A Longitudinal Analysis of the Substance Abuse, Violence, and HIV/AIDS (SAVA) Syndemic Among Women in the Criminal Justice System.

Abenaa Acheampong Jones, PhD[1], **Travis Gerke, ScD**[2], **Catherine W. Striley, PhD, MSW**[3], **Vicki Osborne, MSc**[3], **Nicole Whitehead, PhD**[4], and **Linda B. Cottler, MPH, PhD**[3]

[1]Postdoctoral Fellow, Department of Mental Health, Johns Hopkins School of Public Health, Baltimore, MD, USA

[2]Assistant Member, Moffitt Cancer Center, Tampa, FL, USA

[3]Department of Epidemiology, University of Florida, Gainesville, FL, US

[4]Department of Clinical and Health Psychology, University of Florida, Gainesville, FL, USA

Abstract

Using data from a randomized controlled trial of 319 women mainly recruited from a Municipal Drug Court System in St. Louis, MO, this study evaluates substance use, victimization, and HIV/AIDS risk behaviors over time. The results indicated that for all participants, the likelihood of victimization, using drugs, and meeting the criteria for HIV/AIDS risk, decreased by 46% by the 8-month follow-up, however, results did not differ significantly by intervention group. Women who were sexually abused as a child, had 4+ arrests, or believed they had sexual and drug-using behaviors that need changing at baseline were more likely to experience these issues over time.

Keywords

SAVA; substance use; women; criminal justice; HIV; violence

Introduction

Syndemics are defined as two or more inseparable epidemics working synergistically to produce excessive adverse health and social consequences (Singer, 1996; Singer, 2006; Singer, 2009). The intersection of substance abuse (SA), violence (V) and HIV/AIDS (A), known as the SAVA syndemic, is an anthropologic term defined as the "concurrent, intertwined, and mutually reinforcing health and social problems of substance use, violence, and HIV/AIDS" (Singer, 1996; Meyer, Springer, & Altice, 2011). Studies have documented

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the link between substance use, risky sexual behaviors, and exposure to violence (Gilbert et al., 2015; Sullivan, Messer, & Quinlivan, 2015; Illangasekare, Burke, McDonnell, & Gielen, 2013; Russell, Eaton, Peterson-Williams, 2013; Meyer et al., 2011).

Of particular interest are women involved in the criminal justice system, who are known to have significantly elevated rates of SAVA compared with those in the general population (Meyer et al., 2011; Roth et al., 2012; Fulkerson, Keena, & O'Brien, 2013; Beckwith et al., 2010; Sevigny, Fuleihan, & Ferdik, 2013; Peters, Kremling, Bekman, & Caudy, 2012) and men in the judicial system (Messina, Grella, Cartier, & Torres, 2010; Klein, Elfison, & Sterk, 2008). A better understanding of the SAVA syndemic among women, along with understanding interventions that reduce SAVA among women in criminal justice settings is vital to improve health and behavioral outcomes among this population.

To understand and design interventions to reduce SAVA, it is necessary to assess social, environmental, and political influences that propagate the SAVA syndemic, particularly among those in the criminal justice system (Russell, Eaton, & Petersen-Williams, 2013; Singer, 1996; Singer, 2006; Singer, 2009). For example, criminal justice involvement may contribute to HIV-risk behaviors by disrupting stable social networks, economic situations, and intimate relationships. These disruptions can lead to high-risk sexual behaviors like concurrent and multiple sexual partners and trading sex for money and other resources (Khan et al., 2015; Epperson et al., 2010; Freudenberg, 2009; Plefieger et al., 2013; Sharpe et al., 2012). High-intensity drug use areas and social norms and peer groups are also linked with higher rates of drugs and crimes, which have also been linked to HIV/STI clusters and their associated risk behaviors (Jennings et al. 2013; Sharpe et al. 2012; Tripodi et al., 2013). Furthermore, the War on Drugs, and other policies that lead to residential segregation and to the concentration of poverty and illicit drugs in various geographical districts, have led to a dramatic increase in incarcerated individuals, and contribute to the SAVA syndemic (Adimora et al., 2005; Jennings et al. 2013; Sharpe et al. 2012; Tripodi et al., 2013).

