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Prevalence and Correlates of HIV-Risk Behaviors among Homeless Adults in a Southern City

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ABSTRACT

This paper aims to describe the prevalence and correlates of HIV-risk behaviors among adults receiving transitional and emergency housing services in Memphis, Tennessee. A cross-sectional, interviewer-administered survey was conducted with a convenience-based sample (N=116) of homeless adults. Sex without a condom, sex while on drugs or drunk, and sex with an unknown person emerged as the three most prevalent HIV-risk behaviors. Sex while drunk or high on drugs was also assessed as a significant predictor for sex without a condom and sex with an unknown person. Multivariate logistic regressions revealed that mental health status, duration of homelessness, incarceration history, and sex while drunk or high on drugs were significant predictors of HIV-risk behaviors. Consideration of these important correlates in designing HIV prevention programs for this vulnerable sub-group of adults is warranted.

Keywords: HIV/AIDS; homelessness; HIV-risk behavior

INTRODUCTION

The homeless are at an increased risk for HIV infection compared to the general population, due in part to a higher prevalence of alcohol dependence, illegal drug use, and sexual risk behaviors (Susser et al, 1995; Zopla et al., 1993; Somlai et al., 1998; Tucker et al., 2013; Kidder et al., 2008). Several studies have reported an HIV seroprevalence of greater than one percent among homeless populations in multiple sites across the United States, and the National Alliance to End Homelessness estimates that 3.4% of all homeless individuals are living with HIV (Herndon et al., 2003; Bucher et al., 2007; Beijer et al., 2012; National Coalition for the Homeless, 2009). Test and treatment strategies offer an opportunity to reduce the incidence of HIV transmission among this vulnerable sub-population by identifying undiagnosed infections and promoting early use of anti-retroviral medications (Gardner et al., 2011). This strategy is particularly pertinent to reducing disparities in the spectrum of HIV care; homelessness has been identified as an independent predictor of failed viral suppression, and nine of the ten states with the highest HIV case fatality rates are located in the South (Muthulingam et al., 2013; Hanna et al., 2012).

Although homelessness and HIV separately are longstanding public health concerns in the metropolitan area of Memphis, Tennessee, sexual health risks have not been defined locally among the homeless. The Department of Housing and Urban Development (HUD) reported approximately two percent of all homeless individuals identified during annual point-in-time counts in Memphis and Shelby County were living with HIV/AIDS during 2012 (U.S. Department of Housing and Urban Development, 2012). Furthermore, reports from the Memphis Area Ryan White Part A Program indicate a larger proportion of clients deal with housing instability; in 2011, approximately seven percent of all HIV-positive clients had non-permanent housing and almost four percent lived in an institutional setting (Pichon et al., 2012).

Recent trends explicate the need to address HIV among the homeless as a potentially vulnerable subpopulation: single individual homelessness increased by approximately 38% between 2008 and 2012, and the estimated rate of HIV infection in the Memphis Metropolitan Statistical Area (MSA) remained seventh highest in the nation during 2011 (Kitchen, 2012; Centers for Disease Control and Prevention, 2011). In order to describe the prevalence and correlates of HIV-risk behaviors among adults receiving transitional and emergency housing services in Memphis, this study employed a community-academic partnership model; these objectives are imperative to informing appropriate intervention development and the direction of future work addressing the needs of the homeless population with regard to HIV prevention.

METHODS

A cross-sectional, convenience based sample (N=116) of adults receiving services from emergency and transitional housing providers in Memphis were recruited to participate in an interviewer-administered survey. For inclusion in the study, participants had to be a) at least 18 years of age, b) currently sleeping at a housing shelter or had no place to sleep, and c) self-reported they had not previously taken the survey. Seven surveys were excluded for not meeting the study's eligibility criteria or for having incomplete data, resulting in a total of 109 participants for the data analysis. Characteristics of the sample are shown in Table 1.

