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Recent Partner Violence, Sexual Relationship Power, and STIs among Women Who Use Methamphetamine: Does Type of Sexual Partner Matter?

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Abstract Methamphetamine use, sexual relationship power (SRP), and partner violence (PV) are associated with increased risk of sexually transmitted infections (STIs) among women. The objective of our study was to examine the association of recent PV and SRP on STIs by partner type among HIV-negative, heterosexual women who use methamphetamine in San Diego, CA. Using baseline survey data from 209 women enrolled in FASTLANE II, an HIV behavioral intervention trial, we

conducted logistic regression analyses to examine associations between PV, SRP, and self-reported lifetime STIs (e.g., chlamydia, gonorrhea). Models focused on PV perpetrated within the past 2 months by: (1) spouse, live-in, or steady sexual partners and (2) casual or anonymous sexual partners. Seventy-eight percent of women reported lifetime physical PV and 57% reported lifetime sexual PV. In the past 2 months, 19.6% reported physical and/or sexual violence by a spouse, live-in, or steady sexual partner, and 7.2% reported physical and/or sexual PV by a casual or anonymous partner. Median SRP score was 2.36 (interquartile range: 2.02–2.68). Twenty-six percent of women reported ever being diagnosed with ≥ 1 STI. While recent physical violence and sexual violence were not associated with STI history among women in steady relationships, women who reported recent sexual violence by casual/anonymous partners were approximately 8 times more likely to ever have an STI compared with those with no history of recent PV by casual/anonymous partners (AOR: 7.70; 95% CI: 1.32, 44.84). SRP was not associated with lifetime STIs among women who reported either partner type. Our findings support a relationship between recent sexual violence perpetrated by casual/anonymous partners and women's STI history. Women who use methamphetamine need help in navigating partner violence experiences. Risk reduction interventions to support this marginalized population are needed.

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Introduction

Methamphetamine (meth) remains a serious public health problem and is the fastest rising drug of abuse worldwide [1]. In 2015, over 12 million people in the USA (5% of the population) reported trying meth at least once [2]. San Diego, California, once known as the meth capital of the USA, continues to exhibit high rates of meth use among both men and women [3]. In 2015, almost five thousand San Diego residents were receiving treatment for meth use, and from 2010 to 2015, deaths related to meth overdose increased by almost one and a half-fold [3].

Meth use is associated with partner violence (PV) victimization, defined as physical, sexual, and/or psychological harm by a current or former intimate partner especially in women [4]. Meth use and PV are reciprocally related whereby meth use may facilitate PV through the impairment of judgment, lower decision-making ability, and lower sexual relationship power, and PV may facilitate the use of meth for the purpose of coping with the consequences of PV [5, 6]. Meth use is also associated with increased sexual risk-taking behavior and STI acquisition, directly by injection drug use or indirectly via high-risk sexual practices with injection drug users [7–11]. Further, PV may also lead to STI acquisition through risky sexual practices (e.g., unprotected vaginal and/or anal sex, forced sex with infected partners) [12]. The confluence of substance abuse, violence, and HIV/AIDS, known as the SAVA syndrome, works synergistically to exacerbate and create excess burden among vulnerable populations, such as women who use meth [12–14].

Sexual relationship power (SRP) differentials, expressed through the concepts of decision-making dominance and relationship control, are associated with substance abuse, sexual risk-taking, and PV [15–17]. Power differentials have not only been found to be influenced by but are also a risk factor for substance abuse [16]. High SRP has been found to be associated with reduced sexual risk-taking behaviors [15]. Power within sexual relationships is linked to sexual health through: [1] one's power to negotiate safer sex practices (e.g., condom use); [2] its relationship with PV; and [3] its impact on a person's use of health services [15–17]. These pathways contribute to poor sexual health among victimized individuals. Lastly, the relationship between SRP and PV has been shown to be bidirectional, where greater SRP is associated with reduced PV experiences,

and more experiences of PV are associated with lower SRP [17].

