ASSOCIATION BETWEEN ALCOHOL USE AND SEXUAL RISK BEHAVIORS FOR HIV TRANSMISSION AMONG CLIENTS ATTENDING HIV VOLUNTARY COUNSELING AND TESTING AT MUHIMBILI HEALTH INFORMATION CENTRE IN DAR ES SALAAM, TANZANIA

Violet David Mwanjali, MD

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By

Violet David Mwanjali, MD

A Dissertation Submitted in Fulfillment of the Requirements for the Degree of Master of Medicine (Psychiatry) of the Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences

October 2010

CERTIFICATION

The undersigned certify that they have read and hereby recommend for examination of dissertation entitled *Association of alcohol use and sexual risk behaviors among clients attending HIV Voluntary Counseling and Testing at Muhimbili Health Information Centre in Dar Es Salaam, Tanzania,* in fulfillment of the requirements for the degree of Master of Medicine (Psychiatry) of Muhimbili University of Health and Allied Sciences.

Prof. Gad Paul Kilonzo

(Supervisor)

Date:23/11/10

DECLARATION AND COPYRIGHT

I, **Violet David Mwanjali,** declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature .... Date 23/11/2010

ACKNOWLEDGEMENT

DEDICATION

This work is dedicated to my parents Mr and Mrs Mwanjali. They have always been there for me, loving and supporting me.

ABSTRACT

Background: Understanding the association of alcohol use to HIV transmission is of utmost importance particularly in regard to control of the HIV pandemic. As many as 50% of people living in areas of Southern Africa where HIV is most prevalent report current alcohol use [21]. Unfortunately, very little is known regarding the patterns of alcohol consumption that are mostly associated with risk for HIV transmission.

Objective: This study was designed to determine the association between alcohol use and HIV serostatus as well as sexual risk behaviors among clients who voluntarily seek HIV testing and counseling (VCT) at Muhimbili Health Information Centre (MHIC), Dar es Salaam, Tanzania.

Materials and Methods: A descriptive cross-sectional study design, using quantitative data collection methods, was conducted using the Alcohol Use Disorders Identification Test (AUDIT) over a period of two months, November 2009 through January 2010 to screen 800 participants, who attended HIV/VCT at MHIC.

Results: The overall prevalence of HIV was 13.9% (95% CI of 1.5%-16.5%), being higher among women than men (P-value = 0.001). Twenty seven percent of the study participants were alcohol users. Alcohol use behavior was significantly high among study participants who were males (P-value = 0.002), Christians, (P-value = 0.000), single, (P-value = 0.006), and employed (P-value = 0.032). The risk of HIV infection increases with increase in frequency, (P- value = 0.006), and levels (amount) of alcohol use (P- value = 0.000). The majority of the study participants, who drank alcohol at the harmful and dependence level, were highly likely to report non-regular sexual partners (P values = 0.006) and not to use condom in all sexual contacts with non regular sexual partners (P values = 0.000). Female and male drinkers were more likely to test positive for HIV compared to non drinkers, (P value = 0.002, and P value = 0.012) respectively.

Conclusions: There is a strong association between alcohol consumption and sexual risk behaviors, which predispose individuals to risk of HIV infection. This risk increases sharply with increasing frequency and level of alcohol use. There is an urgent need to invest in HIV/AIDS prevention and control activities in Tanzania that target alcohol consumption. Brief alcohol risk assessment and risk reduction interventions should be incorporated into VCT package.

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ABBREVIATIONS:

AA	Alcoholics Anonymous.
AUDIT	Alcohol Use Disorders Identification Test.
CAGE	Cutting down on drinking, Annoyance with criticisms about drinking, Guilt about drinking, and using alcohol as an Eye opener.
CTC	Care and Treatment Centers for HIV.
HIV	Human Immunodeficiency Virus.
MAST	Michigan Alcohol Dependence Screening Test.
MHIC	Muhimbili Health Information Centre
MNH	Muhimbili National Hospital.
MUHAS	Muhimbili University of Health and Allied Sciences.
SPSS	Statistical Package for the Social Sciences
STIs	Sexually Transmitted Infections.
THMIS	Tanzania HIV and Malaria Indicator Survey Report
VCT	Voluntary Counseling and Testing.
WHO	World Health Organization.

DEFINITION OF TERMS:

Alcohol dependence;

Alcohol dependence is a mental disorder recognizable by symptoms, which can include a strong and persistent desire to consume alcohol despite harmful consequences, gradually, increasing the amount taken over a period of time in order to attain the desired effect. Stopping alcohol intake in these individuals will leads to withdrawal symptoms, which develop over hours or days.

Alcohol misuse;

Alcohol misuse refers to any mental, physical, or social harm resulting from excessive alcohol use.

Alcohol intoxication;

Alcohol intoxication means significant maladaptive behavioural, psychological changes (mood lability, sexual disinhibition, aggression, impairment of judgment), social and occupational functioning that occurs shortly after taking alcohol.

Binge alcohol drinking;

Binge alcohol drinking means drinking alcohol 5 or more standard drinks on one occasion in the previous thirty days

Current alcohol use;

Current alcohol use means drinking at least once in the past one month.

Hazardous alcohol drinking;

Hazardous alcohol drinking means a level of alcohol consumption or pattern of drinking that, should it persist, is likely to result in harm to the drinker or others [1].

Harmful alcohol use;

Harmful alcohol use refers to pattern of alcohol consumption that causes damage to health, either mental or physical and social consequences [1].

Heavy alcohol drinking;

Heavy alcohol drinking means drinking 5 or more standard drinks on more than 5 occasions in previous thirty days.

Habitual excessive alcohol drinking;

Habitual excessive alcohol drinking means drinking leading to intoxication more than twelve times within a year or when the individual is recognisable to be under the influence of alcohol more than a week at a time.

Standard unit of alcoholic beverages;

Standard alcoholic beverage varies according to individual researchers in the gram-unit alcohol ratio they use. Some equate 8 grams to 1 unit, while others to as much as 12 grams to 1 unit. The following calculations are based on 1 unit-8 gram that will be used in this study. Table 1 and 2 below shows the commonly used alcoholic beverages used in Dar-es-Salaam, non-industrialized traditional alcoholic brews and industrialized alcoholic beverages [2].

Table 1: Industrialized alcoholic beverages

Type	Unit/l	1 Unit	% Alcohol
Beer	3	330 ml	4
Spirits (whisky, Gin, Vodka)	36	2.8 ml	43
Wine	9	112 ml	12
Konyagi	44	23 ml	35
Amarula	11	90 ml	8.9

Table 2: Non-industrialized traditional alcoholic brews

TYPE	UNIT/L	1 UNIT	% ALCOHOL
Komoni	6	167 ml	4.5
Chibuku	4	250 ml	3.2
Mbege	3	333 ml	3.
Mnazi	7	143 ml	5.5
Gongo	33	30 ml	26.7

Social (sensible) alcohol drinking (non-hazardous alcohol drinking);

Social (sensible) alcohol drinking means drinking revolves around social occasions while maintaining control with predictable settings and amounts of drinks, which does not cause social, psychological or physical harm to him/her or others. The amount of drinks per day does not exceed four units and the total per week does not exceed 21 units for men and 14 for women. Drinking occurs on 3 or 4 days a week with 3 or 4 dry days during the week.

Unsafe sex;

Unsafe sex refers to sexual contact with partner(s) of unknown HIV status without the use of condoms.

Sensation seeking personality;

Sensation seeking personality is defined as the propensity to seek optimal sensations through novel and arousing experiences.

1.0 REVIEW OF LITERATURE

1.1 INTRODUCTION

Alcohol is the most commonly abused psychoactive substance in the world [3]. In Tanzania, as elsewhere, its use has been an integral part of the social and cultural life of the community, including marriage, funerals and conflict resolution ceremonies [4]. In this social cultural context access to alcohol was limited to mature, married men and women[5].

The trend of alcohol use is changing, and it is now accessible to youth and young adults. It is reported that in some industrialized countries, alcohol consumption is decreasing but it is on the increase in developing nations [6]. For example, studies shows that alcohol consumption in Southern Africa is increasing over time [7], individuals who drink, consume an average of 20 liters of alcohol per capita, per year, representing one of the highest volumes of per capita alcohol consumption in the world [8]. Studies that have been conducted on availability and consumption of alcohol in Tanzania suggest that up to 89% of consumption is in the form of homemade traditional beers [9]. Locally brewed alcoholic beverages are cheap and easily available, making their consumption difficult to limit. Increased consumption of alcohol in the context of the HIV/AIDS epidemic is especially worrying because of the association between alcohol use and sexual risk behaviors.