The survey included socio-demographic factors (i.e., age, gender, race, education), duration of homelessness, history of incarceration, and other characteristics of health. Participants self-reported their physical and mental health status using a standard measure shown to be a valid indicator of health, where response options were excellent, very good, good, fair or poor (Aday 1991; Gelberg et al., 1997). To evaluate current health service utilization, participants were asked when they last saw a physician. Factors such as health insurance coverage, health service utilization, and HIV testing history were also assessed.

Alcohol dependence was evaluated with the Alcohol Use Disorders Identification Test – Consumption (AUDIT-C), which consists of a validated, three-item screening test for heavy drinking and/or active alcohol abuse or dependence (Bush et al., 1998). Perceived susceptibility to HIV/AIDS was evaluated using a scale to measure level of worry of being infected; response options ranged from zero, indicating "not worried at all," to four, indicating "extremely worried." This scale has been characterized for internal reliability and both construct and predictive validity (DeHart & Birkimer, 1997).

HIV-risk behaviors were assessed using ten questions from the Fogg HIV Screening Questionnaire, which include categorical self-report of any of the following behaviors within the past 12 months (yes/no): sex without using a condom, sex while drunk or high on drugs, sex with an anonymous partner, having five or more sex partners, sex with an intravenous drug user, sex with a man who has sex with men, sex with a person who is HIV positive, trading sex for money or drugs, using injection drugs, and sharing drug injection equipment. The Fogg HIV Screening Questionnaire has been evaluated for reliability and has been previously used within the homeless population (Fogg & Mawn, 2010).

A partnership approach was employed between the Shelby County Health Department (SCHD), the University of Memphis School of Public Health (UMSPH), and Christ Community Health Services (CCHS) to develop the study design and survey instrument, administer surveys, and interpret study findings.

Staff from CCHS conducted interviewer-administered surveys at organizations offering emergency and transitional housing services. We recruited participants from agencies known to house 'non-institutionalized' adults, where shelters did not traditionally provide direct services for mental illness or substance abuse. To address possible literacy issues and avoid discomfort on the part of potential participants with low literacy levels, interviewer-administered surveys were necessary. Additionally, many of the survey items included in the interview were previously tested in homeless populations. Participants were provided a \$5 grocery gift card to compensate their time for completing the survey.

Univariate statistics were used to describe HIV-risk behaviors. Bivariate chi-square analyses and univariate logistic regression models were performed to determine unadjusted associations between correlates with HIV-risk behaviors. Multiple logistic regression was used to calculate adjusted odds ratios; independent variables were deleted from the model using a backward stepwise approach. Each variable with a p-value ≤ 0.10 in bivariate analysis was entered into the model, and variables that were significant at the ≤ 0.05 level were retained in the final models. All analyses were performed using the SAS Statistical Analysis package (SAS Institute, Cary, NC, Version 9.3).

RESULTS

The majority of the study's respondents were male (88.1%), ages 40 or older (73.4%), Black (72.5%), had a history of incarceration (83.5%), and reported their overall physical health (70.6%) and mental health (75.2%) as either good, very good, or excellent. Nearly a quarter of the study participants went to or graduated college, and had health insurance within the last year (Table 1). Despite 67% reporting at least one HIV-risk behavior in the past 12 months, about half (46.8%) of the respondents perceived themselves as not being at risk for HIV, with 26.6% reporting never taking a HIV test. The three HIV-risk behaviors with the highest prevalence were sex without a condom (50.5%), sex while high on drugs or drunk (47.7%), and sex with an unknown person in the past 12 months (23.9%) (Table 2).

