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Depression, Substance Use and HIV Risk in a Probability Sample of Men who Have Sex with Men

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Abstract

The persistent HIV epidemic among men who have sex with men (MSM) suggests that continued research on factors associated with risky sexual behavior is necessary. Drawing on prior literature, the role of depression and substance use in HIV risk is also inconclusive. Generalizability of past findings may also be limited to the extent that research has not employed probability samples. Here we report on one of the few probability samples of MSM to examine the role of depressive symptoms and substance use on risky sexual behavior (RSB). Multinomial logistic regression analysis suggested that depression and substance use are independently linked to our risk measure, such that those reporting high levels of depressive symptoms or substance use were more likely to report both unprotected receptive anal intercourse and unprotected insertive anal intercourse, and sex with a risky partner. Implications for prevention and treatment are discussed.

Keywords

HIV Risk; Substance Use; Depression; MSM; Survey Research

1. Introduction

Men who have sex with men (MSM) in the U.S. have been exposed to the risk of HIV transmission at a higher rate than the general population despite all prevention efforts. According to a recent report by Centers for Disease Control and Prevention, MSM have an HIV diagnosis rate more than 44 times that of other men, and more than 40 times that of

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women (CDC, 2010). Moreover, the 2008 Sexually Transmitted Disease Surveillance report by CDC reveals a rise in STDs among MSM from 1999 through 2008, which may be associated with an increase in HIV diagnoses in this group (CDC, 2008).

Risky sexual behavior (RSB) has always been a major cause for HIV transmission among MSM (Gonzalez et al., 2009). Some findings indicate that depression and/or substance use pave the way for norm abandonment or cognitive escape (Fendrich et al., 2010; Venable et al., 2004) and lack of self-efficacy (Leith and Baumeister, 1996), which are psychological mechanisms that make MSM be more inclined to engage in RSB (Clum et al., 2009). A number of studies identified either substance use (Barta et al., 2008; Beckett et al., 2003; Carey et al., 2009; Clatts et al., 2005; Gillmore et al., 2002; Mustanski, 2008; Rotheram-Fuller et al., 2007; Stall & Purcell, 2000) or depression (Alvy et al., 2010; Crepaz and Marks, 2001; De Santis et al., 2008; Reisner et al., 2009) as a correlate of RSB among MSM. According to the limited research currently available substance use may work its effects on RSB in combination with depression (Ammon Avalos et al., 2009; Bancroft et al., 2003; Colfax et al., 2004). The findings regarding these two factors' individual or multiple correlation with RSB, however, are inconclusive.

The purpose of this study is to examine the simultaneous association of depressive symptoms and substance use on RSB among MSM. Our analyses are unique in that they employ a probability sample. Obtaining non-biased probability samples of high-risk populations is a major challenge in the study of RSB. Representative samples of MSM are particularly problematic since homosexuality is still widely stigmatized (Yeka et al., 2006; Cochran, 2001). As a result, most research relies on convenience-based sampling methods in which participants are recruited through a variety of accessible venues at the convenience of the researcher (Fernández et al., 2005; Irwin et al., 2006; Salomon et al., 2009). We note that some studies use sampling methods that systematically adjust for the non-random selection process (e.g., respondent-driven sampling, Reisner et al., 2009). At least one study has employed a nationally representative clinical sample (e.g., Beckett et al., 2003). Nevertheless, the problem of generalizability of findings derived from non-probability samples still persists. Therefore, the analyses based on a probability sample have considerable promise to contribute to the field by providing relatively non-biased results regarding how RSB among MSM is associated with depression and substance use.