Because women are now the fastest growing population in the criminal justice system, and the SAVA syndemic is elevated among women, behavioral interventions tailored to the needs of this population are warranted (Tripodi & Pettus-Davis, 2013; Blankenship et al., 2015; Binswanger et al., 2010; Messina et al., 2010). Gender-based research and interventions are especially needed in the criminal justice system as female recidivism in part has been attributed to a lack of female-oriented drug and behavioral interventions (Tripodi & Pettus-Davis, 2013; Messina et al., 2010). There is also a need for gender-specific health behavior interventions that provide social support and access to social services for female offenders, especially considering their higher rates of negative life events such as poverty and trauma (Blankenship et al., 2015; Binswanger et al., 2010; Messina et al., 2010).

In a systematic review of the SAVA literature, Meyer and colleagues (2011) found that studies pertaining to SAVA among criminal justice populations mainly focused on the impact of substance use and victimization on HIV risk-taking. In a recent assessment of the scientific literature on women who use drugs, El Bassel and Strathdee (2015) highlighted the need for studies that illustrate the prevalence of SAVA among vulnerable groups of women, with special attention towards incarcerated women and women in alternative to incarceration

programs. Additionally, the authors highlighted a need for studies that focused on violence and risky sexual behaviors among vulnerable subpopulations, along with studies on the effect of race and socioeconomic status among drug-using women. The current study aims to address these gaps in research by assessing the longitudinal prevalence of SAVA among criminal justice involved women.

Specifically, we aim to: 1) evaluate the association between a peer-partnered case management intervention and decreases in the likelihood of SAVA over time; 2) assess the strength of relationships between violence, substance use, and HIV/AIDS risk by assessing the effect of the initial prevalence of these issues on longitudinal outcomes; and 3) determine the effect of race and socioeconomic status (education and stable housing) at baseline on SAVA over time. We hypothesize that: 1) the peer-partnered case management intervention is associated with decreased likelihood of SAVA over time, 2) the initial prevalence of violence, substance use, and HIV/AIDS risk is associated with longitudinal outcomes of these issues, with baseline substance use having the strongest effect on violence and HIV/AIDS risk over time, and 3) African-American race, lower education, and unstable housing at baseline is associated with an increased likelihood of SAVA over time.

Methods

Outreach and Recruitment

The data for this study comes from the Sisters Teaching Options for Prevention project (STOP) (R01NR09180, PI: Cottler), a randomized controlled field study featuring a gender-focused behavioral intervention to reduce high-risk drug and sexual behaviors among female offenders. For the STOP study, research staff members were present at the Municipal Court System of St. Louis, Missouri to recruit women present in court between the years of 2005-2008. The sample source of STOP participants came from 1,150 individuals, mainly from city drug courts (78%), state drug courts (12%), and from other types of courts or the community (10%). To be eligible, the women had to be at least 18 years of age, intend to remain in St. Louis for the study period, and have no major cognitive impairments. Of these individuals, 640 or 56% were eligible for the STOP study. Of those eligible, 279 were not interviewed due to a lack of interest or did not show up to their baseline interview. An additional 42 individuals did not complete all the required baseline assessments, leaving 319 participants who were interested, went through the written informed consent procedures, and completed all baseline assessments.

Interviews took place at HealthStreet (a community engagement site) at a time convenient to the women, including evening and weekend options. After written consent was obtained by the research coordinator, the interviewer entered the private room, turned on a recorder, and proceeded to follow the structured interview. The baseline assessments consisted of two interviews conducted: 1) a review of the informed consent, study commitment form, a collection of urine for drug use, chlamydia, and gonorrhea testing, and an assessment of substance use and risky sexual behaviors. At the end of the interview, the research coordinator entered the room for the pretest counseling and HIV testing. Women underwent pre-HIV test counseling with a short educational session on how to reduce risky sexual behaviors and drug use. After that, blood samples were drawn for HIV and Hepatitis C Virus

(HCV). 2) Two weeks later, women returned for an assessment of psychiatric disorders, health services utilized, and history of exposure to violence.

After these rounds of assessments, women received the results of their sexually transmitted infections (STI) testing along with posttest HIV counseling. Of the women tested, 22% were positive for HCV. A small number of women tested positive for each of the remaining STIs tested (less than 5% for each STI). Women were given details on treatment options and services. A strength of STOP was that it addressed the often ignored STI prevention services among drug court enrollees (Robertson, St. Lawrence, & McCluskey, 2012).

Study Conditions

After the baseline assessments and HIV/STI testing, participants were randomized to intervention condition. The research coordinator opened a sealed envelope and gave the participants their randomization status, which had been prepared in advance using a random number generator. This intervention assignment was placed in a sealed in an envelope to keep interviewers and the coordinator blind to assignment until it was made.

