Published in final edited form as:

Drug Alcohol Depend. 2009 June 1; 102(1-3): 138–143. doi:10.1016/j.drugalcdep.2009.02.011.

Factors mediating and moderating the relationship between gender and utilization of health care among Puerto Rican drug users in New York

Sung-Yeon Kang and Sherry Deren

Abstract

This study examined factors that mediate and moderate the relationship between gender and utilization of mental health and medical services in the past year among Puerto Rican drug users (308 females; 892 males) recruited in New York City. Experience of sexual or physical abuse, injection drug use, relationship variables (e.g., having a sexual partner who is an injection drug user), and serious or chronic mental/medical conditions were used as potential mediators and moderators. Both sexual and physical abuse mediated gender effects on use of mental health services. Having chronic medical problems mediated the relationship between gender and utilization of medical and mental health services. Significant interaction effects of gender by depression, physical abuse, and HIV sero-status on utilization of medical services were found. Health (particularly mental health) care was under-utilized by both women and men, despite high rates of depression and chronic medical conditions. The finding of under-use of medical services by HIV-positive drug users (particularly by HIV-positive women) indicates a need for further efforts to engage all HIV-positive persons in care. The findings also indicate an on-going need for mental and other health services for drug users who have been victims of abuse.

Keywords

Utilization of health care; Gender; Puerto Rican drug users

1. Introduction

There is growing evidence that women and men differ in their drug use patterns, health status, and utilization of health care. Women usually begin their drug use at a later age than men, often being introduced by boyfriends or husbands (Inciardi et al., 1993). Drug-using women are also more likely than their male counterparts to have certain psychiatric or psychological problems (e.g., depression, anxiety) (Brown et al., 1995; 1999; Magura et al., 1998; Miles et al., 2002; Robles et al., 2006). Drug-using women who are HIV-positive report more HIV-related symptoms (Kang et al., 2008), more HIV medication side effects (Haug et al., 2005), more difficulties accessing health care (Lichtenstein, 2006), and more delays in initiating HIV treatment (Kang et al., 2008; McDonnell and Kessenich, 2000), than their male counterparts.

Contributors All authors contributed to and have approved the final manuscript. Dr. Kang conducted statistical analyses and wrote the first draft of the manuscript. Dr. Deren contributed to writing of subsequent drafts.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Conflict of Interest All authors declare that they have no conflicts of interest.

Findings of previous studies have pointed to several factors that may contribute to these gender differences. They include relationship variables such as sex partner characteristics (e.g., having a sex partner who is an injection drug user [IDU]), traumatic life experiences (e.g., sexual and physical abuse), mental illness, and other health problems (e.g., hepatitis C). A growing body of literature suggests that the drug use and health-related behaviors of women are often dependent on their relationships with men. For example, women are significantly more likely than men to use drugs with their partners (Miller and Neaigus, 2002) and to have partners who use drugs (Hser et al., 2004; Westermeyer and Boedicker, 2000).

More drug-using women than men report experiences of sexual or physical abuse. These experiences have been associated with high rates of psychiatric co-morbidity and non-adherence to health care regimens (Brady et al., 2002); in addition, they have been identified as inhibitory factors in utilization of health services, particularly among women (Lichtenstein, 2006).

Despite the increasing recognition of gender differences in health-related behaviors, there has been little examination of intervening or mediating factors in the relationships between gender and utilization of health care. How women and men with and without certain problems differ in terms of utilizing health services (interaction effects with gender) has also been little studied. This study examined factors mediating and moderating the relationship between gender and healthcare utilization. Factors examined in the present study are described in detail below.

2. Methods

2.1. Data and sample

The data analyzed in this paper were collected for a NIDA-funded study on determinants of HIV risk behaviors among Puerto Rican injection and non-injection heroin and/or cocaine users residing in New York (NY) and Puerto Rico (PR) in 1998-2003. Puerto Rican drug users have been identified as a group at especially high risk for HIV transmission (e.g., Diaz et al., 1993; Montoya et al., 1999), and for death due to HIV infection among US Hispanics (Selik, 2003).