HIV/AIDS is a catastrophic condition in Tanzania and other parts of Southern Africa. Alcohol use is thought to be a major contributor to transmission of HIV [10]. However, the pattern and amount of alcohol consumption that contributes to the transmission of the disease, is not well studied.

Early detection of alcohol use problems and intervention may result in an increased proportion of users adopting safer patterns of alcohol consumption or abstinence. This may lead to decrease in sexual risk behaviors which are influenced by alcohol use and therefore decrease the prevalence of HIV/AIDS.

1.2 BACKGROUND

1.2.1 Prevalence of HIV/AIDS

Sub-Saharan Africa is more heavily affected by HIV/AIDS than other regions of the world. In 2008, UNAIDS and WHO estimated that over 31.3 million people were living with HIV worldwide, of these, two-thirds live in countries of Sub-Saharan Africa [11].

The Tanzania National HIV testing campaign was conducted in 2007/2008. It involved all the regions of Tanzania mainland, and reported the overall prevalence of HIV infection to be 5.4% [12]. In Dar es Salaam region, HIV prevalence among women and men was shown to be 6.1%, and 5.6% respectively, and the overall prevalence was 5.9% [12]. Females are more likely to use HIV VCT services compared to males [13]. With regard to level of education and HIV testing the Tanzanian HIV and Malaria Indicator Survey reported that about 13.7% with complete primary education, 19.4% with incomplete primary education, 28.4% with secondary or higher education and 18.5% with no education had ever been tested for HIV [14].

The prevalence of HIV/AIDS is higher among females compared to males[11,15]. Females who use alcohol are more likely to be HIV- positive compared to their counterparts who don't drink alcohol [16]. The 2003 Kenya Demographic and Health Surveys (DHS) indicated that HIV prevalence was 19% among women who consumed alcohol as compared to 9% prevalence among women who did not drink [17].

1.2.2 Prevalence of alcohol use behavior

The contribution of alcohol use to HIV transmission is of utmost importance in regard to control of the HIV pandemic. Worldwide, HIV and other STIs account for 6.3% of the burden of disease and alcohol accounts for 4% [18]. In the year 2000 WHO estimated that, Eastern and Southern Africa regions have the highest consumption of alcohol per drinker in the world [19]. Forty percent of South African men and 15% of women drink alcohol,

with significant numbers drinking heavily [20]. In Tanzania, annual per capita consumption of absolute alcohol among people aged 15 years and above is 3.5kg [9].

With regard to demographic characteristics in relation to alcohol consumption, rates of alcohol consumption increase with age, but decrease with higher levels of education, [21]. A community based study among adults aged 15-59 years, using the AUDIT reported that single people had highest rates of hazardous alcohol consumption but the lowest rates of lifetime and current alcohol use, and widowed or divorced had the highest rates of lifetime alcohol use, but married people were more likely to report current alcohol use, and alcohol use was most common among the employed [22]. Another study found that employment and transitions to employment increase the frequency and quantity of drinking, for men, but decreased drinking for women [23]. Men are more likely to drink and be heavy alcohol users than women [24]. Religious beliefs tend to be protective towards alcohol use behaviors if never a drinker. A study that was done among 1841 women in Kilimanjaro reported alcohol abuse to be more prevalent among Christians compared to Muslims [25]. In a recent study among university students in Lebanon, also found alcohol use more common in Christians than Muslims. Nevertheless, they also found among ever drinkers, the odds of alcohol use disorders were comparable across religious groups [26].

Dar es Salaam represents a low drinking region, compared to other regions in the country. Daily male drinkers in Morogoro are reported to be 14.7% and 47.3% in Hai Kilimanjaro, and in both regions it was lower for females [27]. Lifetime alcohol abstinence in Dar es Salaam, between persons aged 15-59 years is 66.9%, with significantly higher rates among males compared to females [22].

1.2.3 Predictors of alcohol use behavior

There are societal/cultural, community and individual factors which influence alcohol use behaviors in different societies. An awareness of these factors can help in designing more effective comprehensive preventive interventions.

Gender differences are one of the strong predictors of alcohol use. Men are significantly more likely to use alcohol compared to women [28]. Some African societies tolerate men who drink alcohol and heavy drinking is regarded as a symbol of masculinity [29].

Sensational seeking personality disposition also predicts alcohol use behavior [30,31]. It is the personality type that is most associated with alcohol use and sexual risk behaviors. Therefore, individuals with this particular kind of a personality are more likely to be at risk for HIV/AIDS transmission.

Individuals who are stressed are more likely to drink alcohol as a means of coping with stress. This is highly related to engaging in higher risk behaviors for HIV transmission since alcohol impairs good judgment and decision making [32,33]. In addition, individuals who are single or never being married [20] are more likely to drink alcohol.

Other associated factors include individuals sexual expectations [29], availability of alcohol, family history of alcoholism and relief from shyness can contribute to alcohol use behaviors.

1.2.4 Association between alcohol use and risk factors for HIV transmission

Sexual risk behavior linked with HIV transmission may be influenced by alcohol use. People with alcohol use disorders are more likely than the general population to contract HIV [19]. Drinkers have increased risk of being HIV positive when compared to nondrinkers [21]. Unsafe sex, identified by the World Health Organization (WHO) as one of the ten leading risk factors for harm globally, is the most common mode of HIV transmission [34].

The subject of alcohol use and HIV serostatus is of special importance in considering prevention of HIV transmission, because alcohol use is associated with STI and HIV prevalence. About 50% of people living in areas of southern Africa where HIV is most prevalent report current alcohol use [20].

The association between alcohol use and increased risk for HIV transmission is a global concern [35]. However, the relationship is more complex than just alcohol consumption equals increased risk behavior for HIV transmission or that it causes high-risk behavior on every occasion [36,37]. Instead, the quantity of alcohol consumed, the frequency of consumption, and/or the context in which drinking occurs specifically before or during sex is related to unprotected sex [21, 38, 39,40].

HIV prevalence increases with greater frequency of alcohol consumption [21,24,36]. In a study among young women in South Africa drinking alcohol at least once per day in the last month and more frequent drinking were both associated with HIV infection [41]. Another study that was done in Kenya showed that; daily alcohol use predicts incident STI diagnoses among Kenyan commercial sex workers [42].

Greater quantities of alcohol consumption are also associated with sexual risk behaviors[29,43]. A recent review of alcohol use and sexual risk behaviors for HIV/AIDS in Sub-Saharan Africa [44] suggest that binge and problem drinking are associated with HIV sexual risk behaviors. Another study conducted in Boston USA showed that binge alcohol use was significantly associated with unprotected vaginal sex with non main female partners and recent HIV/STI diagnosis [45]. In a cross sectional population based study among men attending beer halls in Harare Zimbabwe it was found that HIV prevalence increase with increasing levels of alcohol consumption, men who drank to a point of intoxication were more likely to be HIV positive than men reporting no intoxication [35]. Generally, heavy alcohol drinkers are at greater risk for HIV infection than moderate drinkers and non problem drinkers [46].

The environment in which alcohol is taken appears to play a crucial role in HIV risk behaviors. Places that serve alcohol are often the very places where sex partners meet and these places often serve as sex venues [29,47]. A South African study showed that over 85% of the locations where people meet sex partners are alcohol establishments [48]. In

Zimbabwe it was reported that commercial sex workers do seek clients in beer halls [35]. In Ugandan villages, 4% of people live in homes that sell alcohol but 15% of people living in these homes are HIV positive, nearly double the HIV prevalence rate in the surrounding community [49].

Another contributing factor is that places that serve alcohol rarely have condoms available for their customers [47]. Thus, people who go to nightclubs, bars and other alcohol serving establishments are more likely to be at risk for HIV infection transmission [50]. Employees who work in places which serve alcohol are at higher risk for HIV infection. In Tanzania, it is reported that local brew sellers and females workers in bars, guesthouses, and restaurants were found to be at risk for STI/HIV exposure [51,52]. Women who drink and work in food and recreational businesses near gold mines and drink are significantly more likely to have HIV and other STI than other women who drink in the communities that surround the mines but do not work in food and recreation businesses [53].

Sexual risk-taking behaviors associated with alcohol use are highly prevalent in many African countries severely affected by HIV/AIDS [54,55]. Heavy alcohol consumption is a significant risk factor for STIs and HIV infection. It plays a critical role in HIV risk behavior and HIV transmission [56]. Its consumption can diminish awareness of high risk behaviors [57]. It can also diminish personal control and impair good judgment over multiple sexual partners, having sex with high-risk partners, sex personal control and impair good judgment over multiple sexual partners, unprotected sex, and may have condom failures [21,53,58-61]. A study among STI clinic patients found that alcohol use to the point of intoxication was believed to lower sexual inhibitions and created barriers to using condoms among both men and women [54]. People who strongly believe that alcohol enhances sexual arousal and performance are more likely to practice risky sex after drinking [36,37].