The Standard Intervention (SI) included the standard National Institute on Drug Abuse pre and posttest counseling. Of the 319 women, 155 were randomized to the SI, while 164 were randomized to the Peer-Partnered Case Management Intervention (PPCMI). For those in the SI condition, the coordinator scheduled the posttest counseling and all follow-up visits, and gave each woman a calendar and packet of educational materials. For those randomized to the PPCMI intervention, the peer partner then met with the woman to outline their availability to help with the tasks assigned by the judge and to provide support for succeeding in drug court. With the PPCMI intervention, women could receive 40 hours of case management over a 10-week period with a peer partner. They also had the option to use assistance from their peer partner to apply for medical assistance, government aid, parenting classes, or GED training. Peer partners also provided transportation to services assigned by the judge. While being transported, the women watched a series of DVDs in the van on safe sexual behaviors and general education regarding health. Current recommendations on needed interventions for women who use drugs advocate for the integration of sexual health education, sexual health services, and drug treatment (Malinowska-Sempruch, 2015). The PPCMI was a novel intervention as it incorporated the aforementioned factors, along with practical support such as transportation, and social support with the involvement of a peer mentor. Peer partners served as positive examples, as some were previously in the court system themselves. Fidelity of the intervention was assessed as peer partners tracked the number of hours and detailed the types of activities and support given to participants.

All participants were interviewed using the Washington University Risk Behavior Assessment (WU-RBA), the Violence Exposure Questionnaire (VEQ), and other assessments (Shacham & Cottler, 2010). The WU-RBA, adapted from NIDA's Risk Behavior Assessment, assessed risky sexual and drug-using behaviors, perceptions of risky sexual and drug-using behaviors, and demographics (Needle et al., 1995), while the VEQ, derived from the Conflict Tactic Scale assessed current and past violent experiences (Strauss, 1979). Following their baseline session and randomization, participants were followed with the same assessments at a 4 and 8-month follow-up. Participants were

remunerated $10 for the completion of the 4 and 8-month follow-ups. For women in the SI, their 4-month follow-up was scheduled immediately after baseline interviews, while the 4-month follow-up was scheduled immediately after the 10-week intervention for the PPCMI group. Study procedures were approved by the Washington University of St Louis' Institutional Review Board.

Main Exposures

The main exposures were the assigned intervention (PPCMI vs. SI), and socio-demographic factors such as: race (black vs. non-black), education (high school diploma or higher vs. no high school diploma), unstable housing (living on the streets, with others, shelters etc. vs. living in own house or apartment), and age (18-29 years of age vs. 30+).

Outcome Measures

Violence.—Exposure to violence was assessed by 1) "During the past 4 months, has anyone attacked you with a gun?", 2) "During the past 4 months, has anyone pressured or forced you to participate in sexual acts against your will?", 3) "During the past 4 months, has anyone abused you emotionally, that is, did or said things to make you feel very bad about your life?", 4) "During the past 4 months, has anyone hurt you to the point that you had bruises, cuts, broken bones, or otherwise physically abused you?", and 5)"During the past 4 months, has anyone attacked you with knife, stick, bottle, or other weapon?" Women who reported at least one of these were categorized as having experienced violence in the past 4 months.

HIV/AIDS Risk.—To be considered at risk for HIV/AIDS, participants must have reported at least one risky sexual partner (an injection drug user or having other sexual partners simultaneously) OR 2+ sex partners in the past 4 months AND 1 or more reported unprotected sex acts in the past 4 months (any unprotected oral, vaginal, or anal sex). This definition has been used previously to capture those who are at risk for HIV/AIDS and other STIs, rather than using the common single measure approach (e.g. unprotected sex) (Meyer, Springer, & Altice, 2011).

Substance Use.—To assess recent substance use, women were asked "How many days have you used (drug)" followed by a question regarding how many times a day each drug was used and if they reported using a specific substance at least once in the past 30 days. Recent substance use was defined as using any substance (crack/cocaine, marijuana, stimulants, and heroin) at least once in the past 30 days.

SAVA Criteria.—Based on our definition of violence, HIV/AIDS risk and substance use, a four-level variable was created to assess SAVA. This variable ranged from "0" (indicating that no SAVA component criterion was met), "1" (one SAVA component criterion met), "2" (two SAVA component criteria met), "3" (all three SAVA component criteria met). Participants who met all three criteria (substance use, violence, and HIV/AIDS risk) were categorized as having the SAVA syndemic. Research on SAVA and related syndemics have holistically measured syndemics using a similar approach (Yellin et al., 2018; Sullivan, Messer, & Quinlivan, 2015).