2. Method

In this study, we employed data from the Chicago Male Drug Use and Health Survey which has been described elsewhere (Fendrich et al., 2008). It was a supplement to a general population study focused on drug use and related behaviors in Chicago. The general aim of the supplement was to address the need for a more comprehensive understanding of drug use (including the use of, what were at the time of the study, newly emerging club drugs such as MDMA, also known as Ecstasy) and this behavior's potential links to risky sex among MSM residing in Chicago. The sample was obtained as a supplement to a general population survey, and was concentrated in two postal zip codes in a part of the city known to have a high concentration of gay men. Interviews were conducted between September, 2002 and January 2003. Men who reported a history of consensual sex with other men or who identified themselves as gay or bisexual in a face-to-face screening of randomly selected households in the predetermined location of the city were eligible to be selected. The age range for this sample was 18 to 55 years old. Interviews were completed with 216 self-identified MSM (Fendrich et al. 2008). Respondents were interviewed using audio computer-assisted self-interviews (ACASI). The 216 respondents were asked detailed questions about drug use, risky sexual behavior, and involvement in the gay community. The study also collected urine and saliva samples to test for illicit drug use and validate self-reports.

Table 1 provides the definitions of the variables that we used in our multinomial logistic regression model and Table 2 presents category percentage distributions for the sample which only included men who reported having sex within the past six months (n=177). Some studies (such as Fernández et al., 2005, and Irwin et al., 2006) show that only receptive unprotected anal intercourse (UAI) is correlated with alcohol and drug use. For this reason, we distinguished between receptive and insertive RSB in the analyses reported here. Incorporating partner risk status as well as subject risk behavior, our RSB measure was adapted from the one employed by Fendrich et al. (2010), with two differences: Instead of treating the receptive UAI and insertive UAI as separate variables, we coded them as separate categories of the same variable, since receptive UAI has more direct HIV risk for respondents than insertive UAI. Also, we created another, multiple risk category composed of the respondents who engaged in both receptive and insertive UAI and who also had a risky partner (see Table 1).

The survey utilized a shortened version of the Center for Epidemiologic Studies Depression Scale (CES-D) as a measure of depression. The short CES-D, composed of 7 items that measure depressive feelings and behaviors during the past week, is highly correlated with the full CES-D (.92, with the alpha reliability of .83) (Mirowsky and Ross, 1992). Since the additive CES-D score in the sample was positively skewed, we categorized this measure using a quartile split. This is a commonly used strategy for detecting potential examination of non-linear effects (e.g., Turner, Dobson, and Pocock, 2010)

The drug use, alcohol use, HIV-status, race, and age variables employed are defined in Table 1. Analyses were carried out with Stata version 10.1 (StataCorp, 2008). The final model was adjusted for study design effects in order to control for clustering of observations within primary sampling units (StataCorp, 2003). We hypothesized that substance use and depression would be independently and positively correlated with the risky sexual behavior.

3. Results

Table 2 presents some key characteristics of the sample. The majority of respondents in the sample were in the least risky category of RSB. Just about half the sample used drugs. Multiple binge drinkers comprised more than one-third of the sample, HIV-negative respondents and whites were more than three-quarters. The mean age was 37, with a standard deviation of 8.7 years.

The multinomial logistic regression model (Table 3) was significant overall at the .001 level ($F = 12.02$). Those respondents who used drugs in the past 30 days were not significantly different from those who did not use drugs with respect to having engaged in only receptive or only insertive UAI vs. the reference category (no risky sex or no risky partner). Using drugs, however, increased the relative risk of being in the most risky category of RSB (both receptive and insertive UAI, with risky partner) by about 4 times compared to being in the least risky category. Alcohol use was not a significant predictor of any RSB category.

The middle level of depression, as compared to the lowest level, had no significant impact on respondents' falling into any of the more risky categories of the dependent variable. Respondents with the highest level of depression, as compared to those with the lowest level, were about 5.7 times more likely to have had both receptive and insertive UAI while also having a risky partner, as compared to being in the no-risky-sex-or-partner group. In our analyses, we also checked for the impact of an interaction between drug use and depression on RSB and found it to be non-significant.

HIV-positive respondents were 6.5 times more likely to engage in only receptive risky sex, and 9.2 times more likely to have both receptive and insertive UAI, although they were not

more (or less) likely to have only insertive sex. Of the two demographic variables in our model, race was not a significant predictor of RSB. Age, however, was a significant predictor; older respondents had a reduced odds of falling into the most risky category of RSB.

