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Title

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Permalink

<https://escholarship.org/uc/item/3c8704bg>

Journal

Drug and Alcohol Dependence, 153

ISSN

0376-8716

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Publication Date

2015-08-01

DOI

10.1016/j.drugalcdep.2015.05.023

Peer reviewed



Published in final edited form as:

Drug Alcohol Depend. 2015 August 1; 153: 173–179. doi:10.1016/j.drugalcdep.2015.05.023.

Risk factors for stimulant use among homeless and unstably housed adult women

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Abstract

Background—One of the most common causes of death among homeless and unstably housed women is acute intoxication where cocaine is present. While correlates of stimulant use have been determined in prior research, few studies have assessed risk factors of use specifically in this high-risk population.

Methods—We sampled biological women with a history of housing instability from community-based venues to participate in a cohort study. Baseline and 6-month follow-up data were used to determine the relative risk of stimulant use (crack cocaine, powder cocaine or methamphetamine) among individuals who did not use at baseline.

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Contributors

E.D. Riley contributed to research conception, study design, study supervision, data analysis and manuscript preparation. M. Shumway contributed to research conception, study design, data analysis and manuscript preparation. K.R. Knight contributed to research conception, study design, data analysis and manuscript preparation. D. Guzman contributed to data analysis. J. Cohen contributed to research conception, study design, study supervision, data collection and manuscript preparation. S.D. Weiser contributed to data analysis and manuscript preparation. All authors have read and approved this version of the manuscript.

Study concept and design: EDR, MS, KRK, JC.

Analysis and interpretation of data: EDR, MS, KRK, DG, JC and SDW.

Drafting of the manuscript: EDR, MS, KRK, DG, JC and SDW.

Statistical analysis: DG.

Obtained funding: EDR.

Administrative, technical or material support: EDR, SDW.

Study supervision: EDR, JC.

All authors have read and approved the submitted version of the manuscript.

Conflict of interest

No conflict declared.

Results—Among 260 study participants, the median age was 47 years, 70% were women of color; 47% reported having unmet subsistence needs and 53% reported abstinence from stimulants at baseline. In analyses adjusting for baseline sociodemographics and drug treatment, the risk of using stimulants within 6 months was significantly higher among women who reported recent sexual violence (Adjusted Relative Risk [ARR] = 4.31; 95% CI:1.97–9.45), sleeping in a shelter or public place (ARR = 2.75; 95% CI:1.15–6.57), and using unprescribed opioid analgesics (ARR = 2.54; 95% CI:1.01–6.38).

Conclusion—We found that almost half of homeless and unstably housed women used stimulants at baseline and 14% of those who did not use began within 6 months. Addressing homelessness and sexual violence is critical to reduce stimulant use among impoverished women.

Keywords

Women; Homeless; Cocaine; Stimulant

1. Introduction

While stimulant use has declined in the general population, it remains a major problem in impoverished North American urban areas (Fischer et al., 2006, 2012). Women are especially affected, with higher rates of dependence than men (Lejuez et al., 2007; Sterk et al., 2002), more severe forms of addiction (Fernandez-Montalvo et al., 2014b) and lower rates of treatment (Haller et al., 2003). Research conducted with homeless women living in San Francisco and across British Columbia, Canada (Vancouver, Victoria and Prince George), suggest nearly half of homeless and unstably housed women in these areas use crack cocaine, often with concomitant use of other substances (Riley et al., 2014; Torchalla et al., 2011).

Stimulant use among women has been linked to younger age, Caucasian race, extreme poverty (Stahlman et al., 2013; Torchalla et al., 2011), risky sexual practices (Neblett et al., 2011; Torchalla et al., 2011) and violence (Falck et al., 2001; Riley et al., 2014). It is also associated with psychiatric co-morbidity, such as bi-polar disorder, anxiety and psychiatric distress (Kolodziej et al., 2005; Velasquez et al., 2007). Methamphetamine dependent women entering drug treatment report more psychiatric symptoms than men and non-methamphetamine dependent women (Polcin et al., 2012).

Availability of pharmacotherapies for stimulant use is more limited than agonist maintenance for opiate addiction (Ersche et al., 2010; Mariani and Levin, 2012; Stoops and Rush, 2013); however, therapeutic approaches, including cognitive behavioral therapy (Penberthy et al., 2010), community reinforcement approaches (Higgins et al., 2003), contingency management (Farronato et al., 2013; Lussier et al., 2006; Petitjean et al., 2014; Prendergast et al., 2006), pharmacotherapy (Karila et al., 2011), vaccines (Kosten et al., 2014) and gene therapy (Brimijoin and Gao, 2012), show potential for reducing or discontinuing use (Penberthy et al., 2010). Treatment programs that target other drug types (e.g., methadone and buprenorphine for opioid dependence) have been shown to also reduce stimulant use (Curcio et al., 2011; Fareed et al., 2009, 2010). Despite these treatment options, drop out and relapse serve as central barriers to drug cessation. Treatment dropout

rates among cocaine users are estimated to be 42% in meta analyses of controlled clinical trials (Dutra et al., 2008). In parallel, the Substance Abuse and Mental Health Services Administration's (SAMHSA) Treatment Episode Data Set (TEDS) indicates that 44% of all persons being discharged from drug treatment in 2011 had successfully completed treatment (Substance Abuse and Mental Health Services Administration (SAMHSA), 2014b). Only one-third of cocaine users maintain abstinence during treatment observation (Dutra et al., 2008), which makes the influence of treatment on future use important but uncertain.

In addition to issues related to mental health and drug treatment, stimulant use has been consistently linked with a variety of serious physical health consequences, including HIV and hepatitis C infections (Fischer et al., 2008; Ivy et al., 2013; Novak et al., 2013; Nyamathi et al., 2002), poor clinical outcomes among HIV and HCV-infected women (Carrico et al., 2011; Operskalski et al., 2008; Riley et al., 2011), arrhythmias and sudden death caused by stimulant-induced arrhythmia occurring in the absence of traditional risk factors like infarction (Hsue et al., 2007; Lange and Hillis, 2001). We recently reported a 3% annual mortality rate among 300 homeless women living in San Francisco over a four-year observation period (Riley et al., 2013). The most common cause of death was acute intoxication where cocaine was present, which emphasizes the continued need to better understand stimulant use in this population.