All participants recruited in NY (N=1,200: 308 women and 892 men) were used for the present analysis. They met the following criteria for eligibility: (a) self-identification as Puerto Rican; (b) age 18 or older, and (c) recent use of heroin or cocaine (injected or not-injected). Urine samples were analyzed using Roche OnTrak to verify recent use of heroin and cocaine. HIV testing was also provided, with pre- and post-counseling. All participants in New York were recruited using targeted sampling methods (Watters and Biernacki, 1989; Sifaneck and Neaigus, 2001), based on ethnographic mapping of the recruitment sites to identify areas where drug users could be found. Targeted sampling has been identified as an efficient sampling method to reach "hidden" populations such as illicit drug users who usually would not be successfully reached via a random sampling procedure (Watters and Biernacki, 1989). Trained interviewers obtained informed consent before conducting Computer-Assisted Personal Interviews. The interviewers were bilingual in English and Spanish. Detailed information on the study protocol has previously been reported (Deren et al., 2003). The study protocol was approved by the National Development and Research Institutes Institutional Review Board.

2.2. Measures

The variables examined in this study included socio-demographic background (e.g., age, education, and birthplace), other individual characteristics (abuse experience and drug use history), relationship variables, mental and physical conditions, health insurance, and two

dependent variables (utilization of mental health services and utilization of medical services). Descriptions of the key variables are provided below.

2.2.1 Lifetime experience of abuse—This variable included both sexual and physical victimization during the respondent's lifetime. The abuse was measured by the following questions: (1) Had the respondent ever been forced into a sexual encounter (sexual abuse); and (2) Had the respondent ever been physically mistreated or hurt by a spouse, lover, ex-spouse, or ex-lover (physical abuse). All variables were coded: no (0) vs. yes (1).

2.2.2. Drug use—Injection drug use (ever and prior 30 days), non-injected crack use (ever and prior 30 days), age first injected drugs, and age first smoked crack use, were used. Injection and non-injection drug use were dichotomized: no (0) vs. any use (1).

2.2.3. Relationship variables—Two relationship variables were used: living with a spouse and having IDU sex partners. Each was coded as 0 (no) vs. 1 (yes).

2.2.4. Mental condition—Mental health status was measured by the Center for Epidemiologic Studies Depression Scale (Radloff, 1977), which assesses symptoms of depression during the past week. This scale, which has been utilized in many studies (e.g., Kim et al., 2007; Roberts and Vernon, 1983; Sullivan et al., 2008), has been shown to have high internal consistency and validity (Radloff, 1977). The scale is composed of 20 items. The score for each item ranges from 0 (rarely or none of the time) to 3 (most of the time). The total depression score was first computed, and the score was dichotomized (less than 16 vs. 16 or higher) to assess depression symptomatology (or depressive symptoms). In multiple logistic regression analysis, in testing depression-by-gender interactions, the total depression score was centered prior to multiplying it with gender, as recommended by Baron and Kenny (1986) for a continuous variable.

2.2.5. Medical condition—Measures of physical health status included the following items: (1) chronic medical problems; (2) self-rated global health (excellent/good vs. fair/poor); (3) HIV sero-status; and (4) history of tuberculosis, hepatitis B or C, and/or sexually transmitted infections (STIs). STIs included gonorrhea, syphilis, genital herpes, and genital warts. Items (1) and (4) were coded: no (0) vs. yes (1).

2.2.6. Health care utilization (dependent variables)—Utilization of health care was measured as follows: (1) utilization of in- or out-patient mental health services in the past 12 months; and (2) utilization of medical services, including in- or out-patient services in the past 12 months. The variables were coded: no (0) vs. yes (1).

2.3. Analysis

First, chi-square tests for categorical variables and t-tests for continuous variables were conducted to determine whether there were significant gender differences. Next, to test for mediation effects, logistic regression analyses were performed.

