risk factor in developing countries with low mortality, where alcohol causes 1.8 million deaths (3.2% of total) and is

responsible for 58.3 million (6.2% of total) of disability adjusted life years lost. The World Health Organization (WHO) estimates that, about 2 billion people worldwide consume alcohol and 76.3 million with diagnosable alcohol use disorders. Chronic alcohol abuse can result in alcoholic cirrhosis, predisposing people to infections. Apart from causing malignant neoplasm, neuropsychiatric condition and cardiovascular disease, alcohol intoxication has been linked to aggressive behaviour and crime.[23, 24] Heavy episodic drinking by pregnant women is associated with foetal alcohol syndrome in infants. Extremely difficult to quantify is the fact that heavy drinking often leads to a disrupted family life, domestic violence and child neglect. [25] Alcohol use is also associated with unsafe sexual practices, increasing the risk of spreading HIV. [22] The drinking pattern, as well as the volume of alcohol consumed, is relevant to the health effects. [25] There is clearly no single reason why they do or why different people drink to different extents. [22, 23] It is apparent though that drinking is influenced by factors such as genetics, social environment, culture, age, gender, accessibility, exposure and personality. [23]

1.4.2 Alcohol Consumption in South Africa: Globally, South Africa is the 47th highest consumer of alcohol in the world with 7.81 recorded litres per capita. [26] However this is likely to be an underestimate. South Africa was estimated to consume an additional 2.2 litres per adult capita in unrecorded consumption. This includes traditionally brewed beverages, cross border trade, smuggling, tourist consumption and beverages with alcohol below the legal definition of alcohol. Total alcohol consumption is thus estimated to be around 10 litres per adult capita. [27, 28] Other more recent estimates have suggested 16.6 l litres per drinker of pure alcohol a year.[29, 30] However, many people in South Africa do not drink at all, but those who do drink, drink heavily. The results of the South African Demographic and Health Survey (SADHS), 44.7% of

men and 16.9% of women reported that they currently consumed alcohol. For both sexes, the rate is 28% which translates to 8.3 million South Africans 15 years or older. The prevalence of risky drinking on weekends was 32.8% (males) and 32.4% (females) as compared to 7% (males) and 8% (females) on week days.[31] Based on the World Health Report, South Africa is one of the countries exhibiting the most harmful pattern of drinking as indicated by the level of the population drinking first thing in the morning, drinking to intoxication, drinking apart from meals. [32]

In the past, access to alcohol by black majority was prohibited or restricted.[33] This led to proliferation of homebrews and small-scale illegal outlets that serve them (*shebeens*). Traditional alcoholic beverages include the "*Umqomboth"***,** a home-brewed sorghum beer that is rich in vitamin B and has a low alcohol content. [34] Other home-brewed beers include "*isiqatha"* and "*imfulamfula"*. "*Utshwala"* is a commercially produced traditional beer. [35] '*Chibuku"* – a traditional sorghum beer with an alcohol content of 4% is also consumed**. "***Isizulu"* is an alcoholic fermented beverage/home brew made from maize and sorghum.[35] The common western alcoholic beverages include wine, spirits and beer. It is estimated, there are 23,000 licensed outlets and between 150,000 and 200,000 illegal alcohol outlets (mostly shebeens) in the country,[36] hence the influence of official measures aimed at reducing underage drinking, alcohol-related public disorder, and other problems within those establishments are weakened. At the same time, the prevalence of heavy drinking alcohol-related harm is very high.

1.4.2 Alcohol Related Burden of Morbidity and Mortality in South Africa: In South Africa the estimated mortality due to alcohol has been estimated to be 7.1% (95% confidence interval

6.6 - 7.5%), 10.5% for males and 3.1% for female and total disability adjusted life years of 7%.[26] In 2000, 33 699 deaths were attributable to alcohol, with considerable variation across sex and age groups. For each female death attributable to alcohol, there were over four male deaths, mostly as a result of the large number of fatal injuries in young adult men. As regards morbidity, more than 1.1 million disability adjusted life years (DALYs) were attributable to alcohol. Interpersonal violence accounted for 42.8% of the injury DALYs attributed to alcohol in males and 25.9% in females. These estimates did not quantify the contribution of alcohol to poor health outcomes (such as cancers, heart and liver diseases) nor the association between alcohol consumption and increased risk of HIV/AIDS. [26] The highest prevalence (40.5 to 46.4 per 1,000 births) of Fetal Alcohol Syndrome (FAS) worldwide was reported in children residing in the Western Cape province of South Africa. FAS is the sum total of the damage done to the child before birth as a result of the mother drinking alcohol during pregnancy. FAS causes preventable birth defects and developmental disabilities in these children. [37]

1.4.3 Alcohol Policy in South Africa: Alcohol production is an integral part of the South African economy and has made it an important player in the global alcohol market. Alcohol consumption levels are also high (see 1.4.2 above). Thus the government instituted measures to control the production, sale and consumption of alcohol. [38] For example, it is necessary to have a licence for production and sales of beer, wine and spirits. There is also partial level of enforcement on the hours and place of sale. The age limit for purchasing alcoholic beverages is 18 years. [32] Alcoholic beverages attract a sales tax and value added tax of 14%. Advertising of alcoholic beverages on national television, radio, print or billboards is permitted, but advertisements may not be aimed at children. The advertisements must not depict pregnant

women and they may not mention alcohol content, nor may they feature irresponsible drinking. The adverts should not encourage the operation of a vehicle or machine, and they may not set out to encourage a general increase in the consumption of alcohol. There is however no restriction on sponsorship of sporting and youth events, no requirement for warning in advertisements nor restriction of alcoholic beverage consumption in public domains. The maximum blood alcohol concentration permissible for driving is 0.5ml [32] Despite these measures, illicit and home-brewed alcohol continues to occur and alcohol use is actively promoted by producers.

1.4.4 Groups vulnerable to Alcohol use, Sexual risk behaviour and HIV: High rates of alcohol use have also been observed among vulnerable groups such as commercial sex workers and their clients, truck drivers, adolescents, women, men having sex with men, and among injection drug users. [39] A number of these groups reported regular alcohol use before sex. Furthermore, the prevalence of alcohol dependence in men with *HIV* infection is high. It has also been shown that, condom use was low in these vulnerable groups, especially when under the influence of alcohol and/or other psychoactive substances. [39]

Alcohol use and sexual risk behaviour go hand in hand in commercial sex encounters. Female commercial sex workers (FCSWs) use alcohol to cope with the pressures of their work, such as a large number of sexual encounters. Many a time they and their clients use alcohol together. [40] Drinking alcohol and visiting commercial sex workers are evident among long-distance drivers. [41, 42] Transport workers and migrant workers who frequently visit FCSWs, spread STIs and *HIV* infection from one place to the other and from high-risk groups to the general population. Alcohol use, especially among young adolescents, is associated with multiple partners, casual sexual encounters, early sexual experience and a high level of risk taking all of which increase

the risk of contracting STIs and *HIV* among adolescents.[42-44] Nightclubs, bars and pubs are emerging as places for alcohol use and initiation of sexual activity at an early age. These venues attract young people. *HIV* prevalence is higher among women than among men. Heterosexual contact is the predominant mode of *HIV* transmission among women diagnosed with AIDS. Sexual practices among heterosexuals, which increase risk of exposure to *HIV* in women include: sex with multiple partners; sex with a partner of unknown sexual history or *HIV* status; and failure to use condoms.[1] Among gay men, those who are alcohol dependent are more likely to have unsafe sex with non-steady partners after drinking.[43] Mineworkers, prison inmates, antenatal clinic attendees including racial and ethnic minorities are also particularly at risk of *HIV*.[1, 39, 42] Direct and indirect links have been documented between alcohol use and sexual risk behaviours in vulnerable groups are discussed below.

1.4.5 Relationship Between Alcohol and Sexual Behaviour : A number of studies have been done in both developed and developing countries to determine the relationship between alcohol use and risky sexual behaviours. For instance, results of the Youth Risk Behavioural Surveillance in the United States found that 26.0% of students had had five or more drinks of alcohol in a row (i.e. within a couple of hours) on at least one day during the 30 days before the survey (i.e., episodic heavy drinking). Among the 35.0% of currently sexually active students nationwide, 22.5% had drunk alcohol or used drugs before last sexual intercourse. Overall, the prevalence of having drunk alcohol or used drugs before last sexual intercourse was higher among male (27.5%) than female (17.7%) students. [45]

A cross-sectional study of students (N = 1,130) at a large, urban, minority-serving university in South Florida found that of the 1,130 participants, 14.0% reported risky sexual behavior (having

more than one sexual partner in one year and not using a condom the last time they had vaginal intercourse), and 11.9% reported consistent risky sexual behavior (having more than one partner in one year and not using condoms most or all of the time during the past 30 days). In multivariable analysis, past-month alcohol use had the strongest independent association with both risky and consistent risky sexual behavior. [46]

The association between sexual behaviors, drinking and problem drinking among female bar and hotel workers was studied in Moshi, Tanzania. Problem drinkers were more likely to report high-risk sexual behaviors, including multiple sexual partners during the past year (AOR 3.14; 1.99-4.94), concurrent partners (AOR 3.07; 95% CI 1.33-7.10), exchange of gifts or money for sex (AOR 1.47; 95% CI 1.05-2.05) and having male partners who had other partners (AOR 2.56; 95%CI 1.73-3.80). Problem drinkers were also more likely to have met their last partners in a bar/hotel (AOR 2.34; 95% CI 1.57-3.50) and to have initiated sexual activity by 17 years of age (AOR1.71; 95%CI 1.22-2.40). [47]

In a cross-sectional study of 324 men recruited from beer halls in Harare, Zimbabwe, *HIV* prevalence was shown to increase with increasing levels of alcohol consumption. Having sex while intoxicated in the previous 6 months was reported by 31% of men and was strongly associated with recent *HIV* seroconversion as well as unprotected sex with casual partners and paying for sex. [9]

A population based survey in five districts of Botswana on 1,268 participants found that, 31% of the men in the study and 17% of the women were heavy drinkers. Heavy alcohol use was associated with being male [Adjusted Odds ratio (AOR) 2.60; Confidence interval (CI) 1.89-

3.58], being in an intergenerational relationship [AOR 2.60; 95%CI 1.82-3.69], having had more education [AOR1.44; 95%CI 1.05-2.0], and living with a sexual partner [AOR 2.0; 95%CI 1.43-2.81]. Among men, those who drank heavily were three to four times more likely to have unprotected sex or multiple partners or to pay for sex than non drinkers. For both men and women, the more alcohol they drank, the more likely they were to have risky sex. [5]

A cross-sectional study was conducted in 2005 involving 1528 individuals aged between 15–44 years residing in Oria Village to investigate the magnitude of *HIV*-1 infection and identify risk factors that may be used to develop preventive strategies in rural Kilimanjaro, Tanzania. HIV-1 infection was significantly associated, with taking bottled alcohol (Men: AOR, 5.9; 95%CI: 1.7–20.1) and local brew (men: AOR, 3.7; 95%CI: 1.5–9.2). [13]