Previous research supports the moderating role of partner type (e.g., steady versus non-steady) on the relationship between substance abuse and risk-taking [18]. While substance use has been found to be a risk factor for sexual risk-taking across populations and relationships, this association has been found to be stronger among those who report having sex with non-steady partners, as opposed to steady partners [19]. Condom use-related norms are usually well established in steady relationships, and these norms might diminish the influence of alcohol and/or drug-related impairment on sexual decision-making ability [18]. These practices are less likely to be established within casual relationships, therefore allowing the disinhibiting effects of drugs and alcohol to play a bigger role in sexual decision-making, leading to potentially riskier sexual behaviors and STI acquisition [20].

While PV and SRP have been associated with increased sexual risk-taking behaviors and increased STI risk, little is known about these relationships among women who use meth, specifically accounting for different PV perpetrating sexual partners (i.e., spouse/live-in/steady, casual/anonymous). Drawing from the literature on substance abuse, partner type, and sexual risk behavior, the current research seeks to examine the association of recent partner-specific violence (i.e., perpetrated by spouse/steady versus casual/anonymous partners) and SRP on STIs in a sample of women who use meth.

Methods

We conducted a secondary data analysis using baseline data from FASTLANE II, an HIV behavioral intervention trial conducted between 2006 and 2010 in San Diego, CA [21]. FASTLANE II was designed to reduce sexual risk behaviors, meth use, and depressive symptoms among 432 men and women who reported active meth use. Only women ($n = 209$) were included in the current analysis.

Participants

Participant inclusion criteria for FASTLANE II were the following: [1] aged ≥ 18 years; [2] HIV-negative at intake; [3] self-identifying as heterosexual; [4] sexually

active with at least one opposite sex partner in the past 2 months; and [5] had snorted, smoked, or injected meth at least once during the past 2 months, and at least once during the past 30 days. Exclusion criteria included the following: [1] unwillingness to participate in the intervention and follow-up assessments; [2] current major psychiatric diagnosis accompanied by psychotic symptoms or suicidal ideation within the past 2 weeks; [3] not sexually active in the past 2 months or always used condoms; [4] unprotected sex with a spouse or steady partner only in the past 2 months; [5] trying to get pregnant or trying to get a partner pregnant; [6] current enrollment in a drug treatment program; and [7] a Beck Depression Inventory-Fast Screen (BDI-FS) score of 3 or less, which indicated mild depressive symptoms. Although FASTLANE II was open to cisgender and transgender men and women, only cisgender men and women participated in the study. Inclusion and exclusion criteria for the secondary data analysis were the same with the exception of being limited to women, and pregnancy intention, which was limited to trying to get pregnant since the current analysis was focused on women.

Participants were recruited through poster and media campaigns, street outreach, and referrals from local agencies and enrolled participants. Participants provided written informed consent and were paid \$30 for a 2-hour, baseline survey using audio computer-assisted self-interview technology. Topics included sociodemographic characteristics, drug and alcohol use patterns, sexual risk behavior and sexual health history, mental health, relationship dynamics, and violence victimization history. The FASTLANE II research protocol was approved by the Institutional Review Board (IRB) at the University of California, San Diego Human Research Protections Program (IRB Protocol #101396).

Dependent Variable

Self-reported lifetime history of STIs were assessed at baseline and included the following: gonorrhea ($n = 4$, 1.9%), chlamydia, non-gonococcal urethritis, or non-specific urethritis ($n = 8$, 3.8%), syphilis ($n = 2$, 1.0%), genital or anal warts ($n = 4$, 1.9%), genital or anal herpes ($n = 6$, 2.9%), chancroid ($n = 0$), hepatitis B ($n = 2$, 1.0%), hepatitis C ($n = 30$, 14.4%), trichomoniasis ($n = 17$, 8.1%), and/or any other venereal disease or STI ($n = 7$, 3.4%). Due to small cell counts for

individual STIs, we grouped all STIs to create a dichotomous variable (yes/no).