Covariates

Covariates included social support (defined as having someone to talk to and ask for favors), number of arrests greater than the 25th percentile of reported arrests in the sample (4+ lifetime arrests vs. less than 4 lifetime arrests), high religion/spirituality (defined as viewing religion and spirituality as very important, attending religious services regularly, and seeking advice from religious leaders all in the past 12 months vs. low or no religion/spirituality), childhood parental separation (separated 6+ months from parents before the age of 15 vs. no or less than 6+ months separation from parents before the age of 15), and child sexual abuse (CSA) defined as having experienced child sexual abuse before age of 15).

Analysis

Of the 319 STOP participants at baseline, 261 completed the 4-month interview, and 282 completed the 8-month interview. To address the issue of missing data, multiple imputation was used to generate plausible values for the missing values which would allow all available data to be used, thus preserving statistical power while also providing an appropriate estimation of standard errors through repeated imputation (imputation number=10). Analyses revealed that separation from at least one parent for 6 months or more (p-value <. 02) and arrest history (p-value <.01) were significant predictors of missingness; however, intervention group was not (Figure 1). Variables related to missingness were included in the imputation model to meet the missing at random (MAR) assumption. All analyses were conducted using SAS 9.4.

Multivariate Poisson regressions using generalized estimating equations (GEE), which specified a working correlation structure of autoregressive, were used to estimate the relative risks of correlates of SAVA over time (all three criteria vs. less than 3 or none), along with individual criterion over time (substance use (any substance use vs. no use), violence (any exposure to violence vs. no exposure), and HIV/AIDS risk (yes vs. no). To account for the fact that changes in behavior are often short-term and tend to wane over time, the effect of time was assessed as non-linear. An alpha correction was also implemented to control for multiple testing. Because 4 multivariate regression analyses were conducted, only correlates significant at p <.0125 were considered significant. In addition, a sensitivity analyses, using only complete data, revealed negligible differences between regression estimates of imputed data and complete case analyses.

Results

Socio-Demographic Characteristics

In our sample, 71% of the women were African-American, nearly half had less than a high school diploma (46%), and under a third were between the ages of 18 to 29 (27%) while more than a third were ever married (36%) (Table 1). In addition, women reported a high percentage of unstable housing (76%), child sexual abuse before the age of 15 years of age (51%) and having 4 or more arrests (70%). Just over half were randomized to receive the SI +PPCMI intervention (51%), while the others were assigned to the SI only intervention.

Exposure to Violence, Substance Use, and HIV/AIDS Risk over Time

Almost half of the women reported at baseline using illicit substances in the past 30 days (47%), this rate was 38% by the 8-month follow-up (Table 2). The most commonly used substances were crack/cocaine (baseline: 34%, 8-month: 27%) and marijuana (baseline: 29%, 8-month: 22%).

Exposure to violence in the past 4 months was consistently high, though decreases over time were evident (Table 2). Regarding HIV/AIDS risk, nearly half of the women were categorized as at risk at baseline (they had 2+ sex partners or at least one risky partner AND had reported at least one unprotected sex act) (Table 2).

SAVA Among the Sample

Overall, 17% of the women reported recently using an illicit substance, experiencing at least one incident of violence, and met criteria for HIV/AIDS risk behaviors in the past 4 months (considered positive for the SAVA syndemic); however, the percentage of women classified with SAVA dropped to 9% by the 8-month follow-up (Table 2).

Multivariate Poisson Regressions

A multivariate Poisson regression model was used to obtain relative risk estimates on correlates of substance use, violence, HIV/AIDS risk, and overall SAVA over time (Table 3). Women who believed at baseline that they had risky drug-using behaviors that needed changing were significantly more likely to continue to use substances over time (RR 1.76, 95% CI: 1.37, 2.26). Participants who were black, had greater number of arrests, or low in religion/spirituality were significantly more likely to use substances over time than individuals who did not report these characteristics.

Though exposure to violence was high among our sample, the risk of experiencing violence over time decreased by nearly 20% at the 4-month follow-up (RR .81, 95% CI: .70, .93) and by over 30% by the 8-month follow-up (RR .67, 95% CI: .58, .79). Interestingly, the most robust correlate of exposure to violence over time was child sexual abuse (RR 1.55, 95% CI: 1.29, 1.89). An interaction between intervention group and the 4 and 8-month time points revealed that significant differences between intervention groups and follow-up time were not evident.