TABLE 1 – Descriptive Statistics for Study Sample of Homeless and Transitionally Housed Adults Participating in HIV Risk Behavior Survey (n=109); Memphis, Tennessee, 2011

Variable	N	% ^a
Gender		
Male	96	88.1
Female	13	11.9
Age		
19-39	29	26.6
40-49	41	37.6
50+	39	35.8
Race		
Black	79	72.5
White	29	26.6
Duration of Homelessness		
< 12 months	52	47.7
1 + years	52	47.7
Education		
Less than GED/high school diploma	28	25.7
High school diploma or equivalent	52	47.7
Some college/graduate	29	26.6
History of Incarceration		
Yes	91	83.5
No	18	16.5
Alcohol dependence		
Yes	48	44
No	56	51.4
Physical Health		
Fair, Poor	31	28.4
Good, Very Good, Excellent	77	70.6
Mental Health		
Fair, Poor	30	27.5
Good, Very Good, Excellent	79	72.5
Health Insurance Coverage		
Yes	25	22.9
No	77	70.6
Last doctor visit		
< 12 months ago	79	72.5
1 - 5 years ago	20	18.3
5 + years ago	8	7.3
Total	109	100

^a Missing and unknown data are excluded; may not equal column totals.

Perception of HIV risk, self-report of physical health, education, insurance status, time of last physician visit and time of last HIV test were not significant predictors associated with the three most prevalent HIV-risk behaviors by chi-square analyses; these variables were not included in univariate and multivariate regression models. A noteworthy non-significant finding from the bivariate analysis indicated that perception of HIV risk did not impact the respondents HIV-risk behaviors. When examining perception of HIV risk among those who reported having sex without a condom in the past 12 months, the prevalence was uniform for each strata resulting in a p-value of 0.999 (results not shown).

Participants homeless for less than a year (OR= 3.28 CI 1.47-7.32) and those with a history of incarceration (OR=3.17 CI 1.04-9.63) were significantly more likely to have sex without a condom in the past 12 months when compared to those homeless for longer than a year and people without a history of incarceration. Gender and age were significant factors contributing to sex while drunk or high on drugs; men and people aged 19-39 were more likely than women and all other age groups to have sex while drunk or high on drugs in the past 12 months. Mental health was the only significant factor contributing to having sex with an unknown person in the past 12 months; respondents reporting fair or poor mental health within the last year were 3.1 (CI 1.22-7.85) times more likely than those reporting good, very good, or excellent mental health to have had sex with an unknown person. The association between HIV-risk behaviors was also assessed; those who had sex while drunk or high were significantly more likely to also have sex without a condom (OR= 5.34 CI 2.36-12.13) and sex with an unknown person in the past 12 months (OR= 5.31 CI 1.93-14.63) (Table 3).

TABLE 2 – HIV-Risk Behaviors, Time of Last HIV Test, and Perception of HIV Risk among Study Sample of Homeless and Transitionally Housed Adults Participating in HIV Risk Behavior Survey (n=109); Memphis, Tennessee, 2011

Variable	N	% ^a
Last HIV test		
Never	29	26.6
< 12 months ago	32	29.4
1 - 5 years ago	34	31.2
5 + years ago	13	11.9
Perception of HIV Risk		
Not at all	51	46.8
Little/slightly/somewhat	24	22
Extremely	26	23.9
HIV-Risk Behaviors (<i>in the past 12 months</i>)		
Sex without a condom	55	50.5
Sex while drunk or high on drugs	52	47.7
Sex with an unknown person	26	23.9
Five or more sex partners	16	14.7
Used a needle to inject drugs	8	7.3
Sex with IDU (IV Drug User)	7	6.4
Traded sex for drugs or money or something else needed	3	2.8
Sex with a man who has had sex with a man (MSM)	2	1.8
Sex with someone who is HIV positive	1	0.9
Total	109	100

^a Missing and unknown data are excluded; may not equal column totals.

After adjustment, being homeless for less than one year (OR=3.66 CI 1.59-8.45), history of incarceration (OR=3.65 CI 1.13-11.83), having sex while drunk or high (OR=6.97 CI 2.64-18.41), and being female (OR=7.94 CI 1.61-39.18) were independently associated with having sex without a condom in the past 12 months. Factors related to having sex with an unknown person in the multivariate model were having sex while drunk or high in the past 12 months (OR=4.88 CI 1.74-13.76) and reporting a mental health status of fair or poor (OR=2.68 CI 1.00-7.17) (Table 4).

