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Correlates of exchange sex among a population-based sample of low-income women who have heterosexual sex in Baltimore

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Abstract

Sex exchange is associated with HIV and other morbidities yet has received little research, surveillance, and programmatic attention in the U.S. This study identified correlates of exchange sex among low-income women in Baltimore, Maryland. Participants were recruited into the National HIV Behavioral Surveillance (NHBS) system in 2013 using respondent driven sampling (RDS) and completed a survey and HIV testing. The analytic sample (n=253) consisted of women aged 18 years who had recent (past year) heterosexual sex. Multivariable logistic regression identified correlates of recent exchange sex. Independently associated with recent exchange sex were history of injection drug use (adjusted odds ratio (AOR)=3.4, 95% CI: 1.1-10.3), recent prescription painkiller use (AOR=3.7, 95% CI: 1.4-9.9), recent crack/cocaine use (AOR=6.6, 95% CI: 2.1-20.9), recent arrest (AOR=4.1, 95% CI: 1.2-14.8), and recent consistent condom use (AOR 1.1; 95% CI: 1.0-1.3). Women who exchanged sex exhibited heightened social and structural vulnerability and substance use. These data demonstrate the need for further research examining the context of exchange sex among low-income women and synergies between substance use and HIV risk.

Keywords

sex work; HIV; drug use

Three decades into the HIV epidemic, high HIV/STI rates persist among women engaged in sex work globally.(Baral et al.; Dunkle, Wingood, Camp, & DiClemente, 2010; Exner,

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Dworkin, Hoffman, & Ehrhardt, 2003; Jenness et al., 2011; Patterson et al.; Platt et al., 2007) Sex work encompasses a broad range of situations from informal survival sex to more formal sex work in which women view sex work as an occupation.(Jenness et al., 2011; Vanwesenbeeck, 2001) UNAIDS defines sex work broadly as the exchange of sex for money or other goods, including occasional transactions.(UNAIDS) In a recent meta-analysis of studies from low and middle-income countries, HIV prevalence among women who exchange sex (WES), was 13 times higher than similarly aged women who did not exchange sex.(Baral et al., 2012) Infectious diseases are often occupational hazards of sex work in the context of illegal sex markets, facilitated by multiple sex partners, inconsistent condom use, and high-risk sex partners.(Brantley; Loza et al., 2010; Patterson et al., 2008; Sanders, 2004; Kate Shannon et al.) In criminalized environments, WES experience a unique set of vulnerabilities associated with social and structural factors such as stigma and unsafe work environments.(Agha & Chulu Nchima; Argento et al.; Arnott & Crago; Human_Rights_Watch & WASO; “Sex workers and HIV and ostracised,” ; Wojcicki & Malala) On an individual level, sex work can introduce risk through compromised condom negotiation or rushed negotiations (Alam et al., 2013), and substance use is often used a coping mechanism.(Nemoto et al., 2008; Sherman, Lilleston, & Reuben, 2011)

In the U.S., where sex work is criminalized except for in some parts of Nevada, little is known about the burden of HIV among women who exchange sex for money, goods, or favors (e.g., drugs, food and housing) as well as its nature and scope, resulting in a dearth of information about sex work’s role in the U.S. HIV epidemic. In a meta-analysis of any studies in the U.S. examining HIV among WES, only two of the 14 had occurred within the past ten years.(Paz-Bailey, Noble, Salo, & Tregear, 2016) The pooled HIV prevalence was 17.3%, with prevalence varying considerably across studies (0.3%-30%) and representativeness was hampered by nonprobability (e.g., snowball) recruitment methods. A number of earlier studies have examined the association between sex work and HIV infection, focused primarily on drug users such as focused on crack cocaine smokers(Edlin et al., 1994; Elwood, Williams, Bell, & Richard, 1997; Ross, Hwang, Zack, Bull, & Williams, 2002; Weatherby et al., 1992), people who inject drugs(Astemborski, Vlahov, Warren, Solomon, & Nelson, 1994; Strathdee et al., 2011), and clinical populations (e.g., family planning, drug treatment)(Decker et al.; Dunkle et al.; el-Bassel, Simoni, Cooper, Gilbert, & Schilling). Further, HIV prevalence estimates among WES and comparability between studies is hampered given a lack of standard definition of sex work.

The existence of sex work as well as its role in the U.S. HIV epidemic has been assumed minimal given the dearth of empirical data.(Decker, Beyrer, & Sherman, 2014) In the current study, we aim to characterize sex work and its correlates among women who have heterosexual sex recruited through the National HIV Behavioral Surveillance (NHBS) system in Baltimore, MD.

METHODS

This analysis was conducted with data from the Behavioral Surveillance Research (BESURE) Study, the Baltimore site of the NHBS system(Towe et al., 2010). NHBS is a CDC-funded surveillance system in approximately 21 cities in the United States with high

HIV prevalence. The purpose of NHBS is to measure HIV prevalence, HIV risk behaviors, HIV testing behaviors, and exposure to prevention services over time among persons at high risk for incident HIV infection. (Gallagher, Sullivan, Lansky, & Onorato, 2007) BESURE serves to guide prevention and HIV counseling and testing services in Baltimore. NHBS is conducted as serial cross-sectional surveys, and includes cycles for men who have sex with men (MSM), injection drug users, and heterosexuals at high risk of HIV infection (HET). People are eligible for the HET cycle if they are 18-60 years old, identify as male or female, and have had at least one heterosexual partner in the past 12 months (Towe et al., 2010). The NHBS-HET protocol was approved by Institutional Review Boards at the Johns Hopkins Bloomberg School of Public Health and the Maryland Department of Health and Mental Hygiene.

