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Psychiatric risk in unstably housed sexual minority women: Relationship between sexual and racial minority status and HIV and psychiatric diagnoses

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Abstract

Background—Stress associated with minority statuses has been linked to mental health disorders. However, research conducted exclusively among impoverished women, a population known to be at risk for poor health due to overlapping risks, is sparse. We sought to determine if homeless and unstably housed sexual minority (i.e., non-heterosexual) women were at greater psychiatric risk than their heterosexual counterparts. We also sought to determine if racial/ethnic minority and HIV status contributed to psychiatric risks.

Methods—Homeless/unstably housed women living in San Francisco between 2008 and 2010 were followed biannually over 3 years. Generalized estimating equation analysis identified significant correlates of any substance use, mood, or anxiety disorder, as well as the total number of psychiatric disorders.

Results—Among 300 women, 24% reported non-heterosexual identity at the first study visit. Consistent with minority stress theory, lesbian and bisexual identity were significantly associated with higher levels of mental health comorbidity, and bisexual identity was related to greater rates of substance use disorders and mood disorders. Unique to this study, we found that identity assessed 1 or 2 years prior does not predict current substance disorders, but current identity does. In addition, women who were HIV-infected also had greater rates of mental health comorbidity and substance use disorders. Contrary to psychosocial stress theory, racial/ethnic minority status was associated with reduced odds of substance use disorder in this population. Recent homelessness was related to greater risk of anxiety disorder.

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Conclusion—Best research and health care practices should include assessment of sexual orientation and housing status when addressing risks for mental health and substance disorders among low-income women.

Keywords

Homeless; Women; Sexual Minority; Racial Disparity; Comorbidity; Substance Use

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Low-income individuals are at high risk for both mental health and substance use disorders (Sareen, Afifi, McMillan, & Asmundson, 2011), and this effect appears to be particularly true for women who are homeless or unstably housed (Greenberg & Rosenheck, 2010). For instance, an older study found that 80% of homeless women had an Axis I psychiatric disorder (based on DSM-III criteria) and found high rates of comorbidity within the population (Breakey et al., 1989). Similarly, a recent study of homeless and unstably housed women found that 97% of study participants had at least one current psychiatric disorder, with 85% meeting criteria for a substance use disorder, 70% for a mood disorder, and 74% for an anxiety disorder (Riley et al., 2014, based on data also used for the present study). Estimates of mental health disorders in the general United States female population are substantially lower, with only 22% experiencing a current mental health disorder (Substance Abuse and Mental Health Services Administration, 2013).

Epidemiological and meta-analytic studies have indicated that sexual minority (non-heterosexual in identity or behavior) women are at higher risk for mental health and substance use disorders compared to heterosexual women (Cochran, Ackerman, Mays, & Ross 2004; Cochran, Keenan, Schober, & Mays, 2000; Cochran, Mays, & Sullivan, 2003; King et al., 2008). While studies of homeless sexual minority youth have found that homeless sexual minority adolescents are at higher risk than homeless heterosexual adolescents for substance use and poor mental health (Cochran, Stewart, Ginzler, & Cauce, 2002), the influence of sexual minority status on mental health among adult homeless and unstably housed women remains unexplored.

Unstably housed women may also be influenced by the intersection of multiple minority statuses. Minority stress theory posits that sexual minority individuals experience discriminatory events, expectations of discrimination, concealment of sexual orientation, and internalized stigma as a result of heterosexist environments, and that these stressors have deleterious impacts on mental health (Meyer, 2003). Psychosocial stress theory posits that stressors associated with both individual experiences and institutional discrimination based on racial or ethnic minority status are responsible for health disparities in minority groups compared to non-minority groups (Dressler, Oths, & Gravlee, 2005). Two contrasting hypotheses have been suggested and tested within limited populations: 1) the greater risk perspective proposes that LGB status and racial or ethnic minority status both put individuals at greater risk for poor health outcomes, and 2) the resilience perspective which posits that LGB individuals of racial minority status may be more resilient than LGB individuals who are not racial minorities and therefore not at greater risk for poorer health outcomes than LGB non-racial minorities (discussed at length in Moradi et al., 2010). Research examining how racial and sexual minority statuses are related to psychiatric risk is

limited. An existing study found that psychological distress was similar among sexual minority individuals irrespective of racial minority status (Hayes et al., 2011), although the applicability of this study is unknown as it was conducted in a college student population. Discriminatory processes related to HIV status (Wingood et al., 2007) have also been associated with poorer mental health, and thus may confer additional risk.