TABLE 3 - Univariate Logistic Regression Analyses for Predicting Sex Without a Condom, Sex While Drunk or High on Drugs and Sex with an Unknown Person Among Homeless and Transitionally Housed Adults (n=109); Memphis, Tennessee, 2011

	Sex without a condom (n=55)		Sex while drunk or high on drugs (n= 52)		Sex with an unknown person (n=26)	
	OR ^{a,b}	(95% CI) ^a	OR ^{a,b}	(95% CI) ^a	OR ^{a,b}	(95% CI) ^a
Gender						
Male	0.6	(0.18-1.96)	3.48	(0.90-13.42)	1.05	(0.27-4.14)
Female (Ref)	1		1		1	
Race						
White	2.39	(0.99-5.79)	2.17	(0.91-5.18)	0.82	(0.29-2.32)
Black (Ref)	1		1		1	
Age						
19-39	1.72	(0.65-4.58)	3.39*	(1.24-9.29)	0.81	(0.23-2.78)
40-49	0.82	(0.34-1.99)	1.54	(0.63-3.78)	1.8	(0.65-4.98)
50+ (Ref)	1		1		1	
Duration of homelessness						
< 12 months	3.28**	(1.47-7.32)	1.47	(0.68-3.19)	1.26	(0.49-3.24)
1+ years (Ref)	1		1			
History of incarceration						
Yes	3.17*	(1.04-9.63)	2.78	(0.92-8.43)	1.69	(0.45-9.37)
No (Ref)	1		1		1	
Mental Health						
Fair, Poor	1.41	(0.61-3.29)	1.99	(0.84-4.67)	3.1*	(1.22-7.85)
Good, Very Good, Excellent (Ref)	1		1		1	
Alcohol dependence						
Yes	1.27	(0.59-2.75)	3.85***	(1.70-8.70)	1.51	(0.62-3.68)
No (Ref)	1		1		1	
Sex while drunk or high on drugs						
Yes	5.34***	(2.36-12.13)	-	-	5.31**	(1.93-14.64)
No (Ref)	1		-		1	

^a OR= odds ratio; CI= confidence interval

^b * P<.05; **P<.01; ***P<.001

TABLE 4 - Multivariate Logistic Regression Analyses Predicting Sex Without a Condom and Sex with an Unknown Person among Homeless and Transitionally Housed Adults (n=109): Memphis, Tennessee, 2011

	Sex without a condom (n=55)		
	AOR ^a	(95% CI) ^a	p-value
Sex without a condom (n=55)			
Sex while drunk or high on drugs			
Yes	6.97	(2.64-18.41)	<.0001
No (Ref)	1		
Duration of homelessness			
< 12 months	4.7	(1.78-12.41)	0.0018
1+ years (Ref)	1		
History of incarceration			
Yes	4.36	(1.13-16.79)	0.033
No (Ref)	1		
Gender			
Female	7.94	(1.61-39.18)	0.0109
Male (Ref)	1		
Sex with an unknown person (n= 26)			
	AOR	(95% CI)	p-value
Sex while drunk or high on drugs			
Yes	4.88	(1.74-13.76)	0.0026
No (Ref)	1		
Mental Health			
Fair, Poor	2.68	(1.00-7.17)	0.0501
Good, Very Good, Excellent (Ref)	1		

^a AOR= adjusted odds ratio; CI= confidence interval

DISCUSSION

HIV-Risk Behaviors

Among the HIV-risk behaviors evaluated in this study, unprotected sex resulted as the most frequently reported behavior, where over 50% of participants had sex without a condom in the past 12 months. These results are similar to other studies evaluating non-condom usage among homeless populations: a study of 323 sheltered homeless individuals recruited from six New England states found 61% of their participants had engaged in unprotected sex within the past 12 months; results from a study with 970 homeless women in Los Angeles County reported 64% had unprotected intercourse in the past year; a survey conducted in two Southern cities found that 65% of participants recruited from urban shelter clinics did not use a condom with their main sexual partner among those reporting sexual activity within the past two months (Fogg & Mawn, 2010; Herndon et al., 2003; Grimley et al., 2006). While our results are based on a small, convenience-based sample and thus limits generalizability, the similarity with these other study outcomes indicates that sexual risk behaviors are a significant health risk for the homeless and transitionally housed population in the Memphis metropolitan area.