Study Population

Data for this analysis comes from the 2013 HET3 cycle, which recruited participants from September-December 2013 using respondent driven sampling (RDS) (Heckathorn, 1997). Ten people were initially recruited as seeds who reported an opposite sex partner in the past year, had never injected drugs and either reported living in census tracts identified to be in the top quintile most affected by poverty and HIV in the Baltimore-Towson metropolitan area, had socio-economic status (SES) below the federal poverty guidelines (Towe et al., 2010). These seeds were each given 5 coupons to distribute to their network, and each subsequent recruit was given 3-5 coupons, leading to 0-15 waves of recruitment per seed. Eligible participants were enrolled after completing informed consent procedures, and trained interviewers administered an anonymous survey using computer assisted personal interviews. The survey included questions on demographic indicators, HIV risk behaviors, drug use, and health utilization. After the interview, Maryland state-certified HIV counselors conducted HIV pre-test counseling and performed whole blood collection through phlebotomy for rapid and confirmatory HIV testing. Participants were compensated \$25 for the survey, \$25 for the HIV test plus \$10 for each successful referral. This analysis was restricted to females aged 18 and over who reported sexual intercourse with a male in the past 12 months (N=253/518).

Measures

The outcome of interest is recent history of engaging in exchange sex, defined here as sex exchanged for things like money or drugs in the past 12 months, which was asked separately for main and casual partners and for male and female partners. A dichotomous variable was created (any exchange sex in the past 12 months; yes/no) collapsing responses across partner type and gender. Covariates of interest fell into broad categories of demographics and HIV risk factors.

Age, ethnicity/race, marital status, yearly income, age, education and employment were categorized. Sexual orientation was dichotomized as heterosexual versus bisexual or gay/lesbian/homosexual. Additional variables included recent (past 12 months) arrest and recent homelessness, defined as “living on the street, in a shelter, in a Single Room Occupancy hotel (SRO), or in a car.”

Sexual behavior variables were dichotomous with the exception of condom use which was categorized as consistent condom use with all, some, or none of the respondent's sexual partners in the past 12 months. Sexual behavior variables in the past 12 months for main and casual partners were dichotomized around mean values (e.g., the number of sexual partners, the number of partners with whom participants had unprotected sex, and age of sexual debut). Dichotomous drug use variables include history of ever and recent (past 12 months) injection and non-injection drug use. Additional variables include self-reported diagnosis with chlamydia or gonorrhea in the past 12 months, and self-reported lifetime diagnosis with Hepatitis B or C.

Analyses

All analyses were performed using SAS 9.4 Statistical Software (SAS Institute Inc., Cary, NC, USA) and the CDC version of the Respondent Driven Sampling Analysis Tool (RDSAT, version v.8.1.45). Bivariate analyses were performed between exchange sex and all demographic and risk factor covariates (Tables 1 and 2), and weighted proportions were calculated using individualized RDS sampling weights based on the transition matrix for each independent variable (Salganik & Heckathorn, 2004). Below we report proportions and comparisons of the crude data, given that the original recruitment chains included men who were not maintained in the analytic sample. For demographic factors, homophily values (ranging from -1 to +1) are reported. For statistical comparisons, *p*-values were calculated using chi-squared tests using RDS sampling weights for exchange sex category. Multivariate analysis was conducted using logistic regression with exchange sex as the dependent outcome, incorporating individualized RDS sampling weights based on the transition matrix for the independent variable, exchange sex. Due to the exploratory nature of the study, covariates were included in crude multivariate models if *p*-values from bivariate analyses were less than 0.10, or if the prior literature suggested a relationship. The model was reduced using backwards stepwise regression and Akaike information criterion (AIC) optimization methods to achieve the most parsimonious model. Demographic variables were added first and then reduced, and then risk factor variables were added and reduced for the final model.

Due to poor fit of existing condom-related variables in the multivariate model, a new variable to explore condom use was developed for the multivariate analysis. Percentage of partners with whom condoms were always used was computed and presented as a continuous variable from 0-100%. This serves to avoid biasing results towards people who engage in exchange sex, who are expected to have a higher number of partners. Inclusion of this variable improved model fit statistics to a higher degree than dichotomous or categorical condom use variables used in the original bivariate analysis.

RESULTS

Total, crude, and RDS-adjusted proportions of demographic variables are reported in Table 1 with crude reported throughout the results. The sample was comprised of 253 women who reported having sex with a member of the opposite sex in the past 12 months. Of these participants, the median age was 32.6 years old, 87% identified as black/African American,

and 57% report graduating from high school or obtaining a GED. The majority of women reported economic challenges, with 61% identifying as unemployed or unable to work and 47% reporting yearly household income as less than \$10,000 USD. Thirteen percent of respondents were arrested in the past 12 months, 15% report homelessness in the past 12 months, and 6% report current homelessness. Twenty-nine percent of participants reported exchange sex for money or drugs in the past 12 months.

There were a number of differences between WES and women who did not exchange sex (NWES). WES were significantly older than NWES (39.7 years vs. 30.1 years respectively, $p=0.006$). WES were significantly more likely to report being homosexual/bisexual compared to NWES (35% vs. 20%, $p=0.02$), being unemployed or unable to find work (86% vs. 54%, $p=0.0002$), having been arrested in the past 12 months (35% vs. 7%, $p<0.0001$); and having been homeless in the past 12 months (21% vs. 8%, $p=0.05$) compared to NWES.