While there is increasing evidence for an association between HIV transmission and alcohol use, prevention programs have been slow to intervene. One possible reason is that there is need to know more specifically what the association is between alcohol and HIV transmissions for specific client-patient populations groups so that interventions can be targeted. Interventions to reduce alcohol-related high risk sexual behavior should target men and women in the context of their specific risk and address their interests, concerns, and needs. It is expected that the HIV/AIDS death toll in Africa will continue to rise in the absence of massively expanded preventive and treatment programs [62]. A report from the April 2005 meeting of the 58th World Health Assembly highlighted the association between alcohol consumption and unsafe sex, STIs, and HIV/AIDS.

1.3 Conceptual Framework

There are several predictors of alcohol use which can predispose individuals to alcohol use. These predictors can be broadly grouped as socio-cultural, community, and intrapersonal factors. Some factors also moderate the direct psychoactive effects on the individual depending on the sex of the individual, economic status, individual expectations, and the environment where alcohol is taken, quantity and frequency of alcohol use.

Alcohol influences sexual risk behaviors through its effects on cognitive processes such as poor judgment, lack of reasoning ability and lack of sense of responsibility over appropriate condom use, multiple sexual partners or having sex with at risk partners. See figure 1 below.
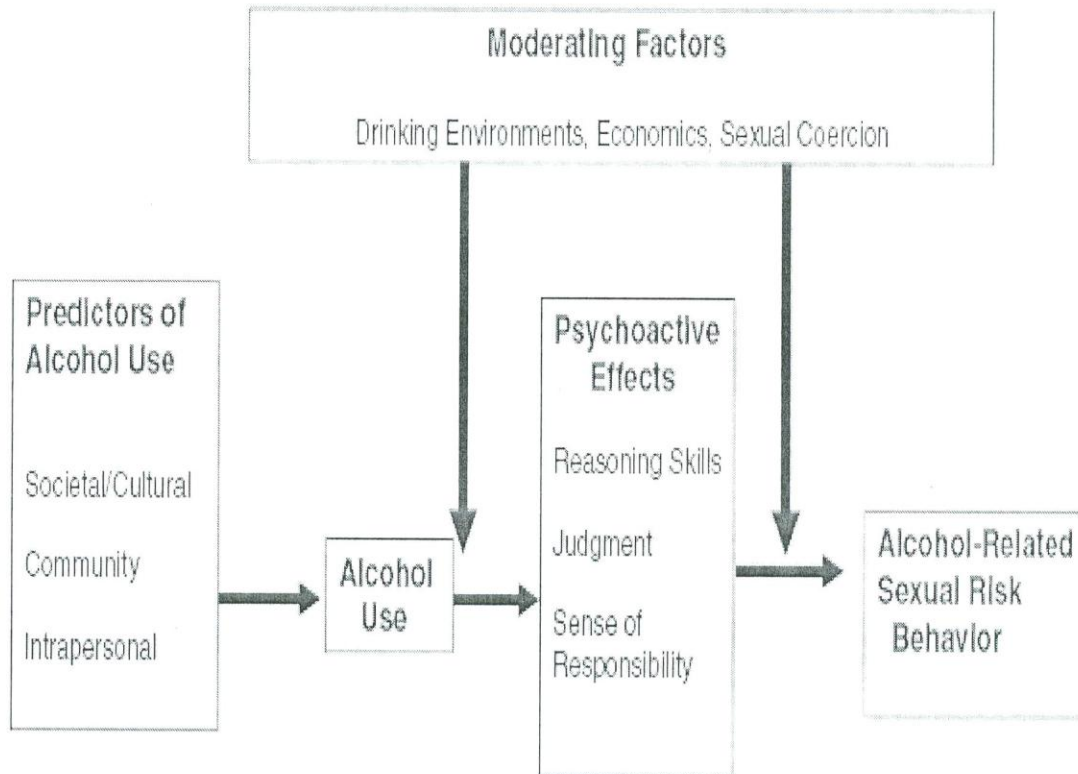
Figure 1: Conceptual model designed to explain alcohol sexual risk associations, designed to fit in an African context

Source: Morojele et al Alcohol use and sexual behaviour among risk drinkers and bar and shebeen patrons in Gauteng province, South Africa [29].

2.0 STATEMENT OF THE PROBLEM

The contribution of alcohol use to transmission of HIV is a subject that has received considerable attention in the scientific literature.

The pattern and extent of alcohol consumption that most contributes to HIV transmission has not been well elucidated to allow for interventions that are more targeted. For example, it is not clear under what circumstances moderate and social use of alcohol contribute to HIV transmission. Studies suggest that binge and problem drinking are

associated with HIV sexual risk behaviors [44,45.]

A clearer understanding of levels and patterns of alcohol drinking that contribute to HIV transmission is likely to lead to more accurately targeting prevention messages.

3.0 RATIONALE OF THE STUDY

HIV/AIDS is the major problem in our area and alcohol drinking particularly binge type of drinking appears to be a common pattern in our area. This study seeks to illuminate the extent of alcohol use that is associated with transmission of HIV infection.

4.0 STUDY OBJECTIVES

4.1 Broad objective:

To determine the association between alcohol use and HIV serostatus as well as sexual risk behaviors among clients who voluntarily seek HIV testing and counseling (VCT) at Muhimbili Health Information Centre (MHIC), Dar es Salaam, Tanzania.

4.2. Specific objectives

1. To determine the association between alcohol use status with various socio-demographic profile of clients attending HIV VCT at MHIC

2. To determine the frequency of alcohol use in relation to HIV serostatus of clients attending at MHIC.

3. To determine the association between the levels of alcohol consumption in relation to HIV serostatus of clients attending at MHIC.

4. To determine the association between alcohol use and sexual risk behaviors among clients attending MHIC that exposes them to HIV infection.

5.0 METHODOLOGY

5.1 Description of the study area:

The study was conducted at MHIC located in the city of Dar es Salaam-Ilala municipality. Dar es Salaam is the largest city in Mainland Tanzania with an estimated population of over 3 million [63] with a 60% predominance of Christians [64]. It is the main commercial centre of Tanzania, comprising of 3 municipalities, which include Ilala, Temeke, and Kinondoni. It has both commercial and non commercial centers giving a heterogeneous exposure.

MHIC was established in 1995 initially as multi-country study site and as of 1997 as a free standing Voluntary Counseling and Testing (VCT) facility. It is situated at Muhimbili National Hospital (MNH) grounds; it is one of the programs that have been established to meet the growing need for counselling and testing services. This was as a result of growing evidence that counselling and testing services contribute significantly towards prevention of the HIV epidemic. About five hundred clients are served at MHIC per month. This offers the opportunity to study a convenient population that is easily accessible. This is an important consideration due to limited time and financial resources.

5.2 Study Population

The sample population comprised of both males and females aged 18 years and above. who attended HIV- VCT centre at MHIC.

5.3 Study Design

Descriptive cross-sectional study design using a quantitative data collection method was used. The study was conducted for a period of two months, November 2009 through January 2010.

5.4 Sample size estimation

The following formula for sample size estimation was used to calculate the minimum sample size [65].

Sample size (N) = $\frac{Z^2 P (1-P)}{d^2}$, whereby;

Z = is the standard normal deviate, which turns out to be 1.96 on using the 95% confidence interval.

P= estimated proportion of HIV positive clients attending at MHIC. For this study was taken to be 27%

d= margin of error which was taken to be 5%

N = $\frac{(1.96)^2*0.27*(1-0.27)}{(0.05)^2}$ =303

I multiplied by 2, 333*2= 606 to correct for the design effect.

Therefore, the minimum estimated sample size was 606. However, I interviewed 800 participants to capture more alcohol users.

5.5 Sampling Procedures;

Clients were recruited on a daily basis, Monday to Saturday with the exception of public holidays. Consecutive consenting clients were taken till sample size needed was reached.

5.6 Eligibility Criteria

Participants were included into the study if they:

- Came for HIV- VCT at MHIC.
- Were 18 years and above.
- Consent for participation was obtained.

5.7 Exclusion criteria

Participants were excluded from the study if they:

- Were below 18 years of age
- Consent to participate was not obtained

5.8 Data collection instrument and procedures

Data was collected using an interviewer administered questionnaire, the Alcohol Use Disorders Identification Test (AUDIT). It was developed by the WHO as a simple method of screening for excessive alcohol drinking and to assist in brief assessment [66, 67].