Independent Variables

Sociodemographic characteristics included age, race/ethnicity, and income. Recent PV was measured by asking participants two questions regarding their experiences of physical and/or sexual violence. Physical violence was defined as actual or threats to cause actual harm such as slapping, punching, kicking, hitting with an object, or assaulting with a knife or other weapon. Sexual violence was defined as being raped, experiencing forced sexual advances, or non-consensual sexual acts. Responses were as follows: “never,” “once in a while,” “fairly often,” and “very often.” We collapsed the last three response options due to low cell counts. Each question was asked separately by partner type: intimate partner (i.e., steady, boyfriend/girlfriend, spouse/live-in partners), casual (i.e., sex partner one only had sex with once or twice), and anonymous (i.e., sex partner one did not know and no money was exchanged) in the past 2 months. Responses were collapsed to create recent PV, which was then categorized as no violence, physical violence only, and sexual violence (with or without physical violence). Due to few incidents of sexual violence alone, there was no category for sexual violence only.

Sexual relationship power (SRP) was assessed using a modified version of the sexual relationship power scale, comprised of two subscales: relationship control and decision-making dominance. In the FASTLANE II study, 11 of the original 23 scale items were used to construct an overall SRP score (relationship control: nine items, Cronbach alpha = 0.74; decision-making dominance: two items, Cronbach alpha = 0.63). For the relationship control subscale, participants were asked their level of agreement on control over sexual activities within their relationships on a four-point Likert scale (strongly agree to strongly disagree). For the decision-making dominance subscale, participants were asked to reflect on decision-making within their sexual relationships and respond by stating who had more power over these decisions (your partner, both of you equally, and you). Scores from each subscale were calculated separately and then combined to create a total score. Scores ranged from 1 to 4 where higher scores indicate higher SRP.

Confounding Variables

Based on the literature, we included meth use and frequency of unprotected vaginal sex as confounding variables in the analysis. Meth use was measured by the number of days meth was used in the past 30 days. Unprotected vaginal sex in the past 2 months was measured by a series of questions that were asked separately for spouse/live-in/steady partners and casual/anonymous partners: “How many times did you receive vaginal sex (your partner inserted his penis into your vagina)?,” “When you received vaginal sex, how many times did your partner wear a condom?,” and “When you received vaginal sex from your partner, how many times did you wear a condom (i.e., a women’s condom)?” Frequency of unprotected vaginal sex for each partner type was determined by subtracting the number of times participants reported using condoms (self or partner use), from the reported number of times they had vaginal sex with their partners in the past 2 months.

Statistical Analysis

Statistical analyses were conducted on baseline data and compared sociodemographic characteristics, sexual and drug-related risk behaviors, and abuse history for participants who reported a lifetime history of STIs with those reporting no lifetime history of STIs. *T* tests and Wilcoxon’s rank sum tests were used to examine normally and non-normally distributed continuous variables, respectively. Binary outcomes were examined using Pearson’s Chi-square or Fisher’s exact tests. Univariate and multivariate logistic regressions were used to examine associations between recent PV, SRP, and lifetime STIs. Two models focused on PV perpetrated by: (1) spouse, live-in, or steady sexual partners ($n = 172$) and (2) casual and/or anonymous sexual partners ($n = 145$). Recent PV was categorized as no violence, physical violence only, or sexual violence with or without physical violence in the past 2 months. Although lifetime physical abuse and sexual abuse were examined in the descriptive analysis, these variables were not included in subsequent multivariate models due to multicollinearity between lifetime and recent experiences of abuse or violence. Further, the focus of the analysis was on recent PV and STIs. Confounding sociodemographic variables that were significant ($p < 0.20$) in the univariate models or cited in the literature as confounders in the association between physical

and/or sexual violence, and STI history were considered for inclusion in the multivariate models. Values were imputed for missing values for recent PV, education, and SRP. Unadjusted and adjusted odds ratios (AOR) and their 95% confidence intervals were reported.