The purpose of this study is to provide empirical evidence for researchers and health care providers who assess health risks among women. Specifically, we sought to clarify the relationships between sexual minority status, racial minority status, HIV status, recent homelessness, and psychiatric disorders among homeless and unstably housed women. Consistent with minority stress theory (Meyer, 2003), we anticipated that sexual minority women would have more substance use and psychiatric disorders than heterosexual women in a population that is already experiencing significant risk, unstably housed women of extremely low socio-economic status. As few studies have examined the relationship between sexual orientation and psychiatric disorders among adult homeless populations, we first wanted to examine this bivariate relationship. Next, we wanted to examine the contributions of other minority statuses as well as recent homeless status. In accord with psychosocial stress theory and previous research on HIV related discrimination among women, we examined the individual contributions of racial minority status, HIV status, sexual minority status, and recent homelessness on mental health. Consistent with the theory that multiple minority statuses may impact mental health, we explored whether there were interactions between race, HIV, and sexual minority status in predicting mental health outcomes.

Methods

Three-hundred homeless and unstably housed women were recruited by a mobile outreach team between June 2008 and August 2010 in San Francisco (methods are also described in Riley et al., 2014). Recruitment methods were based on work by Burnam and Koegel (1988) and included recruitment from homeless shelters, low-income single room occupancy hotels, free meal programs serving over 100 meals per day, and a random sample of low-income single room occupancy (SRO) hotels selected with probability proportionate to the number of women residing in the hotel. At small venues, all persons present on recruitment days were invited to participate in screening activities; at large venues, a subsample of individuals present (e.g., every third person) was invited to participate. Women were eligible for this study if they were over 18 and reported past housing instability, defined as having slept in a shelter, in public (e.g., on the street, in a park, in a car or in a stairwell), or staying with people because they did not have a place to stay. This study was reviewed and approved by the institutional review board at the University of California, San Francisco. This study oversampled HIV-infected women in order to have a large enough sample to conduct analyses based on HIV status. To be included in the study, women had to be: born female, 18 years of age or older, and have ever been homeless or unstably housed (which could include sleeping on the street, in a homeless shelter, or temporarily staying with a series of other people, also known as "couch-surfing".) Once recruited, women completed biannual regular study visits during which time social determinants of health were assessed (including sexual orientation and also including a range of other variables such as past and present trauma,

income, substance use, social isolation, and resource availability), and separate annual visits to assess psychiatric diagnoses, which were timed just after baseline, 1 year, and 2 year follow-up visits. Study participants completed up to 7 regular study visit interviews and 3 psychiatric interviews over a 3 year study period.

Measures

Psychiatric diagnoses—The outcomes of the current study were 1) any substance use disorder, 2) any mood disorder, 3) any anxiety disorder, and 4) the total number of psychiatric diagnoses, including both mental health and substance disorders (as in Riley et al., 2014). The Diagnostic Interview Schedule (DIS) was administered to assess for the following current psychiatric diagnoses based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (American Psychiatric Association, 2000): substance-related disorders (withdrawal, abuse, and dependence associated with alcohol, amphetamines, cocaine, opiates, and sedatives; abuse and dependence associated with hallucinogens, inhalants, marijuana, phencyclidine, and other drugs); mood disorders (major depressive episode, dysthymia, hypomanic episode, manic episode); and anxiety disorders (panic disorder, specific phobia, social phobia, agoraphobia, generalized anxiety disorder, post-traumatic stress disorder). Schizophrenia, dementia, schizophreniform, somatization, and pain disorder were also assessed for and included in the total number of psychiatric diagnoses out of a total possible of 40 different diagnoses.

Sexual orientation, race, HIV status—Participants were asked at their baseline study visit if they identified as lesbian, bisexual, or heterosexual, thus sexual orientation identity was used as the measure of sexual orientation within this study. Race was assessed via self-report. HIV testing occurred during screening for the study, as oversampling for HIV-infected participants occurred to recruit a sample where half of the participants were HIV-infected in order to ensure adequate statistical power to meet the aims of the parent study.

Analyses

Baseline differences in age and total time spent homeless by sexual orientation were tested using ANOVA analyses. Differences in race and HIV status by sexual orientation, as well as differences in completion/non-completion of DIS measures at 1 and 2 year follow-up by race, HIV status, and whether or not participants had been homeless in the 6 months prior to baseline were tested using chi-square analyses.