In a Nigerian study, interviewers collected data from 2,070 never-married adolescents aged 15–19 years. Alcohol use among males was associated with increased likelihood of adolescent sexual initiation (Hazard Ratio 1.90, 95% CI = 1.38–2.62).[17] In Ethiopia, a study on khat (a mild stimulant used for increasing energy and elevating mood in order to improve work performance) and alcohol use among the youths 15-24 years showed that there was a significant and linear association between alcohol intake and unprotected sex, with those using alcohol daily having a three fold increased odds compared to those not using it (AOR; 95% CI) = 3.05; 2.38, 3.91).[4] In Zambia, adolescents who had been drunk 1 or 2 times, and who had been drunk 3 or more times in a life time were 14% and 13% more likely to have had sexual intercourse compared to those who have never been drunk in their lifetime.[48]

There is paucity of information on the relationship between alcohol use and sexual behaviour in South Africa. One of the few studies was the survey on *HIV* risks of 339 men and women recruited from four shebeens in a township in Cape Town South Africa. Comparisons of the 94 (28%) participants who reported meeting sex partners at shebeens to the remaining sample of shebeen goers demonstrated a pattern of higher risk for HIV infection among persons who met sex partners at shebeens. Participants who met sex partners at shebeens reported greater frequencies and quantities of alcohol use as well as alcohol use disorder test scores (AUDIT), a test used to identify individuals whose drinking places them at risk for developing alcohol problems or who are experiencing alcohol related problems. In addition, having met sex partners at shebeens was significantly associated with endorsing greater expectancies that alcohol enhances sexual performance and relationships. [49]

A study of the association between alcohol use and HIV risk-related behaviour among 134 men and 92 women receiving sexually transmitted infection (STI) clinic services in Cape Town, South Africa showed that problem drinking was common among STI clinic patients. For men, heavier alcohol use was associated with having multiple sex partners in the past month, less condom use, and having a history of sexually assaulting women. Among women, higher scores on the AUDIT were also related to having multiple sex partners as well as a history of exchanging sex for money or materials. [4]

A similar study in the same setting among 614 men and 157 women showed that in men, partner's drinking was related to higher rates of unprotected intercourse. The number of sex partners men reported was only associated with their own use of alcohol before sex. In contrast,

women's partners drinking before sex was related to higher frequencies of unprotected intercourse, but womens drinking before sex that related to her number of sex partners. [50]

These are the available studies on the relationship between alcohol use and sexual behaviour in South Africa.

1.5 Study aims and Objectives

1.5.1 Hypothesis

Research Hypothesis: Alcohol consumption affects high risk sexual behaviours.

Null Hypothesis: There is no significant association between alcohol consumption and high risk sexual behaviour in South African adults.

1.5.2 Broad Objective

The broad objective of the study is to determine the association between alcohol consumption and risky sexual behaviour in South African adults in 2006.

1.5.3 Specific Objectives

1. To describe the socio demographic characteristics of the respondents.
2. To determine the prevalence and risk factors of self reported alcohol consumption.
3. To assess the relationship between respondents socio demographic characteristic and *HIV* high risk sexual behaviour.
4. To explore the relationship between alcohol consumption and *HIV* high risk sexual behaviour.

2.0 CHAPTER TWO: METHODOLOGY

2.1 Study Design

The study was a population based analytical cross sectional design conducted as a secondary data analysis from the Soul City Institute of South Africa. The study was conducted nationally and used a structured questionnaire as a tool for data collection. The descriptive component described the socio demographic characteristics of persons who consume alcohol and the profile of those who engaged in high risk sexual behaviours. The analytical component explored the relationship between alcohol consumption and high risk behaviours, and if level of drinking influenced risk taking (explored dose- response relationship).

2.2 Study Population

Inclusion criteria: The study population consisted of all adult males and females 16- 65 years in South Africa, interviewed in the Soul City National Survey- Series 7. Exclusion Criteria were missing or invalid responses to key study variables.

2.3 Sampling Technique

A multi-stage stratified and clustered probability sampling technique was used. The population was stratified according to province and socio-economic category to ensure it was nationally representative. As regards the stages, there were four stages for selection of participants. The first stage was the selection of enumerator areas by systematic sampling from a random starting point. The second stage was the selection of residential sites from within the selected enumeration areas by random selection or ballot. The third stage was the random selection (ballot) of a household at sites with more than one household. This was done by the supervisors. In the last stage, respondents were selected from households using the random grid technique

(similar to table of random numbers).[51] There were 454 non responders. Available data included 1,544 records.

2.4 Description of Study Variables

2.4.1 Exposure Variables: The main exposure variables were number of alcoholic drinks in past week and heavy episodic drinking in the last month. The number of drinks were categorised into four heavy, problem, moderate and non drinkers. Heavy drinking or alcohol use was intake of more than 21 drinks per week for men, and more than 14 drinks per week for women, problem drinking (8–14 drinks/week for women, 15–21 for men), moderate drinking (1–7 drinks/week for women and 1–14 for men). A drink was half a pint of beer or a glass of wine. [52] Heavy episodic drinking or risky drinking was drinking five or more standard drinks at a sitting. [22]

The socio-demographic characteristics were both exposure variables and confounders in the relationship between alcohol consumption and high risk sexual behaviour. These included age; sex- male and female; education- less than secondary and secondary or higher; employment- student, unemployed, employed; race- self defined race as Africans, Coloured, Whites and Asian; residence- urban formal, urban informal and rural and perception of alcohol related harm and perception of susceptibility to *HIV* infection- yes or no.

2.4.2 Outcome Variables: The outcome variables were high risk sexual behaviour. [1] There were two outcomes. These were: -

1. Unprotected sexual intercourse with a casual partner
2. Multiple sexual partners currently

Unprotected sex was determined based on whether condom use with casual partners was always, sometimes or never while number of current sexual partners was categorised into none, single or multiple partners.

2.5 Data Collection Methods and Quality

The data was collected with interviewer (face-to-face) administered structured questionnaire (Appendix 1). The questionnaire contained basic demographic data. In addition, data on amount of alcohol consumed in past week and month; and high risk sexual behaviour was collected. Data were collected by experienced interviewers, who were trained at a one-day session by an experienced supervisor. The supervisor was also responsible for quality control and back checking of the questionnaires, and monitoring of each team. A minimum back check of 15% on every interviewer's work was carried out to ensure that all interviews were conducted according to high quality standards.

Substitution was only allowed where a respondent refused to participate, premises were empty, no one was qualified for the survey, respondent could not communicate with the interviewer because of an unknown foreign language or was physically/mentally unable to be interviewed. Before substitutions were made the interviewer had to revisit the household at different times and on different days thrice. [51] A pilot study was conducted by Soul City to pre-test the questionnaire. Following the pretest adjustments were made to some of the questions to aid respondents understanding and more options were included to some questions.

2.6 Data Management and Analysis

2.6.1 Data Management: Data were entered using EPI INFO version 6 and cleaned using STATA10.0. Data cleaning was done by listing all the variables and checking for missing records. No respondent was excluded from the data set due missing or invalid responses. All variables were tabulated to ensure that the total count was 1544. Listing was also used to check for inconsistencies in responses. For example, respondents who stated they were not sexually active and subsequently stated they use the condom or stated their number of sexual partners, or if non drinkers also stated they were heavy episodic drinkers. Such discrepancies were cleaned and included from the analysis.

Some variables were recoded into groups that allowed for meaningful interpretation. For example there were only two groups of educational level (below and above secondary education) because the respondents with either primary or tertiary education were too few for these two educational levels to be retained as separate groups. Most respondents had either not completed secondary or only had secondary school education. Similarly for alcohol use, problem and heavy drinkers were combined as one category because of the few respondents in both groups. Age was changed from a continuous to a categorical variable for identification of the age group at greatest risk of both risky drinking and risky sexual behaviour. Four age groups were evaluated:- adolescents (16-19 years), young adults (20-29 years), adults (30-44 years) and older adults (45-64 years). Being a heavy episodic drinker and problem/heavy drinker were mutually exclusive hence they were both included in the regression model. The outcome variables were dichotomous hence logistic regression models were used. For evaluation of outcomes, a sub-sample comprising of those who reported that they were sexually active were used.

2.6.2 Data Analysis: Data processing, cleaning and analysed were done using in STATA 10.0 statistical software package. All statistical significance was calculated at 95% confidence interval (CI). The essence of the analysis was to assess the relationship between alcohol consumption and high risk sexual behaviour. The analysis was done in three parts. The first part was simple tabulation of socio demographic characteristics to describe the respondents profile. The second part was bivariate analysis using t test for continuous variable such as comparison of mean age at sexual debut between the sexes and the Pearsons Chi square test for associations between categorical exposure and outcome variables. These are presented in tables and graphs. The third level was univariate and multivariate logistic regressions to determine factors which predicted risky sexual behaviours. To control for multiple confounders in the statistical analysis multivariate analyses were done. Logistic regression was used to fit a model (to compute odds ratios and 95% confidence intervals) to determine how alcohol influenced the probability of engaging in *HIV* high risk behaviour. In the logistic regression, all variables, including the socio demographics (age, sex, education, employment and race), alcohol use and heavy episodic drinking were included. Perceptions of risk of *HIV* and alcohol related harm was also considered. Test for interaction between the socio-demographic and explanatory variables that were plausible was done by including in the interaction term between the two variables before running the regression model. Interaction was present when there was a difference of more than ten percent in the value of the odds ratio obtained when compared with when term was not used or if p values were significant with the use of the term**.**

2.7 ETHICS

This research protocol was submitted to The University of Witwatersrand Committee for Research on Human Subjects (Medical) for ethical clearance (R14/49) (Appendix 2). The original protocol was also submitted for ethical clearance in October 2006. In the primary study respondents were required to sign an informed consent form before the interviews. The interviews were conducted in private because of the intimate nature of some questions.

3.0 CHAPTER THREE: RESULTS

3.1 Socio-demographic Characteristics:

The socio-demographic profile of respondents is presented in Table 1. A total of 1544 records were analysed of which 34.4% were males and 65.6% females. The respondents age ranged between 16 and 65 years with a median of 33 years and mean age of 34.1 $\pm$ 13.7 years. One third (33.7%) of respondents were in the 30 to 44 years age bracket, followed by the 20-29 age group (25.1%). Many (39.1%) had completed secondary school or had tertiary education, while 53.2% were employed. About one half (53.1%) of the respondents were formal urban residents, 28.5% were informal urban residents, while 18.4% resided in rural settlements.

The mean age in the men was 31.5 years (SD13.4) and women 35.4(SD 13.7) the difference was statistically significant (P<0.001). There were also statistically significant differences (P<0.05) in the age, employment status and race of male and female respondents (Table 3.1).