WES and NWES also varied in lifetime and recent sexual behaviors, drug use, and health seeking behaviors (see Table 2). Compared to NWES, WES were significantly more likely to report: 5 male sexual partners in the past year (43% vs. 2.3%, respectively); 3 unprotected male sexual partners (54% vs. 12%, $p<0.001$); always used a condom with all sex partners (15% vs. 12%, $p=0.006$); and an age of sexual debut <16 years (73% vs. 48%, $p=0.04$). Compared to NWES, WES were significantly more likely to report: drug use at the last sex (73% vs. 48%, $p<0.05$), any history of injection drug use (51% vs. 9%, $p<0.0001$) current injection drug use (32% vs. 3%, $p<0.0001$), recently smoked crack or cocaine (67% vs. 4%, $p<0.0001$), ingested methamphetamines (11 vs. 0.4%, $p<0.0001$), smoked/snorted heroin (41% vs. 7%, $p<0.0001$), used downers such as Xanax (37% vs. 4%, $p<0.0001$), prescription painkillers (44% vs. 15%, $p<0.0001$), or ecstasy (19% vs. 6%, $p=0.02$). A significantly higher proportion reported having been diagnosed with HCV (36% vs. 8%, $p<0.05$) and a significantly lower proportion tested positive for HIV (1.4% vs. 8.6%, $p=0.02$) of NWES compared to WES.

Results from the multivariate analysis are presented in Table 3. In multivariate analysis controlling for age, having recently exchanged sex was positively and significantly associated with having a history of injection drug use (adjusted odds ratio (AOR)=3.35, 95%CI: 1.09-10.29); use of prescription painkillers (AOR=3.69, 95%CI: 1.38-9.89); use of crack/cocaine (AOR=6.55, 95%CI: 2.05-20.93; recent history of arrest (AOR=4.13, 95%CI: 1.16-14.78); and recent consistent condom use (AOR 1.13; 95%CI: 1.01-1.25).

DISCUSSION

This study adds to a small body of literature examining factors associated with sex exchange among heterosexual women in the U.S.(Cohan et al.; Decker et al.; Dunkle et al.; Edwards, Iritani, & Hallfors; el-Bassel, Simoni, et al.; Paz-Bailey et al.; Jacqueline Reuben, Serio-Chapman, Welsh, Matens, & Sherman) WES are a population that has been disproportionately burdened by HIV and other morbidities worldwide but have received little research, surveillance, and programmatic attention in the U.S. Among this socioeconomically marginalized sample of women considered to be at increased risk for heterosexual HIV transmission (Reilly, German, Serio-Chapman, & Sherman; Sionean,

Lewis, Nerlander, & Paz-Bailey), WES reported more social instability i.e., higher unemployment, lifetime and recent arrests and recent homelessness compared to their counterparts who did not report engaging in sex work. WES were significantly more likely to have an earlier age of sexual debut, have used drugs at last sexual intercourse, identify as being gay or bisexual, and have a higher prevalence of injection and extensive non-injection drug use. However, WES were more likely to use condoms consistently with all partners compared to NWES, which is in part supported by studies that have found WES to report consistent condom use with their clients as a form of occupational safety.(Lippman et al., 2012) Given that condom use among WES varies widely globally, future research should contextualize this finding further, for example, whether condom use depends on the familiarity with the paying client, experiences with violence, or the setting in which sex work occurs. These data expose the multiple and complex vulnerabilities in which sex work is positioned in this population, with sex exchange likely employed as a survival strategy for many study participants.(Pinkham & Malinowska-Sempruch, 2008; Stratford, Mizuno, Williams, Courtenay-Quirk, & O'Leary, 2008) The vulnerability among women who reported sex exchange is accentuated given the illegal nature of sex work, resulting in a legal environment that affords little protection to them as women and as sex workers.(Buttram, Surratt, & Kurtz; Krusi et al.; Neal, Green, & Ward; Varga & Surratt, 2014)

The density of vulnerability was elevated among WES, potentially indicating how sex work can amplify existing susceptibilities to morbidities such as HIV. Several recent studies have examined multidimensional constructs of structural vulnerability in association with sex exchange, underscoring the complex and synergistic nature of factors that are often reported independently and therefore devoid of their multidimensionality.(Brantley, 2016; J Reuben, Serio-Chapman, Welsh, Matens, & Sherman, 2010) In latent class analysis of sex workers (N=635), higher stability (e.g., residential stability, higher income, less arrests) was associated with a decrease likelihood of sex exchange.(German & Latkin) A recent latent class analysis of structural vulnerability of exotic dancers (N=117) found that women in the high vulnerability group were more likely to report sex exchange and illicit drug use compared to those in the low vulnerability group.(Brantley) Sex work appears to occur in a context of accumulated and interacting vulnerabilities that should be acknowledged when conducting research on WES health and/or planning interventions to address HIV/STI risk among WES.

The current sample was characterized by extremely high levels of injection and non-injection drug use, with WES reporting significantly higher levels of lifetime and recent drug injection, and recent smoking crack cocaine, smoking/snorting heroin, and ingesting "downers," prescription painkillers, and ecstasy. Over two-thirds of WES reported recent crack smoking, and this variable had the strongest association with WES in the presence of other variables. The synergy between crack use and sex exchange among some women has been extensively described (Elwood et al., 1997; Maher & Curtis, 1992; Ross, Hwang, Leonard, Teng, & Duncan, 1999) Given the rise of prescription drugs, less treatment and intervention focus has been placed on crack cocaine dependence, although understanding the complexity of its role in sex exchange against the changing landscape of urban drug use patterns is merited. Substance use can exacerbate sexual risk while also serving as a coping mechanism.(Nemoto et al., 2008; Sherman, Reuben, Chapman, & Lileston, 2011) Past and

current sexual and physical abuse are also associated with drug use and further heighten vulnerability to HIV/STI infection for WES.(El-Bassel, Witte, Wada, Gilbert, & Wallace; Sanders; K. Shannon et al.; Ulibarri et al.) Further, WES experience high burden of mental health co-morbidities (i.e., depression, anxiety).(Roxburgh, Degenhardt, & Copeland; Ulibarri et al.) NWES had a significantly higher HIV prevalence compared to WES, which possibly was driven by compromised statistical power given the small number of WES with HIV infection (n=3). Further caution should be used when interpreting this finding given the broad definition of sex exchange in this sample. The low number of sex exchange partners likely reflects the fact that these women exchange sex casually more in the context of survival sex or drug acquisition – given their exceedingly high rates of drug use. More research is needed to understand the social context and nature of sex exchange in this population.