The likelihood of meeting the criterion of HIV/AIDS risk decreased by 32% at the 4-month follow-up (RR .68, 95% CI: .56, .83) and by 46% by the 8-month follow-up (RR .54, 95% CI: .43, .67). Women who had risky sexual behaviors that needed changing were significantly more likely to be at risk for HIV/AIDS over time than women who did not believe they had risky sexual behaviors that needed changing (RR 1.82, 95% CI:1.44-2.30). However, a significant interaction between sexual risk perception and time was not evident, meaning that women who believed they had risky sexual behaviors that needed changing at baseline were just as likely to decrease their risk of HIV/AIDS over time as women who did not. Significant correlates for risk for HIV/AIDS over time included baseline exposure to violence (RR 1.42, 95% CI: 1.11-1.84). The intervention group was not associated with HIV/AIDS risk over time.

When examining the initial baseline prevalence of violence, substance use, and HIV/AIDS risk on the longitudinal outcomes of these issues, we found that women who experienced violence at baseline were more likely to meet the criterion for HIV/AIDS risk over time (RR 1.42, 95% CI: 1.11-1.84). However, women who met the criterion for HIV/AIDS risk at baseline were more likely to experience violence over time (RR 1.43, 95% CI: 1.21-1.70). Baseline violence and HIV/AIDS risk were not significantly associated with substance use over time.

Overall, the likelihood of SAVA (experiencing violence, using drugs, and meeting the criterion for HIV/AIDS risk), significantly decreased by over 40% at 8-months (RR .54, 95% CI: .35-.81), though a significant change was not evident at the 4-month follow-up. The likelihood of SAVA over time was higher among women who had experienced child sexual abuse (RR 1.90, 95% CI: 1.20-2.99), had 4+ arrests (RR 2.28, 95% CI: 1.17-4.40), or believed they had sexual and drug-using behaviors that need changing at baseline (RR 3.85, 95% CI: 1.32-11.18). However, the intervention group was not significantly associated with SAVA over time.

Discussion

We evaluated the association between a peer-partnered case management intervention and decreases in the likelihood of SAVA over time. Though the likelihood of SAVA significantly decreased by the 8-month follow-up, our results did not support our hypothesis that the PPCMI would be associated with decreases in the likelihood of SAVA over time. This suggests that the reductions in the likelihood of SAVA, as well as reductions in HIV/AIDS risk and exposure to violence over time, were as pronounced among those in the PPCMI group as they were for those in the SI group.

Furthermore, though women in the PPCMI group could receive up to 40 hours of peer-partnered case management, the clear majority did not complete more than 20 hours of the intervention. Uptake of the intervention may have been difficult because of the rigorous requirements of drug court. Moreover, many of the women faced harsh realities. For example, nearly 80% did not have a stable place of their own to stay. Such factors, along with substance use and legal issues, may all have contributed to the suboptimal uptake of the PPCMI intervention. These findings suggest that more research on intervention uptake on marginalized and vulnerable populations are needed. Our findings also indicate the serious need for alternative to incarceration programs to identify and assist program members with their essential needs. Addressing the basic needs of participants may allow them to fully utilize the various treatments offered and maximize positive outcomes. Had the women used all intervention elements, current research supports the hypothesis of a reduction in the likelihood of SAVA. Corsi et al. (2012) found that case management reduced the risky drug and sexual behavior in methamphetamine users; while others have found that former female drug court enrollees believed that social support from other females who were previously substance users (the background of some peer partners) and social services where vital to successful completion of drug court (Fischer, Geiger, & Hughes, 2007).

The second aim of this study was to determine the strength of relationships between violence, substance use, and HIV/AIDS risk by assessing the effect of the initial prevalence of these issues on longitudinal outcomes. We hypothesized that the initial prevalence of violence, substance use, and violence would be associated with the longitudinal outcomes of these issues. However, baseline substance use would have the strongest effect on violence and HIV/AIDS risk over time. Our results found that baseline substance use was only marginally associated with HIV/AIDS risk over time but was not associated with a significantly increased risk of violence over time. We also found that baseline violence was associated with HIV/AIDS risk over time and vice versa. Baseline violence and HIV/AIDS risk were not significantly associated with substance use over time.