Baseline sexual orientation predicting psychiatric diagnoses at baseline, 1, and 2 year follow-ups—The first goal of this study was to determine if the odds of substance use and mental health disorders were higher among sexual minority women compared to heterosexual women. To accomplish these goals we created separate logistic regression models to test substance use, mood, and anxiety disorders, and linear regression models to test the total number of diagnoses using Stata 13 (StataCorp, 2013). All psychiatric diagnoses were established at three time points: just after the first regular (baseline) visit, approximately one year after the baseline visit, and approximately two years after the baseline visit.

Identity categories of sexual orientation were entered into the models (i.e., lesbian and bisexual identity were entered with heterosexual as reference). Separate models were run predicting each mental health outcome at baseline, one, and two year follow-ups. Total variance explained was calculated and reported using R^2 for linear regression and McFadden's R^2 (McFadden, 1974) for logistic regression. Omnibus tests (likelihood ratio chi-square test: LR χ^2 and the F test) were used to assess whether the measure of sexual orientation was related to the outcome.

Baseline sexual orientation, race, and HIV status predicting psychiatric diagnoses at baseline, 1, and two year follow-ups—In order to identify the contribution of race and HIV status to the models testing the relationship between sexual orientation and psychiatric diagnoses, we created logistic and linear models using generalized estimating equations (GEE) to test the presence or absence of a substance use, mood, and anxiety disorder, and the total number of diagnoses, respectively. Within these models, we entered race (non-White versus White as reference) HIV status (HIV-infected with HIV negative as reference), sexual orientation, homelessness within the previous 6 months (yes with no as reference), and time (baseline, 1 year, or 2 year follow-up), with age included as a covariate. Next, we entered the interaction terms into these main effects models. We ran these models both with homelessness within the previous 6 months dichotomized (yes, no) and as a continuous variable representing the amount of time homeless in the previous 6 months, then conducted a sensitivity analysis. When there were differences between these sets of models these are reported within the Results section of the manuscript, though only the results of the model with the dichotomous variable is shown in the Results. As we anticipated that logistic models with dichotomous outcomes would become unstable with multiple interaction terms, we chose to test two-way interactions between race and sexual orientation in predicting the presence or absence of mood, anxiety, and substance use disorders. In analyses with the outcome of the total number of psychiatric diagnoses, we ran both two and three way interactions between sexual orientation, race, and HIV status. *P* values < .10 are reported for interaction models, however results were only interpreted for analyses where *p* <.05.

Results

Participants

Participants included 300 unstably housed women. Specific demographic characteristics and *p* values associated with differences by baseline sexual orientation are reported in Table 1. Demographic and mental health characteristics of the sample have also been reported in Riley et al., 2014 and Tsai, Weiser, Dilworth, Shumway, & Riley (2015). At baseline, 50 women (16.67%) endorsed bisexual identity and 22 women (7.3%) endorsed lesbian identity. Demographic characteristics of participants and results of comparisons on these characteristics by sexual orientation are in Table 1.

Of the 300 participants, 291 (97.0%) completed a baseline mental health assessment, 239 (79.7%) completed a 1 year follow-up mental health assessment, and 166 (55.3%) completed a 2 year follow-up mental health assessment. There were no differences by sexual

orientation, HIV status, or racial/ethnic minority status in proportion of completing the follow-up mental health assessments ($p>.05$ for all χ^2s; results not shown in table). The experience of homelessness within the previous 6 months at baseline was related to lower rates of mental health assessment completion at the 1 year follow-up (74.2% for those who had experienced homelessness within the previous 6 months versus 84.8% for those that had not, $\chi^2=5.16$, $p = .02$; results not shown in table), but not at the 2 year follow-up ($p>.05$).

Psychiatric outcomes at baseline are reported by sexual orientation in Table 2. As can be seen within Table 2, comorbidity was common within the sample, with a median of 8 total diagnoses measured just after baseline. For example, of the 213 women who had a diagnosis of any anxiety disorder at the first time point, 149 (70.0%) met criteria for a diagnosis of Post Traumatic Stress Disorder. Similarly, of the 149 women who had a diagnosis of Post Traumatic Stress Disorder at the first time point, 128 (85.9%) also screened positive for a mood disorder, and 130 (87.2%) also screened positive for a substance use disorder.