Alcohol Use

Several methodologies may be used to evaluate the relationship between alcohol use and risky sexual behaviors. Global association studies measure the correlation between the

quantity and frequency of alcohol use with the frequency of risky sexual behaviors, while situational association studies more specifically assess whether participants engaged in sexual acts while intoxicated. Results from global association studies indicate that individuals who report heavy alcohol use are more likely to engage in sexual HIV-risk behaviors, and situational study results likewise report that persons who used substances prior to sexual activity also engaged in more risky sexual behaviors (Weinhardt et al., 2000). While 44% of study participants screened positive for alcohol dependence using the AUDIT-C tool, this factor was not significantly associated with having sex without a condom or an anonymous partner in the past 12 months; however, our situational assessment of intoxication and sexual activity (having sex while drunk or high on drugs) was significantly associated with these two HIV-risk outcomes. These results indicate situational assessments could be more effective in accurately identifying individuals engaging in risky sexual behaviors, but the assessment does not indicate whether the sexual risk behavior occurred on the same occasion as alcohol or drug use. Detailed, event-level methods must be used to examine the frequency and timing of behaviors to more effectively determine if people engage in risky sexual acts as a function of intoxication; nonetheless, situational assessments may serve as a more rapid tool for community-based workers to identify individuals at an increased risk for engaging in risky sexual behaviors (Weinhardt et al., 2000).

Mental Health

The homeless suffer from high rates of depressive symptomatology compared to the general population, and depressive symptoms among the homeless have been associated with risky sexual behaviors (Ritchey et al., 1990; Bert et al., 2005). In the current study, those who self-reported poor or fair mental health were more likely to engage in sex with an unknown person during the past 12 months, but self-report of poor or fair physical health and time of last physician visit were not significantly associated with any HIV-risk behavior. Similar to these findings, a study among 479 homeless men found self-reported poor health and infrequent interactions with the medical community were not highly associated with HIV-risk behaviors, but poor housing quality was an independent predictor of greater sexual risk behaviors (Stein et al., 2009). Given the missing link between poor physical health and HIV-risk behaviors, alternative sites for reaching homeless individuals at-risk for HIV should be considered outside of the system of outpatient medical care, including facilities providing treatment for mental illness or substance abuse.

History of Incarceration

Research supports evidence that incarceration history is associated with HIV-risk behaviors; however, most of these studies have been conducted among small convenience samples such as this one (Khan et al., 2007; Manhart et al., 2002; Epperson et al., 2010). While the current study found results similar to other research indicating a significant association between incarceration history and HIV-risk behaviors, the results indicate a higher prevalence of incarceration history among our sample population (83.5%) in comparison to other samples of homeless and transitionally housed adults. In the 1999 National Survey of Homeless Assistance Providers and Clients, 54% of homeless participants reported one or more types of incarceration (U.S. Department of Housing and

Urban Development, 1999). More recent studies have also reported lower estimates of incarceration history among homeless population samples compared to our findings; a study of 377 sheltered first time homeless single adults in New York City found 59% had an arrest history, and an examination of a sheltered single adult population, also in New York City, found approximately 23% experienced at least one incarceration episode in the two-year period prior to the date surveyed (Caton et al., 2005; Metraux & Culhane, 2006). The prevalence of incarceration history among our sample explicates the need to further evaluate the relationship between incarceration, homelessness and health behaviors in a Southern city. Since 1985, the average daily inmate population has increased by approximately 350% in Memphis and Shelby County (Shelby County Government, 2013). Routine, voluntary HIV testing began in Shelby County criminal justice centers during 2006, and during this year, almost 15% of all new infections were diagnosed in the county jail system alone (Shelby County Government, 2012).