Our third aim determined the effect of race and markers of socioeconomic status such as education and stable housing on SAVA over time. Previous studies have shown that issues related to SAVA are exacerbated in women who are low-income, homeless, and lack financial and social support (Blankenship, Reinhardt, Sherman, El-Bassel, 2015; Peters et al., 2012; Jennes et al., 2011; Martin et al., 2010; Blankenship et al., 2015; Sharpe et al., 2012). Our hypothesis that race, lower education, and unstable housing at baseline would be associated with an increased likelihood of SAVA overtime was mostly unsupported. The lack of association may be because a significant proportion of our sample had these characteristics, limiting variability. The lack of association may also be attributed to the fact that these women were in drug court, a criminal justice intervention which offers additional support for vulnerable women.

Study limitations include the fact that our sample was not randomly selected, decreasing the generalizability of results to all females in drug court. Our study also relied on self-report data on sensitive questions, which can lead to the social desirability bias and underreporting of risky behaviors. In addition, while all illicit drugs that were assessed at every time interval were considered in this study, we did not have such data for alcohol use. However, our study features a relatively large sample of an under-researched population and a rich data set with detailed items on substance use, violence, risky sexual behaviors, and perceptions of these behaviors.

Our findings illustrated a significant reduction in victimization and HIV-risk over time among women in the study. However, these significant reductions did not differ by intervention groups. Significant reductions in substance use over time were not found, suggesting a need for more research on intervention uptake, along with intensive drug cessation interventions in this population. Our study also highlights the strong need to address the basic needs (e.g. housing) among criminal justice involved women, particularly those in drug court who juggle their harsh realities in addition to their legal requirements. Moreover, our study consistently found that women who reported that their sexual and drug-using behaviors needed to change were less likely to change their risky behaviors over time. Future interventions should directly assess participant's perception of their behaviors and offer further intensive interventions to assist them in reducing their risky behaviors. In addition to studies on intervention uptake, future studies should examine the existence of heterogeneous subgroups of women within the female offender population and evaluate

whether changes in drug use, sexual behaviors, and exposure to violence differ by such groups.

Acknowledgements:

Biography

Abenaa Acheampong Jones, PhD, is a postdoctoral fellow in the Department of Mental Health at the Johns Hopkins University Bloomberg School of Public Health. Her current research focuses on risk factors and interventions pertaining to drug use and HIV/AIDS.

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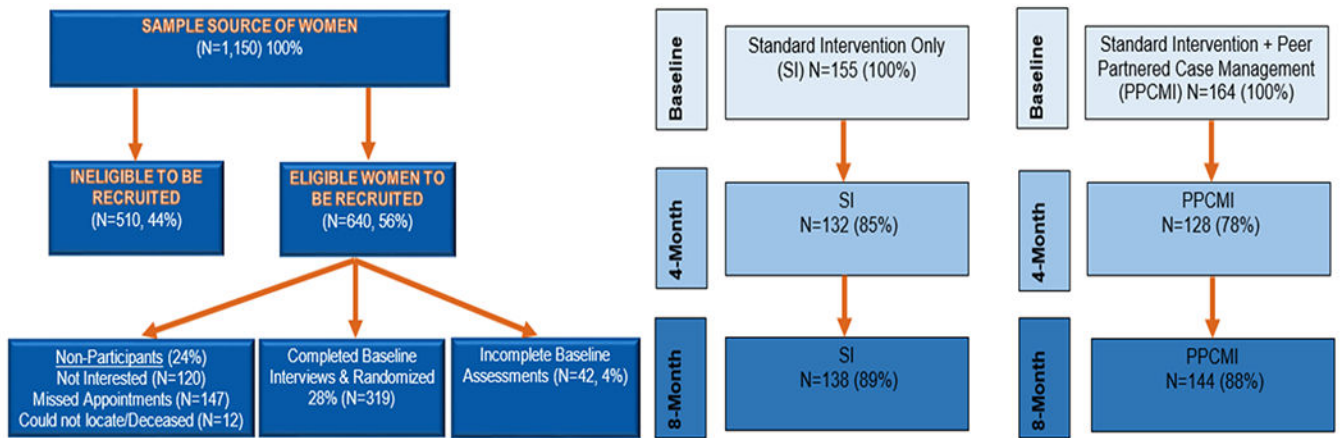
Figure 1.
Sample Source and Flow Log on Attrition by Intervention Group

Table 1.