Sexual Orientation Predicting Psychiatric Diagnoses at Baseline, 1, and 2 Year Follow-ups

Table 3 shows the results of the models estimating odds of psychiatric diagnoses with sexual orientation. Sexual orientation was significantly related to the presence of a substance use disorder at baseline (LR χ^2 [2]=7.16, $p=.028$), and odds of having a substance use disorder at baseline were almost five times greater for participants reporting bisexual identity compared to heterosexual identity (odds ratio [OR]: 4.95; 95% confidence interval [CI]: 1.15, 21.23). Sexual orientation was significantly related to the total number of diagnoses at baseline (F[2,288] = 5.54, $p=.004$), 1 year (F[2,236] = 5.18, $p=.006$), and 2 year (F[2,163] = 4.12, $p=.018$) follow-ups. Study participants who identified as lesbian ($B=2.05$, $p=.036$) or bisexual ($B= 1.98$, p=.005) had on average 2 more total mental health diagnoses at baseline than heterosexual study participants. At 1 year follow-up, the magnitude of the effect in the relationship between sexual orientation and total number of diagnoses was even greater among persons who reported bisexual identity at baseline ($B=2.53$, $p=.005$), but lesbian identity was no longer was significant ($B=2.29$, $p=.070$). Similarly, at 2 year follow-up baseline bisexual identity continued to predict more mental health diagnoses ($B=2.32$, $p=.020$), and lesbian identity did not ($B=-2.09$, $p=.168$).

Sexual Orientation, Race, and HIV Status Predicting Psychiatric Diagnoses at Baseline, 1 Year, and 2 Year Follow-ups

Mood disorders—The main effects only model including race, HIV status, sexual orientation, age, any homelessness in previous 6 months, and time (representing baseline, 1 year, and 2 year follow-up) was significantly related to the presence of a mood disorder (Wald χ^2 [7]=14.13, $p=.049$). The only individual predictor that was significant within this model was bisexual orientation, such that women reporting bisexual orientation were at greater risk for mood disorders ($_{adj}$OR = 1.93, 95% CI: 1.01, 3.67). Results of main effects models including racial/ethnic minority status, HIV status, sexual orientation, and time, which included age and amount of time homeless in previous 6 months as covariates, as related to all psychiatric outcomes are reported in Table 4. No significant interaction effects were detected at the $p< .05$ or $p <.10$ level between racial/ethnic minority status and sexual orientation. This was the only model in which the sensitivity analysis comparing the use of a

dichotomous or continuous variable documenting homelessness in the previous 6 months showed differences, such that the overall model was predictive with the dichotomized homelessness variable whereas it was not with the continuous variable (p=.058), and the time variable was not predictive within the model using the dichotomized variable, whereas it had been predictive with the continuous variable (p=.038). Only the results using the dichotomized variable documenting homelessness in the previous 6 months are shown here.

Anxiety disorders—Neither main effects only models considering the contribution of race, HIV status, sexual orientation, time (representing baseline, 1 year, and 2 year follow-up), any homelessness in previous 6 months, with age as a covariate nor interaction models considering the interactions of race and sexual orientation were related to the presence of an anxiety disorder (p>.05 for Wald χ^2 for both models). The only predictor that was significant within the main effects model was homelessness within the previous 6 months ($_{adj}$OR = 1.52, 95% CI: 1.01, 2.29). The interactions between race and sexual orientation were not significant at either the p <.10 nor p <.05 level.

Substance use disorders—The main effects model including race, HIV status, sexual orientation, any homelessness in the previous 6 months, and time (representing baseline, 1 year, and 2 year follow-up), covarying age was related to the presence of a substance use disorder (Wald χ^2 [7] =15.23, p=.033). Within this model, racial/ethnic minority status was related to reduced odds of a substance use disorder ($_{adj}$OR: 0.37, 95% CI: 0.18, 0.77), HIV-infected status was related to greater odds of a substance use disorder ($_{adj}$OR: 1.81, 95% CI: 1.02, 3.22), and bisexual identity was related to greater odds of a substance use disorder ($_{adj}$OR: 3.05, 95% CI:1.09, 8.56).

