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Importance of Substance Use and Violence in Psychosocial Syndemic Among Women with and At-risk for HIV

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Abstract

Women in the U.S. continue to be affected by HIV through heterosexual contact. Sexual risk behaviors among women have been associated with a syndemic, or a mutually reinforcing set of conditions, including childhood sexual abuse, depression, substance use, violence and financial hardship. Baseline data from a cohort of women with and at-risk for HIV (N=620; 52% HIV+), were analyzed with Poisson regression to assess evidence for additive, independent and interactive effects among syndemic conditions in relation to reported sexual risk behaviors (e.g., unprotected and transactional sex) over the past 6 months, controlling for age and HIV-status. The number of syndemic conditions was incrementally associated with more types of sexual risk behaviors. For example, women with all five syndemic conditions reported 72% more types of risk behaviors over 6 months, as compared to women without any syndemic conditions. Compared to women with no syndemic conditions, women with three syndemic conditions reported 34% more and women with one syndemic condition reported 13% more types of risk behaviors. Endorsing substance use in the past 6 months, reporting childhood sexual abuse, and experiencing violence as an adult were independently associated with 49%, 12%, and 8% more types of risk behaviors respectively compared to women without these conditions. Endorsing both substance use and violence was associated with 27% more types of risk behaviors. These associations were not moderated by HIV-status. Understanding specific relationships and interactions are needed to more effectively prioritize limited resources in addressing the psychosocial syndemic associated with sexual risk behavior among women with and at-risk for HIV. Our results identify interrelated psychosocial factors that could be targeted by intervention studies aiming to reduce high-risk sex in this population.

Keywords

syndemic; women; HIV/AIDS; substance use; violence; risk behaviors

Introduction

Substance abuse, violence, and AIDS have been described as a *syndemic*, or co-occurring afflictions that synergistically contribute to disease burden in vulnerable populations (Singer, 1996; Singer & Clair, 2003). Stall and others (Mustanki, Garofalo, Herrick, & Donenberg, 2007; Stall et al., 2003) have described syndemics among men who have sex with men, including childhood sexual abuse (CSA) and depression. Similar syndemics exist among low-income women that increase risk of HIV (Koblin et al., 2015; Meyer, Springer, & Altice, 2011). As the majority of HIV infections among women are attributable to heterosexual sex (CDC, 2015), a greater understanding of how psychosocial conditions including poverty, violence, and substance use relate to sexual risk behaviors among women

is needed (Krishnan et al., 2008; Oldenburg, Perez-Brumer, & Reisner, 2014; Ostrach & Singer, 2012).

Methodologically, the majority of syndemic literature has examined additive effects of syndemic conditions on HIV-related risk behaviors, these strategies do not address the possibility of interaction effects among conditions and cannot distinguish the effects of one syndemic condition from another in explaining risk outcomes. The present study examines CSA, adult violence, substance use, depression, and perceived financial hardship as syndemic conditions that may be associated with sexual risk behaviors reported by women with and at-risk for HIV. This study contributes to the literature by including perceived financial hardship, and exploring additive and interactive effects among syndemic conditions among predominantly ethnic minority and socioeconomically disadvantaged women with and at risk for HIV. We hypothesized that the number of syndemic conditions would be incrementally associated with number of types of sexual risk behaviors in the past 6 months.

Methods

Sample

Six-hundred and twenty participants assigned female sex at birth (see Table 1 for demographics) completed the baseline assessment of a study of women with and at-risk for HIV. Methods are described in detail elsewhere (Howard et al., 2005; Miller et al., 2005). All participants reported past HIV-related risk behaviors, which included previous intravenous drug use, sex with a known/suspected HIV-infected male, transactional sex, or having 5+ sexual partners in the past five years. HIV-infected and uninfected participants were demographically similar. The institutional review board of Albert Einstein College of Medicine approved the study and all participants provided written informed consent.

Measures

Women were interviewed in English or Spanish. History of CSA was assessed by asking, “as a child, were you ever sexually attacked, raped, or sexually abused?” Violence experienced as an adult was assessed by asking, “as an adult, have you ever been beaten, physically attacked, or physically abused?” Recent illicit substance use was assessed by asking, “in the past 6 months have you used cocaine, crack, speedball, or heroin?” Perceived financial hardship was assessed by asking, “how hard is it for you to pay for the very basics like food, housing, medical care, and utilities?” (1=very hard- 3=not very hard), dichotomized as very hard versus somewhat-not very hard. Depression was measured using the Center for Epidemiologic Studies Depression Scale, which asks about symptoms in the past week, dichotomized at 23 (Radloff, 1977). We created a sexual risk composite score of types of reported sexual risk behaviors in the past 6 months including condomless: sex with >1 partner, sex with 1 partners for money or drugs, vaginal sex with non-primary partner, and anal sex with non-primary partner resulting in a score (0–4). HIV status was confirmed using CD4 and viral load blood tests. We used dichotomized syndemic variables (i.e., CSA, depression, substance use, adult violence, and financial hardship) to create a syndemic summary score ranging from 0–5.