The extent of risk behaviors and multidimensionality of structural factors associated with sex work begs the question why there is such limited public health research and practice attention to this population in the U.S. It has been hypothesized that the dearth of research on sex work is partially driven by the anti-prostitution loyalty oath, better known as the “Prostitution Pledge” (Forbes) which was language inserted into the legislation implementing the President’s Emergency Plan for AIDS Relief (PEPFAR) in 2003. The pledge stated, “no. funds ... may be used to provide assistance to any group or organization that does not have a policy explicitly opposing prostitution and sex trafficking.” Albeit intended for international settings, this policy influenced the domestic funding agenda. This very public change in policy led many researchers in question to shift their topic of inquiry or sensor language used, omitting flag words such as sex worker or harm reduction. (Kempner, 2008) The U.S. Supreme Court deemed the Prostitution Pledge a violation of free speech of U.S. based organizations, although international organizations are not afforded this U.S. constitutional right. The total of these events effectively dampened studies focusing on sex workers in the U.S. Our understanding of the population has been gleaned indirectly from studies of that include women who exchanges sex, such as women in drug treatment, family planning clinic attendees, or national surveys.(Cohan et al.; Decker et al.; Dunkle et al.; Edwards et al.; el-Bassel, Simoni, et al.) The pledge was reinstated by President Donald Trump three days into his tenure as President.

There are several study limitations. The measure of sex work used by NHBS lacked specificity by not explicitly mentioning exchange of sex for goods (e.g., food) or favors (e.g., housing) in addition to receiving money and drugs. (Vanwesenbeeck, 2001) The survey also did not ask about recency, frequency or context of sex work, which limits the ability to understand different contexts of sex work and potentially varying pathways to risk and HIV exposure. Given the broad characterization of sex exchange, comparisons of the current findings to other studies of WES characterized by a more specific definition are compromised. But, the wide range of the number of clients in the past year in our sample and lower number compared to existing studies on sex work in the U.S. context suggests that these women represent an understudied subset of WES with a unique set of characteristics and vulnerabilities compared to other more commonly studied WES populations such as street-based WES (Surratt, Inciardi, Kurtz, & Kiley, 2004) or WES who inject drugs. (Astemborski et al., 1994) Indeed, the peer-driven RDS methodology used in our study

allows for the recruitment of hidden and marginalized populations who often do not participate in research. The study was not powered to estimate stable HIV prevalence among women who exchange sex, as indicated by the large confidence intervals. The timing of HIV infection and initiation or duration of transactional sex engagement is unknown and could have affected the significance of the relationship between being a WES and HIV infection.

Our study adds to the limited empirical literature on WES health in the U.S. context. Even with this relatively broad definition of sex work in terms of the frequency of engaging in sex exchange, WES in our sample have heightened social and structural vulnerability compared with women who do not exchange sex. This study points to the need of a more nuanced understanding of the nature of sex work and how that is related to HIV risk and HIV prevalence. Future studies that disentangle the differences between women who exchange sex for money vs. for drugs or other goods could aid in sharpening our understanding of the nature of these women's risk. The role of socioeconomic vulnerability as a precursor to or byproduct of sex work engagement would inform the usefulness of economic or educational interventions targeting this population. Effective policies and programs are predicated on rigorous research.

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References

- Agha S, Chulu Nchima M. Life-circumstances, working conditions and HIV risk among street and nightclub-based sex workers in Lusaka, Zambia. *Culture, Health & Sexuality*. 2004; 6(4):283–299. DOI: 10.1080/13691050410001680474
- Alam N, Chowdhury ME, Mridha MK, Ahmed A, Reichenbach LJ, Streatfield PK, Azim T. Factors associated with condom use negotiation by female sex workers in Bangladesh. *Int J STD AIDS*. 2013; 24(10):813–821. DOI: 10.1177/0956462413486452 [PubMed: 23970599]
- Argento E, Reza-Paul S, Lorway R, Jain J, Bhagya M, Fathima M, O'Neil J. Confronting structural violence in sex work: lessons from a community-led HIV prevention project in Mysore, India. *AIDS Care*. 2011; 23(1):69–74. DOI: 10.1080/09540121.2010.498868 [PubMed: 21218278]
- Arnott J, Crago AL. Rights Not Rescue: A report on female, male, and trans sex worker's human rights in Botswana, Namibia, and South Africa. 2009 Retrieved from.
- Astemborski J, Vlahov D, Warren D, Solomon L, Nelson KE. The trading of sex for drugs or money and HIV seropositivity among female intravenous drug users. *Am J Public Health*. 1994; 84(3):382–387. [PubMed: 8129052]
- Baral S, Beyrer C, Muessig K, Poteat T, Wirtz AL, Decker MR, Kerrigan D. Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Infectious Diseases*. 2012; 12(7):538–549. DOI: 10.1016/s1473-3099(12)70066-x [PubMed: 22424777]
- Brantley ML, Sherman SG. Identifying patterns of social and economic hardship among structurally vulnerable women: a latent class analysis of HIV/STI risk. 2016 Manuscript in preparation.

