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The correlation between alcohol consumption and risky sexual behaviors among people living with HIV/AIDS

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Abstract

The objectives of this study were to determine if significant correlation exists between drinking any alcoholic beverage and risky sex among 326 AIDS patients. Participants completed anonymous surveys. The result of the regression and Pearson Correlation analyses revealed a significant positive correlation between drinking alcohol before sex and frequency of condom use ($p < .0001$). The number of sex partners respondents reported was also correlated with the frequency of alcohol use ($p = .003$). The result shows that the quantity of alcohol consumption was correlated with two indicators of risky sex: having multiple sexual partners ($p < .0001$) and having sexual intercourse without a condom ($p < .001$). Interventions are that integrate HIV risk reduction with alcohol risk reduction is very useful to minimize the risk of new HIV infections and/or manage existing infections.

Keywords

Alcohol; risky sexual behaviors; HIV/AIDS

Introduction

The HIV/AIDS pandemic remains one of the most serious of infectious disease challenges to public health. At the end of the year 2007, UNAIDS estimated that 33.2 million people were living with HIV (UNAIDS, 2007). An estimated 2.5 million people were infected with HIV in 2007 and AIDS killed 2.1 million people last year alone (UNAIDS, 2007). According to UNAIDS 2007 AIDS epidemic update, every day, over 6, 800 people become infected with HIV and over 5,700 people die from AIDS (UNAIDS, 2007).. The United States of America (USA) is one of the countries with the largest number of HIV infections in the world. A total of 1.3 million people were living with HIV in USA at the end of 2007 and the estimated number of people infected with HIV/AIDS in USA in 2007 alone was 46, 000 people (UNAIDS, 2007).

With the exception of HIV transmission via infected blood/blood products, tissues or organs, all other HIV transmission occurs only as a result of those human behaviors that place an individual at risk of acquiring HIV infection. The major modes of HIV/AIDS transmission are by unprotected sexual contact (anal, vaginal, or oral) with an infected person, and by direct blood contact including sharing needles or injection equipment with an injection drug user who is infected with HIV. Drinking alcohol has been associated with HIV infection in several countries (Bryant, 2006). A study by Ayisi et al. (2000) found that after controlling for confounding variables, women who drank alcohol were 60 percent more likely to be HIV-positive than women who did not drink alcohol.

Alcohol use has been shown to impact HIV infection with increased transmission risk and possible disease progression by blunting one's self-monitoring behavior, thus increasing the likelihood of having multiple or casual sex partners and unprotected sex (Zablotska et al., 2006). A history of heavy alcohol use has been correlated with a lifetime tendency toward high-risk sexual behaviors, including multiple sex partners **and** unprotected intercourse (Malow, Devieux, Jennings, et al., 2001). Studies have consistently demonstrated that people who strongly believe that alcohol enhances sexual arousal and performance are more likely to practice risky sexual behaviors after drinking (Dermen, & Cooper, 2000; George, Stoner, Norris, et al., 2001).

Alcohol is the most commonly used substance among HIV-infected people in the USA (ScienceDaily 22 August, 2007). Each year, about 100,000 deaths in the USA are related to alcohol consumption (McGinnis, & Foege, 1993). Forty-four percent of adults aged 18 years and older (more than 82 million people) report having consumed 12 or more alcoholic drinks in the past year (Dawson, Grant, Chou, et al., 1995). Among these current drinkers, 46 % report as having been intoxicated at least once in the past year and nearly 4 % report as having been intoxicated weekly. More than 55 % of current drinkers report as having consumed five or more drinks in a single day at least once in the past year and more than 12 % did so at least once a week. Nearly 20 % of current drinkers report as having consumed an average of more than two drinks per day. Nearly 10 % of current drinkers (about 8 million people) meet diagnostic criteria for alcohol dependence. An additional 7 % (more than 5.6 million people) meet diagnostic criteria for alcohol abuse (National Institute on Alcohol Abuse and Alcoholism, 1992).

The activities that aid in the transmission of HIV/AIDS may interact directly and/or indirectly with alcohol use and/or abuse. In general, alcohol consumption leads to a higher probability of unprotected sex and therefore to a higher risk of HIV-infection (R1, 2007). People with alcohol abuse disorders are more likely than the general population to engage in behaviors that place them at risk for contracting HIV and similarly, people with HIV are more likely to abuse alcohol at some time during their lives (Petry, 1999). A study on behalf of the NIAAA of the National Institutes of Health, U.S. Department of Health & Human Services (2008) shows that 80 % of people infected with HIV in the USA drink alcohol, and between 30 and 60 % have been diagnosed with an alcohol related abuse disorder. It has been shown that HIV infected people resort to drinking as a way of coping with realities and managing stress (R2, 2008).