To determine whether the relationships between gender and utilization of mental health and medical care are due to an intervening (or mediating) variable, mediation tests were conducted. Variables that were included in the analyses as potential mediators of the relationships between gender and the dependent variables included lifetime experience of abuse (sexual and physical), injection drug use (ever), having an IDU sex partner, chronic medical problems, and HIV sero-status (Depression and living with a spouse were not used since they were measured in terms of current status [hypothetical causal relationships between these variables and the dependent variables, which are required for mediation tests, cannot be established]).

The following four steps in the causal process were necessary to establish a mediated relationship (Baron and Kenny, 1986; Kenny et al., 1998). At the first step, a logistic regression analysis was performed for each dependent variable (i.e., use of mental health services and use of medical services), with gender as the predictor. This step showed whether the odds of the dependent variable differed by gender. The second step, in which the mediator was treated as if it were a dependent variable, tested the relationship between the mediator and gender. At the third step, the dependent variable was regressed on the mediator, with gender presented in the model, to test whether a mediator has a significant effect on the odds of the dependent variable when gender is controlled. At the last step, the size of a gender difference in step 1 was compared with the size of the difference in step 3. To establish a mediated relationship, the magnitude of the relationship between gender and the dependent variable must be completely or substantially reduced by controlling for the mediator. Perfect mediation holds if gender has no effect when the mediator is controlled; partial mediation holds if gender has a substantially reduced but still significant effect.

This study also examined interaction effects of gender by potential moderators in the relationships with utilization of health care. The potential moderators that were examined included health insurance, lifetime experience of abuse, injection drug use, depression, chronic medical problems, HIV sero-status, living with a spouse, and having an IDU sex partner. A moderator variable is an independent variable that affects the direction and/or strength of the relationship between a focal independent variable and a dependent variable (Baron and Kenny, 1986). For example, when depression is present (or not present), women and men were compared in terms of use of medical services. Interaction effects between gender and the potential moderators in the relationship with each of the dependent variables were examined. Gender, potential moderators, and interaction terms (of gender and each of the potential moderator variables) were entered into a multiple logistic regression with backward stepwise elimination of variables. Health insurance was included in the model because of its direct relevance to services utilization.

3. Results

3.1. Socio-demographic characteristics by gender

Although the mean ages between women and men were similar (approximately 38), significant gender differences in other socio-demographic characteristics were found (Table 1). Men were significantly more likely than women to report GED/high school completion (45% vs. 27%, $p < .001$), to have been born in Puerto Rico (57% vs. 36%, $p < .001$), to have ever been incarcerated (89% vs. 71%, $p < .001$), and to be homeless (27% vs. 6%, $p < .001$).

3.2. Gender differences in individual characteristics, relationship variables, health conditions, and healthcare utilization

Women were more likely than men to report experiences of sexual abuse (37% vs. 6%) and physical abuse (54% vs. 14%) (Table 2). Of those who had been sexually abused, 55% of the women's cases and 74% of the men's cases happened at 18 years of age or younger (not shown in Table 2).

More men injected drugs, while more women used non-injected crack. Men began their injection drug use at an earlier age than women (20.6 vs. 23.1), while women smoked crack at earlier age than men (26.6 vs. 28.0). As seen in Table 2, women and men significantly differed in relationship characteristics: more women than men lived with a spouse (29% vs. 17%) and had an IDU sex partner (35% vs. 19%).

Table 2 also shows that women were more depressed, and more women than men reported having chronic medical problems and a lower rate of overall health. There was no significant difference between women and men in their reported history of other diseases including STIs (Table 2). As compared with men, however, more women tested HIV-positive (24% vs. 19%). As seen in Table 2, more women than men (79% vs. 67%) reported that they currently had health insurance (most were enrolled in Medicaid).

Use of mental health services in the prior year was low, although it was higher for women than for men (27% vs. 19%). Women also were more likely than men to have received medical services (77% vs. 69%).

3.3. Mediation tests

To determine whether the relationship between gender and utilization of health care may be mediated by intervening variables such as sexual abuse, mediation tests were conducted.