3.2 Perception of Risk

Respondents were asked what their perceived risks were in relation to alcohol and *HIV*.

About a third (34.1%) of the respondents stated that drinking alcohol could cause a problem for them. There was no statistical difference in perception of risk by men (31.6%) and women (35.1%) (P=0.17). Twenty eight point five percent indicated that they were at risk of getting HIV/AIDS, while 54.6% felt they were not at risk and16.9% did not know. Perception of *HIV* risk was 28.4% in men and 28.5% in women (P=0.90). *HIV* risk perception increased with age (P=0.03), with the 30-44 years age group having the highest risk perception.

Table 3.1: Socio-demographic Characteristics of Respondents

Variable	Total 1544 n %	Males 533 n %	Females 1013 n %
Age (yrs)			
16 -19	282 (18.3)	137(25.8)	145(14.3)
20-29	388 (25.1)	141(26.5)	247(24.4)
30-44	520 (33.7)	156(29.4)	364(35.9)
45-65	354 (22.9)	97(18.3)	257(25.4)
Residence			
Urban formal	820 (53.1)	279(52.5)	541(53.4)
Urban informal	440 (28.5)	155(29.2)	285(28.1)
Rural	284 (18.4)	97(18.3)	187(18.5)
Education			
< Secondary	939(60.8)	314(59.1)	625(61.7)
Secondary and >	605 (39.2)	217(40.9)	388(38.3)
Employment			
Unemployed	722(46.8)	218(41.0)	504(49.8)
Employed	822(53.2)	313(59.0)	509(50.2)
Race			
African	846(54.8)	280(52.7)	566(55.9)
Coloured	499(32.3)	164(30.9)	335(33.1)
Asian	104(6.7)	44(8.3)	60(5.9)
White	95(6.2)	43(8.1)	52(5.1)
Province			
Western Cape	356 (23.1)	104(19.6)	252(24.9)
Eastern Cape	150 (9.7)	51(9.6)	99(9.8)
Northern Cape	116(7.5)	45(8.5)	71(7.0)
Free State	97(6.3)	37(7.0)	60(5.9)
Kwa Zulu Natal	279(18.1)	104(19.6)	175(17.3)
North west	116(7.5)	50(9.4)	66(6.5)
Gauteng	249(16.1)	81(12.3)	168(16.6)
Mpumalanga	94(6.1)	38(7.2)	56(5.5)
Limpopo	87(5.6)	21(4.0)	66(6.5)

3.3 Alcohol Consumption

Table 3.2 presents findings on the use of alcohol and heavy episodic drinking.

Prevalence of alcohol consumption: Of the 1490 respondents to the question, prevalence of consumption of any alcoholic drink in the last week was 24.4% (95%CI: 22.2-26.6). Prevalence of alcohol use was higher in men than in women 39.0% (95% CI: 34.7-43.2) versus 17% (95% CI: 14.4-19.1) (P<0.05). Drinking was also most often reported in the 20-44 years age bracket (55.2%) and least among the adolescents (14.4%). Mean number of drinks per week was 6.14 $\pm$ 7.2 drinks. The mean number of drinks among the male drinkers was 6.47 $\pm$ 6.85, while among the female drinkers was 5.78$\pm$ 8.4 (P = 0.39). The prevalence of alcohol use in the last one week was significantly associated (P<0.05) with all the socio demographic variables including educational level, employment status, race and province. The prevalence in the different provinces in shown in Figure 3.1

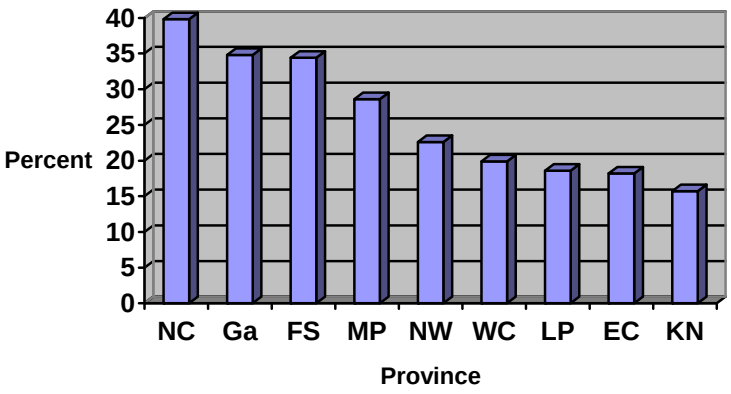
Type of Drinker: Most of the respondents (75.6%) did not drink alcohol in the preceding week. Non drinkers were mainly women (83.3%). About two percent of the male respondents were problem drinkers, while 2.1% were female; while 1.7% of the males and 1.2% of the females were heavy drinkers (Figure 3.2). The difference in level of drinking between men and women was statistically significant (P<0.001).

Heavy Episodic Drinking: The overall prevalence of heavy episodic or risky drinking in last one month was 17.5% (95%CI: 15.5-19.4), with males having a prevalence of 28.5% (95%CI; 24.5-32.4) and females 11.8% (95%CI: 9.7-13.8) (P<0.001). Prevalence was lowest (11.6%; 95%CI 7.7-15.3) in the 16-19 years age group. Prevalence in the 20-29 and 30-44 age groups was 20.2% (95%CI 16.1-24.3) and 20.0% (95%CI: 16.5-23.5) respectively. Employment status, residence and province also significantly affected (P<0.05) prevalence of heavy episodic

Table 3.2: Prevalence of any alcohol use in last one week and heavy episodic drinking in last one month

Variable	Population (N)	Prevalence of any alcohol use in last week n % P value	Population (N)	Prevalence of heavy episodic drinking in last one month n % P value
Total population	1490	364(24.4)	1510	264(17.5)
Sex				
Male	516	201 (39.0) **0.001**	516	147(28.5) **0.001**
Female	974	163 (16.7)	994	117(11.8)
Age (yrs)				
16-19	271	39(14.4) **0.001**	277	32(11.6) **0.008**
20-29	375	102(27.2)	381	77(20.2)
30-44	500	140(28.0)	505	101(20.0)
45-65	344	83(24.3)	347	54(15.6)
Education				
< secondary	902	197(21.8) **0.004**	923	175(19.0) 0.06
Secondary and >	588	167(28.4)	587	89(15.2)
Employment				
Student	295	40(13.6) **0.001**	303	31(10.2) **0.001**
Unemployed	404	84(20.8)	403	75(18.6)
Employed	791	240(30.3)	804	158(19.7)
Residence				
Urban formal	784	181(23.1) **0.001**	802	120(15.0) **0.002**
Urban informal	433	135(31.2)	434	99(22.8)
Rural	273	48(17.6)	804	45(16.4)
Race				
African	818	172(21.0) **0.001**	832	140(16.8) 0.07
Coloured	479	126(26.3)	479	99(20.7)
Asian	98	21(21.4)	104	13(12.5)
White	95	45(47.4)	95	12(12.6)

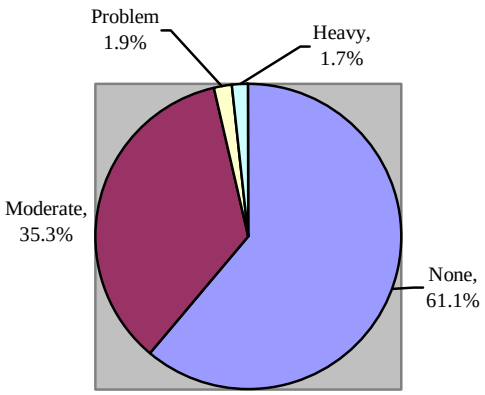
Figure 3.1: Prevalence of alcohol consumption by province



NC- Northern Cape
Ga- Gauteng
FS- Free State
MP- Mpumalanga
NW- North Western Cape
WC- Western Cape
LP- Limpopo
EC- Eastern Cape
KN- Kwa Zulu Natal

Figure 3.2: Level of alcohol use in males and females in the preceding week

Males



Females

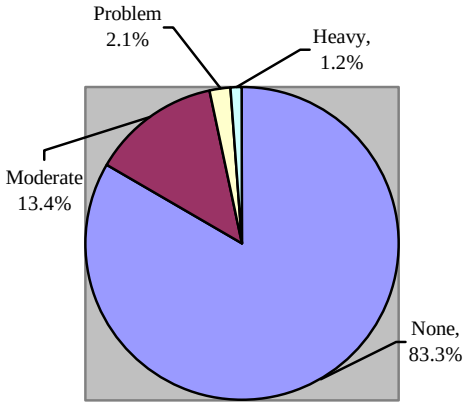
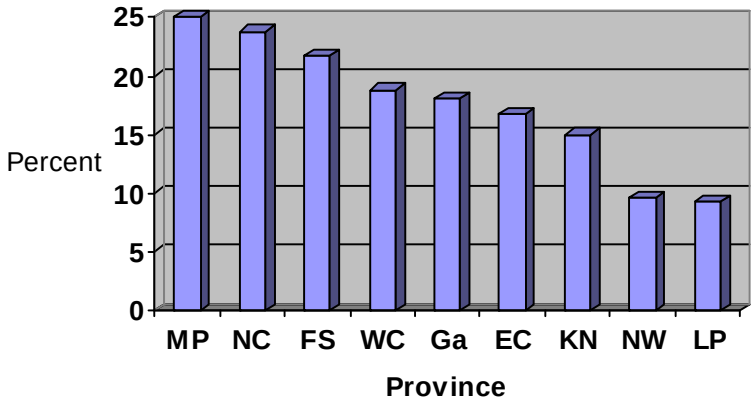


Figure 3.3: Prevalence of heavy episodic drinking by province



MP- Mpumalanga
NC- Northern Cape
FS- Free State
WC- Western Cape
Ga- Gauteng
EC- Eastern Cape
KN- Kwa Zulu Natal
NW- North Western Cape
LP- Limpopo

drinking. Residing in an informal settlement was associated with higher rates of episodic drinking. Figure 3.3 shows the prevalence of heavy episodic drinking in the different provinces.

3.4 Sexual behaviour

Table 3.3 summarises the respondent's sexual behaviours.

3.4.1 Age at sexual debut

One hundred and seventy seven (11.5%) respondents stated that they had never had sexual intercourse, while 16.5% did not respond to the question or could not recall their age at first sexual intercourse. Of the 1142 sexually active persons with responses, 40.9% said their sexual initiation was at 17 years or less. The mean age at sexual initiation was 17.13 (SD 2.61) years in the males with inter quantile range of 11, 17, 22 and 32 years and 17.91 (2.45 SD) years in females with inter quantile range of 12, 18, 21 and 29 years. The difference was statistically significant ($P<0.001$).

3.4.2 Number of Sexual Partners.

In last twelve months: One hundred and sixty one (11.8%) practiced secondary abstinence, while 66.8% of the men and 70.7% of the women were sexually monogamous. About 25% and 12.0% of the males and females respondents respectively had had more than one partner. The mean number of sexual partners in the last twelve months among the sexually active respondents was 1.52 (SD 1.41) in the men and 1.24 in women (SD 0.84). The difference was statistically significant (P<0.001).