Here we sought to extend prior research, first by recruiting a community-based sample of homeless and unstably housed women, which restricts the population by gender and socioeconomic status to allow more focus on stimulant use in a population known to be at especially high risk. We considered several factors known to be disproportionately common in impoverished populations that have been linked with negative health outcomes among unstably housed women, including unmet subsistence needs and mental health comorbidity (Riley et al., 2014). In addition, while studies in the general population indicate that social isolation predicts intimate partner violence (Goodman et al., 2009; Hankin et al., 2010), our recent work with unstably housed women conversely shows that the odds of violence increase as social isolation decreases and drug use increases (Riley et al., 2014). Our qualitative research in the same sample confirms that this finding reflects socio-structural situations in which impoverished women use social isolation to extricate themselves from dangerous or drug-using environments (Knight et al., 2014).

Understanding that more than 85% of unstably housed women from this population have a history of substance-related disorders (Riley et al., 2014) and that the social context of poverty makes consistent care and treatment challenging (Riley et al., 2007), we sought a "real world" understanding of stimulant use that included various types of use (e.g., first use, continued casual use, use after multiple years of abstinence, and relapse after recent use or dependence). This broad approach offers the providers most likely to interface with homeless women, such as emergency department physicians and social service providers, population-level information to inform services. Based on our prior work, we hypothesized that unmet subsistence needs and multiple mental health conditions would increase the risk of stimulant use, and that social isolation would decrease the risk of stimulant use. We also hypothesized that drug treatment would confound associations between stimulant use and poverty-related factors.

2. Methods

2.1. Study population

The goal of this study was to determine risk factors for stimulant use in the very near future, thus the first 6-month follow up visit was chosen as the time point to assess the outcome. Base line data were collected between June, 2008 and August, 2010 for “Shelter, Health and Drug Outcomes among Women” (SHADOW), a community-based cohort study examining violence and health risks among HIV-infected and uninfected homeless and unstably housed women living in San Francisco, CA. As previously described (Riley et al., 2014), recruitment was accomplished by a mobile outreach team that systematically screened women for study participation at free meal programs, homeless shelters, and a probability sample of low-cost single room occupancy (SRO) hotels. This recruitment methodology recognizes the realities of frequent transitions between literal homelessness and unstable housing (Riley et al., 2005; Surratt and Inciardi, 2004). Potential study participants were tested for HIV antibody during screening procedures. HIV-infected women were oversampled on additional recruitment days to accomplish HIV-specific aims of the cohort study regarding violence and risk behaviors. Inclusion criteria included female sex (biological), age ≥ 18 years and a history of housing instability (slept in public or a homeless shelter, or stayed with a series of acquaintances because there was no other place to sleep [“couch-surfed”]). Reimbursement of \$15 was given for each study interview. Study procedures were approved by the Institutional Review Board at the University of California, San Francisco.

2.2. Instrument

All questionnaires and study procedures were pilot tested to ensure appropriateness for the target population. Answers to sensitive questions about drug use were obtained via Audio Computer-Assisted Self-Interviews (ACASI) during which participants listened to questions through headphones and entered responses into a computer.

Demographic, social, structural and behavioral topics were addressed. Regarding socioeconomic status, we included employment status, unmet subsistence needs (insufficient access to food, clothing, a restroom, a place to wash or a place to sleep; Gelberg et al., 1997) and homelessness (sleeping in a shelter or public place). Regarding social connections and support, we measured marital status and extreme social isolation (i.e., “very socially isolated,” defined by the Hawthorne Friendship Scale; a 6-item multidimensional scale designed to measure a quantitative spectrum between social isolation and social connection; Hawthorne, 2006). Considering substance use in the prior 6 months, we included at-risk alcohol use (>1 drink/day for women (NIAAA, 1995), use of stimulants (crack cocaine, powdered cocaine and methamphetamine), use of heroin and unprescribed opioid analgesics (Oxycontin, Vicodin, morphine or other opioid painkillers). Physical and sexual violence in the past 6 months were assessed by questions based on the Severity of Violence Against Women Scales (Marshall, 1992), which were tested previously in this population (Riley et al., 2014). Violence variables indicated whether the individual was hit, slapped, kicked, bitten, choked, shot, stabbed or struck with an object (physical violence), or forced to have sex of any kind (sexual violence).

Covariates assessed prior experience in residential, inpatient or outpatient drug treatment, and self-help abstinence groups (e.g., Alcoholics Anonymous and Narcotics Anonymous). Prior studies indicate that different types of drug treatment, as well as treatment frequency, total duration and quality influence future drug use (Phillips et al., 2014). However, only 20% of study participants were in any type of inpatient or outpatient substance use treatment and half of those in treatment were in methadone maintenance. While the proportion of individuals in treatment was higher than the national average of 11% (Substance Abuse and Mental Health Services Administration (SAMHSA), 2014a), we did not have sufficient power to address specific treatment types or duration in this small sample. Limited statistical power necessitated the collapse of all formal drug treatment into a single variable and all self-help abstinence group participation into another variable. A history of stimulant use was not included in adjusted analysis due to its correlation with drug treatment. The decision to include drug treatment instead of a stimulant use history focused the analysis on individuals who recently sought help for addiction rather than including infrequent, recreational or past use.

In order to reduce interview-fatigue, assessments of current mental health (depression, manic episodes and schizophrenia) and current pain were conducted separately using the diagnostic interview Schedule (DIS)-IV within one month of the main study interview. The DIS is a reliable tool (Cottler et al., 1998; Ross et al., 1995; Zimmerman and Coryell, 1988) which uses DSM-IV criteria (Zimmerman and Coryell, 1988).

2.3. Data analysis

McNemar's test was used to compare baseline frequencies of study factors by stimulant use. Longitudinal logistic models fit by Generalized Estimating Equations (GEE) were used to estimate the population-level risk of stimulant use reported at follow-up among individuals who reported no stimulant use at baseline. Independent variables were deleted from the regression model if they did not contribute to its overall fit. Goodness of fit was determined by log likelihood ratios. Multicollinearity among variables and potential effect modification were examined.