As a step toward establishing mediated relationships, significant relationships between gender and mediators are required. The results were shown in Table 2. Gender was found to be significantly related to all of the potential mediators, i.e., sexual abuse, physical abuse, injection drug use, having an IDU sex partner, having chronic medical problems, and HIV sero-status (Table 2).

As seen in Table 3, gender was found to be significantly associated with both health care utilization variables (use of mental health services [OR=1.66, $p<.001$] and use of medical services [OR=1.51, $p<.001$]). These significant associations were prerequisites for further tests to establish a mediated relationship. The results are summarized in Table 3. In all, six mediation tests were conducted for each of the two dependent variables.

3.3.1. Factors mediating the relationship between gender and use of mental health services—In the first mediation test, sexual abuse was added to the regression model that contained gender only, resulting in a significant effect for sexual abuse and loss of significance for gender in predicting use of mental health services. This result indicates that sexual abuse mediates the gender effect on the dependent variable. Similarly, a significant effect was seen after physical abuse was added to the regression model and the significance of gender was lost. As in the case of sexual abuse, physical abuse was found to mediate the relationship between gender and use of mental health services.

When chronic medical problems were added to the regression model, there was a significant effect on the utilization of mental health services; however, gender remained significant. On the other hand, the magnitude of the relationship between gender and the dependent variable was reduced (from OR=1.66 to OR=1.38). This indicates that having chronic medical problems is a partial mediator of gender effect on the dependent variable.

Table 3 also shows the variables that did not mediate utilization of mental health services. When history of injection drug use, having an IDU sex partner, and HIV sero-status were added (each separately) to the model, there were no significant effects on the utilization of mental health services; however, gender remained significant, indicating that these three variables are not mediators of the relationship between gender and the utilization of mental health services.

3.3.2. Factors mediating the relationship between gender and use of medical services—A significant effect of having chronic medical problems on use of medical services was seen; also, loss of significance for gender in predicting the dependent variable was found. This result indicates that having chronic medical problems is a mediator. When HIV sero-status was entered to the regression, gender remained significant; however, the magnitude of the

gender effect was reduced. The finding showed a partial mediation effect for this variable on use of medical services.

As seen in Table 3, sexual abuse, physical abuse, injection drug use, and having an IDU sex partner had no significant effects on use of medical services, and gender remained significant, indicating that these four variables do not mediate the relationship between gender and the utilization of medical services.

3.4. Multiple logistic regression of healthcare utilization

Multivariate relationships between independent variables on each of the dependent variables were examined (Table 4). The independent variables examined included gender, health insurance, experience of abuse (sexual and physical), injection drug use, depression, chronic medical problems, HIV sero-status, living with a spouse, and having an IDU sex partner. In addition, nine interaction effects were examined, for gender by each of the same variables.

3.4.1. Utilization of mental health services—Health insurance, sexual abuse, depression, and chronic medical problems were significantly related to use of mental health services (AOR=2.81; AOR=1.51; AOR=1.07; AOR=2.96, respectively). Injection drug use was moderately ($p<.06$) related to the dependent variable. A moderate interaction effect of gender by depression on utilization of mental services was also found. Further analysis (not presented in the Table) showed that: when high depression (higher than one standard deviation above the mean) was present, women were less likely than men to use mental health services (27% vs. 37%, $p=ns$); when depression was not present, more women than men received mental health services (27% vs. 16%, $p<.001$).

3.4.2. Utilization of medical services—Table 4 shows that health insurance, depression, chronic medical problems, HIV ser-status, and living with spouse were significantly related to utilization of medical services (AOR=2.30; AOR=1.04; AOR=2.61; AOR=4.89; AOR=1.82, respectively). Also significantly related to this dependent variable were three interaction effects of gender by depression, physical abuse, and HIV sero-status. These interaction effects indicated differential gender effects of these variables in relation to utilization of medical services. For example, further analyses showed that when depression was not present, women were more likely than men to receive medical services (77% vs. 68%, $p\leq.01$), whereas no significant gender difference was found when high depression was present (77% vs. 78%, $p=ns$). Similarly, HIV-positive women were less likely than HIV-positive men to receive medical services (72% vs. 83%, $p<.05$), whereas HIV-negative women were more likely than HIV-negative men to use the services (72% vs. 66%, $p\leq.001$). Another finding was a differential gender effect of physical abuse on utilization of medical services (as compared to men with physical abuse, women with physical abuse tended to receive more medical services [71% vs. 80%, $p=.09$]).