Interaction models were not fully testable with the substance use disorder outcome because White race and lesbian identity predicted the presence of substance use disorder perfectly (i.e., all White lesbian women endorsed symptoms consistent with a substance use disorder). Notably, of the 69 sexual minority women within the sample, only 7.2% (n=5, which included 3 lesbian women and 2 bisexual women) did not meet DIS criteria for a substance use disorder at baseline. Among heterosexual women, 18.0% (n=40) did not meet criteria for a substance use disorder at baseline. The interaction between bisexual identity and racial/ethnic minority status as related to the presence of a substance use disorder was not significant (p>.10).

Total number of diagnoses—The overall model using race, HIV status, sexual orientation, age, any homelessness in the previous 6 months, and time (representing baseline, 1 year, and 2 year follow-up) was related to the total number of diagnoses (Wald χ^2[7] =18.40, p=.01). Within this model, HIV-infected persons had, on average, one additional psychiatric diagnosis (B=1.28, p=.021), while individuals who identified as bisexual (B=2.10, p=.006) had more than two additional diagnoses compared to heterosexual women. When both two and three way interactions between race, HIV status, and sexual orientation were entered into the model predicting the total number of diagnoses at baseline the overall model remained significant (Wald χ^2[14] =29.59, p=.009), but none of the interaction terms were significant at the p<.05 level, and only one interaction was related at the p<.10 level, that of bisexual identity and racial/ethnic minority status, such that women

of racial/ethnic minority and bisexual status had more diagnoses (B=4.32, p=.086), but did not meet the preset criterion of p<.05.

Discussion

This is one of the first longitudinal studies to identify mental health disparities among sexual minority women who have been homeless. We found that 24% of homeless and unstably housed adult women reported a lesbian or bisexual identity at the start of our study, making health risks associated with sexual orientation an important topic in this population. Among study participants, we found that sexual orientation was a strong and consistent correlate of psychiatric comorbidity, with lesbian identity being associated with more comorbidity than heterosexual identity at baseline and bisexual identity predicting more comorbidity at baseline, 1, and 2 year follow-ups. We also found that bisexual identity predicted around 5 times the odds of the presence of a substance use disorder at baseline. These results indicate that researchers and health care providers assessing risk of substance disorders should frequently reassess sexual identity, as identity assessed one or two years prior does not predict current substance disorders, but current identity does.

The disproportionately high prevalence of substance use disorders and psychiatric comorbidities among sexual minority women is consistent with minority stress theory (Meyer, 2003), and suggests sexual minority people are at greater risk for poor psychiatric outcomes, even when study participants are restricted to homeless and unstably housed persons. This is notable because homeless women are already at extremely high risk for poor psychiatric outcomes. Sexual minority women may experience a unique and longstanding path to homelessness beginning in adolescence, as evidenced by research indicating that sexual minority adolescents are between 4 and 13 times more likely to experience homelessness, frequently also being estranged from parents or guardians (Corliss, Goodenow, Nichols, & Austin, 2011). This may indicate a longstanding pattern of housing instability with its accompanying mental health risks. Future analyses that examine factors such as violence, stress, and homelessness as mediators between sexual minority status and psychiatric outcomes will allow a more thorough understanding of these relationships.

In contrast to what we had anticipated in concordance with psychosocial stress theory, minority race, HIV status, and sexual minority status did not all confer greater mental health risk. Instead, racial/ethnic minority status was significantly related to lower odds of a substance use disorder in this population. This is opposite of what would be expected under psychosocial stress theory, but not altogether surprising given previous research which shows lower rates of substance abuse diagnoses among racial minorities (Grant et al., 2004). This association likely indicates that, among women who have experienced homelessness, minority race may be associated with other factors. For instance, minority race is an independent risk factor for homelessness (Early, 2004) and racial minorities experience earlier onset of homelessness (North, Pollio, Smoth, & Spitznagel, 1998). Morse (1992) considered multiple paths to homelessness, including mental illness at the individual level and racial discrimination at a systemic level. Given that women who are not racial minorities have not historically been subject to systemic racial discrimination, their paths to homelessness could be driven not only by poverty but also by greater substance use, leading

to an overrepresentation in our sample of women of White race with substance use disorders. The exact nature of racial differences in paths to homelessness are not known, but previous research has found that African-American women with mental illness have a protective delay in time until homelessness (Wuerker, 1997) suggesting that there are likely underlying socio-protective factors, or existing differences in mental health status.