Table 3.3: Sexual Behaviours by Gender

Variable	Total (n=1367) N %	Males (n=455) n %	Females (n=912) N %	P Value
Age at Sexual debut (yrs)				
≤17	559 (40.9)	149(32.7)	410(45.0)	**0.001**
>17	583 (42.6)	236(51.8)	347(38.1)	
No response *	225 (16.5)	70(15.5)	155(16.9)	
No. of partners in last 12mths				
None	161 (11.8)	28(6.2)	133(14.6)	**0.001**
Single	949 (69.4)	304(66.8)	645(70.7)	
Multiple	220 (16.1)	111(24.4)	109(12.0)	
No response	37 (2.7)	12(2.6)	25(2.7)	
No of sex. partners in last 1mth				
None	185 (13.5)	23(5.0)	162(17.8)	**0.001**
Single	1022 (74.8)	344(75.6)	678(74.3)	
Multiple	106 (7.8)	69(15.2)	37(4.1)	
No response	54 (3.9)	19(4.2)	35(3.8)	
Current no. of sexual partners				
None	194 (14.2)	39(8.6)	155(17.0)	**0.001**
Single	1046 (76.5)	349(76.7)	697(76.4)	
Multiple	96 (7.0)	58(12.7)	38(4.2)	
No response	31 (2.3)	9(2.0)	22(2.4)	

* No response included those who refused to answer, considered question too personal, could not recall and 5 people who stated when they got married.
Respondents who were not sexually active, who did not wish to answer or don't remember were not included in the analysis.

In last one month: As regards multiple partners, 15.2% and 4.1% of men and women respectively had multiple partners. Among the sexually active respondents, the mean number of sexual partners in the last one month differed between men and women, 1.18 (SD 0.49) and 1.06 (SD 0.37) respectively (P<0.001).

Currently: Most (76.5%) of the respondents, 76.7% of the men and 76.4% of the women had only one sexual partner, while 12.7% and 4.2% respectively had multiple partners. The men (1.17; SD 0.45) had significantly higher mean number of current sexual partners than women (1.07; SD 0.31) (P<0.001).

3.4.3 Condom use

Generally consistent condom use was low in both sexes. About a quarter, 25.6%, used condoms consistently in the last 12months, 21.7% used it consistently with their regular partner and 7.2% with casual partners. Consistent condom use in the last 12 months was reported by 29.3% men and 23.6% women (P=0.02). Condom use at last sexual intercourse was stated by 35.0% of the men and 28.2% of the women (P=0.10). Twenty seven percent of the men and 19.1% of the women used the condom all the time with their regular partner (P=0.02). Only 10.3% of the men and 5.6% of the women used the condom consistently with their casual partners (P=0.28). Persons who could not recall or did not wish to answer were excluded in the analysis (Table 3.4).

Table 3.4: Condom use by Gender

Variable	Total (n=1367) N %	Males (n=455) n %	Females (n=912) N %	P Value
Condom use in last 12 mths**				
Consistent	309 (25.6)	125(29.3)	184(23.6)	**0.02**
Inconsistent	866 (71.8)	286(67.0)	580(74.5)	
No response/No partner	31 (2.6)	16(3.7)	15(1.9)	
Condom use LSI				
Yes	416 (30.4)	159(35.0)	257(28.2)	0.10
No	729 (53.3)	243(53.4)	486(53.3)	
No response	222 (16.3)	53(11.6)	169(18.5)	
Condom use with regular partner				
Consistent	297 (21.7)	123(27.0)	174(19.1)	**0.02**
Inconsistent	817 (59.8)	278(61.1)	539(59.1)	
No response/No partner	253 (18.5)	54(11.9)	199(21.8)	
Condom use with casual partner				
Consistent	98 (7.2)	47(10.3)	51(5.6)	0.28
Inconsistent	168 (12.3)	69(15.2)	99(10.8)	
No response/ one& no partner	1101 (80.5)	339(74.5)	762(83.6)	

* *n=1206, number who were sexually active within last 12months.
Respondents who were not sexually active, who did not wish to answer or don't remember were not included in the analysis

3.5 Sexual Behaviour and Alcohol Consumption

Figures 3.4, 3.5 and 3.6 shows the dose response relationship between level of alcohol consumed in the past one week with three of high risk behaviours (multiple partners currently and unprotected sex with a casual partner) by sex. The figures shows that for both sexes the proportion of respondents reporting risk behaviours was lowest among non drinkers, followed by moderate drinkers, who in turn had sexual risk behaviours that problem/heavy drinkers. The chi square test for trends were significant ($P<0.05$) except for the relationship between alcohol use and unprotected sex in the women.

Figure 3.4: Alcohol consumption and current number of sexual partners by sex.

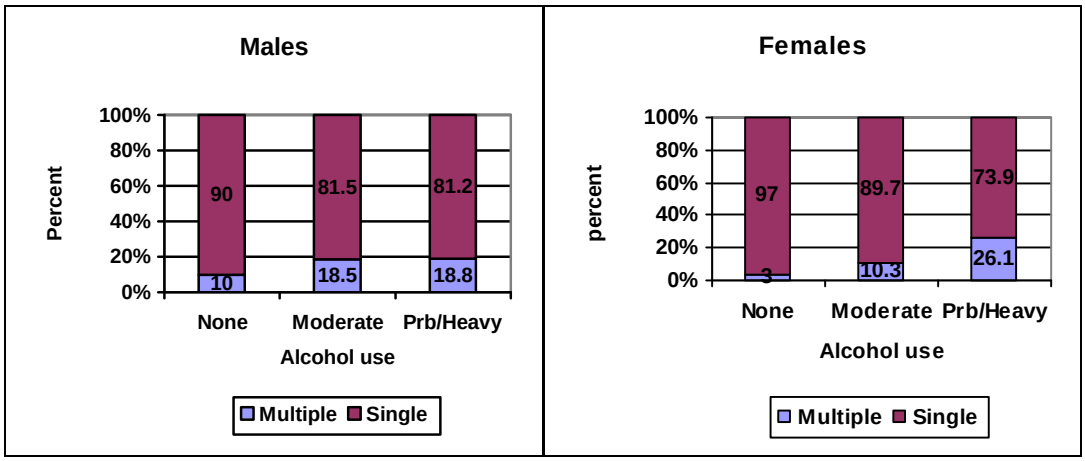
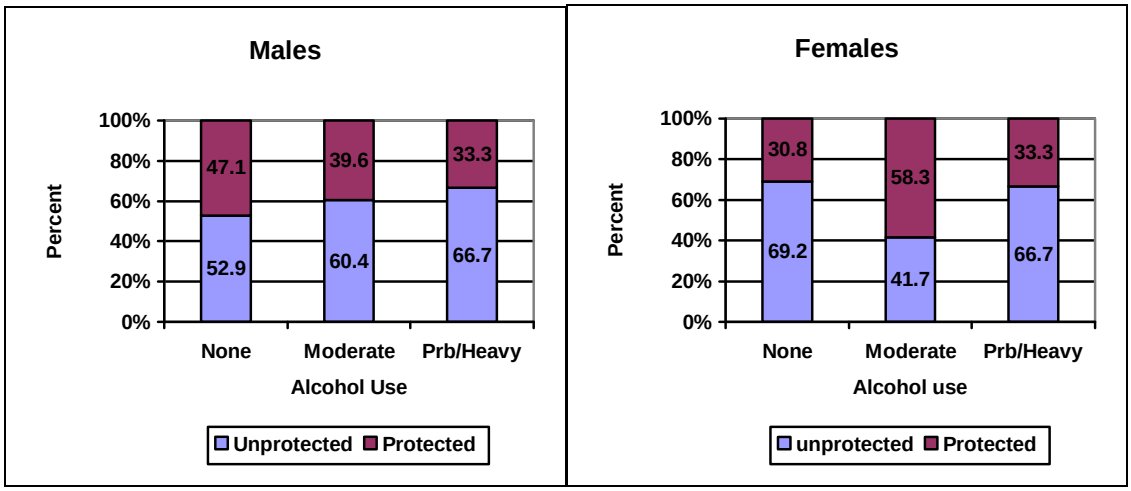


Figure 3.5: Alcohol consumption and unprotected casual sexual intercourse by sex.



3.6 Bivariate Analysis: Factors Associated with HIV High risk behaviours.

To explore the relationship between exposure and outcomes, bivariate analysis of the explanatory variables (level of alcohol use and risky of drinking) and potential confounders (age, sex, education, employment and race), with the outcome variables of high risk sexual behaviour (multiple partner, unprotected sex with casual partner) were conducted using the Pearsons Chi square test. Analysis showed significant association between the variables, the proportions of respondents with high risk sexual behaviour in the different categories are shown in Appendix 2. The prevalence of all the high risk behaviours was higher among the less educated, employed and African race.

3.7 Logistic Regression Analysis: Factors Associated with High Risk Behaviours

The outcomes of interest (multiple partners concurrently, early sexual initiation, unprotected sex with casual partner) are binary variables. Logistic regression was fitted to determine variables that can be used to explain high risk behaviour. The significance level adopted for both univariate and multivariate analysis was 0.05. Stepwise regression (forward selection method) was used to choose explanatory variables for the multivariate analysis and was also verified using the backward selection method. The model with the maximum likelihood ratio was adopted as the best fit for the data. Table 4 focused on univariate analysis, while Table 3.5 shows the multivariate analysis. Lastly, analyses were run (Table 3.6) for all the variables found to be important in explaining high risk behaviour and these were stratified by sex to examine if the associations were consistent for males and females.

3.7.1 Univariate Analysis

Multiple partners: Age, sex, employment, race, perception of HIV and type of drinker and heavy episodic drinking were significantly associated (P<0.05) with having multiple sexual partners. Men were at three times greater odds of having multiple partners than the women (OR 2.22; 95%CI: 1.98-4.68). The 16-19 and 20-29 age groups were eight times more likely (OR 8.01; 95%CI 2.88-22.30 and OR 7.53; 95%CI 2.94-19.30) to have multiple partners than those aged 45-65 years. Alcohol use predicted engaging in high risk sexual behaviours. Moderate drinking and problem drinking were strongly associated with having multiple partners (Table 3.4). There was a dose response relationship between alcohol consumption and multiple partners, in that problem drinkers (> 7drinks/ week for women and >14 for men), had higher odds (OR 6.47; 95%CI 2.43-17.19) of multiple partner than did moderate drinkers (1-7drinks/ week for women and 1-14 for men), who in turn had higher odds (OR 3.74; 95%CI 2.36-5.92) compared to none drinkers. People who consumed no alcohol were at low risk of multiple partners. Heavy episodic drinkers had 4.7 (95%CI 3.08-7.29) times greater odds of having multiple concurrent sexual partners.