4. Discussion

Our research provides evidence for the independent role of both drug use and high levels of depression on high risk sexual behavior among MSM. That is, drug use and reports of high levels of depression each independently increased the odds of engaging in *both* receptive and insertive UAI with a risky partner. These findings are uniquely important since they were obtained from a probability sample where members were not specifically selected because of disclosure of ongoing risk behavior or because of their presence in venues where risk behavior may be normative.

Additional findings suggest, all else being equal, compared to other men in the sample, HIV positive men were more likely to be engaged in either risky receptive UAI or both risky receptive and insertive UAI. These findings are consistent with prior conclusions drawn about behavior in this sample with respect to sero-sorting; i.e., HIV positive men may be increasingly engaged in risky behavior with other HIV positive men (Fendrich et al., 2010). Finally, observed age effects were consistent with previous research suggesting that younger MSM in the U.S. were at higher risk of HIV infection due to UAI than their older counterparts (Mansergh & Marks, 1998).

The analyses presented above are cross sectional and causal inferences can only be demonstrated with longitudinal data. Also, the trends with respect to, for instance, substance use among the MSM population in Chicago may have changed since the data were collected in 2002 and 2003. There is also an issue related to whether or not these findings can be generalized to other locales. Because Chicago is a large urban area with a residentially concentrated MSM population, the patterns of drug use and depression may in fact not be generalizable to nonurban areas or to other urban locations where MSM are not concentrated. Also, our data rely on self-reported risk behavior, which is another possible concern given that people tend to underreport risk behaviors such as drug use (Fendrich et al., 2004). If anything, however, under-reporting would tend to attenuate the findings reported here. These analyses included a no-risk category that represented persons who reported unprotected sex, but no risky partner. The rationale for including these respondents in the no risk category was that we defined the risk posed by unprotected sex as likely to be contingent on the riskiness of partners. Finally, we note that even though this was a probability sample, the relatively small sample size potentially adversely impacted the power to detect significant effects.

Although our findings are not definitive, they do suggest directions for further research. For example, while the relationships explored here focused on substance abuse generally, it might be informative for future research employing probability samples to examine the impact of specific substances (such as cocaine or methamphetamine) in the presence of mental health conditions on risk outcomes. Building on this work, it also might be useful for future research to examine the association between other types of mental health symptoms and diagnoses (such as anxiety disorder) and risk behavior outcomes (Hart et al., 2008).

5. Conclusions

Our findings have implications for both prevention and intervention. Prevention programs need to stress the importance of both substance abuse and mental health problems in

exacerbating HIV risk behavior. We note that increasingly, service delivery researchers and professionals are stressing the importance of integrated services, where treatment seeking patients are comprehensively screened and treated for both mental health and substance abuse related problems (e.g., Sterling et al., 2011). While we did not directly assess comorbid diagnoses in this study, our findings suggest that this approach has the potential added benefit for positively impacting HIV risk among MSM. Finally, to the extent that repeated exposure to HIV may confer additional health risks among HIV positive men (Smith et al., 2005), this study underscores the continued need to reinforce HIV prevention messages in the context of HIV treatment programs for HIV positive men.

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Highlights

- The role of Depression and Substance Use in HIV risk among MSM is inconclusive.
- Generalizability of past findings is limited to the extent that research has not employed probability samples.
- Using a probability sample of MSM, we found that both depression and substance use were linked to our HIV measure.
- Prevention programs need to stress the importance of both substance abuse and mental health problems in exacerbating HIV risk behavior.

Table 1

Variables used in the multinomial logistic regression model

Risky Sexual Behavior (RSB): A four-category variable created by combining two separate variables related to RSB – any unprotected anal intercourse, and any risky partner (defined as having multiple, casual, or HIV-positive or HIV-unknown partners) in the past 6 months.

Depression: A three-category variable created by categorizing the additive depression scale scores (DSS) through a quartile split (the two middle quartiles combined).

Drug Use: A binary variable comparing those who reported illicit drug use in the past 30 days or had any positive urine or oral illicit drug test to those with no drug use and no positive drug test (see Mackesy-Amiti et al., 2008 for more details on drug test procedure). The self-reported drug use measure inquired about use of marijuana, cocaine (powder or crack), heroin, hallucinogens (PCP, LSD and other hallucinogens), inhalants, methamphetamine, prescription stimulants, tranquilizers, sedatives, and pain relievers, and “club drugs” (ecstasy/MDMA, ketamine, Rohypnol, GHB).. The urine and saliva drug test measure assessed whether respondents tested positive for amphetamine/methamphetamine, cocaine, marijuana, heroin/opiates, and MDMA (ecstasy).