HIV status was related to psychiatric risk in this population. HIV-infected women had greater odds of a substance use disorder, and greater psychiatric comorbidity within longitudinal models that also included race, sexual orientation, homelessness in the previous 6 months, and age. While this study was longitudinal, participants were already HIV-infected at the start of the study, so it is not possible to determine if factors associated with HIV status led to differences in substance use disorders and comorbidity, or if pre-existing substance use and comorbidity led to higher risk for HIV infection predating our study.

We did not find support for the theory that racial minority status and sexual minority status considered together confer synergistic risk (i.e. syndemic theory) among homeless women. It is important to note, however, that the testing of sexual orientation by race interactions was not possible in models examining substance use outcomes due to perfect prediction of the presence of a substance use disorder for White lesbian identified women. We did find a unique contribution of recent homelessness in predicting an anxiety disorder. This suggests that homelessness itself may confer a risk for amplified anxiety and/or exacerbation of anxiety symptoms. This could occur through multiple pathways including increased hypervigilance required during periods of homelessness, as well as violence or trauma exposure that may be related to homelessness.

It is important to consider the potential sources of these mental health disparities among unstably housed sexual minority women of extremely low socio-economic status. Homeless and unstably housed women are already at significant risk for violence and victimization (Lee & Schreck, 2005), and sexual minority women may also experience additional violence, victimization, and discrimination due to sexual minority status (Herek, 2009). Within our study, women who identified as bisexual were at high risk for psychiatric disorders and comorbidities. Whether women who identified as bisexual were subject to "double discrimination" from both heterosexual and lesbian and gay communities (Weiss, 2004) thereby increasing their experience of stigmatization, is beyond the scope of this study, but is an area for future research among this population.

Implications for Practice and Policy

Our study leads to several recommendations for policy and practice among homeless and economically disadvantaged women. First, sexual minority women comprised a sizeable proportion of homeless women in our study, thus services which are designed specifically for sexual minority homeless women should be provided. In this context, increased risks of psychiatric comorbidity and substance use indicate that comprehensive service delivery, including integrated mental health care, is warranted, particularly in health care settings that serve HIV-infected women. Models of service delivery for integrated HIV primary care have been developed (Zaller, Gillani, & Rich, 2007), yet may need to be implemented on a wider scale. At a minimum, given the large proportion of homeless or unstably housed women

who identified as lesbian or bisexual, service providers for homeless women should consider ways to make their environments welcoming for sexual minority women.

Second, given the overrepresentation of sexual minority women among the homeless, efforts should be made to understand the path to homelessness for this population, so that it can be prevented. If the increased vulnerability to homelessness among sexual minority women during adolescence is related to a longstanding pattern of homelessness among adult sexual minority women, then targeted services for addressing homelessness among sexual minority adolescents, before homelessness becomes a lifelong problem, are warranted. If, instead, there are different vulnerabilities for homelessness among sexual minority adults, these too must be identified so that the increased burden of homelessness among this population may be reduced. One way to identify the paths to homelessness among sexual minority women, as well as other relevant health disparities among sexual minority women, is for policy makers to request the inclusion of sexual orientation as a basic demographic variable in large scale survey efforts. For example, for the past two biennial homeless Point in Time Counts, which are required for all areas receiving Homeless Assistance Grant Funding from the U.S. Department of Housing and Urban Development, the city of San Francisco has included measures of sexual orientation in their follow-up homeless survey. The San Francisco Homeless survey conducted in 2015 confirmed what we report here, that sexual minority women are overrepresented within the San Francisco homeless population (i.e., 38.4% of women were sexual minority within the San Francisco Homeless Survey; Flentje, Leon, Carrico, Zheng, & Dilley, 2016), but this would remain unknown without policy makers who decided to ask about sexual orientation.

Limitations

This study included a count of the total number of psychiatric diagnoses, which included substance use diagnoses. This approach was taken due to the very high rates of both mental health and substance disorders in this population. It is important to note that multiple mental illnesses are not independent of one another, nor is mental illness independent of substance use, rather they interact and influence one another over time (Riley et al., 2011). Enumerating conditions is not an ideal analytic approach, primarily because it does not recognize interaction and does not recognize differing weights of influence from each condition; however evidence of exactly how weighting and multiple interactions should be accomplished does not currently exist. Here we used this approach and also investigated its parts. Diagnostic information was also gathered via self-report, however the Diagnostic Interview Schedule represents a rigorous methodology for estimating psychiatric diagnoses and 84% of study participants had a positive diagnosis for a substance use disorder thus there is no evidence of under-reporting of potentially stigmatizing behaviors. The extent to which the study design of oversampling for HIV-infected women may have implications for the observed rates of mental health disorders among the population through indirect effects is unknown. This study was also limited in its ability to test interactions between race and sexual orientation in predicting substance use disorder due to both the high rates of endorsement of substance use disorder among unstably housed women as well as attrition seen in 1 and 2 year follow-ups. Similarly, this study enrolled a small sample of lesbian

women, thus results regarding lesbian women should be interpreted with caution, as some analyses may have been underpowered.