- Buttram ME, Surratt HL, Kurtz SP. Resilience and syndemic risk factors among African-American female sex workers. *Psychology, Health, and Medicine*. 2014; 19(4):442–452. DOI: 10.1080/13548506.2013.824595
- Cohan D, Lutnick A, Davidson P, Cloniger C, Herlyn A, Breyer J, Klausner J. Sex worker health: San Francisco style. *Sex Transm Infect*. 2006; 82(5):418–422. DOI: 10.1136/sti.2006.020628 [PubMed: 16854996]
- Decker MR, Beyrer C, Sherman SG. Ending the invisibility of sex workers in the US HIV/AIDS surveillance and prevention strategy. *AIDS*. 2014; 28(15):2325–2327. [PubMed: 25313588]
- Decker MR, Miller E, McCauley HL, Tancredi DJ, Levenson RR, Waldman J, Silverman JG. Sex trade among young women attending family-planning clinics in Northern California. *International Journal of Gynecology & Obstetrics*. 2012; 117(2):173–177. [PubMed: 22356762]
- Dunkle KL, Wingood GM, Camp CM, DiClemente RJ. Economically motivated relationships and transactional sex among unmarried African American and white women: results from a U.S. national telephone survey. *Public Health Rep*. 2010; 125(Suppl 4):90–100. [PubMed: 20626196]
- Edlin BR, Irwin KL, Faruque S, McCoy CB, Word C, Serrano Y, Holmberg SD. Intersecting epidemics—crack cocaine use and HIV infection among inner-city young adults. Multicenter Crack Cocaine and HIV Infection Study Team. *New England Journal of Medicine*. 1994; 331(21):1422–1427. [PubMed: 7969281]
- Edwards JM, Iritani BJ, Hallfors DD. Prevalence and correlates of exchanging sex for drugs or money among adolescents in the United States. *Sex Transm Infect*. 2006; 82(5):354–358. DOI: 10.1136/sti.2006.020693 [PubMed: 16901917]
- el-Bassel N, Simoni JM, Cooper DK, Gilbert L, Schilling RF. Sex trading and psychological distress among women on methadone. *Psychol Addict Behav*. 2001; 15(3):177–184. [PubMed: 11563794]
- El-Bassel N, Witte SS, Wada T, Gilbert L, Wallace J. Correlates of partner violence among female street-based sex workers: substance abuse, history of childhood abuse, and HIV risks. *AIDS Patient Care STDS*. 2001; 15(1):41–51. [PubMed: 11177587]
- Elwood WN, Williams ML, Bell DC, Richard AJ. Powerlessness and HIV prevention among people who trade sex for drugs (‘strawberries’). *AIDS Care*. 1997; 9(3):273–284. [PubMed: 9290833]
- Exner TM, Dworkin SL, Hoffman S, Ehrhardt AA. Beyond the male condom: the evolution of gender-specific HIV interventions for women. *Annual Review of Sex Research*. 2003; 14:114–136.
- Forbes A. Speaking of sex workers: How suppression of research has distorted the United States’ domestic HIV response. *Reprod Health Matters*. 2015; 23(45):21–29. DOI: 10.1016/j.rhm.2015.06.008 [PubMed: 26278830]
- Gallagher KM, Sullivan PS, Lansky A, Onorato IM. Behavioral surveillance among people at risk for HIV infection in the US: the National HIV Behavioral Surveillance System. *Public health reports*. 2007; 122(1_suppl):32–38. [PubMed: 17354525]
- German D, Latkin CA. Social stability and HIV risk behavior: evaluating the role of accumulated vulnerability. *AIDS Behav*. 2012; 16(1):168–178. DOI: 10.1007/s10461-011-9882-5 [PubMed: 21259043]
- Heckathorn DD. Respondent-driven sampling; a new approach to the study of hidden populations. *Social Problems*. 1997; 44:174–199.
- Human_Rights_Watch, & WASO. Treat Us Like Human Beings”: Discrimination Against Sex Workers, Sexual and Gender Minorities, and People Who Use Drugs in Tanzania. 2013 Retrieved from.
- Jenness SM, Kobrak P, Wendel T, Neaigus A, Murrill CS, Hagan H. Patterns of exchange sex and HIV infection in high-risk heterosexual men and women. *J Urban Health*. 2011; 88(2):329–341. DOI: 10.1007/s11524-010-9534-5 [PubMed: 21286827]
- Kempner J. The Chilling Effect: How Do Researchers React to Controversy? *PLoS Med*. 2008; 5(11)doi: 10.1371/journal.pmed.0050222
- Krusi A, Chettiar J, Ridgway A, Abbott J, Strathdee SA, Shannon K. Negotiating safety and sexual risk reduction with clients in unsanctioned safer indoor sex work environments: a qualitative study. *Am J Public Health*. 2012; 102(6):1154–1159. DOI: 10.2105/AJPH.2011.300638 [PubMed: 22571708]