Analysis

We explored bivariate relationships between sexual risk composite scores and syndemic variables using Spearman's correlation and Chi-squares, controlling for age and HIV-status. Race/ethnicity was not bivariately associated with the syndemic conditions and, therefore, not controlled for. We used multivariate Poisson log-linear regression models adjusted for deviance and robust standard errors for the parameter estimates to account for mild violation of the distribution assumption (Cameron & Trivedi, 1998). To explore the effects of specific syndemic conditions, we entered syndemic conditions into a Poisson log-linear regression model and assessed multiplicative interaction effects. Study analyses were performed with SPSS version 20.0 (IBM Corp., 2012).

Results

Sample demographics and frequencies of syndemic conditions are reported in Table 1. Bivariately, two syndemic conditions were associated with the sexual risk composite: substance use ($\rho=0.36$, $p<0.001$) and CSA ($\rho=0.12$, $p<0.01$). We identified multiple bivariate relationships between dichotomized syndemic variables. Perceived financial hardship was significantly associated with substance use ($\chi^2=3.96$, $p<0.05$) and depression ($\chi^2=11.08$, $p<0.01$). Depression was significantly associated with CSA ($\chi^2=21.01$, $p<0.001$) and violence ($\chi^2=6.16$, $p<0.05$). Violence was also associated with CSA ($\chi^2=25.80$, $p<0.001$). When we looked at bivariate relationships between syndemic conditions and HIV status, we found a significant association with violence ($\chi^2=10.16$, $p=0.001$), such that 66% HIV-positive women reported violence compared to 54% of HIV-negative women, and financial hardship ($\chi^2=11.50$, $p=0.001$), such that 22% of HIV-positive women reported having a "very hard" time financially compared to 34% of HIV-negative women. No other bivariate relationships were significant.

Table 2 presents associations between the number of syndemic conditions and sexual risk composites, controlling for age and HIV-status. Compared to women endorsing no syndemic conditions, women with all five syndemic conditions reported 72% higher sexual risk composites. Each increase in the number of syndemic conditions was significantly associated with an incremental increase in sexual risk composites, as compared to women who reported no syndemic conditions (See Table 2).

Table 3 presents multivariate models including syndemic conditions and interaction effects. In the model examining independent effects, substance use, adult violence, and CSA were each significantly associated with greater sexual risk composites. Specifically, women who reported substance use reported 49% greater sexual composites. Those who reported CSA reported 12% greater sexual composites compared to those who did not. Women who reported violence reported 8% greater sexual composites compared to those who did not. The interaction model revealed a significant interaction between substance use and violence, indicating that women who reported substance use and violence had 27% greater sexual composites, compared to those with either condition alone. The interaction between substance use and CSA was not significant. Financial hardship and depression were not independently associated with the sexual composite score in either model.

Discussion

Consistent with prior literature, number of syndemic conditions was positively and incrementally associated with number of types of sexual risk behaviors among women living with and at-risk for HIV (Koblin et al., 2015; Meyer et al., 2011). Similar to Koblin et al.'s 2015 findings, substance use was more strongly associated with sexual risk behaviors, compared to other syndemic conditions. Paralleling previously published literature- CSA and adult violence were each associated with sexual risk behaviors (Illangasekare, Burke, McDonnell, & Gielen, 2013; Kelly, Cheng, Spencer-Carver, & Ramaswamy, 2014). We did not find a significant association for financial hardship, in contrast to previous literature (Campbell et al., 2009; El-Bassel et al., 1997; Lane et al., 2004; Schiff, El-Bassel, Engstrom, & Gilbert, 2002). However, we did find bivariate relationships among syndemic variables, including between financial hardship and substance use, depression, and HIV-status. In this sample, HIV-infection was significantly associated with less perceived financial hardship, potentially reflecting the charitable resources available to people living with HIV in the New York area. The additive relationship between number of syndemic conditions and sexual risk, despite the lack of expected bivariate associations, emphasizes the importance of the co-occurrence these syndemic conditions. Additionally, we identified an interaction between substance use and violence, consistent with syndemic theory and other syndemic research focused on urban women (Koblin et al., 2015; Singer, 1992; Singer & Clair, 2003). Together, these findings indicate that while an additive framework may be associated with sexual risk behaviors, investigation of specific syndemic conditions using multivariable models is needed to identify which conditions are most associated with sexual risk behaviors and should be prioritized.