3. Results

3.1. Participant characteristics

Over 90% of eligible persons agreed to participate in the original study (Riley et al., 2014) and 93% of enrolled persons, who were alive and had opportunity to participate (e.g., not incarcerated and still living in the area), were retained after one year of follow-up. By design, HIV-infected persons represented half of the original cohort in order to ensure statistical power for HIV-related analyses. Study participants included in the current analysis were those who (1) completed both baseline and 6-month follow-up interviews (up to month 10, at which time the interview was considered for the following 12-month interval), and (2) completed the mental health assessment within 6 months of baseline. Compared to the entire cohort ($N = 300$), a lower proportion of study participants included in the current analysis ($n = 260$) were homeless at baseline (43% vs. 66%, $p < 0.01$); no statistical differences existed

between excluded and included participants according to drug use or mental health variables.

Most of the 260 study participants included in the current analysis were women of color (70% non-Caucasian), the median age was 47 years, almost half of study participants reported having unmet subsistence needs, 46% had slept in a shelter or public place during the prior 6 months and almost 90% were socially isolated (Table 1). Experiencing more than moderate levels of pain was reported by 40% of the sample, 66% had major depression, 23% experienced recent manic episodes and 18% had schizophrenia. Physical and sexual violence during the prior 6 months were reported by 27% and 10% of participants respectively (Table 1).

3.2. Characteristics of baseline stimulant users

Lifetime use of stimulants (crack cocaine, powder cocaine or methamphetamine) was reported by 89% of respondents, while use in the prior 6 months was reported by 47% of the sample population at baseline. Compared to individuals who did not report stimulant use at baseline, a higher proportion of baseline stimulant users were homeless (56% stimulant users vs. 34% non-stimulant users, $p < 0.01$), had major depression (73% vs. 57%, $p = 0.01$), experienced manic episodes (29% vs. 16%, $p < 0.02$), experienced physical violence (36% vs. 17%, $p < 0.01$), experienced sexual violence (14% vs. 4%, $p = 0.01$), used heroin (25% vs. 3%, $p < 0.01$), used unprescribed opioid analgesics (36% vs. 14%, $p < 0.01$) and engaged in at-risk drinking (56% vs. 31%, $p < 0.01$) (Table 1). In addition, a higher proportion of baseline stimulant users participated in drug treatment (32% vs. 7%, $p < 0.01$) and self-help abstinence groups (39% vs. 10%, $p < 0.01$) in the 6 months prior to baseline.

3.3. Predictors of stimulant use among participants who did not use at baseline

Restricting to those who did not use stimulants at baseline ($n = 118$), 17 individuals (14%) reported stimulant use at follow-up (12 reported crack cocaine use, 6 reported powdered cocaine or methamphetamine use). The majority of persons who began use after baseline (53%) reported a frequency of less than one time per month. Baseline factors that significantly increased the risk of stimulant use during the follow-up period included recent sexual violence (ARR = 4.31; 95% CI: 1.97–9.45), homelessness (Adjusted Relative Risk [ARR] = 2.75; 95% CI: 1.15–6.57) and use of unprescribed opioid analgesics (ARR = 2.54; 95% CI: 1.01–6.38) (Table 2). Contrary to our hypotheses, mental health, social isolation and unmet subsistence needs did not significantly influence the risk of stimulant use during follow-up.

4. Discussion

Almost half of community-recruited homeless and unstably housed women participating in this study reported stimulant use at baseline and 14% of those who did not use at baseline began using within a very short time period (6 months). This high rate of use is surprising because prior research suggests that the frequency of illicit substance use decreases substantially after age 29 (Raveis and Kandel, 1987) and the median age of the present cohort was 47. Increasing participant age did not decrease the risk of stimulant use in this

cohort. We reviewed the possibility that the population age distribution was too old to see an age effect; however, the age range was 20–69 and the median was 47, thus the age distribution was not severely skewed and there was heterogeneity in this range. Thus, in this sample of community-recruited homeless and unstably housed women, stimulant use was relatively common, and rather than age or race, future use was predicted by sexual violence, homelessness and taking unprescribed opioid analgesics. In addition, while drug use is a well-established risk factor for HIV, HIV serostatus was not a strong predictor of stimulant use, suggesting the possibility of a unidirectional relationship when study participants are restricted to impoverished women.

We previously reported high levels of primary partner violence and non-primary partner violence against homeless and unstably housed women (Riley et al., 2014), as well as an increased risk of violence in marginal housing situations (Knight et al., 2014). The current analysis highlights sexual violence as a relatively common phenomenon contributing to stimulant use among homeless and unstably housed women. Compared to 0.3% of American women from the general population who have been sexually assaulted in the prior 12 months (Tjaden et al., 2000), sexual assault was 33 times higher in half the time period among homeless and unstably housed women participating in the current study. This remarkably high level of violence against impoverished women is consistent with studies in multiple geographic areas (Bonugli et al., 2013; Bourgois et al., 2004; Galano et al., 2013; Riley et al., 2014; Tutty et al., 2013; Wenzel et al., 2006), suggesting the ongoing recognition of this public health problem and the lack of an effectual response. Results presented here and elsewhere suggest that continued violence against impoverished women not only compromises health and increases emergency department use (Doran et al., 2014), it also increases the risk of subsequent drug use (ARR = 4.56; 95% CI: 1.93–10.76; Table 2) and increases the severity of addiction (Fernandez-Montalvo et al., 2014a).

Few prior studies have estimated the risk of stimulant use among impoverished women over time, although our results are consistent with those that have shown various types of associations between violence/trauma and substance use among women (Coffey et al., 2002; Falck et al., 2001; Hedtke et al., 2008; Ullman et al., 2006; Wechsberg et al., 2003). Ethnographic research indicates that crack cocaine is often used to manage physical and emotional pain and escape from sensations of depression and grief in relation to violence (Bungay et al., 2010). The current study supports these findings by the increased risk of stimulant use among participants who reported sexual violence and those who used unprescribed opioid analgesics (Table 2). Likewise, our findings are consistent with reports indicating that living environments in which impoverished women experience violence or feel unsafe, anxious, and maintain hyper-vigilance also contribute to on-going drug use (Shannon et al., 2009; Substance Abuse and Mental Health Services Administration (SAMHSA), 2009). In addition, several prospective studies have been conducted in combined groups of men and women indicating that violence experienced post-substance use treatment is related to relapse (Walton et al., 2002; Yang et al., 2011). Results presented here extend prior research by showing that, in a population where mental illness, housing instability and multiple types of violence are common, homelessness and sexual violence both independently and simultaneously predict the use of stimulants.