Addressing the Need for HIV Prevention

Given our sample was recruited from emergency and transitional housing shelters, these facilities are implicated as optimal locations to support behavioral interventions mitigating HIV-risk behaviors, as well as routine HIV testing services. Previous studies have concluded that community-based rapid HIV testing is feasible, acceptable and effective for homeless populations, and in 2006, the Centers for Disease Control and Prevention revised recommendations to advise that all persons at high-risk for HIV should be screened annually (Bucher, 2007; Anaya, 2010; Branson et al., 2006). Furthermore, the National HIV/AIDS Strategy calls on all public health sectors to work toward 1) reducing the number of new HIV infections, 2) increasing access to care and improving health outcomes, and 3) reducing HIV disparities (White House Office of National AIDS Policy, 2010). In recognition of the identified risky sexual behaviors, HIV testing should be integrated into services offered to both chronic homeless adults and those who are transitionally housed. Expanding HIV testing as a routine part of mental health and substance abuse services for homeless adults in the Mid-Southern region of the U.S. would aid in meeting the National HIV/AIDS Strategy goals by identifying new infections in a typically underserved minority population, and also would allow timely linkage to care to improve health outcomes. In addition, our findings indicate the need to combine evidence-based HIV sexual health prevention programs where homeless adults receive substance use, mental health and psychiatric services.

Strengths and Limitations

This project made several noteworthy contributions to the extant literature. First, the research was conducted in a mid-sized, Mid-Southern city where social and contextual influences have been known to perpetuate HIV-related disparities. In contrast, previous studies primarily focused on homeless adults in larger and more densely populated metropolitan areas of Los Angeles, San Francisco and New York City. Second, we used a community-academic research partnership approach to assess HIV risk behaviors. Working collaboratively with community-based HIV service providers, the local health department, and an academic institution, streamlined current community efforts into an organized research partnership and increased the overall credibility of our team in addressing potential correlates of HIV risk to better understand HIV disparities.

There are several limitations to our study that must be considered when interpreting these results. First, the study's findings are based on a small nonprobability convenience sample of temporarily housed adults. The cross-sectional design and small sample size limits our ability to generalize findings to all homeless adults and particularly those who are unsheltered in the Southern region of the U.S. While the small sample size contributed to wide confidence intervals among some of the predictor variables, the findings were still significant. Second, managers from transitional housing units and emergency shelters self-selected their facilities to participate in the study. Likewise, homeless adults from these facilities self-selected to participate, and thus may view issues related to HIV-risk behaviors differently from non-participants; participants may be more comfortable with the breadth of topics associated with sexual health and substance abuse than those who chose not to participate. Additionally, since we recruited participants from agencies known to house 'non-institutionalized' adults, this recruitment method may have provided a cohort of individuals who were less likely to need mental illness or substance abuse services. Third, this study relied solely on self-reported risk behaviors, which may be privy to socially desirable responses; however, all efforts were made to minimize this bias as interviews were conducted in private rooms and no member of the research team had prior interaction with the study sample. In spite of these limitations, our findings documented HIV-risk behaviors and possible correlates providing useful insight for future HIV-prevention interventions targeting homeless adults.

CONCLUSION

Given the prevalence of HIV-risk behaviors documented in this study, HIV testing should be integrated as a routine part of care for the homeless in the Memphis metropolitan area to meet the National HIV/AIDS Strategy goals. Transitional housing units and emergency shelters are well positioned in many communities to reach newly homeless adult subpopulations as our nation continues to suffer from economic uncertainties. Further investigation is necessary to better understand the social and contextual factors that lead to non-condom usage, and evidence-based, risk-reduction interventions are warranted to prevent transmission of new infections among homeless and transitionally housed adults in Memphis.

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