The AUDIT helps to identify alcohol dependence, hazardous alcohol use, harmful and some specific consequences of harmful drinking. It is particularly designed for health care practitioners and a range of health settings, but with suitable instructions it can be self-administered by non-health professionals. It was found to provide an accurate measure of risk across gender, age, and cultures [66,68], suggesting that the AUDIT has fulfilled its promise as an international screening test [69]. AUDIT is the best screening instrument for the whole range of alcohol problems in primary care, compared to the CAGE and the MAST [70].

The AUDIT is a ten-item screening instrument with a total score of 40, and the range of possible score is from 0 to 40. It has three questions on the amount and frequency of alcohol drinking, three questions on alcohol dependence and four questions on problems caused by alcohol. For the first eight questions there are five possible answers, and each one is scored from 0-4. For questions nine and ten, there are three possible answers, and a score of 0, 2 and 4 is allocated. The scores are summarized in table 3 below as follows;

Table 3: Scores of the AUDIT

AUDIT scores	Recommendations
0	Never used alcohol level.
1-7	Alcohol consumption at the low risk level.
8-15	Alcohol consumption at the hazardous level.
16- 40	Alcohol consumption at the harmful and dependence level.

The principal investigator constructed the questionnaire based on the objectives of the study. The questionnaire had 24 questions, categorized into 3 main sections, namely;

general information, eight questions on socio-demographic characteristics, ten questions on the AUDIT and 6 questions on sexual risk behaviors. To check for the accuracy of translation, the questionnaire was prepared in English then it was translated into Kiswahili. The Kiswahili version was used for the study and the time taken to complete it ranged between 8- 12 minutes. The AUDIT was translated into Kiswahili by D Malulu 2000, (unpublished data) and was adopted in this study. Well experienced counselors interviewed study participants. Those who were couples were interviewed each separately then reunited again for pretest and post test counseling so as to maintain confidentiality, privacy and to minimize non response bias.

VCT for HIV is internationally recognized as an effective and important strategy for both prevention and care. Research has found it to be a cost-effective strategy for facilitating behavior change and it is an important entry point for comprehensive care and support including access to highly active antiretroviral therapy for those who test HIV positive [72]. Negative test results means that no HIV antibodies were found in the blood, and positive test results means HIV antibodies were found in the blood. Figure 2 below summarizes how clients were seen at MHIC HIV/VCT. This is a routine care at MHIC except that patients were interviewed for alcohol use.
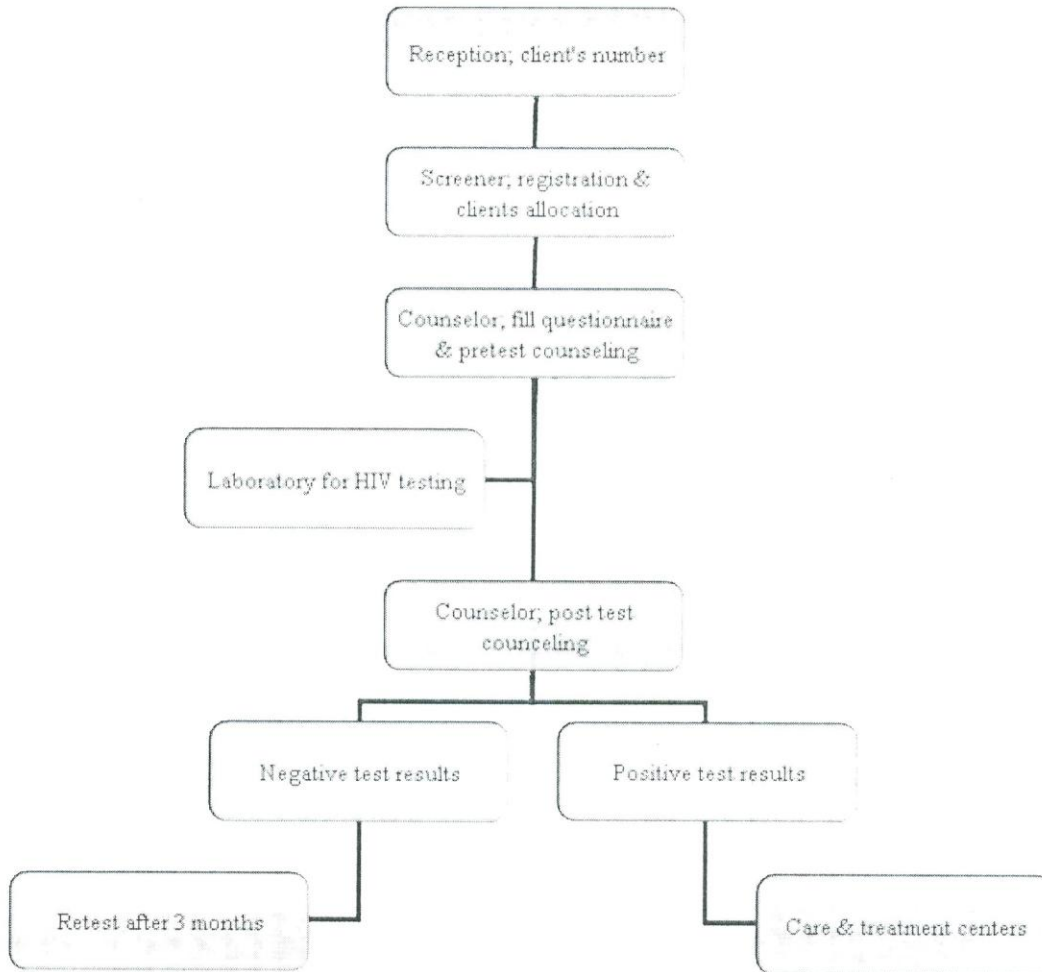
Figure 2: Client flow chart

After the interviews and HIV pretest counseling, a rapid test for HIV was done on all study participants. Laboratory technicians at MHIC did HIV test using the Tanzania HIV Rapid Test Algorithm adopted from the Tanzania Ministry of Health and Social Welfare as shown in figure 2 below. Uni-Gold™, Determine and SD Bioline have the required sensitivity and specificity for inclusion into the Tanzania National Rapid HIV testing algorithm [73]. The first test was SD-Bioline, non reactive results were reported as negative results, and reactive results were confirmed by the second test, Determine test. Reactive

results in the Determine test were recorded as positive. Uni-gold™ test was done if a sample from a client results were indeterminate (non reactive in Determine test). However, there were no indeterminate results in this study. Figure 3 below summarizes the Tanzania Rapid test algorithm adopted by the Tanzania Ministry of Health and Social Welfare.
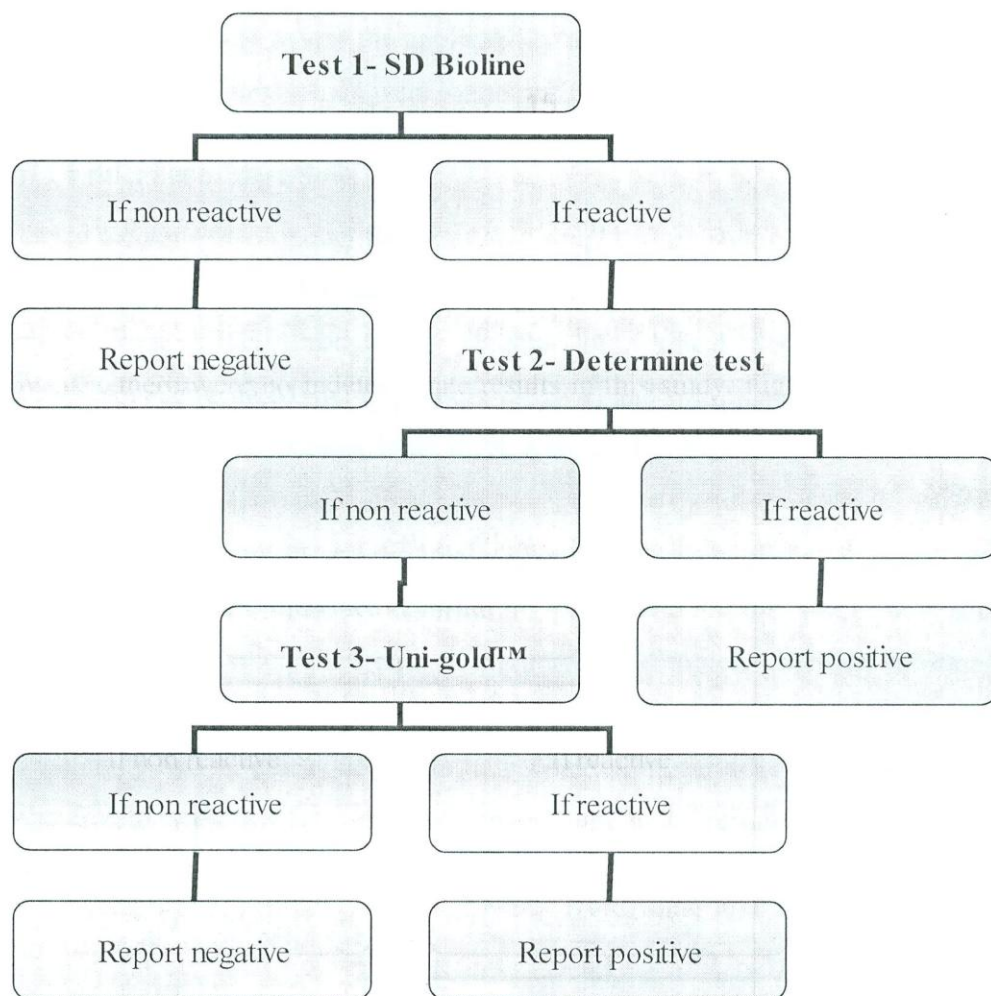
Figure 3: Tanzania HIV Rapid Test Algorithm