Conclusion

This study found that sexual orientation was related to psychiatric outcomes among homeless and unstably housed women. Bisexually identified homeless and unstably housed women evidence greater risk for substance use disorders and mood disorders, and both lesbian and bisexual women are at greater risk for more extensive psychiatric comorbidity. HIV-infected women were also at greater risk for substance use disorders and psychiatric comorbidity. Women who had experienced recent homelessness were also at greater risk for anxiety disorders. Best practices for research and health care services for low-income women should include ongoing assessment of sexual orientation and housing status and integrated services should be considered for homeless women.

Acknowledgments

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Table 1

Baseline demographic characteristics of homeless and unstably housed adult women living in San Francisco, CA (*N*=300) by sexual orientation and differences in demographic characteristics by sexual orientation

	Total (*N*=300)	Heterosexual (*n*=228)	Lesbian (*n*=22)	Bisexual (*n*=50)	*p*
			Sexual Orientation		
Age *M*(*SD*)	47.05 (8.68)	47.49 (8.65)	45.77 (8.16)	45.59 (9.01)	.290
Race *n* (%)					.746
Black/African American	130 (43.33%)	101 (44.30%)	8 (36.36%)	21 (42.00%)	
Asian/Pacific Islander	10 (3.33%)	8 (3.51%)	0 (0.0%)	2 (4.00%)	
Hispanic/Latina	15 (5.00%)	11 (4.82%)	1 (4.55%)	3 (6.00%)	
Multiracial/Other	55 (18.33%)	37 (16.23%)	5 (22.73%)	13 (26.00%)	
White	90 (30.00%)	71 (31.14%)	8 (36.36%)	11 (22.00%)	
HIV-infected *n* (%)	152 (50.67%)	119 (52.19%)	5 (22.73%)	28 (56.00%)	.022
Total time homeless since 18 (in years)[a]	6.04 (6.39)	5.93 (6.60)	5.30 (5.14)	6.87 (5.91)	.547
Total time homeless in past 6 months (in months)[b]	1.32 (1.97)	1.34 (2.00)	1.16 (1.58)	1.31 (2.00)	.91
Total income in last 6 months	1185 (1421)	1140 (1218)	1044 (653)	1450 (2268)	.33

Note: *p* values are the result of ANOVA analyses for age and total time homeless, and chi-square analyses for race and HIV status

[a] Homeless for the purposes of this measure is defined as nights spent in a shelter, on the street, in an abandoned building, camping, in cars, or staying with someone you could only stay with for 1–2 nights

[b] Homeless for the purposes of this measure is defined as nights spent in a shelter, on the street, in an abandoned building, or in a car

Table 2

Psychiatric diagnoses measured just after baseline, one year, and two year follow-ups of homeless and unstably housed adult women living in San Francisco, CA (*N*=291) by sexual orientation

	Total	Sexual Orientation		
		Heterosexual	Lesbian	Bisexual
Baseline				
Any Substance Use Disorder *n* (%)	246 (84.54%)	182 (81.98%)	19 (86.36%)	45 (95.74%)
Any Mood Disorder *n* (%)	204 (70.10%)	152 (68.47%)	16 (72.73%)	36 (76.60%)
Any Anxiety Disorder *n* (%)	216 (74.23%)	167 (75.23%)	18 (81.82%)	31 (65.96%)
Sum of Major Diagnoses (M, Mdn, SD)	7.88, 8.00, 4.44	7.40, 7.00, 4.41	9.45, 8.00, 5.01	9.38, 10.00, 3.85
One year follow-up				
Any Substance Use Disorder *n* (%)	200 (83.68%)	149 (80.98%)	15 (88.24%)	36 (94.74%)
Any Mood Disorder *n* (%)	144 (60.25%)	105 (57.07%)	13 (76.47)	26 (68.42%)
Any Anxiety Disorder *n* (%)	160 (66.95%)	122 (66.30%)	13 (76.47%)	25 (65.79%)
Sum of Major Diagnoses (M, Mdn, SD)	7.51, 7.00, 5.06	6.95, 6.00, 4.93	9.24, 9.00, 4.48	9.47, 8.50, 5.34
Two year follow-up				
Any Substance Use Disorder *n* (%)	141 (84.94%)	109 (83.85%)	8 (80.00%)	24 (92.31%)
Any Mood Disorder *n* (%)	99 (59.64%)	77 (59.23%)	4 (40.00%)	18 (69.23%)
Any Anxiety Disorder *n* (%)	116 (69.88%)	90 (69.23%)	7 (70.0%)	19 (73.08%)
Sum of Major Diagnoses (M, Mdn, SD)	7.53, 7.00, 4.69	7.29, 7.00, 4.58	5.2, 4.00, 4.52	9.62, 11.00, 4.76