4. Discussion

The present study found that women and men drug users differ significantly in experiences of abuse, relationship characteristics, and mental and other health conditions. The findings that drug-using women, compared with drug-using men, were more depressed and that more of them had serious, chronic physical conditions are consistent with those often reported in the literature (e.g., Brown et al., 1999; Miles et al., 2002). The findings that drug-using women were more likely than drug-using men to live with a spouse and to have an IDU sex partner have also been documented elsewhere (Hser et al., 2004; Westermeyer and Boedicker, 2000).

Higher percentages of women, as compared with men, reported that they utilize mental and medical health services. Despite the high prevalence of depression, utilization of mental health

services was low for both women and men. A low rate of mental health services utilization might, in part, be attributable to the stigma attached to mental illness (Dinos et al., 2004; Givens et al., 2007) as well as to gaps in insurance coverage for mental health care, as distinguished from medical care. Not surprisingly, health insurance was found to be a significant factor in the utilization of health care.

Both sexual abuse and physical abuse mediated the relationship between gender and utilization of mental health services. Most respondents with a history of abuse also reported that it occurred before they reached age 18. Many studies have shown the adverse impacts of abuse experiences (particularly in childhood) on later deviant behaviors (e.g., substance abuse, criminal involvement) (Smith and Thornberry, 1995), drug treatment outcomes (Kang et al., 1999), and use of HIV medications (Kang et al., 2008). However, the traumatic experiences in the present study were positively related to utilization of health services. These findings may indicate that, among drug users who have been victims of abuse, the need for health care in general, and mental health services in particular, is both ongoing and unmet.

Chronic medical problems were directly related to utilization of mental health and medical services. The findings indicated the presence of a bidirectional relationship between mental health and chronic medical illness, as shown by other studies (e.g., Katon, 2003; Katon et al., 2007; Miller et al., 2007). Having chronic medical problems mediated the relationship between gender and use of medical services.

Differential gender effects of depression, physical abuse, and HIV sero-status on the utilization of medical services were found. Further analysis found that HIV-positive women were significantly less likely than HIV-positive men to utilize medical health services, whereas among those who were HIV-negative, more women than men received medical services. Of great concern was that 17% of HIV-positive men and 28% of HIV-positive women reported no use of medical services in the past year. The noteworthy gender-by-depression interaction effects on use of mental health and medical services suggest that treating drug-using women for depression (and perhaps also for other mental health problems) might lead to over-all improvement in their health.

The findings of this study must be interpreted in light of its potential limitations. All of the data (except for HIV-testing and urinalysis for verifying recent use of cocaine and heroin) were obtained by self report, which could result in under- or over-reporting. Since the findings are based on a sample of Puerto Rican drug users, the results may not be generalizable to other populations. Another limitation is that cross-sectional analyses of the data might not suffice to support the causal interpretation of the associations. Other limitations of the data include the lack of information about quality of health care services, mental health problems other than depression, and beliefs and roles related to gender. In addition, the measures of abuse were limited.

Despite these limitations, several important findings emerge from this study. First is the finding that health (particularly mental health) care was under-utilized by both women and men in this population, even though their depression and chronic medical problems indicated a high level of need. This suggests that drug users of both sexes might benefit from educational efforts to promote the use of mental/medical health services. The finding of under-use of medical services by HIV-positive drug users (particularly by HIV-positive women) indicates a need for further efforts to engage all HIV-positive persons in care. Another important finding is that a history of sexual and/or physical abuse mediates the relationship between gender and healthcare utilization. This indicates that interventions to prevent and treat these traumatic experiences might lead to the overall improvement of health status or care in this population. This study also showed the benefits of using mediation and moderation analyses to better understand the

mechanism through which the initial variable affects the outcome variable (i.e., the relationship between gender and use of health care services). For example, in examining interaction effects, women and men were found to differ in terms of use of medical services, with or without presence of depression and HIV+. It is unlikely findings such as these would have been revealed without the use of mediation and moderation analyses.