5.9 Selection and training of research assistants

Six counselors, with previous research experience, fluent in Kiswahili, were recruited as

research assistants. They were trained on the study protocol, research procedures, the use of the study instrument and data generation procedures.

5.10 Pre-test of the study instrument

Prior to the main study, a pre-test of the instrument was administered to 100 participants in mid September 2009 in Magomeni HIV VCT centre in Kinondoni district. The purpose of the pretest was to assess the applicability of the questionnaire items and time used to complete it. Questions which were found difficult to understand were refined.

5.11 Ethical considerations

Ethical clearance to conduct the study was sought from Muhimbili University and Allied Sciences Research and Publication Committee (Appendix No 12.3). Permission was also sought from MNH through the Director of Clinical Services who provided an introductory letter to MHIC (Appendix no 12.4) and from Kinondoni Municipal Council who provided an introductory letter to Magomeni HIV VCT centre (Appendix 12.5).

All participants were informed verbally about the purpose of the study and requested to participate. Written informed consent to participate in the study was sought from potential study participants, and all participants completed written informed consent forms (Appendix No 12.7). They were informed that acceptance or refusal to participate in the study had no consequences to their counselling services in any way, and that they were free to withdraw from the study at any time and free not to answer any question if they felt it to be psychologically traumatizing or uncomfortable.

Study participants were assured of confidentiality and the questionnaires were anonymous, only numbers were used throughout the study. There were no risks in participating in this study. Those who were HIV positive were referred to CTC. In addition, two participants with the hazardous level of alcohol use were referred to AA. Participants therefore had the benefit of having the best counseling services, however, there was no financial benefits for participation.

5.13 Data entry, cleaning and analysis

Information obtained was collected using questionnaires. All questionnaires were checked daily for completeness and consistencies. All questionnaires were completed satisfactorily and included in the analysis. The data obtained was stored by the principal investigator in a secure environment. Data entry was done by the principal investigator using Statistical Package for Social Science (SPSS) version 13. Data cleaning and balancing was done simultaneously during and after data entry. Data was analyzed using SPSS version 13.

Frequency tables of relevant variables and cross tabulations were prepared to explore the association between dependent and independent variables. Statistical associations involving categorical variables were assessed using chi-square test. P-values of less than or equal to 0.05 was considered statistically significant in differences or association being examined. Alcohol use was categorized into four levels; the never used alcohol level, the low risk level, the hazardous level, and the harmful and dependence level. Odd ratio derived from the regression coefficients of >1 were interpreted as a risk factor while odd ratio of <1 suggested to have protective factor.

6.0 RESULTS

During a period of six weeks, a total of 846 clients attended HIV/VCT at MHIC and they were eligible for the study. Among these, 800 were enrolled for the study whereby 46 clients were excluded from the study, 2 of them had a history of being raped and they were too distressed to answer questions, 21 clients refused to consent for the study and 23 clients were below 18 years of age. Data for 800 participants was analyzed. Figure 4 summarizes population profile.

Table 4 summarizes the demographic characteristics of the surveyed sample.

The results revealed that there were slightly more females, 405 (50.6%) than males. Their ages ranged from 18 to 82 years, with median age of 30.5 ± 10.66. There were more 336 (42%) in the age group of 25-34 years. Over half, 57.5% were married or cohabiting, and 44% had primary education.

Among the 800 participants, 38.6% were businessmen/women and self employed, 32% were employed, 14.1% were students, 12.1% were unemployed/housewives, and 3.1% were peasants. A large proportion of study participants were Christians, 476 (59.5%), and the remaining participants were Muslims.
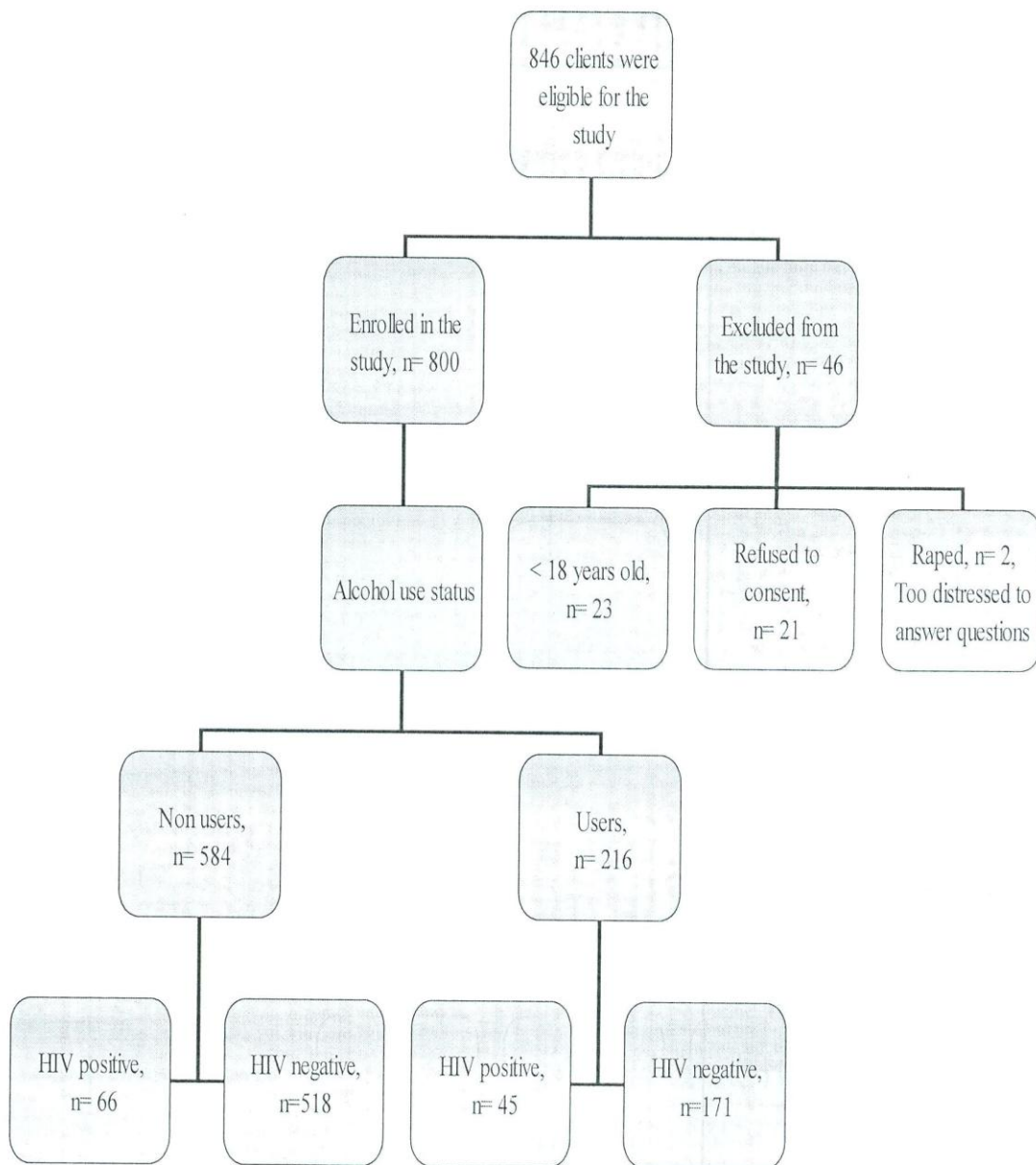
Figure 4: Population Profile