Baseline Socio-Demographic Characteristics of Sample (N=319)

Socio-Demographic Characteristics at Baseline	PPCMI (N=164) N (%)	SI (N=155) N (%)	Total (N=319) N (%)	P value
African-American	121 (74%)	104 (67%)	225 (71%)	0.19
Ever married	53 (32%)	61 (39%)	114 (36%)	0.19
18-29 years of age	47 (29%)	40 (26%)	87 (27%)	0.58
Has social support	134 (82%)	113 (73%)	247 (77%)	0.06
Less than high school diploma	80 (49%)	67 (43%)	147 (46%)	0.32
Child Sexual Abuse	76 (47%)	87 (56%)	163 (51%)	0.08
Separated from Parents in Childhood (6+ mos.)	115 (71%)	115 (74%)	230 (72%)	0.47
More than 4 arrests	118 (72%)	106 (68%)	224 (70%)	0.49
Unstable Housing	118 (72%)	125 (81%)	243 (76%)	0.07
High Religion/Spirituality	38 (23%)	32 (21%)	70 (22%)	0.59
Recruited from Municipal Drug Court System	145 (88%)	137 (88%)	282 (88%)	0.99
Perceived to Have Risky Sexual Behaviors that Need Changing	65 (40%)	74 (48%)	139 (44%)	0.14
Perceived to Have Drug-Using Behaviors that Need Changing	85 (52%)	61 (40%)	146 (46%)	0.03
Any Drug Use	78 (48%)	72 (46%)	150 (47%)	0.84
HIV Risk	68 (42%)	75 (48%)	143 (44%)	0.21
Violence	87 (53%)	94 (61%)	181 (58%)	0.17

Table 2.

Longitudinal Assessment of SAVA Components Over Time

SAVA in the Past 4 Months	Baseline (N=319)	4-Month Follow-Up (N=261)	8-Month Follow-Up (N=282)	p-value 4-Month Follow-Up	p-value 8-Month Follow-Up
Violence Components					
Was threatened with a gun					
No	308 (97%)	257 (98%)	278 (99%)		
Yes	11 (3%)	4 (2%)	4 (1%)	.15	.13
Was pressured or forced to participate in sexual acts					
No	291 (91%)	239 (92%)	272 (96%)		
Yes	28 (9%)	22 (8%)	10 (4%)	.96	<.01
Emotionally abused					
No	152 (48%)	155 (59%)	181 (64%)		
Yes	167 (52%)	106 (41%)	101 (36%)	<.001	<.0001
Physically abused (hurt to the point of bruises, cuts, broken bones)					
No	258 (81%)	228 (87%)	255 (90%)		
Yes	61 (19%)	33 (13%)	27 (10%)	.03	<.001
Attacked with knife, stick, bottle, or other weapon					
No	290 (91%)	247 (95%)	276 (98%)		
Yes	29 (9%)	14 (5%)	6 (2%)	.07	<.001
Any Violence (1+violence components)					
No	138 (43%)	145 (56%)	177 (63%)		
Yes	181 (57%)	116 (44%)	105 (37%)	<.001	<.0001
HIV/AIDS Risk Behavior Components					
Unprotected oral sex (performed)					
No	163 (51%)	167 (64%)	182 (65%)		
Yes	156 (49%)	94 (36%)	100 (35%)	<.001	<.0001
Unprotected vaginal sex					
No	120 (38%)	118 (45%)	143 (51%)		
Yes	199 (62%)	143 (55%)	139 (49%)	.03	<.0001
Unprotected anal sex					

SAVA in the Past 4 Months	Baseline (N=319)	4-Month Follow-Up (N=261)	8-Month Follow-Up (N=282)	p-value 4-Month Follow-Up	p-value 8-Month Follow-Up
No	291 (91%)	244 (93%)	263 (93%)	.23	.26
Yes	28 (9%)	17 (7%)	19 (7%)		
Any unprotected sex act (vaginal, anal, or oral)					
No	101 (32%)	107 (41%)	129 (46%)	<.01	<.0001
Yes	218 (68%)	154 (59%)	153 (54%)		
Number of sex partners (2+ vs. less than 2)					
No	172 (54%)	179 (69%)	207 (73%)	<.0001	<.0001
Yes	147 (46%)	82 (31%)	75 (27%)		
Risky partner (likely to be an IDU or have another partner)					
No	246 (77%)	218 (84%)	248 (88%)	.05	<.0001
Yes	73 (23%)	43 (16%)	28 (10%)		
HIV/AIDS risk behavior (risky partner OR 1+ sex partners AND 1+ unprotected sex act)					
No	176 (55%)	187 (72%)	218 (77%)	<.0001	<.0001
Yes	143 (45%)	74 (28%)	64 (23%)		
Substance Use (Number of Uses in Past 30 Days)					
Marijuana					
No	227 (71%)	199 (76%)	219 (78%)	.05	.04
Yes	92 (29%)	62 (24%)	63 (22%)		
Crack/Cocaine					
No	211 (66%)	185 (71%)	205 (73%)	.06	.02
Yes	108 (34%)	76 (29%)	77 (27%)		
Heroin					
No	306 (92%)	252 (97%)	272 (96%)	.62	.70
Yes	13 (4%)	9 (3%)	10 (4%)		
Stimulants					
No	317 (99%)	259 (99%)	281 (100%)	.84	.64
Yes	2 (1%)	2 (1%)	1 (0%)		
Any drug use in the past 4 months					
No	169 (53%)	157 (60%)	176 (62%)	.01	<.01
Yes	150 (47%)	104 (40%)	106 (38%)		