Acknowledgements

An early version has been presented at the American Public Health Association Annual Meeting in San Diego in October, 2008. The authors would like to thank Dr. Charles Cleland for his statistical assistance for the analyses presented in this manuscript.

Role of Funding Source This research was supported by National Institute on Drug Abuse (NIDA) Grant # R03DA022918. Data used were obtained from a project funded by the same Institute, Grant No. R01DA10425. NIDA had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; or in the decision to submit the paper for publication.

REFERENCES

- Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical consideration. *J. Pers. Soc. Psychol* 1986;51:1173–1182. [PubMed: 3806354]
- Brady S, Gallagher D, Berger J, Vega M. Physical and sexual abuse in the lives of HIV-positive women enrolled in a primary medicine health maintenance organization. *AIDS Patient Care STDs* 2002;16:121–125. [PubMed: 11945208]
- Brown LK, Schultz JR, Gragg RA. HIV-infected adolescents with hemophilia: Adaptation and coping. The hemophilia behavioral intervention evaluation project. *Pediatrics* 1995;96:459–463. [PubMed: 7651778]
- Brown V, Melchior L, Huba GJ. Level of burden among women diagnosed with severe mental illness and substance abuse. *J. Psychoactive Drugs* 1999;31:31–40. [PubMed: 10332636]
- Deren S, Oliver-Velez D, Finlinson A, Robles R, Andia JF, Colón HM, Kang S-Y, Shedlin M. Integrating qualitative and quantitative methods: Comparing HIV-related risk behaviors among Puerto Rican drug users in Puerto Rico and New York. *Subst Use Misuse* 2003;38:1–24. [PubMed: 12602804]
- Diaz T, Buehler J, Castro K, Ward J. AIDS trends among Hispanics in the United States. *Am. J. Public Health* 1993;83:504–509. [PubMed: 8384802]
- Dinos S, Stevens S, Serfaty M, Weich S, King M. Stigma: the feelings and experiences of 46 people with mental illness. Qualitative study. *Br. J. Psychiatry* 2004;184:176–181. [PubMed: 14754832]
- Givens JL, Katz IR, Bellamy S, Holmes WC. Stigma and the acceptability of depression treatments among African Americans and whites. *J. Gen. Intern. Med* 2007;22:1292–1297. [PubMed: 17610120]
- Haug NA, Sorensen JL, Lollo ND, Gruber VA, Delucchi KL, Hall SM. Gender differences among HIV-positive methadone maintenance patients enrolled in a medication adherence trial. *AIDS Care* 2005;17:1022–1029. [PubMed: 16176898]
- Hser YI, Huang Y-C, Teruya C, Anglin MD. Gender differences in treatment outcomes over a three-year period: A path model analysis. *J. Drug Issues* 2004;34:419–440.
- Inciardi, J.; Lockwood, D.; Pottieger, A. *Women and crack-cocaine*. Macmillan; New York: 1993.
- Kang S-Y, Goldstein MF, Deren S. Gender differences in health status and care among HIV-infected minority drug users. *AIDS Care* 2008;20:1146–1151. [PubMed: 18608064]
- Kang S-Y, Magura S, Laudet A, Whitney S. Adverse effects of child abuse victimization among substance-using women in treatment. *J. Interpersonal Violence* 1999;14:657–670.
- Katon WJ. Clinical and health services relationships between major depression, depressive symptoms, and genera; illness. *Biol. Psychiatry* 2003;54:216–226. [PubMed: 12893098]
- Katon W, Lin EH, Kroenke K. The association of depression and anxiety with medical symptom burden in patients with chronic medical illness. *Gen. Hosp. Psychiatry* 2007;29:147–155. [PubMed: 17336664]