This work has several limitations. First, the stigmatized nature of the syndemic conditions may have resulted in under-reporting. Second, the syndemic conditions had varying timeframes. Variability in how syndemic conditions are operationalized across studies may have contributed to inconsistencies with the published literature. Additionally, this sample had high rates of reported depression, adult violence, financial hardship, which may have affected our results. Eligibility criteria included endorsement of HIV-related high-risk behaviors in the past five years, limiting the generalizability. In subsequent studies, frequency of sexual risk behaviors and benefits obtained from social services would further elucidate these syndemic relationships. Ultimately, longitudinal assessment is needed to establish causal pathways between syndemic conditions.

As most HIV cases among women are attributable to heterosexual sex (CDC, 2015), the identified associations between substance use and violence with number of type of sexual risk behaviors suggest that integrative approaches that target substance use and trauma may reduce sexual risk behaviors, consistent with previous findings (Exner, Seal, & Ehrhardt, 1997). More interventions are needed that concurrently focus on interrelated psychosocial conditions associated with engagement in sexual risk behaviors, prioritizing substance use, trauma and violence prevention (Logan, Cole, & Leukefeld, 2002; Walkup et al., 2008).

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Table 1

Sample Profile.

<i>N=620</i>		<i>n (%)</i>
Age (M (SD))		44.8 (5.7), range 35–71
Race/Ethnicity		
	Black/ African American	301 (49%)
	Hispanic	233 (38%)
	White	58 (9%)
	Other	28 (5%)
Completed High School or GED		348 (56%)
HIV+		324 (52%)
History of Childhood Sexual Abuse		245 (40%)
Recent Illicit Substance Use		154 (25%)
Victim of Violence as Adult		355 (57%)
Perceived Financial Hardship ^a		
	Very hard	164 (26%)
	Somewhat hard	219 (35%)
	Not very hard	209 (34%)
Distress (CES-D; Mean (SD))		20.2 (13.1)
	23	234 (39.3%)
Number of Sex Risk Behaviors (Mean (SD))		1.3 (0.6)
	Sex with >1 man in the past 6 months	287 (46.3%)
	Transactional sex for drugs or money	30 (4.8%)
	Condomless vaginal sex with non-primary partner	34 (5.5%)
	Condomless anal sex with non-primary partner	3 (0.5%)

^a“How hard is it for you to pay for the very basics like food, housing, medical care, and utilities?”

Table 2

Relative Rate Ratios of Sexual Risk Composite by Number of Syndemic Problems Using Poisson Regression.

<i>N=603</i>	Sexual risk composite	
	<i>Rate Ratio</i>	<i>95% CI</i>
Age	0.99	0.99, 1.00
HIV-status	0.97	0.89, 1.05
Number of Syndemic Conditions		
0 (<i>n</i> =69) ^a		
1 (<i>n</i> =163)	1.13 *	1.04, 1.23
2 (<i>n</i> =185)	1.22 *	1.11, 1.35
3 (<i>n</i> =129)	1.34 **	1.19, 1.51
4 (<i>n</i> =43)	1.54 ***	1.27, 1.86
5 (<i>n</i> =14)	1.72 ***	1.37, 2.17

^aReference group.*
p<0.05;**
p<0.01;***
p<0.001

Table 3

Relative Rate Ratios of Sexual Risk Composite by Syndemic Problems Using Log-linear Poisson Regression.

<i>N</i> =592	Sexual risk composite			
	Independent Effects Model		Interaction Effects Model	
	<i>Rate Ratio</i>	<i>95% CI</i>	<i>Rate Ratio</i>	<i>95% CI</i>
Age	0.99	0.99, 1.00	0.99	0.99, 1.00
HIV-status	0.96	0.89, 1.04	0.96	0.89, 1.04
History of childhood sexual abuse	1.12 ^{**}	1.03, 1.22	1.11 [*]	1.02, 1.21
History of violence	1.08 [*]	1.00, 1.16	1.00	0.93, 1.07
Recent illicit substance use	1.49 ^{***}	1.36, 1.64	1.28 ^{***}	1.12, 1.46
Perceived financial hardship	1.01	0.91, 1.12	0.99	0.91, 1.08
Emotional distress	1.00	0.99, 1.00	0.99	0.99, 1.00
Recent illicit substance use X History of violence			1.27 ^{**}	1.06, 1.53

*
p<0.05;**
p<0.01;***
p<0.001