Table 3

Main effects of unadjusted models of sexual orientation predicting psychiatric diagnoses just after baseline, 1, and 2 year follow-up for homeless and unstably housed adult women living in San Francisco, CA, with heterosexual as reference. (N=291 at baseline mental health measure)[a]

	Mood Disorder			Anxiety Disorder			Substance Use Disorder			Total number of diagnoses		
	Logistic models: $_{adj}$OR (95% CI)									Linear models: B, p		
	Baseline	1 yr	2 yr	Baseline	1 yr	2 yr	Baseline	1 yr	2 yr	Baseline	1 yr	2 yr
Lesbian	1.23 (0.46, 3.27)	2.45 (0.77, 7.78)	0.46 (0.12, 1.71)	1.48 (0.48, 4.57)	1.65 (0.52, 5.28)	1.04 (0.26, 4.22)	1.39 (0.39, 4.93)	1.76 (0.39, 8.06)	0.77 (0.15, 3.89)	2.05, p=.036[*]	2.29, p=.070	−2.09, p=.168
Bisexual	1.51 (0.72, 3.13)	1.63 (0.77, 3.43)	1.55 (0.63, 3.82)	0.64 (0.32, 1.25)	0.98 (0.47, 2.04)	1.21 (0.47, 3.10)	4.95 (1.15, 21.23)[*]	4.23 (0.97, 18.40)	2.31 (0.51, 10.53)	1.98, p=.005[*]	2.53, p=.005[*]	2.32, p=.020[*]

[*]
p<.05

Table 4

Main effects of sexual orientation, race, HIV status, any homelessness within previous 6 months, and time (representing baseline, 1 year, and 2 year follow-up) with age as a covariate, predicting psychiatric diagnoses at baseline, 1, and 2 year follow-up from Generalized Estimating Equations for homeless and unstably housed adult women living in San Francisco, CA, with White race, HIV- status, heterosexual orientation, and no time homeless in previous 6 months as reference, covarying age.

	Mood $_{adj}$OR (95%CI)^a	Anxiety $_{adj}$OR (95%CI)^a	Substance $_{adj}$OR (95%CI)^a	Total sum of Diagnoses B (95% CI) ^{b}
Non-White race	.70 (.43, 1.12)	0.98 (0.60, 1.59)	0.37 (0.18, 0.77)**	−0.69 (−1.86, 0.47)
HIV-infected	1.06 (0.69, 1.63)	1.21 (0.77, 1.90)	1.81 (1.02, 3.22)*	1.28 (0.19, 2.36)*
Lesbian	1.39 (0.59, 3.24)	1.81 (0.68, 4.80)	1.75 (0.56, 5.53)	1.92 (−0.16, 3.99)
Bisexual	1.93 (1.01, 3.67)*	0.73 (0.40, 1.31)	3.05 (1.09, 8.56)*	2.10 (0.61, 3.60)**
Homeless in previous 6 months	1.33 (.90, 1.97)	1.52 (1.00, 2.29)*	1.09 (0.65, 1.83)	0.47 (−0.18, 1.12)
Time	0.90 (0.81, 1.00)	0.99 (0.89, 1.10)	0.97 (0.84, 1.11)	−0.09 (−0.26, 0.08)

^{a}These models had binary outcome variables, thus confidence intervals that do not cover 1 reflect p values less that .05

^{b}These models had continuous outcome variables thus confidence intervals that do not cover 0 reflect p values less that .05

*
p<.05,

**
p<01