SAVA in the Past 4 Months	Baseline (N=319)	4-Month Follow-Up (N=261)	8-Month Follow-Up (N=282)	p-value 4-Month Follow-Up	p-value 8-Month Follow-Up
SAVA Components					
No criterion Met	58 (18%)	87 (33%)	111 (40%)	.04	<.01
One criterion met	102 (32%)	83 (33%)	89 (32%)		
Two criteria met	105 (33%)	62 (24%)	57 (20%)		
All criteria met (SAVA syndemic)	54 (17%)	29 (11%)	24 (9%)		

*
p-values were generated from unadjusted models assessing time and SAVA components

Table 3.

Correlates of Substance Use, Violence, HIV/AIDS, and SAVA Over Time

Variables	Substance Use Over Time RR (CI)	Violence Over Time RR (CI)	HIV/AIDS Risk Over Time RR (CI)	SAVA Over time RR (CI)
Black	1.64 (1.26, 2.14)	1.01 (.86, 1.19)	.90 (.72, 1.13)	1.23 (.79, 1.93)
Ever Married	1.24 (1.01, 1.52)	-----	-----	-----
18-29 years of age	1.03 (.82, 1.35)	1.06 (.89, 1.26)	1.12 (.87, 1.44)	1.03 (.65, 1.66)
Less than high school diploma	.98 (.81, 1.19)	.93 (.79, 1.10)	1.06 (.87, 1.32)	.90 (.62, 1.33)
Child Sexual Abuse	-----	1.55 (1.29, 1.89)	-----	1.90 (1.20, 2.99)
Separated from parents 6+mos	.95 (.77, 1.17)	1.13 (.91, 1.41)	-----	1.17 (.70, 1.97)
Arrested 4+ times	1.58 (1.22, 2.06)	1.29 (1.05, 1.55)	1.12 (.84, 1.49)	2.28 (1.17, 4.40)
Intervention Group (PPCMI)	.98 (.81, 1.19)	.89 (.76, 1.04)	.94 (.75, 1.17)	.90 (.60, 1.34)
Unstable Housing	-----	-----	1.37 (1.00, 1.88)	-----
Low Religion/Spirituality	1.37 (1.07, 1.74)	-----	-----	-----
Recruited from Court System	.85 (.64, 1.16)	.97 (.74, 1.28)	1.43 (.94, 2.17)	1.16 (.65, 2.10)
Baseline Violence	1.07 (.88, 1.33)	-----	1.42 (1.11, 1.84)	-----
Baseline Substance Use	-----	-----	1.13 (.90, 1.42)	-----
Baseline HIV/AIDS risk	-----	1.43 (1.21, 1.70)	-----	-----
I have risky drug-using behaviors that need changing	1.76 (1.37, 2.26)	-----	-----	.80 (.38, 1.69)
I have risky sexual behaviors that need changing	-----	-----	1.82 (1.44, 2.30)	.74 (.32, 1.67)
Time (4-month)	1.02 (.80, 1.33)	.81 (.70, .93)	.68 (.56, .83)	.70 (.48, 1.03)
Time (8-month)	.97 (.74, 1.28)	.67 (.58, .79)	.54 (.43, .67)	.54 (.35, .81)
Baseline risky drug use perceptions *Time (4-month)	.74 (.54, 1.01)	-----	-----	-----
Baseline risky drug use perceptions *Time (8-month)	.72 (.52, 1.00)	-----	-----	-----
Baseline risky drug use perceptions * Baseline risky sexual behavior perceptions	-----	-----	-----	3.85 (1.32, 11.18)

*Table represents 4 separate multivariate models (substance use, violence, HIV/AIDS Risk, SAVA)

*----- denotes that a variable was not included in the multivariate model due to a lack of significance in the unadjusted model