The lack of event-level data precludes our ability to assess the use of appropriate care following sexual assault, thus the degree to which it may have protected against subsequent stimulant use is indeterminable. However, prior research shows that appropriate trauma care following sexual assault is rare. Less than one-fifth of U.S. hospitals provide comprehensive services to sexual assault patients (Patel et al., 2013), and follow-up care is less common among individuals who are homeless (OR = 0.30) and use cocaine (OR = 0.29) (Ackerman et al., 2006), which are the same characteristics of individuals found to be at highest risk for stimulant use in the current study. Results presented here highlight the importance of post-sexual assault follow-up care for homeless women as critically important, not only for mental and physical health, but as a possible safeguard against future stimulant use.

Consistent with prior research reporting associations between mental illness and substance use (Stewart et al., 1998; Waldrop et al., 2007), we found that depression and manic episodes were more common among stimulant users at baseline (Table 1); however these mental health conditions did not increase the risk of stimulant use among individuals who did not use at baseline (Table 2). These results may suggest that cross-sectional associations between mental illness and substance use in prior studies reflected estimates of substance use on mental health, not mental health on substance use. Alternatively, results may suggest that individuals experiencing the most severe symptoms of mental illness do not stop using stimulants and thus would not have been included in this sample of women who did not use at baseline. Another possibility is that effects are different in populations with a high prevalence of mental illness.

Less than 10% of all baseline stimulant non-users were in drug treatment, and the limited number of persons in treatment precluded further stratification by treatment type, duration or quality. Women who reported some type of treatment were almost three times more likely to start using stimulants than individuals who were not in treatment. The magnitude of association was maintained in adjusted analysis, but the adjusted estimate did not reach a level of statistical significance. This positive association is similar to prior findings that show difficulties in achieving and maintaining abstinence among stimulant users (Dutra et al., 2008; Substance Abuse and Mental Health Services Administration (SAMHSA), 2014b), which can be particularly problematic for homeless persons returning to a challenging pretreatment social environment (Stahler et al., 2005). The inclusion of drug treatment in the current study shows that, on average, the treatment that only a few unstably housed women are able to access does not diminish the population-level influence of homelessness and sexual violence on stimulant use.

4.1. Limitations

Results presented here should be considered in the context of several limitations. First, compared to the entire cohort, a lower proportion of participants included in the current analysis were homeless at baseline (Table 1), which may have biased the sample toward individuals with more resources and/or less life chaos. Considering results from this and prior analyses, which indicate homelessness as a risk factor for using stimulants, this would have likely biased study results toward the null. Thus, effects are at least as strong as those reported here. Second, study participants may have underreported behaviors such as drug

use, due to recall bias or social desirability; however, this would also have biased results toward the null, again indicating that risks are at least as extreme as those reported. Third, the sample was relatively small and, due to limitations in statistical power, drug treatment was not broken down by type of treatment, time in treatment, quality of treatment or intensity/frequency of current treatment. It is possible that more refined variables would indicate significant differences in risk by specific treatment types. Fourth, data were obtained from a single geographical location and may not be representative of homeless women in other areas. However, prior research regarding impoverished adults from different geographic areas have been similar on a variety of social, behavioral, health and health services-related observations (Kidder et al., 2007; Kim et al., 2006; Leaver et al., 2007; Lewis et al., 2003; Riley et al., 2007; Sterk et al., 2007; Wenzel et al., 2007), increasing the likelihood that results reported here may be generalizable to impoverished women in other areas. A fifth limitation is that results presented here assessed the use of stimulants after a period of no use, a decision that did not distinguish between first use and relapse. This decision emphasizes a population-level approach and precludes our ability to estimate risk for each type of use. Study strengths include the use of prospective data from a community-recruited sample of homeless and unstably housed women, which allowed us to estimate risk, the inclusion of variables that are unique to very low-income individuals, and a direct assessment of multiple mental health conditions using the DIS-IV.

5. Conclusion

In an environment where almost half of homeless and unstably house women use stimulants at baseline, those who do not use are at high risk to start using in a short (6-month) time period. Results presented here suggest that factors contributing to drug use risk in the general population, such as age and race, are not strong predictors of stimulant use among extremely impoverished women. While the use of stimulants is multifactorial and likely includes additional factors that are outside the scope of the current study, results presented here indicate that violence and homelessness have strong population-level influences on the use of stimulants. Increasing access to safe and permanent housing, and decreasing sexual violence is critical to reducing stimulant use among impoverished women.

Acknowledgments

The authors would like to thank the SHADOW study team for their dedication, our community partners for their ongoing support of our work, and the SHADOW study participants for trusting us with their personal information.

Role of funding source

This study was funded by the National Institutes of Health (DA15605, R01 DA036301 and UL1 RR024131). The National Institutes of Health and the National Institute on Drug Abuse had no role in the design or conduct of the study; the collection, management, analysis or interpretation of the data; or the preparation, review or approval of the manuscript.

References

Ackerman DR, Sugar NF, Fine DN, Eckert LO. Sexual assault victims: factors associated with follow-up care. *Am J Obstet Gynecol.* 2006; 194:1653–1659. [PubMed: 16635464]