- Lippman SA, Chinaglia M, Donini AA, Diaz J, Reingold A, Kerrigan DL. Findings from Encontros: a multi-level STI/HIV intervention to increase condom use, reduce STI, and change the social environment among sex workers in Brazil. *Sexually transmitted diseases*. 2012; 39(3):209. [PubMed: 22337108]
- Loza O, Patterson TL, Rusch M, Martinez GA, Lozada R, Staines-Orozco H, Strathdee SA. Drug-related behaviors independently associated with syphilis infection among female sex workers in two Mexico-US border cities. *Addiction*. 2010; 105(8):1448–1456. ADD2985 [pii]. DOI: 10.1111/j.1360-0443.2010.02985.x [PubMed: 20456292]
- Maher L, Curtis R. Women on the edge of crime: Crack cocaine and the changing contexts of street-level sex work in New York City. *Crime, Law and Social Change*. 1992; 18:221.
- Neal JJ, Green TA, Ward JW. Trends in heterosexually acquired AIDS in the United States, 1988 through 1995. *Journal of Acquired Immunodeficiency Syndromes and Human Retrovirology*. 1997; 14(465):474.
- Nemoto T, Iwamoto M, Colby D, Witt S, Pishori A, Le MN, Giang le T. HIV-related risk behaviors among female sex workers in Ho Chi Minh City, Vietnam. *AIDS Education and Prevention*. 2008; 20(5):435–453. [pii]. DOI: 10.1521/aeap.2008.20.5.435 [PubMed: 18956984]
- Patterson TL, Semple SJ, Staines H, Lozada R, Orozovich P, Bucardo J, Strathdee SA. Prevalence and correlates of HIV infection among female sex workers in 2 Mexico-US border cities. *Journal of Infectious Diseases*. 2008; 197(5):728–732. DOI: 10.1086/527379 [PubMed: 18260766]
- Paz-Bailey G, Noble M, Salo K, Tregear SJ. Prevalence of HIV Among US Female Sex Workers: Systematic Review and Meta-analysis. *AIDS and Behavior*. 2016:1–14. [PubMed: 26370101]
- Pinkham S, Malinowska-Sempruch K. Women, harm reduction and HIV. *Reproductive health matters*. 2008; 16(31):168–181. [PubMed: 18513618]
- Platt L, Rhodes T, Judd A, Koshkina E, Maksimova S, Latishevskaya N, Parry JV. Effects of sex work on the prevalence of syphilis among injection drug users in 3 Russian cities. *American Journal of Public Health*. 2007; 97(3):478–485. DOI: 10.2105/ajph.2005.069732 [PubMed: 17018827]
- Reilly ML, German D, Serio-Chapman C, Sherman SG. Structural vulnerabilities to HIV/STI risk among female exotic dancers in Baltimore, Maryland. *AIDS Care*. 2015; 27(6):777–782. DOI: 10.1080/09540121.2014.998613 [PubMed: 25588144]
- Reuben J, Serio-Chapman C, Welsh C, Matens R, Sherman S. Correlates of current transactional sex among a sample of female exotic dancers in Baltimore, MD. *Journal of Urban Health*. 2010; 88(2):342–351.
- Reuben J, Serio-Chapman C, Welsh C, Matens R, Sherman SG. Correlates of current transactional sex among a sample of female exotic dancers in Baltimore, MD. *Journal of Urban Health*. 2011; 88:342–351. [PubMed: 21327548]
- Ross MW, Hwang LY, Leonard L, Teng M, Duncan L. Sexual behaviour, STDs and drug use in a crack house population. *International Journal of STD and AIDS*. 1999; 10(4):224–230. [PubMed: 12035774]
- Ross MW, Hwang LY, Zack C, Bull L, Williams ML. Sexual risk behaviours and STIs in drug abuse treatment populations whose drug of choice is crack cocaine. *International Journal of STD and AIDS*. 2002; 13(11):769–775.
- Roxburgh A, Degenhardt L, Copeland J. Posttraumatic stress disorder among female street-based sex workers in the greater Sydney area, Australia. *BMC Psychiatry*. 2006; 6:24. [PubMed: 16719928]
- Salganik M, Heckathorn D. Sampling and estimation in hidden populations using respondent-drive sampling. In: RM S, editor *Sociological Methodology*. Vol. 34. Boston: Blackwell Publishing; 2004. 93–239.
- Sanders T. Female street workers, sexual violence, and protection strategies. *Journal of Sexual Aggression*. 2001; 7(5-18)
- Sanders T. A continuum of risk? The management of health, physical and emotional risks by female sex workers. *Sociology of Health and Illness*. 2004; 26(5):557–574. [PubMed: 15283777]
- Sex workers and HIV and ostracised. *Lancet*. 2012; 380(9838)doi: 10.1016/s0140-6736(12)61197-0
- Shannon K, Kerr T, Allinott S, Chettiar J, Shoveller J, Tyndall MW. Social and structural violence and power relations in mitigating HIV risk of drug-using women in survival sex work. *Social Science and Medicine*. 2008; 66(4):911–921. [PubMed: 18155336]

- Shannon K, Strathdee SA, Goldenberg SM, Duff P, Mwangi P, Rusakova M, Pickles MR. Global epidemiology of HIV among female sex workers: influence of structural determinants. *The Lancet*. 2015; 385(9962):55–71.
- Sherman SG, Lileston P, Reuben J. More than a dance: The production of sexual health risk in the exotic dance clubs in Baltimore, USA. *Social Science and Medicine*. 2011; 73(3):475–481. DOI: 10.1016/j.socscimed.2011.05.036 [PubMed: 21724311]
- Sherman SG, Reuben J, Chapman CS, Lileston P. Risks associated with crack cocaine smoking among exotic dancers in Baltimore, MD. *Drug and Alcohol Dependence*. 2011; 114(2-3):249–252. DOI: 10.1016/j.drugalcdep.2010.10.003
- Sionean C, Lewis R, Nerlander L, Paz-Bailey G. Prevalence and Correlates of Exchange Sex Among Low-Income Heterosexual Women in 21 US Cities; Paper presented at the Conference on Retroviruses and Opportunistic Infections; Seattle, WA. 2015.
- Stratford D, Mizuno Y, Williams K, Courtenay-Quirk C, O’Leary A. Addressing poverty as risk for disease: recommendations from CDC’s consultation on microenterprise as HIV prevention. *Public health reports*. 2008; 123(1):9–20. [PubMed: 18348475]
- Strathdee SA, Lozada R, Martinez G, Vera A, Rusch M, Nguyen L, Patterson TL. Social and structural factors associated with HIV infection among female sex workers who inject drugs in the Mexico-US border region. *PLoS One*. 2011; 6(4):e19048.doi: 10.1371/journal.pone.0019048 [PubMed: 21541349]
- Surratt HL, Inciardi JA, Kurtz SP, Kiley MC. Sex work and drug use in a subculture of violence. *NCCD news*. 2004; 50(1):43–59.
- Towe VL, Sifakis F, Gindi RM, Sherman SG, Flynn C, Hauck H, Celentano DD. Prevalence of HIV infection and sexual risk behaviors among individuals having heterosexual sex in low income neighborhoods in Baltimore, MD: the BESURE study. *J Acquir Immune Defic Syndr*. 2010; 53(4): 522–528. DOI: 10.1097/QAI.0b013e3181bcde46 [PubMed: 19875965]
- Ulibarri MD, Roesch S, Rangel MG, Staines H, Amaro H, Strathdee SA. “Amar te Duele” (“love hurts”): sexual relationship power, intimate partner violence, depression symptoms and HIV risk among female sex workers who use drugs and their non-commercial, steady partners in Mexico. *AIDS and Behavior*. 2015; 19(1):9–18. DOI: 10.1007/s10461-014-0772-5 [PubMed: 24743959]
- Ulibarri MD, Semple SJ, Rao S, Strathdee SA, Fraga-Vallejo MA, Bucardo J, Patterson TL. History of abuse and psychological distress symptoms among female sex workers in two Mexico-U.S. border cities. *Violence Vict*. 2009; 24(3):399–413. [PubMed: 19634364]
- UNAIDS. UNAIDS Guidance Note on HIV and Sex Work. 2012 Retrieved from UNAIDS.
- Vanwesenbeeck I. Another decade of social scientific work on sex work: a review of research 1990-2000. *Annual Review of Sex Research*. 2001; 12:242–289.
- Varga LM, Surratt HL. Predicting health care utilization in marginalized populations: Black, female, street-based sex workers. *Womens Health Issues*. 2014; 24(3):e335–343. DOI: 10.1016/j.whi.2014.02.001 [PubMed: 24657047]
- Weatherby NL, Shultz JM, Chitwood DD, McCoy HV, McCoy CB, Ludwig DD, Edlin BR. Crack cocaine use and sexual activity in Miami, Florida. *Journal of Psychoactive Drugs*. 1992; 24(4): 373–380. [PubMed: 1491286]
- Wojcicki J, Malala J. Condom use, power and HIV/AIDS risk: sex-workers bargain for survival in Hillbrow/Joubert Park/Berea, Johannesburg. *Social Science & Medicine*. 2001; 53(1):99–121. [PubMed: 11380165]