Alcohol Use: A binary variable comparing those who reported no or only one binge-drinking (5 or more drinks on the same occasion) episode in the past 30 days to those reporting multiple binge-drinking episodes.

HIV Status: A binary variable comparing respondents with HIV-negative or unknown status to those who are HIV-positive.

Race: A binary variable comparing whites to others (including African Americans, Native Americans, Asians, Hispanics, and those who considered themselves bi-racial)
Age: A continuous variable.

Table 2

Characteristics of the MSM sample (n = 177)

Variables	%
Dependent	
RSB ¹	
No unprotected anal intercourse (UAI) or no risky partner *	59.89
Only insertive UAI, and risky partner	14.69
Only receptive UAI, and risky partner	15.82
Both receptive and insertive UAI, and risky partner	09.60
Independent	
Depression **	
Low depression scale score (DSS) (<= 2) *	30.51
Middle DSS (3 <= DSS <= 7)	46.33
High DSS (>= 8)	23.16
Drug Use	
No drug use reported and no positive drug test *	53.11
Any drug use reported or any positive drug test	46.89
Alcohol Use	
Abstainers or one binge occasion in the past month *	59.32
Multiple binge occasions in the past month	40.68
HIV Status	
Negative or unknown *	85.31
Positive	14.69
Race	
White *	79.66
Non-white	20.34
Age	Mean: 37, SD: 8.7

¹RSB= Risky Sexual Behavior.

* The reference category.

** The prevalence rates deviate from 25100% due to the excluded cases from the sample

Table 3

Multinomial logistic regression results for risky sexual behavior (n = 177)

	Odds Ratio (95% CI) ^a					
	Only Rec., Risky Prt vs. No UAI or No Risky Prt	P	Only Ins., Risky Prt vs. No UAI or No Risky Prt	P	Rec. and Ins., Risky Prt vs. No UAI or No Risky Prt	P
Drug Use	None	1.00 (0.00 – 0.00)	1.00 (0.00 – 0.00)	1.00 (0.00 – 0.00)		
	Any	1.46 (0.40 – 5.32)	1.65 (0.68 – 4.04)	4.05 (1.16 – 14.1)		*
Depression	Low	1.00 (0.00 – 0.00)	1.00 (0.00 – 0.00)	1.00 (0.00 – 0.00)		
	Middle	0.69 (0.22 – 2.21)	0.94 (0.41 – 2.19)	2.99 (0.65 – 13.7)		
	Upper	0.50 (0.13 – 1.97)	0.41 (0.11 – 1.44)	5.72 (1.76 – 18.9)		**
Alcohol Use	Abstainer/One Binge	1.00 (0.00 – 0.00)	1.00 (0.00 – 0.00)	1.00 (0.00 – 0.00)		
	Multiple Binge	2.13 (0.79 – 5.73)	2.11 (0.81 – 5.47)	0.87 (0.29 – 2.62)		
HIV Status	Negative/Unknown	1.00 (0.00 – 0.00)	1.00 (0.00 – 0.00)	1.00 (0.00 – 0.00)		
	HIV-positive	6.49 (2.49 – 16.9)	1.71 (0.63 – 4.60)	9.17 (3.01 – 28.0)		***
Race	White	1.00 (0.00 – 0.00)	1.00 (0.00 – 0.00)	1.00 (0.00 – 0.00)		
	Non-white	0.28 (0.05 – 1.62)	0.80 (0.34 – 1.89)	1.29 (0.60 – 2.80)		
	Age	1.02 (0.94 – 1.10)	1.01 (0.96 – 1.07)	0.86 (0.80 – 0.91)		***

^aThe model was run by using Stata 10.1 (Stata_Corp. 2003), accounting for the sampling design effects.

* p < .05

** p < .01

*** p < .001