- Kenny, DA.; Kashy, DA.; Bolger, N. Data analysis in social psychology. In: Gilbert, DT.; Fiske, ST.; Lindzey, G., editors. *The Handbook of social psychology*. McGraw Hill; Boston, MA: 1998. p. 233-265.
- Kim TW, Palepu A, Cheng DM, Libman H, Saitz R, Samet JH. factors associated with discontinuation of antiretroviral therapy in HIV-infected patients with alcohol problems. *AIDS care* 2007;19:1039–1047. [PubMed: 17852002]
- Lichtenstein B. Domestic violence in barriers to health care for HIV-positive women. *AIDS Patient Care STDS* 2006;20:122–132. [PubMed: 16475893]
- Magura S, Kang S-Y, Rosenblum A, Handelsman L, Foote J. Gender differences in psychiatric comorbidity among cocaine-using opiate addicts. *J. Addict. Dis* 1998;17:49–61. [PubMed: 9789159]
- McDonnell M, Kessenich CR. HIV/AIDS and women. *Lippincotts Prim. Care Pract* 2000;4:66–73. [PubMed: 11022520]
- Miles D, Kulstad J, Haller DL. Severity of Substance Abuse and psychiatric problems among perinatal drug-dependent women. *J. Psychoactive Drugs* 2002;34:339–346. [PubMed: 12562101]
- Miller DK, Constance HL, Brennan PA. Health outcomes related to early adolescent depression. *J. Adolesc. Health* 2007;41:256–262. [PubMed: 17707295]
- Miller M, Neaigus A. Sex partner support, drug use and sex risk among HIV-negative non- injecting heroin users. *AIDS Care* 2002;14:801–813. [PubMed: 12511213]
- Montoya ID, Bell DC, Richard AJ, Carlson JW, Trevino RA. Estimated HIV risk among Hispanics in a national sample of drug users. *J. Acquir. Immune Defic. Syndr* 1999;21:21–50.
- Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl. Psychol. Measurement* 1977;1:385–401.
- Roberts RE, Vernon SW. The Center for Epidemiologic Studies Depression Scale: Its use in a community sample. *Am. J. Psychiatry* 1983;140:41–46. [PubMed: 6847983]
- Robles RR, Matos TD, Deren S, Colón HM, Sahai H, Marrero C, Reyes J, Andia J, Shepard E. Drug treatment disparities among Hispanic drug-using women in Puerto Rico and New York City. *Health Policy* 2006;75:159–169. [PubMed: 16338479]
- Selik, RM. Comparisons of rates of death due to HIV disease among U.S. Hispanics of different national origins in 2000. Paper presented at the National HIV Prevention Conference; Atlanta, Georgia. Jul. 2003
- Sifanek SJ, Neaigus A. The ethnographic accessing, sampling and screening of hidden populations: Heroin sniffers in New York City. *Addict. Res. Theory* 2001;9:519–543.
- Smith C, Thornberry TP. The relationship between childhood maltreatment and adolescent involvement in delinquency. *Criminology* 1995;33:451–481.
- Sullivan LE, Saitz R, Cheng DM, Libman H, Nunes D, Samet JH. The impact of alcohol use on depressive symptoms in human immunodeficiency virus-infected patients. *Addiction*. Jul 10;2008 [Epub ahead of print]
- Watters J, Biernacki P. Targeted sampling: Options for the study of hidden populations. *Soc. Problems* 1989;36:416–430.
- Westermeyer J, Boedicker AE. Course, severity, and treatment of substance abuse among women versus men. *Am. J. Drug Alcohol Abuse* 2000;26:523–535. [PubMed: 11097190]

Table 1

Socio-demographic characteristics by gender

	Women (N=308)	Men (N=892)	p
Age (mean; SD)	37.9 (6.7)	37.7 (8.0)	ns
≥ GED/High school completion	27%	45%	<.001
Born in Puerto Rico	36%	57%	<.001
Ever in jail/prison	71%	89%	<.001
Homeless *	6%	27%	<.001