Unprotected sex with casual partner: Residents of rural areas were two times (OR 1.96; 0.96-4.04) more likely to have unprotected sex than those residing in urban areas. Those who perceived that they were vulnerable to *HIV* were less likely to have unprotected sex (OR 0.33; 95%CI 0.20-0.58). Moderate and problem drinking was protective against inconsistent condom use with a casual partner (OR 0.72; 95%CI 2.36-5.92 and 0.79; 95%CI 2.43-7.19 respectively). Similarly heavy drinkers were 31% less likely to have unprotected casual sex (OR 0.69; 95%CI 0.40-1.17). However there is no evidence that drinking was protective as there was no significant association.

3.7.2 Multivariate Analysis

Table 3.5 shows the adjusted odds ratio for high risk behaviours. Adjustments were made for socio-demographics and risk perception.

Multiple partners: Age, sex, employment, race, perception of susceptibility to HIV infection and type of drinker and heavy episodic drinking were significantly associated ($P<0.05$) with having multiple sexual partners. Type of drinker and heavy episodic drinking still predicted having multiple partners although odds were slightly reduced (AOR 2.37; 95%CI 1.19-4.69 and AOR 4.15; 95%CI 1.37-11.97 respectively) for moderate and problem drinkers, and 3.21(95%CI 1.69-6.39) among the heavy episodic drinkers. There was still a dose response relationship.

Unprotected sex with casual partner: After potential confounding was adjusted for, persons with percieved risk of HIV infection were 69% less likely to report unprotected sex at last sexual intercourse (95%CI 0.17-0.56), while those who perceived the risk of harm from consuming alcohol were 83% less likely to have unprotected sex (AOR 0.17; 95%CI; 0.22-0.71). The differences were statistically significant.

Test for Interaction

Interaction terms were tested between age, sex, education, employment and race with the explanatory variables – alcohol use and heavy episodic drinking. Interaction existed only between sex and the level of alcohol use, with multiple partners as the outcome variable.

Table 3.5: Logistic regression: Univariate analysis of factors associated with high risk behaviours

Characteristic	Multiple Partners Currently (n=1142)	Unprotected sex with Casual partner (n=266)
	OR (95%CI) P value	**OR (95%CI) P value**
Age (years)		
45-65	1	1
16-19	**8.01(2.88-22.30)0.001**	0.66(0.26-1.69)0.39
20-29	**7.53(2.94-19.30)0.001**	0.96(0.42-2.19)0.93
30-44	**3.32(1.27-8.69)0.02**	1.18(0.51-2.69)0.69
Sex		
Female	**1**	1
Male	**3.04(1.98-4.68)0.001**	0.76(0.46-1.25)0.27
Education		
< secondary	1	1
Secondary and >	0.84(0.55-1.29)0.43	1.23(0.75-2.04)0.41
Employment		
Student	1	1
Unemployed	0.37(0.21-0.66)0.001	1.89(0.89-3.97)0.09
Employed	**0.31(0.18-0.52)0.001**	0.98(0.52-1.84)0.95
Race		
African	1	1
Coloured	**0.31(0.17-0.56)0.001**	0.71(0.39-1.31)0.27
Asian	**0.23(0.06-0.97)0.04**	1.24(0.31-4.98)0.76
White	0.25(0.06-1.06)0.06	0.69(0.24-1.93)0.47
Residence		
Urban formal	1	1
Urban Informal	**1.51(1.16-1.96)0.002**	0.78(0.43-1.44)0.43
Rural	0.71(0.49-1.01)0.06	**1.96(0.94-4.04)0.07**
Perception of HIV risk		
No	1	1
Yes	**0.33(0.23-0.34)0.001**	**0.33(0.20-0.58)0.001**
Perception of Alcohol risk		1
No	1	**0.53(0.31-0.89)0.02**
Yes	0.98(0.63-1.52)0.93	
Type of Drinker		
None	1	1
Moderate	**3.74(2.36-5.92)0.001**	0.72(0.41-1.26)0.25
Probm-heavy	**6.47(2.43-17.19)0.001**	0.79(0.24-2.60)0.70
Heavy Ep.Drinking		
No	1	1
Yes	**4.71(3.08-7.29)0.001**	0.69(0.40-1.17)0.17

Bolded odds ratios, confidence intervals and p values were statistically significant.

Table 3.6: Logistic regression: Multivariate analysis of factors associated with high risk behaviour

Characteristic	**Multiple Partner Currently (n=1142)**	**Unprotected sex with Casual partner (n=266)**
	AOR (95%CI) P Value	AOR (95%CI) P value
Age (years) 45-65 16-19 20-29 30-44	 1 **4.37(0.98-19.57)0.05** **7.62(2.22-26.25)0.001** **4.52(1.31-15.58) 0.02**	 ----
Sex Female Male	 1 **2.22(1.32-3.74)0.003**	 ----
Education < secondary Secondary and >	 ----	 ----
Employment Student Unemployed Employed	 1 **0.34(0.14-0.80)0.01** **0.30(0.13-0.73)0.008**	 ----
Race African Coloured Asian White	 1 **0.39(0.20-0.77)0.007** **0.46(0.11-2.11)0.32** 0.45(0.10-2.11)0.31	 ----
Residence Urban formal Urban informal Rural	 1 1.34(0.74-2.44) 0.33 1.36(0.74-2.51)0.32	 1 0.76(0.40-1.45) 0.42 **2.13(0.99-4.62)0.05**
Perception HIV risk No Yes	 1 **0.46(0.28-0.76)0.002**	 1 **0.31(0.17-0.56)0.001**
Perception of Alcohol risk No Yes	 ----	 1 **0.17(0.22-0.71)0.002**
Type of Drinker None Moderate Problem-heavy	 1 **2.37(1.19-4.69)0.01** **4.15(1.37-11.97)0.02**	 1 0.94(0.43-2.03)0.87 1.57(0.36-6.87)0.55
Heavy episodic drinking No Yes	 1 **3.21(1.62-6.39)0.001**	 1 0.51(0.22-1.15)0.10

3.7.3 Logistic Regression Model: Multivariate Analysis of Factors Associated with *HIV* High Risk Behaviour by Sex

Table 3.6 shows the regression analysis stratified by sex.

Multiple partners: Disaggregation of high risk behaviours by gender found that most of the factors influencing sexual behaviours were still significant in both sexes. However perception of risk of *HIV* infection was not significant in women, while problem drinking was no longer significant in the men. The adjusted odds ratio of alcohol use and heavy episodic drinking was higher in the females than males ($P<0.05$).

Unprotected casual sex: With condom use with casual partners, place of residence was no longer significant even though rural residents remained at highest risk. Perception of susceptibility to HIV was still significant in men and women (AOR 0.19; 95%CI 0.08-0.47 and AOR 0.45; 95%CI 0.20-0.99 respectively).

Table 3.7: Multivariate analysis: Adjusted association of high risk behaviour fitted by sex.

Characteristic	**Multiple Sexual Partners Currently**		**Unprotected Sexual with Casual Partner**	
	MALES (n=407) **AOR 95%CI P value**	**FEMALES** (n=735) **AOR 95%CI P value**	**MALES** (n=116) **AOR 95%CI P value**	**FEMALES** (n=150) **AOR 95%CI P Value**
Age (years) 45-65 16-19 20-29 30-44	 1 **16.12(1.51-26.84)0.02** **13.12(1.65-16.61)0.02** **9.66(1.21-11.67)0.03**	 0.76(0.08-6.28)0.76 **5.64(1.11-8.45)0.04** 2.45(0.47-2.75)0.30	----	
Education < secondary Secondary & >	----		----	
Employment Student Unemployed Employed	 1 0.86(0.25-2.91)0.81 0.50(0.15-1.64)0.25	 **0.17(0.05-0.64)0.009** **0.15(0.04-0.60)0.007**	----	
Race African Coloured Asian White	 1 0.31(0.13-0.76)0.01 0.50(0.10-2.49)0.40 0.21(0.03-1.69)0.14	 **0.38(0.12-1.19)0.009** --- 0.95(0.10-8.89)0.97	----	
Residence Urban formal Urban inform Rural	 1 1.85(0.86-4.02)0.12 1.31(0.57-3.02)0.12	 0.76(0.27-2.17)0.61 1.26(0.49-3.24)0.62	 1 0.76(0.29-1.99)0.58 1.58(0.51-4.87)0.42	 0.80(0.33-1.93)0.62 2.88(0.95-8.68)0.06
Perception HIV No Yes	 1 **0.38(0.20-0.72)0.003**	 0.54(0.24-1.21)0.14	 1 **0.19(0.08-0.47)0.001**	 **0.45(0.20-0.99)0.05**
Perception Alco. No Yes	----		 1 **4.45(1.96-10.11)0.001**	 **2.46(1.16-5.18)0.02**
Alcohol Use None Mod Prob & Heavy	 1 **2.46(1.26-4.79)0.008** 1.17(0.28-4.89)0.82	 1 **3.17(1.02-9.91)0.04** **9.68(1.31-17.45)0.02**	 1 1.41(0.44-4.49)0.56 2.55(0.34-2.64)0.36	 1 0.77(0.25-2.34)0.65 0.82(0.06-11.71)0.88
Heavy Episodic drinking Yes	 1 **2.43(1.03-5.92)0.005**	 1 **4.45(1.46-3.55)0.009**	 1 0.80(0.24-2.72)0.72	 1 0.27(0.08-0.86)0.03

4.0. CHAPTER FOUR: DISCUSSION

The main objective of this study was to determine the association between alcohol consumption and risky sexual behaviour in South African adults. Univariate and multivariate analysis using logistic regression and Pearsons chi square test analysis were used to assess the relationship. Results found that use of alcoholic beverages including heavy episodic drinking, was significantly associated with having multiple sexual partners. Socio demographic characteristic particularly age, sex and race were also found to influence sexual behaviours.

4.1 Socio-demographic Characteristics

The participants socio-demographic profile reflects the economic status in South Africa. [53] Educational levels were low and unemployment rates high. There were significant differences in the age, educational level and employment status of men and women, with the women generally been older and having lower socio economic status than the men. Poverty, low educational level and unemployment affect sub-Saharan African countries, particularly women in these countries. [54] The very diverse cultures of South Africa are reflected in the proportions of different races involved in the study. Africans were the predominant racial group interviewed, nonetheless they were underrepresented in relation to the national distribution of 79.6%. [53] Comparatively more Coloureds and Asians were interviewed. About half of the population was urbanized.