Table 4: Socio-demographic characteristics of the study participants (n=800)

Socio demographic variables	Number (N) (%)
Age of participants (years)	
Range	18-82
Median (± SD)	30.5 ± 10.66
Sex	
Male	395 (49.4)
Female	405 (50.6)
Marital status	
Single	264 (33.0)
Married or cohabiting	460 (57.5)
Divorced or separated	76 (9.5)
Religion	
Christian	476 (59.5)
Muslim	324 (40.5)
Level of education	
No formal education	17 (2.1)
Primary school	352 (44.0)
Secondary school	277 (34.6)
College/University	154 (19.3)
Occupation	
Housewives/unemployed	97 (12.1)
Peasants	25 (3.1)
Businessmen/women and self employed	309 (38.6)
Employed	256 (32.0)
Students	113 (14.1)
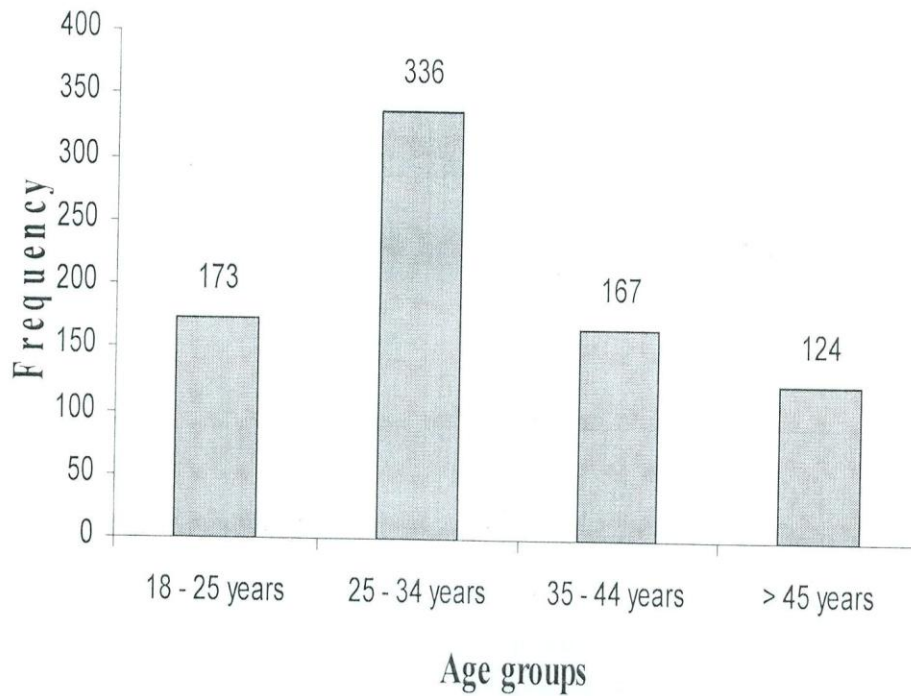
Figure 5: Age distribution of the study participants

Less than half the study participants were young adults in that 42.0% were in the age group 25-34 years. Youths between 18-24 years only constituted slightly over one fifth of study participants 21.6%. The age group 45 and above were fewest 15.5%.

35-44 years	112 (67.1)	55 (32.9)	
45 years and above	93 (75)	31 (25)	
Sex			
Male	269 (68.1)	126 (31.9)	0.002
Female	315 (77.8)	90 (22.2)	
Marital status			
Single	174 (65.9)	90 (34.1)	
Married or cohabiting	353 (76.7)	107 (23.3)	0.006
Divorced or separated	57 (75)	19 (25)	
Religion			
Christian	323 (67.9)	153 (32.1)	0.000
Muslim	261 (80.6)	63 (19.4)	
Level of education			
No formal education	17 (100)	0 (0)	
Primary school	250 (71)	102 (29)	
Secondary school	207 (74.7)	70 (25.3)	0.06
College/University	110 (71.4)	44 (28.6)	
Occupation			
Housewives/unemployed	73 (75.3)	24 (24.7)	
Peasants	21 (84)	4 (16)	
Businessmen/women & self employed	220 (71.2)	89 (28.8)	
Employed	176 (68.8)	80 (31.3)	
Students	94 (83.5)	19 (16.8)	0.032

A significant statistical association was found between sex of the study participants and alcohol use. More males (31.9%) were alcohol users than females (22.2%), (P-value=0.002) and alcohol use was more common among study participants who were single (34.1%).

The result of this study showed a statistically significant association between religion and alcohol use status. About (32.1%) of Christians were alcohol users compared to Muslims (19.4%), (P-value=0.000).

Among alcohol users, a large proportion of study participants who were employed (31.3%) were alcohol users, followed by businessmen/women & self employed, (28.8%), then housewives and unemployed (24.7%) and the remaining participants were peasants (16%). The difference was statistically significant (P-value=0.032).

There were no statistically significant difference in alcohol use status by participants' level of education (P=0.06) or by age categories (P=0.08).

Table 6: Prevalence of HIV infection among clients attending HIV VCT at MHIC

HIV serostatus	Male	Female	Total
Positive (+ve)	39 (9.9)	72 (17.8)	111 (13.9)
Negative (-ve)	356 (90.1)	333 (82.2)	689 (86.1)
Total	395	405	800

The overall prevalence of HIV infection at MHIC was found to be 13.9% with 95% CI of 11.5%-16.5%. The proportion of HIV positive participants attending at MHIC was higher among females (17.8%) than males (9.9%), and the difference was statistically significant. (X^2=10.5, P- value =0.001).
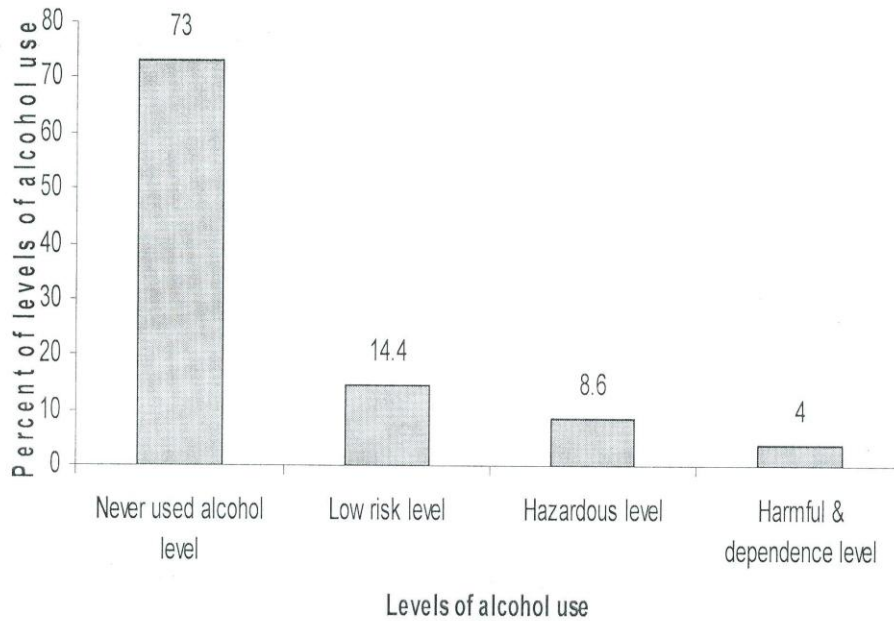
Figure 6: Frequency distribution of levels of alcohol use among study participants

In this study, the majority (73%) of the study participants reported lifetime alcohol abstinence. Twenty seven percent reported consumption of alcohol of various levels of whom 22.2% were females and 31.9% were males. Most of them were drinking alcohol at the low risk level (14.4%), with fewer (4%) drinking at the harmful and dependence level.

Table 7: Frequency of alcohol use in relation to HIV serostatus among clients attending HIV VCT at MHIC

Frequency of alcohol use	HIV serostatus		Total	OR (95% CI)
	Positive	Negative		
Never	66 (11.3)	518 (88.7)	584	1.00
Monthly or less	20 (19)	85 (81)	105	1.85 (1.03-3.30)
2-4 times a month	9 (21.4)	33 (78.6)	42	2.14 (0.91-4.92)
3 times a week or more	16 (23.2)	53 (76.8)	69	2.37 (1.22-4.50)
Total	111 (13.9)	689 (86.1)	800	---

A total of 111 (13.9%) study participants reported to be HIV positive of which, (23.2%) were using alcohol 3 times a week or more, and they were two times more likely to test HIV positive compared to those who had never used alcohol. The difference was statistically significant. (Odd ratio= 2.37, 95% CI = 1.22-4.5, Chi-square test for linear trend X^2= 12.602, P- value = 0.006).