* Living on the streets or in a shelter

Table 2

Gender differences in individual characteristics, relationship variables, health conditions, and healthcare utilization

	Women (N=308)	Men (N=892)	p
Abuse experience:			
Sexual abuse (ever) ^a	37%	6%	<.001
Physical abuse (ever) ^a	54%	14%	<.001
Drug use history:			
Injection drug use (IDU) (ever) ^a	65%	83%	<.001
Current IDU (prior 30 days)	52%	73%	<.001
Non-injected crack use (ever)	90%	81%	<.01
Non-injected crack use (prior 30 days)	75%	57%	<.001
Age first injected (mean, SD)	23.1 (7.6)	20.6 (6.6)	<.001
Age first smoked crack (mean, SD)	26.6 (7.3)	28.0 (8.7)	<.05
Relationship variables:			
Living with a spouse	29%	17%	<.001
Had an IDU sex partner ^{a,b}	35%	19%	<.001
Mental/physical conditions:			
Depression (mean, SD)	27.7 (13.5)	22.2 (12.5)	<.001
Depression symptomatology ^c	81%	69%	<.001
Chronic medical problems ^a	60%	47%	<.001
Overall health status (fair or poor)	50%	36%	<.001
TB	37%	42%	ns
Hepatitis B/C	41%	47%	ns
STI	50%	47%	ns
HIV+ ^a	24%	19%	<.05
Health insurance:			
Yes (currently)	79%	67%	<.001
Healthcare utilization ^b :			
Mental health services	27%	19%	<.01
Medical services	77%	69%	<.01

^aUsed as potential mediators.^bPrior year.^cThe CES-D total score was dichotomized: less than 16 (0) vs. 16 or higher (1).

Table 3Mediation tests^a

	Use of mental health services		Use of medical services	
	Odds ratio	p	Odds ratio	p
Gender (1=male; 2=female)	1.66	.00	1.51	.00
Mediation test:				
Gender	1.31	.11	1.44	.03
Sexual abuse	1.81	.00	1.18	.43
Mediation test:				
Gender	1.34	.09	1.41	.04
Physical abuse	1.51	.02	1.20	.29
Mediation test:				
Gender	1.55	.01	1.50	.01
Injection drug use (ever)	.86	.37	1.00	.98
Mediation test:				
Gender	1.55	.01	1.51	.01
Had an IDU sex partner ^b	1.20	.28	.93	.64
Mediation test:				
Gender	1.38	.04	1.33	.08
Chronic medical problems	3.80	.00	2.89	.00
Mediation test:				
Gender	1.56	.01	1.42	.03
HIV+	1.36	.08	1.75	.00

^aTo determine which variables mediate the relationship between healthcare utilization and gender, logistic regressions were performed with other variables added to the regression model.

^bIn the past year.

Table 4

Multiple logistic regression of healthcare utilization

	Use of mental health services			Use of medical services		
	AOR	95% CI	p	AOR	95% CI	p
Health insurance	2.81	1.87-4.22	.00	2.30	1.73-3.07	.00
Sexual abuse	1.51	1.02-2.22	.04	-	-	-
Physical abuse	-	-	-	.42	.16-1.12	.08
Injection drug use	.71	.50-1.02	.06	-	-	-
Depression	1.07	1.03-1.11	.00	1.04	1.01-1.08	.02
Chronic medical problems	2.96	2.12-4.12	.00	2.61	1.94-3.52	.00
HIV +	-	-	-	4.89	1.72-13.88	.00
Living with spouse	-	-	-	1.82	1.25-2.65	.00
Gender x depression	.98	.95-1.00	.06	.97	.95-1.00	.03
Gender x physical abuse	-	-	-	2.01	1.09-3.71	.03
Gender x HIV +	-	-	-	.32	.16-.64	.00

Note: Multivariate logistic regression analysis with backward stepwise procedure was used. Variables entered on step 1 were: gender, health insurance, sexual abuse, physical abuse, injection drug use, depression, chronic medical problems, HIV sero-status, living with a spouse, having an IDU sex partner, and nine interaction terms (gender by each of the same variables).