4.2 Prevalence of Alcohol use

Overall, 39% of the men and 17% of the women reported drinking alcohol in the last one week. This is lower than what has been reported in 1998 SADHS for the men, but similar rates were reported for women. [56] Lower rates were reported for both sexes in the 2003 SADHS -30%

and 10% respectively. [29] High levels of alcohol use and dependence in South Africa have similarly been found by other authors [7, 31] and reported in neighbouring countries, including Botswana and Zimbabwe.[5, 9] Only 2.0% and 1.4% of the respondents were problem or heavy drinkers. The true prevalence of heavy drinking and heavy episodic drinking is likely to be much higher as respondents may give socially desirable responses. Also, given the social pressures on women in certain cultures not to drink alcohol it is possible that under-reporting may be even greater in certain subpopulations, such as African women. [28] Men and young persons (20-44 years) were more often current and risky drinkers. However, adolescents and even those less than 18 years of age were heavy episodic drinkers (9.5% of the risky drinkers). This is perilous to their health as volume of alcohol use increases with age. It is recognised that men commonly use alcohol as a disinhibitor, a sex facilitator, a symbol of masculinity, and a means of relaxation, recreation, socializing and improving communication skills. [57] Alcoholic beverages are also used as a facilitator in approaching the opposite sex. [32, 57] Among women on the other hand, alcohol use increases involvement in risky sexual encounters, sex for gain and sexual victimization, thus exposing them to the risk of unwanted pregnancies and STIs. [21, 57] Notwithstanding considerable morbidity and mortality associated with alcohol use, control measures are largely absent and not thoroughly enforced.

Education and employment can serve as proxies of socio economic status. A high socio economic status may increase the ability to afford alcoholic beverages and prevalence of drinking. [58] Prevalence of drinking in the preceding week was highest in the Northern Cape and Gauteng Provinces, while risky drinking was most in Mpumalanga and Northern Cape Provinces. Prevalence of drinking was highest among the whites. This is similar to the findings of the SADHS, where the rank ordering of ever using alcohol and past month binge drinking

from highest to lowest was Whites, Colored, Africans and Asians.[28] However, the 1998 SADHS found the lowest prevalence among Africans, suggesting a shift in the demographic profile of drinking in South Africa. [56]

4.3 Association between Socio-demographics and High risk sexual behaviour

Young people between the ages of 20-29 years had a high likelihood of multiple partners while those 16-19 the highest risk of early sexual initiation. The magnitude of the odds ratio was quite high suggesting a relationship between the two variables. Young people acquire *HIV* infection through unprotected sex at a much higher rate than adults. AIDS has been cited as a leading cause of death among the youths who, in many cases, became infected as teenagers. Risk-taking behaviour, including sexual risk taking, is more common among young people than in the general population. [1,3] According to a nationally representative survey of students in South Africa, 48% of 15-19 year olds reported ever having had sex.[59] Among the sexually experienced youths, 53% reported that they used a condom at last sex, but the majority (66%) reported that they did not always use a condom with their most recent sexual partner. [59] Alcohol plays an important role in sexual risk taking among young people. [1, 3] Results from the South African Youth Behavioural survey, showed that among learners who were sexually active, the national prevalence of alcohol or drug use before sex was 13.8% [12.0 - 15.6]. Significantly more male (17.9% [15.8 - 20.1]) than female learners (8.7% [6.6 - 10.8]) reported using alcohol or drugs before sex. [60] In the United States of America, 25% of College students reported that they had used alcohol or drugs at last sexual intercourse and 42% reported not using a condom at last intercourse. The students reported rates of 15% to 65% of condom use following drinking. [61] Young people with alcohol use disorders are more likely than other drinkers to be sexually

active, to have greater numbers of partners and to initiate sexual activity at slightly younger ages. [26, 30] Older men on the other hand were more likely to have extramarital sex and pay for sex than their younger counterparts. [58]

A few important gender differences were notable in correlates of sexual risk-taking. Men (especially the adolescents) had more concurrent multiple sexual partners and initiated sex earlier than women. Hormonal factors might be expected to increase impulsiveness and risk taking behaviour in males. [57] "Masculinity" is often linked to the ability to have multiple partners, imbibe alcohol and engage in promiscuous behaviour.[57] Generally, consistent condom use was less often reported in females compared to males. Condom use is male controlled. Male dominance and economic dependence also limits the women's ability to adopt preventive measures such as the use of condoms. Furthermore, economic dependence makes women have lower negotiating power within sexual relationships. [1,3] This may explain the increasing incidence of *HIV* infection among women, and heterosexual contact is the predominant mode of *HIV* transmission among women diagnosed with AIDS.[1] Studies have found that men used the condom at last sexual intercourse, initiated sex before the age of 14 years, and had multiple partners more than women. [56, 60]

Respondents with higher levels of education were found to have a decreased probability of having multiple sexual partners and early sexual initiation. This suggests that educated people may be more restrictive in their sexual relations probably due to being in school and a higher level of knowledge.[62] Education is highly correlated with income. Hence men with better education may have more money to spend and can afford to buy sex, while poor women may

have sex for money. [5,30, 62] Thus the findings on socio economic status and risky behaviour may be gender related and can be conflicting. [54, 61, 63]

The role of race/ethnicity in HIV/AIDS risk is complex and other variables such as gender, age and socioeconomic status need to be considered simultaneously. The Africans had earlier age at sexual initiation and more multiple partners than the other races. Results of the 1998 and 2003 SADHS also found that Africans reported having multiple partners more than any other ethnic group and they had an earlier median age at first sexual intercourse than Coloureds, White and Asians in that order. [28, 56] The use of condoms with a casual partner was least among the Asians, followed by the Whites, Coloured and highest in the Africans. [28] Findings also indicate that personal, situational and behavioural factors including level of acculturation may be an important variable to consider in the interplay between alcohol and high risk behaviour. [28]

Perception of *HIV* and alcohol related harm was observed to have a protective influence having multiple partners and condom use. The literature shows that the link between alcohol use and sexual risk behaviours in terms of *HIV* infection is embedded in the perceptions and expectations of individuals, which in turn are influenced by socio cultural and other individual-related factors. [64]

4.4 Association between Alcohol and High Risk Sexual Behaviour

Drinkers, tended to engage in more impulsive and risky behaviour, such as having early sexual initiation, and multiple sexual partners currently. The amount of alcohol consumed per week (quantity) correlated strongly with sexual risk taking. Problem and heavy drinkers were more strongly associated with engaging in high risk behaviour than moderate drinkers, who were also

more positively associated with having multiple sexual partners concurrently than none drinkers. Heavy episodic drinking (quanitity per occasion) was also significantly associated with the having multiple partners. The risk of taking alcohol and heavy episodic drinking was a strong and still remained strong after adjustments hence unlikely to be due to the effect of confounders. Consuming alcohol and risky drinking was protective against inconsistent condom use with casual partners but did not reach significant levels. The most significant correlates of risky sexual behaviour were similar for men and women.

The increased condom use with casual sexual partner among heavy alcohol users at first glance appears to be contrary to the expected. However, similar findings have been observed among persons reporting high-risk behaviors and alcohol consumption in Tanzania.[65, 66] This may be indicative of some success in increasing condom use among high groups of *HIV* infection, although overall condom use remained low and in most cases condoms was not used consistently with all partners. It is also possible that some drinkers may have learned from prior experiences that they are more likely to engage in sex while under the influence of alcohol, and hence have prepared themselves for the act by having a condom or learning to negotiate condom use [2]. Thus condom use may be indicative of high-risk behaviors, and the tendency to engage multiple sex partners because of its perceived *HIV* protection. [47]

There is an increase in alcohol use by teenagers and women, men however, have more social liberties than women, on alcohol use as well as sexual activities. [1] Sexual practices among women, which increase risk of exposure to *HIV* include: sex with multiple partners; sex for money or resources, sex with a partner of unknown sexual history or *HIV* status; and failure to use condoms [1 ,9, 12, 57, 58]. The likelihood of engaging in these practices may be influenced by

alcohol consumption. [16, 27] Alcohol and substance use have been identified to have the greatest effect on condom use not among women who know they engage in risky sex, but among those who do not sufficiently appreciate that every sexual encounter is risky. [36, 40, 42] With the teenagers, the age for initiating alcohol use and experimenting with sex is on the decline, but the age for marriage is on the rise. However condom use remains limited. Alcohol use is also known to be associated with certain types of sexual activity such as unprotected casual sex, group sex and anal sex. [39] Although no association was observed between alcohol use and unprotected casual sex, this could be due to information bias and uncontrolled confounders. Alcohol use has also been linked to early sexual experiences. [39, 67] Alcohol use and sexual risk behaviours are 'siamese twins" and particularly prevalent in settings such as nightclubs, bars, dark houses, highway eating joints and motels, and brothels. [18, 27,30, 32]

Increasing modernization and liberalization have contributed towards more permissive attitudes towards alcohol use and sexual risk behaviour. In developing countries, globalization (for example through the media) has contributed towards the erosion of traditional values and the adoption of Western lifestyles, particularly among younger groups. More specifically, the fact South Africa has been subjected to Western/colonial rule has contributed towards alcohol use no longer being restricted to traditional or ceremonial use of low-alcohol brews by specific population groups; alcohol is now used widely and is socially more acceptable than before. [31, 33] Modernization has also led to changes in lifestyle, a decline in adherence to traditional moral values, and to increased vulnerability to sexual risk behaviours, and thus to STIs, including HIV/AIDS. An increase in foreign traffic, psychoactive substance use, commercial sex work and

STI prevalence have contributed towards an increase in *HIV* infection.[1] *HIV*/AIDS, are a serious public health problem in South African. [1]

This is one of the very few population based studies to explore the association between alcohol use and a number of high risk sexual behaviours in sub-Saharan Africa and probably the first in South Africa. The effect of alcohol on sexual risk was modified by gender, with females who were problem drinkers being at a greater risk of multiple partners. The results from this survey reinforce the findings from smaller venue based studies such as beerhalls and sexually transmitted disease clinics that alcohol use is strongly associated with a number of risky sexual behaviours in sub-Saharan Africa [4, 7, 9, 47, 49]. This study also supports the findings of other subpopulation studies such as the South African Youth behaviour Survey which found a relationship between the use of alcohol and engaging in sexual intercourse among students of public secondary schools.[60] A study among in-school and out-of-school students in Ethiopia found that, alcohol use was strongly and linearly associated with initiation of sexual activity, and unprotected sex.[6] Similarly, among men who have sex with men, regular drinking and drinking to intoxication was associated with unprotected sexual intercourse. [43] However, some of these studies were not stratified by gender.

This survey confirms that these associations hold in a population-based study, that the relationships between alcohol use and risky sexual practices are higher in women, and that there is a dose-response relationship between alcohol use and multiple partners in both genders. Thus there is a strong need to target alcohol use and abuse in *HIV* prevention programs, especially for women. Even though causality can not be determined from a cross-sectional study, the

consistency of results across many studies (including the reported associations between alcohol use and incident *HIV* infection [8,10,13], the dose-response relationship between alcohol and risky sex, the strength of the associations after adjustments for possible confounders, and the biologic plausibility all suggest that alcohol use is likely to be a cause rather than a consequence of risky sexual behaviour.