- Bonugli R, Lesser J, Escandon S. The second thing to hell is living under that bridge: narratives of women living with victimization, serious mental illness, and in homelessness. *Issues Ment Health Nurs*. 2013; 34:827–835. [PubMed: 24131415]
- Bourgois P, Prince B, Moss A. The everyday violence of hepatitis C among young women who inject drugs in San Francisco. *Hum Organiz*. 2004; 63:253–264.
- Brimijoin S, Gao Y. Cocaine hydrolase gene therapy for cocaine abuse. *Future Med Chem*. 2012; 4:151–162. [PubMed: 22300095]
- Bungay V, Johnson JL, Varcoe C, Boyd S. Women's health and use of crack cocaine in context: structural and 'everyday' violence. *Int J Drug Policy*. 2010; 21:321–329. [PubMed: 20116989]
- Carrico AW, Bangsberg DR, Weiser SD, Chartier M, Dilworth SE, Riley ED. Psychiatric correlates of HAART utilization and viral load among HIV-positive impoverished persons. *AIDS*. 2011; 25:1113–1118. [PubMed: 21399478]
- Coffey SF, Saladin ME, Drobos DJ, Brady KT, Dansky BS, Kilpatrick DG. Trauma and substance cue reactivity in individuals with comorbid posttraumatic stress disorder and cocaine or alcohol dependence. *Drug Alcohol Depend*. 2002; 65:115–127. [PubMed: 11772473]
- Cottler LB, Compton WM, Ridenour TA, Ben Abdallah A, Gallagher T. Reliability of self-reported antisocial personality disorder symptoms among substance abusers. *Drug Alcohol Depend*. 1998; 49:189–199. [PubMed: 9571384]
- Curcio F, Franco T, Topa M, Baldassarre C, Gruppo Responsabili, U.O.S.T. Buprenorphine/naloxone versus methadone in opioid dependence: a longitudinal survey. *Eur Rev Med Pharmacol Sci*. 2011; 15:871–874. [PubMed: 21845796]
- Doran KM, Shumway M, Hoff RA, Blackstock OJ, Dilworth SE, Riley ED. Correlates of hospital use in homeless and unstably housed women: the role of physical health and pain. *Womens Health Issues*. 2014; 24:535–541. [PubMed: 25213745]
- Dutra L, Stathopoulou G, Basden SL, Leyro TM, Powers MB, Otto MW. A meta-analytic review of psychosocial interventions for substance use disorders. *Am J Psychiatry*. 2008; 165:179–187. [PubMed: 18198270]
- Ersche KD, Bullmore ET, Craig KJ, Shabbir SS, Abbott S, Muller U, Ooi C, Suckling J, Barnes A, Sahakian BJ, Merlo-Pich EV, Robbins TW. Influence of compulsivity of drug abuse on dopaminergic modulation of attentional bias in stimulant dependence. *Arch Gen Psychiatry*. 2010; 67:632–644. [PubMed: 20530013]
- Falck RS, Wang J, Carlson RG, Siegal HA. The epidemiology of physical attack and rape among crack-using women. *Violence Vict*. 2001; 16:79–89. [PubMed: 11281226]
- Fareed A, Casarella J, Amar R, Vayalapalli S, Drexler K. Benefits of retention in methadone maintenance and chronic medical conditions as risk factors for premature death among older heroin addicts. *J Psychiatr Pract*. 2009; 15:227–234. [PubMed: 19461397]
- Fareed A, Musselman D, Byrd-Sellers J, Vayalapalli S, Casarella J, Drexler K, Phillips L. On-site basic health screening and brief health counseling of chronic medical conditions for veterans in methadone maintenance treatment. *J Addict Med*. 2010; 4:160–166. [PubMed: 20823944]
- Farronato NS, Dursteler-Macfarland KM, Wiesbeck GA, Petitjean SA. A systematic review comparing cognitive-behavioral therapy and contingency management for cocaine dependence. *J Addict Dis*. 2013; 32:274–287. [PubMed: 24074193]
- Fernandez-Montalvo J, Lopez-Goni JJ, Arteaga A. Psychological, physical, and sexual abuse in addicted patients who undergo treatment. *J Interpers Violence*. 2014a; 30:1279–1298. [PubMed: 24992952]
- Fernandez-Montalvo J, Lopez-Goni JJ, Azanza P, Cacho R. Gender differences in drug-addicted patients in a clinical treatment center of Spain. *Am J Addict*. 2014b; 23:399–406. [PubMed: 24961362]
- Fischer B, Powis J, Firestone Cruz M, Rudzinski K, Rehm J. Hepatitis C virus transmission among oral crack users: viral detection on crack paraphernalia. *Eur J Gastroenterol Hepatol*. 2008; 20:29–32. [PubMed: 18090987]
- Fischer B, Rehm J, Patra J, Kalousek K, Haydon E, Tyndall M, El-Guebaly N. Crack across Canada: comparing crack users and crack non-users in a Canadian multi-city cohort of illicit opioid users. *Addiction*. 2006; 101:1760–1770. [PubMed: 17156175]

- Galano MM, Hunter EC, Howell KH, Miller LE, Graham-Bermann SA. Predicting shelter residence in women experiencing recent intimate partner violence. *Violence Against Women*. 2013; 19:518–535. [PubMed: 23637314]
- Gelberg L, Gallagher T, Andersen R, Koegel P. Competing priorities as a barrier to medical care among homeless adults in Los Angeles. *Am J Public Health*. 1997; 87:217–220. [PubMed: 9103100]
- Goodman LA, Smyth KF, Borges AM, Singer R. When crises collide: how intimate partner violence and poverty intersect to shape women's mental health and coping? *Trauma Violence Abuse*. 2009; 10:306–329. [PubMed: 19776085]
- Haller DL, Miles DR, Dawson KS. Factors influencing treatment enrollment by pregnant substance abusers. *Am J Drug Alcohol Abuse*. 2003; 29:117–131. [PubMed: 12731684]
- Hankin A, Smith LS, Daugherty J, Houry D. Correlation between intimate partner violence victimization and risk of substance abuse and depression among African-American Women in an urban emergency department. *West J Emerg Med*. 2010; 11:252–256. [PubMed: 20882145]
- Hawthorne G. Measuring social isolation in older adults: development and initial validation of the Friendship Scale. *Soc Indic Res*. 2006; 77:521–548.
- Hedtke KA, Ruggiero KJ, Fitzgerald MM, Zinzow HM, Saunders BE, Resnick HS, Kilpatrick DG. A longitudinal investigation of interpersonal violence in relation to mental health and substance use. *J Consult Clin Psychol*. 2008; 76:633–647. [PubMed: 18665691]
- Higgins ST, Sigmon SC, Wong CJ, Heil SH, Badger GJ, Donham R, Dantona RL, Anthony S. Community reinforcement therapy for cocaine-dependent outpatients. *Arch Gen Psychiatry*. 2003; 60:1043–1052. [PubMed: 14557150]
- Hsue PY, McManus D, Selby V, Ren X, Pillutla P, Younes N, Goldschlager N, Waters DD. Cardiac arrest in patients who smoke crack cocaine. *Am J Cardiol*. 2007; 99:822–824. [PubMed: 17350374]
- Ivy, W., 3rd; Miles, I.; Le, B.; Paz-Bailey, G. *AIDS Behav*. 2013. Correlates of HIV infection among African American Women from 20 cities in the United States. epub ahead of print
- Karila L, Reynaud M, Aubin HJ, Rolland B, Guardia D, Cottencin O, Benyamina A. Pharmacological treatments for cocaine dependence: is there something new? *Curr Pharm Des*. 2011; 17:1359–1368. [PubMed: 21524259]
- Kidder DP, Wolitski RJ, Campsmith ML, Nakamura GV. Health status, health care use, medication use, and medication adherence among homeless and housed people living with HIV/AIDS. *Am J Public Health*. 2007; 97:2238–2245. [PubMed: 17971562]
- Kim TW, Kertesz SG, Horton NJ, Tibbetts N, Samet JH. Episodic home-lessness and health care utilization in a prospective cohort of HIV-infected persons with alcohol problems. *BMC Health Serv Res*. 2006; 6:19. [PubMed: 16504167]
- Knight K, Lopez A, Shumway M, Comfort M, Cohen J, Riley ED. Single room occupancy (SRO) hotels as mental health risk environments among impoverished women: the intersection of policy, drug use, trauma, and urban space. *Int J Drug Policy*. 2014; 25:556–561. [PubMed: 24411945]
- Kolodziej ME, Griffin ML, Najavits LM, Otto MW, Greenfield SF, Weiss RD. Anxiety disorders among patients with co-occurring bipolar and substance use disorders. *Drug Alcohol Depend*. 2005; 80:251–257. [PubMed: 15876498]
- Kosten T, Domingo C, Orson F, Kinsey B. Vaccines against stimulants: cocaine and MA. *Br J Clin Pharmacol*. 2014; 77:368–374. [PubMed: 23509915]
- Lange RA, Hillis LD. Cardiovascular complications of cocaine use. *N Engl J Med*. 2001; 345:351–358. [PubMed: 11484693]
- Leaver CA, Bargh G, Dunn JR, Hwang SW. The effects of housing status on health-related outcomes in people living with HIV: a systematic review of the literature. *AIDS Behav*. 2007; 11:85–100. [PubMed: 17682940]
- Lejuez CW, Bornova MA, Reynolds EK, Daughters SB, Curtin JJ. Risk factors in the relationship between gender and crack/cocaine. *Exp Clin Psychopharmacol*. 2007; 15:165–175. [PubMed: 17469940]
- Lewis JH, Andersen RM, Gelberg L. Health care for homeless women. *J Gen Intern Med*. 2003; 18:921–928. [PubMed: 14687278]