Results

Of 209 women, over 80% of women had a sexual partner defined as spouse, live-in, or steady in the past 2 months; approximately 70% had a casual or anonymous sexual partner. The median age was 37 (interquartile range [IQR]: 29–44). Three-fourths made less than \$10,000 annually. Thirty-seven percent of participants were White, 27% were Black/African American, 21% were Hispanic/Latino, and 15% were other race(s).

Twenty-six percent of women reported ever having one or more STIs. Prevalence of lifetime physical violence and sexual violence was 78% and 57%, respectively. Approximately 20% of women experienced physical and/or sexual violence by a spouse, live-in, or steady partner in the past 2 months. Seven percent of women experienced physical and/or sexual violence by a casual or anonymous partner in the past 2 months. The median SRP score was 2.36 (IQR: 2.02–2.68).

Univariate Findings

Baseline comparisons of STI-positive and STI-negative women assessed by lifetime history suggested that the two groups were similar with respect to sociodemographic characteristics, with the exception of income (Table 1). Women with a lifetime history of STI were significantly more likely to have an annual income of less than \$10,000 compared with women without a history of STI. Specific to risk behaviors, there were no significant differences between the groups on days of meth use in the past month and unprotected vaginal sex with any type of sexual partner (i.e., spouse, live-in, or steady, and casual or anonymous) in the past 2 months. Similarly, groups did not differ in terms of SRP score; that is, there were no significant differences in the average SRP score.

Significant differences were found between the two groups and experience of PV. In terms of violence history, women who reported a lifetime history of STIs were more likely to report recent sexual violence with or without physical violence by casual/anonymous

Table 1 Characteristics of heterosexual women who use methamphetamine with and without a lifetime history of STI in San Diego, California ($n = 209$)

| Baseline characteristics | STI ($n = 55$) | No STI ($n = 154$) | Total ($n = 209$) | p value |
|---|------------------|----------------------|---------------------|-----------|
| Sociodemographics | | | | |
| Age in years, median (IQR) | 38 (33–44) | 36 (27–43) | 37 (29–44) | 0.12 |
| Race/ethnicity, n (%) | | | | |
| White | 26 (47) | 51 (16) | 77 (37) | 0.23 |
| Black/African American | 10 (18) | 46 (30) | 56 (27) | |
| Hispanic/Latino | 11 (20) | 33 (21) | 44 (21) | |
| Other | 8 (15) | 24 (33) | 32 (15) | |
| Annual income, n (%) | | | | |
| ≥ \$10,000 | 7 (13) | 45 (29) | 52 (25) | 0.02 |
| < \$10,000 | 48 (87) | 109 (71) | 157 (75) | |
| Risk behaviors | | | | |
| Median days of meth use in past month (IQR) | 15 (3–25) | 15 (7–21) | 15 (5–21) | 0.78 |
| Frequency of unprotected vaginal sex with spouse, live-in, or steady partner in past 2 months, median (IQR) | 10 (4–40) | 15 (5–30) | 13 (5–30) | 0.87 |
| Frequency of unprotected vaginal sex with casual or anonymous partner in past 2 months, median (IQR) | 2 (1–7) | 4 (0–10) | 3 (0–8) | 0.65 |
| Abuse history | | | | |
| Ever physically abused, n (%) | 43 (80) | 121 (79) | 164 (78) | 1.00 |
| Ever sexually abused, n (%) | 38 (69) | 82 (53) | 120 (57) | 0.06 |
| Violence by spouse, live-in, or steady partners in the past 2 months, n (%) | | | | |
| Physical only | 7 (15) | 20 (16) | 27 (15) | 0.70 |
| Sexual with or without physical | 5 (11) | 9 (7) | 14 (8) | |
| No recent violence | 34 (74) | 100 (78) | 134 (77) | |
| Violence by casual or anonymous partners in the past 2 months, n (%) | | | | |
| Physical only | 3 (7) | 5 (5) | 8 (5) | 0.02 |
| Sexual with or without physical | 5 (12) | 2 (2) | 7 (5) | |
| No recent violence | 33 (80) | 99 (83) | 132 (90) | |
| Sexual relationship power, median (IQR) | 2.35 (2.08–2.57) | 2.37 (2.05–2.69) | 2.36 (2.02–2.68) | 0.44 |