A study of drinking habits and sexual behaviors of heterosexuals found that women and men who frequently combined alcohol use with sexual encounters were generally less likely to use condoms during sexual intercourse (Bagnall, Plant, & Warwick, 1990). Similarly, a study of homosexual men found that their alcohol or other drug use combined with sexual activity to be strongly associated with high-risk sexual behaviors. Even those who drank alcohol only occasionally at the time of sexual encounters were twice as likely to be categorized as "high risk," based on the frequency of involvement in a range of sexual practices within non-monogamous relationships, than were those who did not drink (Stall, McKusick, Wiley, Coates, & Ostrowe, 1986). Men who did not drink during sexual encounters were three times more likely to be classified as being in a "no risk" category than were men who combined drinking with sexual activity.

With respect to the role of gender and sexuality factors in HIV transmission, gender prescribes a specific role and status for men and women. Beliefs of what constitutes men and women are deeply rooted in the socio-cultural contexts of every community and create an unequal balance of power between women and men (International Council of AIDS Service Organizations, 2007). In each society, norms and beliefs of suitable roles for men and women are enforced by that society's institutions and practices. This determines the extent to which men and women

are able to control the various aspects of their sexual lives, i.e. their ability to negotiate the initiation of sex, conditions under which it takes place, including condom usage (International Council of AIDS Service Organizations, 2007). The unequal power balance between men and women in some society results in their unequal access to HIV information, resources and services which in turn plays a critical role in determining their respective vulnerabilities to HIV infection (International Council of AIDS Service Organizations, 2007).

Vulnerability to HIV is also influenced by sexuality. For instance, sexual minorities are comprised of people whose sexualities and sexual behaviors and/or practices do not conform to what is considered to be socially acceptable (International Council of AIDS Service Organizations, 2007). In many societies gay men, bisexual men, lesbians, bisexual women, transgender persons, and transsexuals are heavily stigmatized and generally exist in environments of inequity, discrimination, oppression and violence that increase their vulnerability to HIV infection (International Council of AIDS Service Organizations, 2007).

In 1998, an estimated 400,000 college students between the ages of 18 and 24 had unprotected sex after drinking alcohol, and an estimated 100,000 had sex when they were so intoxicated that they were unable to consent (Hingson, et al., 2002). In a study conducted by the Kaiser Family Foundation, 23% (5.6 million) of sexually active teens and young adults ages 15–24 in the USA reported as having had unprotected sex because they had been drinking or using drugs at the time. Twenty-four percent of teens ages 15–17 reported that their alcohol and drug use led them to be more sexually active than they had planned to be (The Henry J. Kaiser Family Foundation and the National Center on Addiction and Substance Abuse at Columbia university, 2002). Other studies that examined the consequences of alcohol use and specific sexual encounters have also demonstrated a connection between alcohol use and high-risk sexual behaviors. Scottish adolescents who drank alcohol at the time of their first sexual intercourse encounter, were less likely to have used a condom compared to those who did not drink alcohol (Robertson, & Plant, 1998). A survey of adolescents in Massachusetts, USA, revealed that teens were less likely to use condoms if sexual activity followed drinking alcohol or other drug use (Hingson, Strunin, Berlin, & Heeren, 1990). Similarly, adult homosexual men and heterosexual women (but not heterosexual men) reported that they were less likely to use a condom during those sexual encounters in which they felt intoxicated (Hingson, Strunin, Berlin, & Heeren, 1990). These reports of simultaneous alcohol use and high-risk sexual behavior suggest that alcohol can directly influence a high risk-taking sexual behavior that can, in turn, lead to HIV infection

The purpose of this study is to determine if alcohol use is correlated with two critical risk-taking behaviors (number of sexual partners and lack of condom use) among people living with HIV/AIDS. The specific objectives are to determine:

- if significant correlation exists between alcohol use and condom use among people living with HIV/AIDS
- If significant correlation exists between frequency of alcohol use and number of sexual partners among people living with HIV/AIDS
- If significant correlation exists between number of alcoholic drinks and number of sexual partners among people living with HIV/AIDS.