- Lussier JP, Heil SH, Mongeon JA, Badger GJ, Higgins ST. A meta-analysis of voucher-based reinforcement therapy for substance use disorders. *Addiction*. 2006; 101:192–203. [PubMed: 16445548]
- Mariani JJ, Levin FR. Psychostimulant treatment of cocaine dependence. *Psychiatr Clin North Am*. 2012; 35:425–439. [PubMed: 22640764]
- Marshall L. Development of the severity of violence against women scales. *J Fam Violence*. 1992; 7:103–121.
- Neblett RC, Davey-Rothwell M, Chander G, Latkin CA. Social network characteristics and HIV sexual risk behavior among urban African American women. *J Urban Health*. 2011; 88:54–65. [PubMed: 21234695]
- NIAAA. National Institute on Alcohol Abuse and Alcoholism. Government Printing Office; Washington, DC: 1995. The Physician's guide to helping patients with alcohol problems.
- Novak RM, Metch B, Buchbinder S, Cabello R, Donastorg Y, Figueroa JP, Abdul-Jauwad H, Joseph P, Koenig E, Metzger D, Sobieszyk M, Tyndall M, Zorilla C. Risk behavior among women enrolled in a randomized controlled efficacy trial of an adenoviral vector vaccine to prevent HIV acquisition. *AIDS*. 2013; 27:1763–1770. [PubMed: 23807272]
- Nyamathi AM, Dixon EL, Robbins W, Smith C, Wiley D, Leake B, Longshore D, Gelberg L. Risk factors for hepatitis C virus infection among homeless adults. *J Gen Intern Med*. 2002; 17:134–143. [PubMed: 11841529]
- Operskalski EA, Mack WJ, Strickler HD, French AL, Augenbraun M, Tien PC, Villacres MC, Spencer LY, Degiacomo M, Kovacs A. Factors associated with hepatitis C viremia in a large cohort of HIV-infected and -uninfected women. *J Clin Virol*. 2008; 41:255–263. [PubMed: 18243785]
- Patel A, Roston A, Tilmon S, Stern L, Roston A, Patel D, Keith L. Assessing the extent of provision of comprehensive medical care management for female sexual assault patients in US hospital emergency departments. *Int J Gynaecol Obstet*. 2013; 123:24–28. [PubMed: 23850033]
- Penberthy JK, Ait-Daoud N, Vaughan M, Fanning T. Review of treatment for cocaine dependence. *Curr Drug Abuse Rev*. 2010; 3:49–62. [PubMed: 20088819]
- Petitjean SA, Dursteler-MacFarland KM, Krokarc MC, Strasser J, Mueller SE, Degen B, Trombini MV, Vogel M, Walter M, Wiesbeck GA, Farronato NS. A randomized, controlled trial of combined cognitive-behavioral therapy plus prize-based contingency management for cocaine dependence. *Drug Alcohol Depend*. 2014; 145:94–100. [PubMed: 25456571]
- Phillips KA, Epstein DH, Preston KL. Psychostimulant addiction treatment. *Neuropharmacology*. 2014; 87:150–160. [PubMed: 24727297]
- Polcin DL, Buscemi R, Nayak M, Korcha R, Galloway G. Gender differences in psychiatric symptoms among methamphetamine dependent residents in sober living houses. *Addict Disord Their Treat*. 2012; 11:53–63. [PubMed: 23559891]
- Prendergast M, Podus D, Finney J, Greenwell L, Roll J. Contingency management for treatment of substance use disorders: a meta-analysis. *Addiction*. 2006; 101:1546–1560. [PubMed: 17034434]
- Raveis VH, Kandel DB. Changes in drug behavior from the middle to the late twenties: initiation, persistence, and cessation of use. *Am J Public Health*. 1987; 77:607–611. [PubMed: 3565657]
- Riley E, Cohen J, Knight K, Decker A, Marson K, Shumway M. Recent violence in a community-based sample of homeless and unstably housed women with high levels of psychiatric comorbidity. *Am J Public Health*. 2014; 104:1657–1663. [PubMed: 25033127]
- Riley ED, Cohen J, Shumway M. Overdose fatality and surveillance as a method for understanding mortality trends in homeless populations. *JAMA Intern Med*. 2013; 173:1264. [PubMed: 23836270]
- Riley ED, Gandhi M, Hare C, Cohen J, Hwang S. Poverty, unstable housing, and HIV infection among women living in the United States. *Curr HIV/AIDS Rep*. 2007; 4:181–186. [PubMed: 18366949]
- Riley ED, Moore K, Sorensen JL, Tulsy JP, Bangsberg DR, Neilands TB. Basic Subsistence needs and overall health among human immunodeficiency virus-infected homeless and unstably housed women. *Am J Epidemiol*. 2011; 174:515–522. [PubMed: 21749972]
- Riley ED, Moss AR, Clark RA, Monk SL, Bangsberg DR. Cash benefits are associated with lower risk behavior among the homeless and marginally housed in San Francisco. *J Urban Health*. 2005; 82:142–150. [PubMed: 15738328]