STI sexually transmitted infection, IQR interquartile range

partners (12% vs. 2%; $p = 0.02$). Generally, all variables significant at $p < 0.2$ were included in the multivariate model (see the “Statistical Analysis” section). While SRP was not found to be significant in the univariate analysis, due to the focus of the current study, this variable was included in the final models.

Multivariate Findings

Table 2 shows findings from the multiple regression analysis. The first model that focused on recent PV

by spouse, live-in, or steady sexual partners showed no significant associations with lifetime STI history. The second model that focused on recent PV by casual or anonymous sexual partners showed that women who reported recent sexual violence with or without physical violence by a casual/anonymous sexual partner were approximately 8 times more likely to ever have an STI compared with those with no history of recent PV (AOR: 7.70; 95% CI: 1.32, 44.84). SRP was not associated with lifetime STI history in either model.

Table 2 Multiple logistic regression of the associations between recent partner violence, sexual relationship power, and lifetime history of STIs by partner type among heterosexual women who use methamphetamine in San Diego, California

| Variable | Spouse, live-in, or steady partner (<i>n</i> = 175) | | Casual or anonymous partner (<i>n</i> = 147) | |
|---------------------------------|--|-----------|---|------------|
| | AOR | 95% CI | AOR | 95% CI |
| Recent violence | | | | |
| Physical only | 1.31 | 0.48–3.60 | 1.31 | 0.24–7.10 |
| Sexual with or without physical | 1.27 | 0.37–4.29 | 7.70 | 1.32–44.84 |
| Sexual relationship power | 0.71 | 0.30–1.70 | 0.82 | 0.33–2.06 |

STIs sexually transmitted infections, AOR adjusted odds ratio, CI confidence interval. Reference group for recent abuse is no physical or sexual abuse by a partner in the past 2 months. Confounders include age, race/ethnicity, annual income, meth use in the past month, and unprotected vaginal sex in the past 2 months

Discussion

This study contributes to the existing literature by exploring the relationship between PV, SRP, and self-reported STI diagnosis among women who use meth. Specifically, it provides a comparison of the sexual health of women who report abusive steady partners versus those who report abusive casual partners. Our findings support a positive relationship between sexual violence perpetrated by casual/anonymous partners and lifetime STI history among women who use meth. Specifically, women who use meth and had experienced sexual violence from casual/anonymous partners in the previous 2 months were nearly 8 times more likely to report having a lifetime history of STIs compared with those who were not abused by casual/anonymous partners. This association was not significant among women who use meth and reported experiences of physical violence and/or sexual violence from steady partners.

Previous research has documented an association between substance abuse and sexual risk behaviors [22] and the moderating role of partner type on the relationship between alcohol use and sexual risk-taking [18]. There is a stronger relationship between alcohol use and risk-taking among those who reported having sex with non-steady or casual partners compared with those who reported having sex with steady partners. However, to our knowledge, the present study is the first one to examine the association between violence perpetrated by different partner types (steady versus non-steady/casual) and sexual risk behavior among women who actively use drugs.