MATERIALS AND METHODS

Study Design

The data was collected from the HIV positive clients of Montgomery AIDS Outreach Inc. (located in Montgomery, Alabama) who were either diagnosed as being HIV positive by a

laboratory test or as having AIDS by a physician. The questionnaire was designed to collect data on behaviors that could be associated with HIV/AIDS transmissions in the Black Belt Counties (BBC) of Alabama. The Black Belt Counties have a higher than average percentage of black residents compared to whites. The living conditions in the BBC remain the worst in the nation. Sociopolitical factors seem to have condemned these counties to persistent poverty, poor employment, low incomes, low education, high infant mortality and poor health. Questions used in Behavioral Risk Factor Surveillance System (BRFSS), a national data collection effort supported by the Centers for Disease Control and Prevention were thoroughly reviewed to incorporate important parameters to track the prevalence of risk behaviors and their interactions in the HIV/AIDS transmission. These questions were incorporated in the questionnaire that was used in this study. Tuskegee University's Institutional Review Board (IRB) approved the questionnaire, Informed Consent forms and study protocol. The major modules of the questionnaire included: socio-economic and demographic information; knowledge about HIV/AIDS, HIV testing, substance use, and HIV/AIDS risk behaviors before and after the knowledge of their HIV infection status. Participants filled out a questionnaire anonymously without any individual identifying information

Data collection procedures

A letter requesting permission of HIV positive clients to participate in the survey was sent to the executive director of Montgomery AIDS Outreach (MAO), Inc. which is located in Montgomery, Alabama. Montgomery AIDS Outreach (MAO) provides community based HIV/AIDS treatment and prevention service through education, quality services and compassionate care to HIV/AIDS clients and their families in 27 counties in Alabama. After the permission was granted from the executive director, the questionnaires, along with informed consent forms were given to MAO staff for administration and retrieval. Permission for clients to participate in the survey was granted either by signing and returning the consent form or through completion of the questionnaire. Respondents' names were not included in the questionnaire, thus maintaining their confidentiality.

At the time of this study, MAO, Inc., program had about 1000 clients who were living with HIV/AIDS in the BBC of Alabama. For this study, MAO, Inc., was able to recruit 341 HIV positive people who were willing to participate in the study at its clinical sites. This represented about 34.1 % of the MAO, Inc., program clientele. The respondents completed the questionnaire during their clinical visits. The respondents completed the questionnaire at their own convenience and that of MAO staff. Montgomery AIDS Outreach staff administered and retrieved the questionnaires at its clinical sites. A total of 341 questionnaires were distributed but only 326 questionnaires were fully completed and returned with a response rate of 96 %. The other 15 questionnaires were also returned but were not fully completed and as a consequence they were discarded and not used in the analysis. This represented a 4 % refusal/dropout rate of the distributed questionnaires. The MAO staff was trained in the administration and retrieval of the questionnaires. This included an overview of the purpose of the survey, explanation of guidelines and questions, and sensitivity of the questions. MAO staff answered questions raised by participants completing the questionnaire. Each participant returned the completed questionnaire in a sealed envelope to MAO staff. Upon receiving the completed questionnaire from the participant, MAO staff gave each participant a Wal-Mart coupon worth \$15.00, which was provided by the Tuskegee University as an incentive token and compliment for filling out a questionnaire. Researchers at the Center for Computational Epidemiology, Bioinformatics and Risk Analysis (CCEBRA), a Research Team in the College of Veterinary Medicine, Nursing and Allied Health, Tuskegee University collected the completed questionnaires from MAO staff. All completed questionnaires were kept in the office of the Principal Investigator, in a secure and locked file cabinet.

Data Entry and Management—A database was developed using FileMaker Pro 6.0v4 to store, retrieve and manage the responses to the questions. FileMaker Pro is a multi platform (WINDOWS and MAC OS) relational database system that has been utilized at CCEBRA for several years. The database was designed to ensure data security and privacy. It is password protected. Only those authorized to handle this confidential survey information had access to the database.

Data entry took place, as completed questionnaires were returned to CCEBRA offices. Prior to entering the data each questionnaire was visually checked for completeness. Two people (data entry team) performed this task. All data entry team members were familiar with the questionnaire and had excellent computer skills. Furthermore, the work of the data entry team was monitored closely for quality control by someone was always available to answer questions to minimize data entry errors into the databases.

Measures—This study addressed several questions. However responses to five questions related to risk-taking sexual behaviors (number of sexual partners and condom use), one of the major determinants of HIV transmission, were selected for analysis. These questions were; “Did you use latex condom(s) the last time you had sexual intercourse?” “How often did you or your partner use a condom when you had sex?” “Did you drink any alcoholic beverage before you had sexual intercourse the last time?” “How often did you drink alcohol before you had sex?” and “How many drinks (at least 12 ounces of beer or 5 ounces of wine or 1.5 ounces of liquor) did you usually drink before you had sex?”