- Ross HE, Swinson R, Doumani S, Larkin EJ. Diagnosing comorbidity in substance abusers: a comparison of the test-retest reliability of two interviews. *Am J Drug Alcohol Abuse*. 1995; 21:167–185. [PubMed: 7639204]
- Shannon K, Kerr T, Strathdee SA, Shoveller J, Montaner JS, Tyndall MW. Prevalence and structural correlates of gender based violence among a prospective cohort of female sex workers. *BMJ*. 2009; 339:b2939. [PubMed: 19671935]
- Stahler GJ, Shipley TE Jr, Kirby KC, Godboldte C, Kerwin ME, Shandler I, Simons L. Development and initial demonstration of a community-based intervention for homeless, cocaine-using, African-American Women. *J Subst Abuse Treat*. 2005; 28:171–179. [PubMed: 15780547]
- Stahlman S, Javanbakht M, Stirland A, Guerry S, Gorbach PM. Methamphetamine use among women attending sexually transmitted disease clinics in Los Angeles County. *Sex Transm Dis*. 2013; 40:632–638. [PubMed: 23859909]
- Sterk CE, Elifson KW, Theall KP. Individual action and community context: the Health Intervention Project. *Am J Prev Med*. 2007; 32:S177–S181. [PubMed: 17543709]
- Sterk CE, Theall KP, Elifson KW. Health care utilization among drug-using and non-drug-using women. *J Urban Health*. 2002; 79:586–599. [PubMed: 12468678]
- Stewart SH, Pihl RO, Conrod PJ, Dongier M. Functional associations among trauma, PTSD, and substance-related disorders. *Addict Behav*. 1998; 23:797–812. [PubMed: 9801717]
- Stoops WW, Rush CR. Agonist replacement for stimulant dependence: a review of clinical research. *Curr Pharm Des*. 2013; 19:7026–7035. [PubMed: 23574440]
- Substance Abuse and Mental Health Services Administration (SAMHSA). Results from the 2013 National Survey on drug use and health: summary of national findings. SAMHSA; Rockville, MD: 2014a. NSDUH Series H-48, HHS Publication No. (SMA) 14-4863
- Substance Abuse and Mental Health Services Administration (SAMHSA). Discharges from substance abuse treatment services. SAMHSA; Rockville, MD: 2014b. Treatment episode data set (TEDS): 2011. BHSIS Series S-70, HHS Publication No. (SMA) 14-4846
- Substance Abuse and Mental Health Services Administration (SAMHSA). Addressing the specific needs of women. SAMHSA; Rockville, MD: 2009. Treatment Improvement Protocol (TIP) Series 51, HHS Publication No (SMA) 09-4426
- Surratt HL, Inciardi JA. HIV risk, seropositivity and predictors of infection among homeless and non-homeless women sex workers in Miami, Florida, USA. *AIDS Care*. 2004; 16:594–604. [PubMed: 15223529]
- Tjaden, P.; Thoennes, N.; Samuels, J.; Thacker, S. Full Report of the Prevalence, Incidence and Consequences of Violence Against Women: Findings From the National Violence Against Women Survey. U.S. Department of Justice, Office of Justice Programs, National Institute of Justice; Washington, DC: 2000.
- Torchalla I, Strehlau V, Li K, Krausz M. Substance use and predictors of substance dependence in homeless women. *Drug Alcohol Depend*. 2011; 118:173–179. [PubMed: 21498010]
- Tutty LM, Ogden C, Giurigu B, Weaver-Dunlop G. I built my house of hope: abused women and pathways into homelessness. *Violence Against Women*. 2013; 19:1498–1517. [PubMed: 24424578]
- Ullman SE, Townsend SM, Starzynski LL, Long LM. Correlates of comorbid PTSD and polysubstance use in sexual assault victims. *Violence Vict*. 2006; 21:725–743. [PubMed: 17220016]
- Velasquez MM, von Sternberg K, Mullen PD, Carbonari JP, Kan LY. Psychiatric distress in incarcerated women with recent cocaine and alcohol abuse. *Womens Health Issues*. 2007; 17:264–272. [PubMed: 17544298]
- Waldrop AE, Back SE, Verduin ML, Brady KT. Triggers for cocaine and alcohol use in the presence and absence of posttraumatic stress disorder. *Addict Behav*. 2007; 32:634–639. [PubMed: 16863682]
- Walton MA, Chermack ST, Blow FC. Correlates of received and expressed violence persistence following substance abuse treatment. *Drug Alcohol Depend*. 2002; 67:1–12. [PubMed: 12062775]

- Wechsberg WM, Lam WK, Zule W, Hall G, Middlesteadt R, Edwards J. Violence, homelessness, and HIV risk among crack-using African-American women. *Subst Use Misuse*. 2003; 38:669–700. [PubMed: 12747401]
- Wenzel SL, Tucker JS, Elliott MN, Hambarsoomians K. Sexual risk among impoverished women: understanding the role of housing status. *AIDS Behav*. 2007; 11:9–20. [PubMed: 17160485]
- Wenzel SL, Tucker JS, Hambarsoomian K, Elliott MN. Toward a more comprehensive understanding of violence against impoverished women. *J Interpers Violence*. 2006; 21:820–839. [PubMed: 16672743]
- Yang C, German D, Webster D, Latkin C. Experiencing violence as a predictor of drug use relapse among former drug users in Baltimore, Maryland. *J Urban Health*. 2011; 88:1044–1051. [PubMed: 21877254]
- Zimmerman M, Coryell W. The validity of a self-report questionnaire for diagnosing major depressive disorder. *Arch Gen Psychiatry*. 1988; 45:738–740. [PubMed: 3395202]

Highlights

- We estimate the risk of stimulant use among homeless and unstably housed women.
- Sexual violence and homelessness predict stimulant use.
- Risks are not confounded by drug treatment.
- Stimulant use prevention should address homelessness and sexual violence.