This research draws from the SAVA syndemic and builds upon prior research on the role of partner type on the relationship between drug use and sexual risk-taking

[6, 14]. Multiple structural, biological, and behavioral syndemic mechanisms link substance use and sexual violence to STI risk increasing the likelihood of HIV acquisition. Sexual venues that cater to people who use meth (e.g., sex clubs, bathhouses) have been associated with anonymous sexual encounters, increased number of sexual partners, aggressive sexual behaviors, and HIV risk [23, 24]. These venues have also been associated with increased odds of having unprotected receptive anal sex with an infected partner, which subsequently increases the chance of contracting an STI by 2–3-fold [25]. Recent research has linked meth use to increased rectal mucosal inflammatory cytokine production, which may increase STI risk [26]. Additionally, the pharmacological effects of meth use have been shown to cause changes in the brain's dopamine system, thereby increasing libido and impairing judgment and the ability to recognize cues and fend off sexual violence for women under the influence [27]. Our finding that sexual violence perpetrated by casual/anonymous partners is associated with an increased likelihood of lifetime STI history among women who use meth aligns within the SAVA syndemic framework.

There are a number of study limitations rooted in the data collection format (self-report) of the current study, and specifically in the collection of data related to lifetime STI diagnoses. Limited access to care throughout the participant's life creates an unclear history of sexually acquired infections, specifically when and how the participant contracted the STI. Specifically, we cannot say definitively that an STI infection was contracted from a recent partner, or that the infection was contracted through sexual contact. Additionally, social desirability biases may deter participants from self-reporting an STI, and even recall biases may have

impacted the reporting of infections during interviews. Although we were able to detect associations based on a lifetime measure of STI diagnosis, utilization of a more proximal measure such as past year STI diagnosis would allow for stronger inferences to be made. Future research should incorporate methods to establish clear sexual histories and timelines and assess recent STI diagnosis as the outcome.

This analysis was limited in the inability to account for unprotected anal sex, a risk factor for STIs, as a potential confounder in the association between physical and/or sexual PV and lifetime STI history. This was due to limited number of unprotected anal sex acts reported, which could have been a result of the short, past 2-month timeframe for these questions. However, we were able to account for unprotected vaginal sex in the multivariate analysis, another risk factor for STIs.

This study utilized the SRPS to measure the concept of sexual relationship power. While this measure has been validated in a number of samples, it has not been tested among people who use drugs. The culture of drug use may contribute to increased risk of PV and therefore should be included in measures of SRP. Additionally, when asked about SRP, participants were asked to reflect on all types of sexual partners. This approach created some ambiguity regarding to whom participants were referring when reflecting on power within their relationships, and if this was the same person identified as the perpetrator of their recent experiences of PV. Lastly, the cross-sectional nature of this study limits the ability to establish causality. However, a strength of the study was that the population was not limited to those seeking drug treatment, thereby providing us with access to a hard-to-reach group of women meth users for future comparisons with non-users.

Research suggests that PV and substance abuse among girls and women have a bidirectional relationship, varying by type of substance. For example, similar to meth, for women users of other stimulants such as cocaine, PV was very common, and a positive association between experiencing different types of PV and STI has been documented [28]. Our study sample had a high prevalence of PV; both physical and sexual, which is not surprising since research has shown that meth users have commonly been subjected to lifetime traumatic experiences that correlate with both PV victimization and perpetration [29].

Although SRP was not associated with increased STI in this sample, the role of SRP in the association between PV and STI cannot be excluded. Future research should examine the role of meth users' engagement in sex trading relationships to procure drugs, power dynamics, and risks for violence and STI [30]. STI prevention strategies for women who use meth should account for the individual behavioral and social factors that promote both substance use and STI risk in women. Overall, the current research highlights that women who use methamphetamine need help in navigating partner violence experiences. Risk reduction interventions to support this marginalized population are needed. It is also important to delineate the type of sexual partner perpetrating recent PV in future-related studies and prevention efforts. Our study has also demonstrated that income level was associated with an increased likelihood of STI in women who use meth; this should also be taken into consideration when tailoring prevention strategies.

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