Table 1

Demographic characteristics of women who have heterosexual sex by engagement in exchange sex in the past year: The National HIV Behavioral Surveillance System in Baltimore (2013, n=253) @

	Total Crude N (%)	Crude N (%)		RDS Weighted %, (95% CIs)		
		WES (N=72)	NWES (N=181)	WES (N=72)	NWES (N=181)	Total Homophily
Age (median =32.6): **						
18-24	49 (19.4%)	6 (8.3%)	43 (23.8%)	3.8% (0.3-5.9)	27.2% (14.1-47.2)	0.162
25-34	84 (33.2%)	28 (38.9%)	56 (30.9%)	34.0% (16.9-59.3)	29.0% (16.8-39.5)	0.154
35-44	37 (14.6%)	10 (13.9%)	27 (14.9%)	14.4% (3.4-37.0)	11.2% (4.2-20.0)	0.039
45-60	83 (32.8%)	28 (38.9%)	55 (30.4%)	47.8% (20.7-63.3)	32.6% (17.8-47.2)	0.414
Race:						
Non-Hispanic black	220 (87.0%)	61 (84.7%)	159 (87.9%)	81.3% (61.1-93.0)	95.1% (91.6-99.8)	0.203
Other	33 (13.0%)	11 (15.3%)	22 (12.1%)	18.7% (6.8-39.8)	4.9% (0.3-8.4)	0.183
Household Income:						
\$0-\$9,999	118 (47.4%)	40 (56.3%)	78 (43.8%)	46.1% (30.3-67.8)	51.7% (44.2-69.1)	-0.085
\$10,000-\$19,999	83 (33.3%)	21 (29.6%)	62 (34.8%)	38.5% (15.8-57.4)	29.5% (17.2-39.2)	0.058
\$20,000+	48 (19.3%)	10 (14.1%)	38 (21.4%)	15.4% (5.7-26.2)	18.8% (8.3-23.8)	-0.571
Marital Status:						
Never Married	177 (70.0%)	52 (72.2%)	125 (69.1%)	62.2% (44.3-83.1)	70.0% (55.2-79.4)	0.070
Married or cohabiting	35 (13.8%)	6 (8.3%)	29 (16.0%)	11.7% (2.6-25.2)	14.3% (5.4-23.1)	0.053
Separated/divorced/widowed	41 (16.2%)	14 (19.5%)	27 (14.9%)	26.1% (4.5-44.6)	15.7% (9.5-29.6)	-0.206
Sexual Identity: *						
Heterosexual/straight	192 (75.9%)	42 (58.3%)	150 (82.9%)	65.3% (63.7-90.0)	80.0% (72.1-90.4)	-0.029
Homosexual/bisexual	61 (24.1%)	30 (41.7%)	31 (17.1%)	34.7% (9.8-36.7)	20.0% (9.6-28.1)	0.160
Education:						
Completed grade 12/GED	145 (57.3%)	40 (55.6%)	105 (58.0%)	50.4% (28.6-69.5)	50.2% (31.6-62.3)	0.310
Completed less than grade 12	108 (42.7%)	32 (44.4%)	76 (42.0%)	49.6% (29.8-71.3)	49.8% (38.1-68.2)	0.094
Employment status: ***						
Unemployed/unable to work	154 (60.9%)	58 (80.6%)	96 (53.0%)	86.2% (72.8-95.9)	53.6% (35.5-64.3)	0.232
Employed or not looking	99 (39.1%)	14 (19.4%)	85 (47.0%)	13.8% (4.0-27.2)	46.4% (35.6-64.5)	0.196