Table 1

Prevalence of baseline characteristics and recent (past 6 months) behaviors/situations among homeless and unstably housed biological women living in San Francisco ($N = 260$).

	Total ($N = 260$)	Stimulant non-users ($N = 118$) N (%)	Stimulant users ($N = 142$) N (%)	p -Value
Age				
Minimum, maximum	20–69	25–69	20–62	0.22
Median (quartiles)	47 (41–53)	48 (43–53)	47 (40–53)	
Race/ethnicity				
White	79 (30.4)	35 (29.7)	44 (31.0)	0.68
African American	113 (43.5)	49 (41.5)	64 (45.1)	
Latina	12 (4.6)	6 (5.1)	6 (4.2)	
Asian/Pacific Islander	7 (2.7)	5 (4.2)	2 (1.4)	
Other	49 (18.8)	23 (19.5)	26 (18.3)	
Employed	48 (18.5)	26 (22.0)	22 (15.5)	0.18
Unmet subsistence needs	121 (46.5)	46 (39.0)	75 (52.8)	0.03
Homeless (slept in a shelter or public place)	120 (46.2)	40 (33.9)	80 (56.3)	<0.01
Married or partnered	144 (55.4)	56 (47.5)	88 (62.0)	0.02
Social isolation (Hawthorn Friendship Scale)				
Very isolated	156 (60.0)	79 (66.9)	77 (54.2)	0.14
Isolated	75 (28.8)	31 (26.3)	44 (31.0)	
Some social support	18 (6.9)	6 (5.1)	12 (8.5)	
Socially connected	9 (3.5)	2 (1.7)	7 (4.9)	
Very socially connected	2 (0.8)	0 (0.0)	2 (1.4)	
Experienced recent pain				
Not at all/moderate	156 (60.0)	68 (57.6)	88 (62.0)	0.48
Quite a bit/extreme	104 (40.0)	50 (42.4)	54 (38.0)	
HIV-positive	129 (49.6)	58 (49.2)	71 (50.0)	0.89
Major Depression	169 (66.0)	67 (57.3)	102 (73.4)	0.01
Manic Episodes	59 (23.0)	19 (16.2)	40 (28.6)	0.02
Schizophrenia	47 (18.3)	18 (15.4)	29 (20.7)	0.27
Experienced physical violence	70 (27.2)	20 (17.1)	50 (35.7)	<0.01
Experienced sexual violence	25 (9.7)	5 (4.3)	20 (14.3)	0.01
Crack cocaine use	122 (46.9)	0 (0.0)	122 (85.9)	<0.01
Powder cocaine use	30 (11.5)	0 (0.0)	30 (21.1)	<0.01
Methamphetamine use	54 (20.8)	0 (0.0)	54 (38.0)	<0.01
Heroin use	40 (15.4)	4 (3.4)	36 (25.4)	<0.01
Unprescribed opioid analgesic use	67 (25.8)	16 (13.6)	51 (35.9)	<0.01
At-risk alcohol use (>7 drinks/week or 4 drinks at one time)	115 (44.2)	36 (30.5)	79 (55.6)	<0.01
Participated in self-help abstinence groups (e.g., alcoholics anonymous or narcotics anonymous)	68 (26.2)	12 (10.2)	56 (39.4)	<0.01
Inpatient or outpatient substance use treatment	53 (20.4)	8 (6.8)	45 (31.7)	<0.01

∞ Hawthorn Friendship Scale: a 6-item scale where increasing scores indicate more social connection. 0–11 = very isolated; 12–15 = isolated; 16–18 = some social support; 19–21 = socially connected; and 22–24 = very socially connected.

[#] $p < 0.05$.

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Table 2

Risk factors for stimulant use among homeless and unstably housed biological women who did not use stimulants at Baseline ($n = 118$).

	Unadjusted relative risk (95% CI)	Adjusted relative risk (95% CI)
Age (years)	1.00 (0.95–1.06)	
Race		
Caucasian (ref)	1.0	
African American	3.21 (0.74–13.97)	
Latina	2.92 (0.31–27.36)	
Asian/Pacific Islander	3.50 (0.38–31.91)	
Other	3.04 (0.61–15.28)	
Employed	0.47 (0.12–1.93)	
Unmet subsistence needs	1.39 (0.58–3.35)	
Homeless (Slept in a shelter or public place)	2.19 (0.92–5.25)	2.75 (1.15–6.57) [‡]
Married or partnered	1.58 (0.65–3.87)	
Very socially isolated (Hawthorne Friendship Scale < 12) [∞]	1.01 (0.15–6.93)	
Experienced recent extreme pain	1.94 (0.79–4.75)	
HIV-infected	0.43 (0.16–1.15)	
Major depression	0.75 (0.30–1.85)	
Manic episodes	0.74 (0.18–2.98)	
Schizophrenia	1.27 (0.40–4.01)	
Experienced physical Violence	1.49 (0.54–4.11)	
Experienced sexual Violence	4.80 (2.02–11.43)	4.31 (1.97–9.45) [‡]
Heroin use	3.80 (1.28–11.27)	
Unprescribed opioid analgesic use	2.66 (1.08–6.54)	2.54 (1.01–6.38) [‡]
At-risk alcohol use (>7 drinks/week or 4 drinks at one time)	1.59 (0.66–3.85)	
Self-help abstinence group participation (e.g., AA, NA)	1.18 (0.31–4.54)	
Inpatient or outpatient substance use treatment	2.95 (1.06–8.17)	2.92 (0.99–8.63)

[‡]Contributed to the fit of the final model;

[∞]Hawthorn Friendship Scale: a 6-item scale where increasing scores indicate more social connection. 0–11 = very isolated; 12–15 = isolated; 16–18 = some social support; 19–21 = socially connected; and 22–24 = very socially connected.