Statistical Analyses—The data was analyzed using SAS System for Windows (SAS Institute, Inc., Version 9.0.1). Frequency distributions were used for demographic characteristics of the respondents. Regression and Pearson Correlation analysis were used to determine if significant correlations existed between alcohol use and selected risky sexual behaviors. A t-test was used to determine if there is a significant difference between males and females with respect to drinking alcohol before sex. A one-way analysis of variance (ANOVA) was used to determine whether there were significant differences between races with respect to drinking alcohol before sex.

Results and discussion

Table 1 shows a summary of the demographic characteristics of the respondents by number and their percentages in relation to sex, race, age group, marital status, level of education and level of income.

The event-specific analysis was used to determine if significant correlations existed between alcohol use and risky sexual behaviors. In the event-level analysis participants were asked to recall whether a particular sexual intercourse episode (e.g., during the most recent sexual intercourse) encounter, whether they or their partner used alcohol and a condom at the time, the frequency with which they used alcohol, and condoms. The results of the analysis in Table 2 shows a significant positive correlation between drinking any alcoholic beverage such as beer, wine cooler or liquor before sex and frequency of condom use ($p < .0001$).

All respondents who said that a latex condom was used the last time they had sex were asked, “Was it for a few times, half of the time, most of the time or every time?” Respondents were also asked if they used any alcoholic beverage before sex. The majority of the respondents 46 (57%) who consumed alcohol before sex reported that they had used a latex condom a few times or half of the time during sexual intercourse, and 35 (43%) reported that they did not drink alcohol before sex and had used a latex condom a few times or half of the time during sexual intercourse. The analysis also shows that a large majority of the respondents 95(74%)

who did not drink alcohol before sex reported that they had used a latex condom most of the time or every time they had sexual intercourse. Twenty six percent of the respondents reported that they consumed alcohol before sex and had used a latex condom most of the time or every time they had sexual intercourse. This confirms that people who used alcohol before sex were less likely to use condoms indicating that alcohol use is a significant predictor of inconsistent use of condoms among people living with HIV/AIDS ($p < .0001$) (Table 2). We also examined the correlation between gender-specific prevalence and alcohol consumption before sex. The results in Table 2 further show that men were significantly more likely than women to drink alcohol before sex (40 (36.7 %) vs. 23 (23.5 %); $p = .003$). However, there were no significant differences between races ($p = .25$) with respect to drinking alcohol before sex.

The most possible explanation for the significant difference observed between genders with respect to drinking alcohol is that women may be more protected against drinking alcohol than are men because of social factors associated with the female gender role and particular personality characteristics. Women believe there are more social sanctions against drinking for them than for men [23]. In a national survey, women judged that 50% of other people would strongly disapprove of a woman getting drunk at a party but only 30% of others would strongly disapprove of a drunken man and 65 % of the women said they strongly disapproved of a woman getting drunk, whereas 58% strongly disapproved of a man getting drunk [24]. One reason women might perceive alcohol use as a less acceptable activity for them than for men is that alcohol consumption is part of the male gender role, but is discouraged as part of the female gender role [25].

The findings of gender differences in alcohol use before sex, strongly suggest that biological and psychosocial factors that may play a role in the gender differences in alcohol use are yet to be explored. In the long run, identifying and understanding such differences could improve our understanding of the nature and cause of alcohol use before sex. This could have implications for tailoring HIV/AIDS prevention and treatment interventions to maximize positive outcomes for both males and females. This study also assessed if frequency of drinking alcohol were significantly correlated to the number of sexual partners. The results of the analysis in Table 2 found significant correlation between frequency of alcohol use and high numbers of sexual partners ($p = .003$). Further analysis of the number of sexual partners by the frequency of drinking before sex showed that a few time drinkers were more likely to have one sexual partner than most of the time drinkers (73 percent vs. 27 percent) indicating that the number of sexual partners was positively correlated with the frequent use of alcohol ($p = .003$). The most plausible explanation for this is that alcohol consumption reduces social and sexual inhibitions and concerns about HIV/AIDS prevention and safe sexual behaviors. It facilitates casual sex and increased number of sexual partners. Alcohol gives people more courage (sometimes significantly more) to do what they would otherwise not have done and also being less aware of the consequences. Frequent alcohol bingers engaged in unplanned sexual activities in 41% of the cases compared to just 8% in occasional drinkers and they had unprotected sex in 22% of the cases compared to 4%, as revealed by American studies [26].