Table 8: Association between levels of alcohol use and HIV serostatus among clients attending HIV VCT at MHIC

Levels of alcohol use	HIV serostatus		Total	OR (95% CI)
	Positive	Negative		
Never used alcohol	66 (11.3)	518 (88.7)	584	1.00
Low risk level	21 (18.3)	94 (81.7)	115	1.75 (0.99-3.10)
Hazardous level	12 (17.4.)	57 (82.6)	69	1.65 (0.8-3.37)
Harmful & dependence level	12 (37.5)	20 (62.5)	32	4.71 (2.1-10.7)
Total	111 (13.9)	689 (86.1)	800	---

A total of 111 (13.9%) of the study participants tested HIV positive of which (37.5%)

were using alcohol at the harmful and dependence level, 18.3% at the low risk level, 17.4% at the hazardous level and the lowest percentage (11.3%) were of those who had never used alcohol in their life time. Study participants who were using alcohol at the harmful and dependence level were almost five times more likely to test HIV positive compared to participants who had never used alcohol. The difference was statistically significant. (Odds ratio= 4.71, 95% CI = 2.1-10.7, Chi-square test for linear trend X^2 = 16.8, P- value = 0.000).

Table 9: Association between levels of alcohol use and condom use among clients attending HIV VCT at MHIC

Levels of alcohol use	Condom use		Total
	YES	NO	
Never used alcohol	49 (46.2)	57 (53.8)	106
Low risk level	18 (41.9)	25 (58.1)	43
Hazardous level	15 (39.5.)	23 (60.5)	38
Harmful & dependence level	2 (8)	23 (92.0)	25
Total	84 (39.6)	128 (60.4)	212

A total of 25 study participants were drinking alcohol at the harmful; and dependence level. Of these, 23 (92%) were more likely not to use condoms all the time they had sex with non regular sexual partners, followed by those who drank alcohol at the hazardous level, 23, (60.5%), the low risk level, 25 (58.1%) and the least likely not to use condoms all the time they had sex with non regular sexual partners, were in the never used alcohol level, 57 (53.8%). The difference was statistically significant, (Chi-square for linear trends, X^2 = 8.97, P-value = 0.03).

Table 10: Association between levels of alcohol use and number of non regular sexual partners among clients attending HIV VCT at MHIC

Levels of alcohol use	No. of non regular sexual partners		Total
	1-2	**3+**	
Never used alcohol	94 (88.7)	12 (11.3)	106
Low risk level	34 (79.1)	9 (20.9)	43
Hazardous level	30 (78.9.)	8 (21)	38
Harmful & dependence level	7 (28)	18 (72)	25
Total	165 (77.8)	47 (22.2)	212

Study participants who drank alcohol at the harmful and dependence level were a total of about 25. Of these 18, (72%) were more likely to have 3 or more non-regular sexual partners, followed by those who drank alcohol at the hazardous level, 8 (21.1%) , the low risk level 9 (20.9%) and fewer had not used alcohol in their lifetime, 12 (11.3%). The difference is statistically significant. (Chi-square for linear trends, $X^2 = 30.81$, P-value = 0.001).
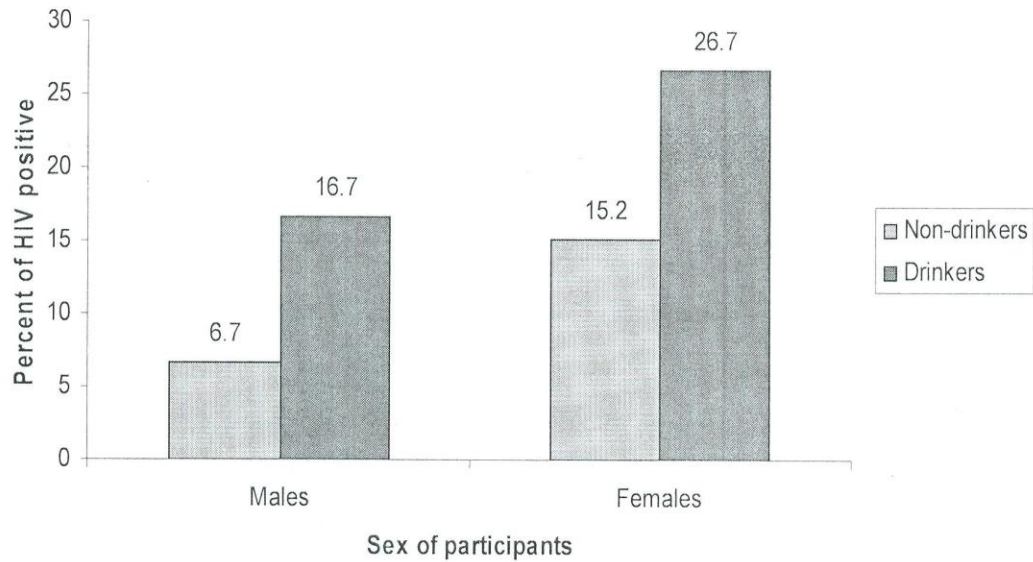
Figure 7: Comparison of HIV serostatus among non-drinkers and drinkers by sex

Female drinkers, 24 (26.7%) were more likely to test positive for HIV compared to females non drinkers, 48 (15.2%). The difference is statistically significant ($X^2 = 9.6$, P value = 0.002).

Also male drinkers, 21 (16.7%) were found more likely to test positive compared to male non drinkers, 48 (15.2%). The difference is statistically significant ($X^2 = 6.3$, P value = 0.012).

7.0 DISCUSSION

The demographic characteristics of the surveyed sample revealed that there were just slightly more females than males accessing VCT services during the period of study. These findings are in line with a study which was done by Njeru et al [13] who reported that females are more likely to use HIV VCT services compared to males. Most of the study participants were Christian by religion, and this is not surprising when one considers that as reported by National Bureau of Statistics [64] mainland Tanzania is predominantly Christians. With regard to level of education, more participants had primary school education level, followed by secondary education and university education, and very few had no formal education. This pattern overall compares with the Tanzania HIV and Malaria Indicator Survey report (THMIS) [14] which reported that, about 31.7% with primary education level ever tested for HIV, followed by 28.4% with secondary or higher education, 19.4% with incomplete primary education and 18.5% had no formal education. However, of interest is that only 2% of this study population had not formal education compared to 18.5% in THMIS survey. It could be due to geographical urban bias where most people have access to education or the fact that the THMIS was a population survey. However, this difference may also be explained by the fact that the study population is voluntarily seeking VCT services, aware of risks for HIV infection and presumably perceive the benefits of knowing their status. Almost half of the study participants were in the age group of 25-34 years with a mean age of 33.18.

7.1 Alcohol use status with various socio-demographic profiles

In this study, 73% of study participants were lifetime alcohol abstainers, and the overall proportion of lifetime alcohol users was 27%. Out of those who were drinkers more than half were drinking at the low risk level of alcohol use (14.4%). And the rates were significantly higher among women than men. These results compare well with what was found in other studies, although reported prevalence rates of lifetime abstinence in this study was higher than found in a recent study by Mbatia et al [22] who conducted a population based cross-sectional study among 1,100 study participants aged 15-59 years

from two urban areas of Dar es Salaam, Tanzania using the AUDIT. They found lifetime abstinence of alcohol to be 66.9%, which was lower compared to this study, and the overall prevalence of lifetime alcohol use to be 28.9%, which was slightly higher than that found in this study, and the rates were significantly higher among males than females. These differences here also may be accounted for by types of study populations.

The male- female pattern found in this study is similar to many other studies. For example, Weiser et al [24] conducted a cross-sectional population based study of 1,268 adults from five districts in Botswana using a stratified two stage probability sample design and found that men were more likely to drink alcohol than women. Two other studies Shisana et al [20] and Morojele et al [29] found that men were more likely to drink alcohol than women.

The extent to which alcohol use is restricted across religious groups varies. This study revealed that large proportions of Christians drink alcohol compared to Muslims. This concurs well with findings from Mitsunanga et al [25] who did a study among 1841 women in Kilimanjaro using CAGE and reported alcohol abuse to be more prevalent among Christians compared to Muslims. In a recent study among university students in Lebanon conducted by Ghandour et al [26] also found alcohol use more common in Christians than Muslims. However, they also reported, among ever drinkers, the odds of alcohol use disorders were comparable across religious groups, highlighting potential differences and similarities between Christians and Muslims. The implication is that religion is not a moderating factor once a drinker.