4.5 Limitations of the study

First, the association between alcohol use and high risk sexual behaviour is difficult to interpret because of the uncertain temporal relationships between the variables due to the cross-sectional research design. It is not possible to be certain if alcohol use preceded high risk behaviour (for example engaging in unprotected casual sex) or not. As there was no information on the pattern of use of alcohol beyond the four-week period prior to the survey, it is difficult to speculate on the significance of this strong association. It is assumed that the four-week window assessment period is representative of long-term individual pattern of use of alcohol. The correctness of this assumption can not be verified from the present study. Thus the findings must be interpreted cautiously. Second, data were self-reported and could be unreliable (information bias) due to faulty recall or social desirability bias. To minimize self-reporting bias, there were no questions about *HIV* status. In addition, respondents were assured confidentiality and privacy in all interviews, and carefully trained interviewers were used and trained to ask sensitive questions in a non-judgemental fashion. While risky sexual practices and alcohol use may have been underreported, this underreporting is likely to shift associations found towards the null. Thus the true risk between risky sex and alcohol use is likely to be higher that reported. Thirdly, mental

health, particularly history of depression and use of psychoactive drugs were not assessed. These could result in high risk-taking behaviours independent of alcohol use, and could generate spurious associations with risky sexual behaviours, especially among the heavy episodic drinkers.

The data were collected primarily to determine impact of Soul city edutainment programmes on knowledge, attitudes and practices on HIV/AIDS, cancer of the cervix and community participation for *HIV* prevention. Hence there was not as much detail about alcohol use as I would have liked and could not control for all potential confounders. For instance, measures on alcohol use did not address age at initiation of alcohol use, number of years of alcohol use, alcohol dependence or impairment in social functioning. Findings would have been strengthened if the internationally validated WHO AUDIT test was used as a screening tool for alcohol use. [68] Also, it is difficult to establish causality with the study design, the findings can only indicate associations. Finally, South Africa has a number of unique features that may limit generalisability to neighbouring African countries, such as its relatively high per capita income, comparatively well developed health care infrastructure, high prevalence of *HIV* infection, strong response by non-governmental AIDS organisations and civil society groups, but weak government commitment to combating *HIV*.[69] Nonetheless, similar results from studies in other African countries [5,6, 9, 10] strongly support these findings and their applicability elsewhere in Africa.

4.6 Strengths of the study

The strengths of the study lies in its large sample size, over 1500 participants were interviewed hence chance findings are unlikely. It had a national coverage; with respondents coming from the nine provinces of the country. In addition, all sexually active age groups were involved, and both men and women were interviewed. This study is one of the first population based studies to assess the relationship between alcohol and high risk sexual behaviour in Sub Saharan Africa and South Africa.

5.0 CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1 Conclusion

There was a high prevalence of alcohol consumption and heavy episodic drinking in this large probability sample of rural and urban adults in South Africa. There was association between broad socioeconomic conditions and sexual behaviour particularly age, sex and race. A strong and consistent relationship was demonstrated between alcohol use and multiple sexual partners among both men and women. This study also confirms the associations between heavy episodic drinking and the risky sexual practices of having multiple sexual partners in both sexes. Females who were problem drinkers and heavy episodic drinkers had a higher risk of having multiple sexual partners concurrently. As regards unprotected sexual intercourse, although not significant, female drinkers were found to be protected from inconsistent condom use with a casual partner. Male drinkers on the other hand, were found to be a higher risk of having unprotected sex with casual partners. Perceptions of susceptibility to *HIV* and alcohol related harm influenced consistent condom use with casual partners. The findings in this study underscore the importance of integrating policies on alcohol abuse in *HIV* prevention efforts particularly for women in South Africa and elsewhere in the world.

The following key issues emerged from review of literature as factors to be considered in the relationship between alcohol and risky sexual behaviours: the prevalence of certain myths and notions about “masculinity”; a lack of firm implementation of alcohol-related policies; high *HIV* prevalence and the need to augment prevention efforts in this respect; the interwovenness of alcohol use, sexual risk behaviours and STI/*HIV*/AIDS; the effect of modernization on the youth,

which manifests in early drinking, early sexual activity and increasing vulnerability to risk behaviours; and a paucity of research data on alcohol and sexual risk behaviours.

5.2 Recommendations

The prevalence of *HIV*/AIDS in South Africa continues to remain high. The prevalence of drinking is also high. In view of the strong overlap between risky alcohol use and sexual risk-taking, there is the need for new approaches to *HIV* prevention that simultaneously address the overlap of risk behaviours as well as some of the social, economic, and demographic factors that help fuel the *HIV* epidemic. To date few policies have been implemented in South Africa and elsewhere in Africa to address the strong overlap between alcohol use and *HIV*. A study by Fritz et al. has shown that it is methodologically feasible and culturally appropriate to carry out *HIV* interventions in Zimbabwe beer halls.[9] Additional risk reduction strategies that could be considered include educational campaigns targeting alcohol and *HIV* education for students in schools, worksites and other social venues. The *HIV* prevention programs are more likely to be effective if they address the age and gender differences that help to perpetuate the spread of *HIV* in South Africa and elsewhere in Africa.

The association between amount of alcohol consumed and risky sexual behaviors, however, suggest that interventions focused on changing alcohol consumption levels, should reduce both the amount of consumed per month and amount of alcohol consumed per occasion. In addition, these programmes should emphasize the relationship between alcohol use and such risky sexual behaviours as unprotected sex and early sexual initiation. This is particularly necessary to target these interventions at male and female adolescents and youths whose expectations of the positive

effects of alcohol consumption have proven to be particularly strong.[21, 61, 64] The context of alcohol use needs also to be addressed. The setting of alcohol use has been found to be more closely related to sexual risks than are the quantity or frequency of use. [49]

In addition, interventions that controls sale of alcohol to persons less than 18 years, limits alcohol licenses, close unlicensed shebeens, and the bolstering of programs for the prevention, treatment, and rehabilitation of alcohol abuse are also essential. [9, 18] Alcohol use in South Africa and elsewhere in Africa has deep-seated cultural and social meanings related to social status, gender identity, and family and communal structures [29] that must be taken into account in the design of effective alcohol reduction strategies. However, reinforcing or raising the drinking age may also be effective at decreasing high risk sexual behaviours. [27]

Finally, it is important to teach young people how to deal with advertising messages that portray alcohol and sexuality as complementary, especially in developing countries where regulations for mass media messages are lacking or not strictly enforced. [64] The media (electronic and print) can play an important role in shaping and influencing sexual behaviour and alcohol use patterns. Advertisements, pornographic movies, thrillers and romantic programmes glamorize and promote engagement in these activities should be disallowed. [16] Warnings to remind on control of alcohol use during periods of festivities and celebrations are also be necessary.

In order to understand the factors that lead to sexual risk behaviours when alcohol is used there is a need for an in-depth understanding of the socio-cultural factors that influence risk behaviours, such as myths and notions about masculinity, alcohol use and sexual risk behaviours, the role of poverty/economic disparity, the vulnerability of the youth population, inadequate implementation of policies related to alcohol use and high-risk groups**.** Qualitative methods, are

also necessary to understand what makes a person drink before having sex? What happens to the risk perception? What kinds of sexual encounters is one likely to engage in? What happens to the likelihood of and the ability to use condoms under the influence of alcohol in a given individual? What is the likelihood of STI/HIV transmission? Also, further studies are needed to disentangle the complex relationship between condom use and alcohol use.

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APPENDICES

APPENDIX 1: QUESTIONNAIRE

ALCOHOL CONSUMPTION AND HIGH RISK SEXUAL BEHAVIOUR AMONG ADULT SOUTH AFRICANS

SECTION 1: Demographics

1. Type of area/ Tipe area

Metropolitan formal/Metropolitaans formeel	1
Metropolitan informal/Metropolitaans informeel	2
Town/Dorp*	3
Rural village/Plattelandse nedersetting	4
Rural on farm/Plattelands op plaas	5
Rural scattered/Plattelands verspreid	6

2. Sex of respondent/ Geslag van respondent

Male/Manlik	1
Female/Vroulik	2

3. What is your age in completed years? /Hoe oud is jy, in voltooide jare?

……..YEARS | | |

4. What is your current employment status (which of the following best describes your present work situation)? /
Wat is jou huidige werkstatus (watter van die volgende beskryf jou huidige werksituasie die beste)?

Student/scholar / Student/skolier	01
Unemployed, not looking for work / Werkloos, soek nie werk nie	02
Unemployed, looking for work / Werkloos, soek werk	03
Work in informal sector, not looking for permanent work / Werk in die informele sector, soek nie permanente werk nie	04
Work in informal sector, looking for permanent work / Werk in die informele sector, soek permanente werk	05
Pensioner (sick/disabled, etc.) / Pensionaris (siek, gestremd, ens.)	06
Housewife, not working at all, not looking for work / Huisvrou, werk glad nie, soek nie werk nie	07
Housewife, looking for work / Huisvrou, soek werk	08
Self-employed - full time / In eie diens - voltyds	09
Self-employed - part time / In eie diens - deeltyds	10
Employed part time (if none of the above) / In deeltydse diens (indien geen van bogemelde)	11
Employed full time / In voltydse diens	12

5. What is your highest educational qualification? /
Wat is jou hoogste opvoedkundige kwalifikasie?

NONE/Geen	01
SOME PRIMARY/Bietjie primêre opleiding	02
PRIMARY COMPLETED/Primêre opleiding voltooi	03
SOME SECONDARY/Bietjie sekondêre opleiding	04
SECONDARY COMPLETED/Sekondêre opleiding voltooi	05
TERTIARY/Tersiêre opleiding	06
OTHERS (SPECIFY)/Ander (Spesifiseer)	07

6. What language do you speak at home most of the time? /
Watter taal praat jy die meeste van die tyd tuis?

English/Engels	1
Afrikaans	2
Zulu/Zoeloe	3
South Sotho/Suid Sotho	4
Setswana	5
Xhosa	6
Pedi / North Sotho/Noord Sotho	7
Venda	8
Tsonga	9
Seswati	10
Ndebele	11
Others Specify/Ander: ……	

8. RACE **(*Interviewer do not ask*)** /RAS **(Onderhoudvoerder moet nie vra nie)**

African/Swart	1
Coloured/Kleurling	2
Asian/Indiër	3
White/Blanke	4

SECTION 2: KNOWLEDGE AND ATTITUDES

PERCEPTION OF RISK/RISIKO PERSEPSIE

9. Drinking alcohol causes problems for me. / Die gebruik van alcohol veroorsaak vir my probleme.

Yes/ Ja	1
No/ Nee	2
Uncertain/Don't Know/Onseker/Weet nie	*3*

10. Do you think you **[*personalised*]** are at risk of getting HIV/AIDS? /
Dink jy dat jy **[***verpersoonlik***]** die risiko loop om MIV/VIGS te kry?