	Total Crude N (%)	Crude N (%)		RDS Weighted %, (95% CIs)			Total Homophily
		WES (N=72)	NWES (N=181)	WES (N=72)	NWES (N=181)		
History of arrest: ***							
Arrested in past 12 months	33 (13.0%)	18 (25.0%)	15 (8.3%)	35.1% (11.9-63.9)	7.4% (2.2-14.6)		0.061
Not arrested in past 12 months	220 (87.0%)	54 (75.0%)	166 (91.7%)	64.9% (35.8-88.0)	92.6% (85.2-97.8)		0.077
Homelessness in past 12 months: *							
Homeless past 12 months	37 (14.6%)	18 (25.0%)	19 (10.5%)	21.3% (7.8-46.1)	8.4% (1.3-15.0)		0.040
Not homeless past 12 months	216 (85.4%)	54 (75.0%)	162 (89.5%)	78.7% (55.1-92.2)	91.6% (84.8-98.7)		-0.008
STI diagnoses:							
STI diagnosis #, \$ (past 12 mo)	17 (6.8%)	8 (11.1%)	9 (5.0%)	14.7% (0.7-34.9)	6.9% (1.6-16.5)		17 (6.8%)
Ever diagnosed\$ with HCV ***	30 (12.1%)	15 (21.7%)	15 (8.4%)	35.7% (16.5-60.5)	7.8% (1.4-14.9)		30 (12.1%)
Tested HIV positive *	15 (6.0%)	3 (4.2%)	12 (6.7%)	1.4% (0.0-4.1)	8.6% (1.9-16.8)		15 (6.0%)

@ Chi-square P values based on percent RDS-weighted by outcome variable (exchange sex)

\$ Self-reported;

Chlamydia or gonorrhea

* P value <0.05;

** P value <0.01;

*** P value <0.001

Reported homophily values are for study population by independent covariate only, collapsed over outcome variable

Sex and drug behaviors among women who have heterosexual sex by engagement in exchange sex in the past year: The National HIV Behavioral Surveillance System in Baltimore (2013, n=253) @

Table 2

	Total Crude N (%)	Crude N (%)		RDS Weighted %, (95% CIs)	
		Exchange sex (N=72)	No exchange sex (N=181)	Exchange sex (N=72)	No exchange sex (N=181)
Sex exchange (past 12 mo)	72(28.9%)	72(26%)		72(26%)	
Multiple partners (past 12 mo):					
5 male sexual partners ***	46 (18.3%)	39 (54.2%)	7 (3.9%)	43.0% (23.4-57.3)	2.3% (0.0-6.9)
3 unprotected ^ male sexual partners ***	62 (24.6%)	42 (58.3%)	20 (11.1%)	53.9% (30.8-76.5)	11.6% (5.0-21.5)
3 male exchange partners	47 (18.7%)	47 (65.3%)	-	66.0% (41.4-74.5)	-
Condom use in past 12 mo: **					
Used a condom with all partners	23 (9.1%)	4 (5.6%)	19 (10.5%)	14.8% (0.0-38.7)	12.2% (4.4-25.4)
Used a condom with some partners	100 (39.7%)	45 (62.5%)	55 (30.6%)	62.7% (37.6-80.9)	28.6% (16.9-40.7)
Age at sexual debut:					
Sexual debut age <16 *	147 (58.1%)	48 (66.7%)	99 (54.7%)	72.8% (58.4-90.5)	47.6% (32.3-62.8)
Drug use (past 12 mo unless indicated):					
Drug use at last sex ***	61 (24.2%)	34 (47.2%)	27 (15.0%)	65.3% (44.1-85.0)	15.9% (7.2-32.8)
Ever injected drugs ***	47 (18.6%)	28 (38.9%)	19 (10.5%)	50.6% (31.2-72.4)	9.1% (2.3-11.2)
Injection drug use past 12 mo ***	21 (8.3%)	17 (23.6%)	4 (2.2%)	31.9% (16.8-52.5)	3.3% (1.9-15.9)
Smoked Marijuana	136 (53.8%)	44 (61.1%)	92 (50.8%)	62.9% (35.4-77.2)	48.3% (30.2-60.3)
Smoked crack/cocaine ***	47 (18.6%)	31 (43.1%)	16 (8.8%)	67.1% (46.9-86.5)	4.4% (0.7-8.8)
Ingested Methamphetamine ***	2 (0.8%)	1 (1.4%)	1 (0.6%)	11.3% (0.0-31.6)	0.4% (0.0-2.7)
Smoked or snorted heroin ***	31 (12.3%)	19 (26.4%)	12 (6.6%)	40.8% (18.7-59.8)	6.8% (1.0-11.5)
Ingested downers (Xanax, valium) ***	31 (12.3%)	22 (30.6%)	9 (5.0%)	37.0% (20.9-58.6)	3.7% (0.2-3.8)
Ingested prescription painkillers ***	53 (21.0%)	28 (38.9%)	25 (13.8%)	43.6% (19.6-61.1)	15.3% (5.2-25.1)
Ingested ecstasy *	27 (10.7%)	12 (16.7%)	15 (8.3%)	19.3% (4.5-41.5)	6.1% (1.1-12.9)

@ Chi-square P values based on percent RDS-weighted by outcome variable (exchange sex)

* P value <0.05;

Reported for vaginal sex;

P value <0.001;

***

P value <0.01;

**

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Table 3

Correlates of exchange sex in the past 12 months among women who have heterosexual sex: The National HIV Behavioral Surveillance System in Baltimore (2013, n=253) [@]

	OR (CIs)		AOR (CIs)	
Age (years)	1.04	(1.00-1.07)	1.02	(0.98-1.06)
Arrested in past 12 months	6.39	(2.31-17.67)	4.13	(1.16-14.78)
Ever injected drugs	8.09	(3.29-19.90)	3.35	(1.09-10.29)
Crack or cocaine use (12 months)	18.13	(6.89-47.72)	6.55	(2.05-20.93)
Prescription painkiller use (12 months)	5.29	(2.11-13.30)	3.69	(1.38-9.89)
Sexual debut at less than 16 years old	2.26	(1.03-4.98)	2.30	(0.96-5.48)
Proportion condom use $\times 10^*$	1.14	(1.03-1.26)	1.13	(1.01-1.25)

* 10% increase in proportion of partners used condoms with in past 12 months

[@] crude odds ratios (OR) and adjusted odds ratios (AOR) with confidence intervals (CIs).