Higher rates of alcohol use were significantly seen among study participants who were employed. This is similar to what Mbatia et al [22] found; they reported that alcohol use is most common among the employed. Also, a study that was done by Mizell et al [23] found that employment and transitions to employment increase the frequency and quantity of drinking, for men, but decreased drinking for women. This has implications for

Employee Assistance Programmes (EAP) which focus on alcohol intervention in the work place. Targeting the newly employed particularly men may be an effective strategy. This is a service which is increasingly available in Dar es Salaam.

In this particular study it was found that being married or cohabiting is significantly associated with lower levels of lifetime alcohol use and being single is a risk factor for using alcohol. Similar findings were reported by Shisana et al [20], who found higher rates of alcohol use among single people. This is contrary to what Mbatia et al [22] found that single people had the lowest rates of lifetime and current alcohol use but had highest rates of hazardous alcohol consumption and married people were more likely to report current alcohol use.

Age differences and level of education did not show any significant association with alcohol use status contrary on what was found by Fisher et al [21] who did a population based study among high risk women in Moshi Kilimanjaro. He reported that young age and low education predicted the onset of alcohol use, the transition from use to regular use, and from regular use to abuse. The difference may be accounted for by the fact that this is select population of persons accessing VCT services while Fisher et al [21] did a population based study.

7.2 HIV sero prevalence

Several studies have reported on the association between alcohol use as risk factors for HIV transmission, however, no studies have focused on populations voluntarily accessing HIV testing services, which is the entry point for prevention and care for HIV. This study reports on the prevalence of HIV among self referring clients attending a VCT center in Dar es as well as the association between alcohol use and sexual risk factors for HIV transmission

In this present study, the overall prevalence of HIV was found to be 13.9%, significantly higher among females (17.8 %) than males (9.9%) and probably reflects the prevalence among attendees of VCT centers generally in the country. These results are higher than

that found in the Tanzania National HIV testing campaign [12] which was conducted in 2007/2008, in which all the regions of Tanzania mainland were involved. In Dar es Salaam region, the overall HIV prevalence was found to be 5.9%, higher among women, 6.1%, and 5.6% among men. This may be accounted for by the fact that the Tanzania National HIV testing campaign was a population based study.

7.3 Frequency of alcohol use in relation to HIV serostatus

Consuming alcohol excessively either in quantity or frequency or consuming it before sex may prevent individuals from making safe sex decisions, hence more likely to test positive for HIV. This study found that the risk of testing positive for HIV infection increases with increasing frequency of alcohol use. Drinking alcohol three times a week or more increases the risk of HIV infection. These results concur with other studies. In a study conducted by Zuma et al [41] among young women in South Africa reported that drinking alcohol at least once per day in the last month and more frequent drinking were both associated with HIV infection. Fritz et al [35] reported that HIV prevalence increases with increasing frequency of alcohol consumption. Another study among Kenyan commercial sex workers by Yadav et al [42] reported daily alcohol use predicts incident STI diagnoses. Other studies by Gerb et al [39] and Fisher et al [21] on frequency of alcohol use and the risk of HIV infection transmission, all reported that HIV infection increases with increase in frequency of alcohol.

7.4 Levels of alcohol consumption in relation to HIV serostatus

This study revealed that drinking alcohol at the harmful & dependence level increases the risk of testing positive for HIV infection. This concurs with a cross sectional study done by Fritz et al [35] among 324 men attending beer halls in Harare Zimbabwe found that HIV prevalence increase with increasing levels of alcohol consumption, men who drank to a point of intoxication were more likely to be HIV positive than men reporting no intoxication. Another study by Morojele et al [29] on risk drinkers and bar and shebeen patrons in South African showed that high quantities of alcohol consumption increase the

risk for HIV transmission. A systematic review and meta-analysis done by Fisher et al [46], found that heavy alcohol drinkers are at greater risk for HIV infection than moderate drinkers and non problem drinkers. Raj et al [45] studied heterosexual African American men using an audio computer-assisted self-interview found that binge alcohol use was significantly associated with unprotected vaginal sex with non main female partners and recent HIV/STI diagnosis. However, none of these studies reported the exact level of alcohol consumption that increases the risk for HIV prevalence among a VCT population, but this particular study found that harmful and dependence level of drinking had an almost five-fold increased risk of testing positive for HIV infection.

7.5 Alcohol use and sexual risk behaviors

In this particular study condom use and number of non regular sexual partners were considered as sexual risk behaviors for HIV transmission. Drinking alcohol at the dependence and harmful level was highly associated with not using condom with non regular sexual partner. Participants who have never used alcohol in their lifetime were at the lowest risk of unprotected sex. Furthermore, this study found that drinking alcohol at the harmful and dependence level is associated with increase in number of non regular sexual partners. To my understanding there are no other studies that found that drinking alcohol at the harmful and dependence level increases sexual risk behaviors. However, there are studies that to some extent concur with results of this study. A study conducted by Simbayi et al [54] with STI clinic attendees in Cape Town South Africa found that alcohol use to the point of intoxication was believed to lower sexual inhibitions and created barriers to using condoms among both men and women. A population based, cross-sectional study of 1,268 adults from five districts in Botswana conducted by Weiser et al [24] found that there was a dose-response relationship between alcohol consumption and unprotected sex for both genders, in that heavy drinkers had higher odds of unprotected sex and people who consumed no alcohol were at lowest risk for unprotected sex. Dunkle et al [60] did a study on women attending antenatal clinics in Soweto South Africa found that problem drinking was associated with higher odds of sex exchange. Raj

et al [45] also reported that binge alcohol drinkers are more likely to engage in unprotected anal and vaginal sex with non regular female partner. Studies by Clift et al [53], Shaffer [59] and Zachariah et al [61], reported that heavy alcohol consumption may create barriers to using condoms and may leads to more concurrent sex partners.

7.6 HIV serostatus among non-drinkers and drinkers by sex

This study found that women who drink alcohol were more likely to be HIV- positive compared with women who do not drink alcohol. This is supported by a study, which was done by Kenya Central Bureau of Statistics [17] and another study which was done by Ayis et al [16]. They all reported that females who use alcohol are more likely to be HIV-positive compared to their counterparts who do not drink alcohol.

8.0 Limitations of the study

It was not possible to do a qualitative study which would look more clearly on predictors of alcohol use like societal/cultural and community norms as well as moderating factors like drinking environments, economics and sexual coercion due to constraints of time and resources.

However, in this study alcohol use was measured using the standardized tests of alcohol use and misuse, the AUDIT, therefore these results offer greater precision in describing alcohol use as well as its association to sexual risk behaviors. Moreover, the sample size was big enough increasing the power of this study. Therefore, important conclusions can be drawn from these findings as well as recommendations for possible future research and intervention on alcohol use can be made.

9.0 Conclusion

With an overall prevalence of HIV of 13.9 % among a VCT population there is no doubt that HIV/AIDS continues to pose a huge challenge. There are clear and consistent associations between alcohol use and increased risk for HIV transmission with increasing frequency and level of alcohol consumption. Drinking alcohol three times a week or

more increases the risk of testing positive for HIV infection. Also, drinking alcohol at the harmful and dependence level increases the risk of unprotected sex, and having sex with non regular sexual partners hence increases risk of testing HIV positive.

10.0 Recommendations

This is the first study of its kind among a VCT population to be conducted in Tanzania. However, since Dar es Salaam is categorized as a low drinking region compared to other regions in the country [27]. I therefore recommend a similar type of study be conducted in the higher drinking regions in order to get a better picture of the problem. Also more comprehensive longitudinal qualitative studies should be done in order to elicit specific information on societal/cultural and community norms, which leads to alcohol use, as well as moderating factors like drinking environments, economics and sexual coercion which influence psychoactive effects, and alcohol related sexual risk behaviors.

There is an urgent need to invest in HIV/AIDS prevention and control activities that target alcohol consumption in Tanzania. Evidence for the WHO brief alcohol counseling with low level drinkers and hazardous level drinkers have shown to be effective in the context of general medical and psychiatric patient populations [73]. This simple brief alcohol counseling strategies should be adapted for incorporation into the VCT package as an alcohol risk reduction intervention.

Furthermore, awareness of effects of alcohol use on transmission of HIV as well as sensible drinking should be encouraged through provision of education through media, since community education is important in preventive interventions. More education should be emphasized on the dangers of excessive alcohol use, and the relationship between alcohol use and risk sexual behaviors which exposes individual to risk of HIV infection transmission.

Researches should be conducted in future to test these interventions and to identify new preventive strategies for people who drink alcohol and are at risk for HI

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