The participants were also asked about their alcohol consumption and risky sexual behaviors. The result in Table 2 shows that the quantity of alcohol consumed was correlated with two indicators of risky sexual behaviors: having multiple sexual partners ($p < .0001$) and having sexual intercourse without a condom ($p < .001$). Some participants (36%) who drunk 5 or more drinks on a single occasion reported they had had six or more sexual partners within one year and 58% of the respondents who drank 1–2 drinks on a single occasion reported they had had less than two sexual partners within one year. With respect to the correlation between number of drinks and condom use, those who drank 5 or more alcoholic drinks before sex were more likely to report as having not used condoms during sexual intercourse (58 percent for not using condom vs. 42 percent for using condom). Further analysis also shows that those who drunk

1–2 drinks of alcohol before sex were more likely to use condoms if sexual activity did not follow drinking (86 percent for using condom vs. 14 percent for not using condom).

Reasons underlying the correlation between alcohol use and high-risk sexual behaviors among people living with HIV/AIDS have been described and include decreased inhibitions and risk perception [27], belief that alcohol enhances sexual arousal [28], deliberate use of alcohol as an excuse of high-risk behavior [29], and the indirect association that bars are common places to meet potential sexual partners [30].

Conclusion and recommendations

Though much is known about alcohol use and risk sexual behaviors, not much is known about the correlation between alcohol consumption in conjunction with sex and the risk of HIV acquisition, among people living with HIV/AIDS. This study assesses such correlation. Respondents provided information about the quantity and frequency of their alcohol use, as well as information about the number of times they engaged in specific risky sexual behaviors responsible for HIV/AIDS transmission. The collected/gathered information was then correlated to test for the different correlations. This study has shown that there is correlation between the number and frequency of drinking alcohol with risky sexual behaviors among people living with HIV/AIDS. Respondents who used alcohol before sex and those who used alcohol most of the time and more heavily, are more likely to engage in risky sexual behaviors responsible for HIV/AIDS transmission. People who drank more alcohol than others had a large number of sex partners and were less likely to use condoms during sexual intercourse. The marked alcohol use and risky sexual behaviors in this population of HIV-infected individuals are common and alarming. More than a fourth (28 percent) of the respondents reported that they used alcohol most of the time or every time before sexual intercourse. Therefore, researchers interested in HIV/AIDS need to capitalize on this correlation in looking for factors that covary with behavior that puts people at risk for these negative outcomes. Alcohol-related interventions might help increase safer sex behaviors such as condom use among people living with HIV/AIDS. Developing targeted interventions among populations where the risk is greatest could enhance the design of interventions aimed at increasing condom use in conjunction with addressing other issues such as partner reduction, and mutual monogamy. Education and training programs should develop educational materials to distribute to people living with HIV/AIDS and to the communities that have the dual epidemics of alcohol use and HIV transmission. The integration of adverse effects of alcohol use in educational materials would not only help to trigger discussions on alcohol use between clients and care providers, but would also provide information on how individuals can help their family members and partners. This would in turn greatly help to minimize the risk of new HIV infections and/or manage existing infections.

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Table I
Demographic Characteristics of Respondents

Demographic characteristics	n	%
Sex		
Female	136	42
Male	181	56
Transgender	4	1
Transsexual	5	2
Race		
African American	208	64
White (non-Hispanic)	94	29
Hispanic	10	3
Others	14	4
Age group		
18–29	53	19
30–39	86	30
40–49	104	37
50–59	34	12
60 and above	6	2
Marital Status		
Single	183	56
Married	47	15
Divorced	47	15
Separated	31	10
Widow (er)	3	1
Other	13	4
Level of education		
Grade 1 through 11	51	16
Grade 12 to college 3 years	211	65
College 4 to graduate school	61	19
Level of income		
\$9,999 or under	97	31
\$10,000 to \$24,999	119	37
\$25,000 to \$49,999	43	13
\$50,000 to \$74,999	13	4
Don't know/Not sure	46	15

Table II
The correlation between demographic and HIV/AIDS risky behaviors and drinking alcohol among people living with HIV/AIDS

Variables	Alcohol Before Sex		Few time Drinkers		Most of the time Drinkers	1-2 Drinks	5 or more drinks	P-value
	Yes	No						
Frequency of Condom use								
Few times	57%	43%	-	-	-	-	-	<.0001
Half of the times	26%	74%	-	-	-	-	-	
Gender								
Female	23.5%	76.5%	-	-	-	-	-	0.003
Male	36.7%	63.3%	-	-	-	-	-	
Race								
African American	26.5%	73.5%	-	-	-	-	-	0.25
White (non-Hispanic)	38.3%	61.7%	-	-	-	-	-	
Number of sexual Partners								
One sexual partner			73%		27%	-	-	0.003
Less than two (Six or more sexual partners)			-		-	58%	(36%)	<.0001
Condom use								
Condom used			-		-	86%	42%	
Condom not used			-		-	14%	58%	<.001