Yes/ Ja	1
No/ Nee	2
Uncertain/Don't Know/Onseker/Weet nie	*3*

SECTION 3: SELF-EFFICACY ITEMS

I am now going to read a number of statements. To what extent do you agree or disagree with each statement. There are no right or wrong answers. Would you say that you strongly agree, agree, are neutral, disagree or strongly disagree with the following? /

Ek gaan nou 'n aantal stellings aan jou voorlees. In watter mate stem jy saam, of nie saam met elke stelling nie. Daar is geen regte of verkeerde antwoorde nie. Sou jy sê dat jy beslis saamstem, saamstem, neutraal is, nie saamstem nie, of beslis nie saamstem met die volgende nie?

		Strongly agree Stem beslis saam	**Agree/ Stem saam**	**Neutral/ Neutraal**	**Disagree/ Stem nie saam**	**Strongly disagree/ Verskil beslis**	***DK/ Uncer-tain/W eet nie/On seker***
11.	When I am with my friends I feel I can refuse a drink at any time./ Wanneer ek saam met my vriende is, voel ek ek kan te enige tyd 'n drankie weier.	1	2	3	4	5	*6*

SECTION 4: BEHAVIOUR AND INTENTION

You may consider the following questions to be sensitive, and you may feel that some of them are not applicable to you. We have to ask everybody the same questions though, so we would appreciate it if you answer the questions as they apply to your life. /Jy mag die volgende vrae as sensitief beskou, en mag voel dat sommige daarvan nie op jou van toepassing is nie. Ons moet egter vir almal dieselfde vrae vra, en sal dit dus waardeer as jy die vrae beantwoord soos hulle op jou lewe van toepassing is.

12. How old were you when you had your first penetrative sexual intercourse? /
Hoe oud was jy toe jy vir die eerste keer penetrerende seksuele omgang gehad het [*Be ready to explain "penetrative"/ Wees gereed om "penetrerend" te verduidelik*]

…….. | | | |

13. How many sexual partners have you had over the last 12 months? /
Hoeveel seksmaats het jy gedurende die afgelope twaalf maande gehad?

…….. | | | |

14. How many sexual partners do you currently have? /
Hoeveel seksmaats het jy tans?

…….. | | | |

15. In the past month how many people have you had sex with?/Gedurende die afgelope maand, met hoeveel mense het jy seks gehad?

…….. | | | |

16. In the last 12 months, how often have you insisted that you and your partner(s) use a condom to prevent getting HIV or AIDS? /
Hoe dikwels het jy gedurende die afgelope 12 maande daarop aangedring dat jy en jou metgesel(le) 'n kondoom gebruik om MIV of VIGS te verhoed?

Never/ Nooit	1
Sometimes/ Sometimes	2
Always/ Altyd	3
Uncertain/Can't remember/Onseker/Kan nie onthou nie	*4*

17. Did you and your partner use a condom the last time you had sex? /

Het jy en jou metgesel ‘n kondoom gebruik toe julle die laaste keer seks gehad het?

Yes/ Ja	1
No/ Nee	2
Uncertain/Can’t /remember /DK/Onseker/Kan nie onthou nie/Weet nie	*3*
Refuse/Weier om te antwoord	*4*

18. How often do you use condoms when having sex with …/

Hoe dikwels gebruik jy kondome as jy seks het met …

a. … your husband (boyfriend)/wife (girlfriend)/regular partner/

a. … jou man (kêrel)/vrou (meisie)/gereelde metgesel?

Always/ Altyd	1
Sometimes/ Soms	2
Never/ Nooit	3
Not sexually active/Nie seksueel aktief nie	*4*
Refuse to answer/Weier om te antwoord	*5*

b. … any person other than your husband (boyfriend)/wife (girlfriend)/regular partner/

b. … enige persoon behalwe jou man (kêrel)/vrou (meisie)/gereelde metgesel?

Always/ Altyd	1
Sometimes/ Soms	2
Never/ Nooit	3
Not applicable (one partner only)/NVT (slegs een seksmaat)	*4*
Not sexually active /Nie seksueel aktief nie	*5*
Refuse to answer/Weier om te antwoord	*6*

19. In the past week I have had … drinks. (alcohol)/Ek het … alkoholiese drankies die afgelope week gehad.

…….. | | | |

20. In the past month I have had more than 5 drinks at one sitting./ Ek het gedurende die afgelope maand meer as 5 drankies in een sitting.

Yes/ Ja	1
No/ Nee	2
Refuse to answer/Weier om te antwoord	*3*

Thank you for your time!!!

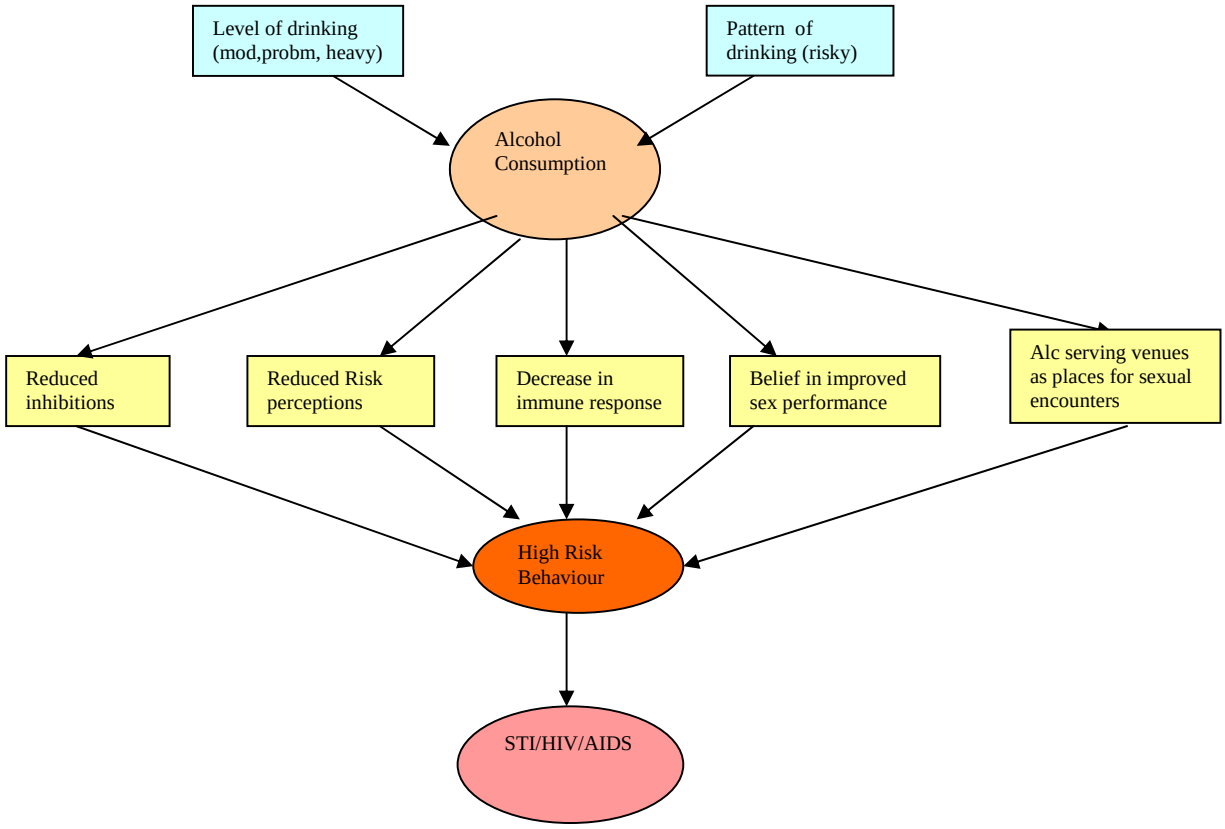
APPENDIX 2: Ethical Clearance Certificate

APPENDIX 3: Bivariate Analysis: Relationship between outcome variable (High risk behaviour) and socio-demographic characteristics and other potential confounders.

Characteristic	Multiple partner (n=96)		Early Sexual Debut (n=583)		Inc. condom use Casual partner (n=168)		Unprotected LSI (n= 729)	
	N %	P value	n %	P value	n %	P value	n %	P value
Age								
16-19	17(17.7)	**0.001**	105(18.0)	**0.001**	22(13.1)	0.50	54(7.4)	**0.001**
20-29	44(45.8)		186(31.9)		59(35.1)		167(22.9)	
30-44	30(31.3)		197(33.8)		66(39.3)		310(45.5)	
45-65	5(5.2)		95(16.3)		21(12.5)		198(27.2)	
Sex								
Male	58(60.4)	**0.001**	236(40.5)	**0.001**	69(41.1)	0.28	243(33.3)	0.09
Female	38(39.6)		347(59.5)		99(58.9)		486(66.7)	
Education								
< sec	57(59.4)	0.43	363(62.3)	**0.02**	89(53.0)	0.41	436(59.8)	**0.001**
Sec and >	39(40.6)		220(37.7)		79(47.0)		293(40.2)	
Employment								
Student	27(28.1)	**0.001**	118(20.2)	**0.001**	34(20.2)	0.09	59(8.10)	**0.001**
Unemployed	26(27.1)		170(29.2)		53(31.6)		244(33.5)	
Employed	42(44.8)		295(50.6)		81(48.2)		426(58.4)	
Residence								
Urban	44(45.8)	0.25	281(48.2)	0.23	97(57.7)	0.08	392(51.0)	0.21
Town	27(28.1)		174(29.9)		33(19.6)		203(27.9)	
Rural	25(26.0)		128(21.9)		38(22.6)		154(21.1)	
Race								
African	78(81.2)	**0.001**	367(62.9)	**0.001**	120(71.4)	0.63	378(51.8)	**0.001**
Coloured	14(14.6)		177(30.4)		32(19.0)		260(35.7)	
Asian	2(2.1)		17(2.9)		7(4.2)		48(6.6)	
White	2(2.1)		22(3.8)		9(5.4)		43(5.9)	
Perception Alco								
No	63(65.6)	0.93	367(62.9)	0.75	126(75.0)	**0.02**	473(64.9)	**0.03**
Yes	33(34.4)		216(37.1)		42(25.0)		256(35.1)	
Perception HIV								
No	43(44.8)	**0.001**	384(65.9)	0.18	70(41.7)	**0.001**	481(66.0)	0.14
Yes	53(55.2)		199(34.1)		98(58.3)		248(34.0)	
Alcohol use *								
None	36(40.9)	**0.001**	365(65.0)	**0.001**	101(67.3)	0.50	481(69.4)	0.24
Moderate	46(52.3)		172(30.6)		42(28.0)		194(28.0)	
Problem& heavy	6(6.8)		25(4.4)		7(4.7)		18(2.6)	
Heavy Episodic drinking *	45(48.4)	**0.001**	410(77.8)	**0.001**	113(71.5)	0.17	547(77.2)	**0.05**
No	48(51.6)		153(37.2)		45(28.5)		162(22.8)	
Yes								

*** Had non responses to the question**

APPENDIX 4: Alcohol Consumption and High Risk Sexual Behaviour



Adapted from: *Rehm J et al. The relationship of average volume of alcohol consumption and patterns of drinking to burden of disease: an overview.* [24]